行政院所屬各機關因公出國人員出國報告

（出國類別：研究）

參與「建構SARS與新興傳染病偵測與疫情調查」心得報告

服務機關：衛生署疾病管制局

出國人職稱：薦任技正

姓名：吳俊賢

出國地區：美國喬治亞州

出國期間：九十二年十月廿七日　至

九十三年四月廿七日

報告日期：九十三年五月廿七日

系統識別號:C09203600

公 務 出 國 報 告 提 要

頁數: 51　含附件: 是

報告名稱:

生物戰及新興與再浮現傳染病

主辦機關:

行政院人事行政局

聯絡人／電話:

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出國人員:

吳俊賢　行政院衛生署　行政院衛生署疾病管制局　薦任技正

出國類別: 研究

出國地區: 美國

出國期間: 民國 92 年 10 月 27 日 -民國 93 年 04 月 27 日

報告日期: 民國 93 年 07 月 22 日

分類號/目: J4／公共衛生、檢疫　J4／公共衛生、檢疫

關鍵詞: SARS,新興傳染病,偵測,疫情調查

內容摘要: 二〇〇三年春天，變種的冠狀病毒造成香港、中華人民共合國、新加坡、加拿大與中華民國等國新興的嚴重急性呼吸道症候群的疫情，也喚醒了民眾對新興及再浮現傳染病的認知與警覺。近年來的禽流感、重症流行性感冒、登革出血熱、瘧疾、肺結核、愛滋病與人類免疫缺失病毒感染、庫賈氏症、西尼羅腦炎等傳染性疾病，不論屬於新興傳染病或屬於再浮現傳染病，都造成了不可估計之社會的、經濟的與健康的衝擊。而在恐怖主義的環伺之下，生物恐怖之疑慮，更是方興未艾。有鑑於此，流行病學家與統計學家，莫不期盼藉由建立完整的偵測與資料收集系統，建立以數學模式來量化傳染病的傳染動力學與防治的方法，並評估防治的成本效益的方法，協助傳染病防治政策的建立、評估與修正。　本「建構SARS與新興傳染病偵測與疫情調查」研究計畫出國進修的時間爲2003年10月27日至4月27日，假美國疾病管制及預防中心舉行。研究計畫主題爲新興及再浮現傳染病與生物戰偵測，因適逢嚴重急性呼吸道症候群的疫情，故於溝通協調過程中就著眼於以剛剛發生不久的嚴重急性呼吸道症候群爲優先研習的項目，進而學習對生物戰偵測之分析。研習過程分爲五大主題：一、參與美國疾病管制與預防中心建構SARS、突發、不明原因疫病與新興傳染病偵測與疫情調查資料庫管理系統與接觸者追蹤資料庫管理系統之建立；學習疫情調查分析方式與疫情調查：介紹美國疾病管制及預防中心開發之「突發疫情管理系統」（Outbreak Management System, OMS），透過統一化的欄位型態、格式與長度，可因應突發疫情立即擴充與修改，兼俱有條碼列印功能，並可在膝上型及口袋型電腦執行，透過安全網路傳送彙整於中心的統一資料庫供統計分析之用。；二、學習美國疾病管制中心生物感應偵測系統（BioSense）與症候群偵測系統（Syndromic Surveillance）之建構與分析：介紹生物感應偵測系統（BioSense）建製之緣由，前述系統

係由「丟入式通報偵測（Dropping Surveillance）」、「快速突發疫情偵測系統（Rapid Outbreak Detection System, RODS）」、「生物風暴（BioStorm）」、「實驗室應變網路（Lab Response Network, LRN）」、「生物監測系統（BioWatch）」等演變而來，同時介紹症候群偵測系統偵測目的及實際應用狀況；三、參與國際新興傳染病研討會（ICEID），研習新興及再浮現傳染病、生物戰之偵測、疫情調查與應變處理；四、研習傳染病與新興傳染病數學模式之建立；五、建立與該國之良好合作與互動關係。　　感謝行政院人事行政局提供筆者參與「建構SARS與新興傳染病偵測與疫情調查」短期研究計畫之機會，習後八點建議事項爲：一、建構我國「因應突發疫情之網路套餐問卷資料庫」，以解決衛生局（所）公共衛生人力與防疫人力因爲頻於流動所造成的疫情調查經驗與統計分析技術無法延續、疫情調查資料難以即時流通與整合的問題。二、提供多元化教育訓練，建置e-learning自學教育訓練系統。將重要的不明原因疫情調查案例蒐集彙整，改寫成爲教案，供流行病學訓練班學員、公共衛生防疫人力、疫情調查備援人力與有志參與防疫工作的人員可以循序漸進的學習不明原因疫情調查工作如何進行。三、派駐疫情調查與公共衛生人員至鄰近與需要協助的國家，以訓練我國防疫人員偵測與調查分析之能力，並建立長久之合作機制，強化我國與國際間之疫病偵測與處理應變網路；四、建立國內公共衛生人員資料庫，並設立遠距會議系統；五、整合實驗室專長，建構我國不明原因疫病之快速檢驗能力；六、強化國內合作；七、選擇國家重點方針；八、拓展國際交流。

本文電子檔已上傳至出國報告資訊網

摘　要

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二〇〇三年春天，變種的冠狀病毒造成香港、中華人民共合國、新加坡、加拿大與中華民國等國新興的嚴重急性呼吸道症候群的疫情，也喚醒了民眾對新興及再浮現傳染病的認知與警覺。近年來的禽流感、重症流行性感冒、登革出血熱、瘧疾、肺結核、愛滋病與人類免疫缺失病毒感染、庫賈氏症、西尼羅腦炎等傳染性疾病，不論屬於新興傳染病或屬於再浮現傳染病，都造成了不可估計之社會的、經濟的與健康的衝擊。而在恐怖主義的環伺之下，生物恐怖之疑慮，更是方興未艾。有鑑於此，流行病學家與統計學家，莫不期盼藉由建立完整的偵測與資料收集系統，建立以數學模式來量化傳染病的傳染動力學與防治的方法，並評估防治的成本效益的方法，協助傳染病防治政策的建立、評估與修正。

本「建構 SARS 與新興傳染病偵測與疫情調查」研究計畫出國進修的時間為 2003 年 10 月 27 日至 4 月 27 日，假美國疾病管制及預防中心舉行。研究計畫主題為新興及再浮現傳染病與生物戰偵測，因適逢嚴重急性呼吸道症候群的疫情，故於溝通協調過程中就著眼於以剛剛發生不久的嚴重急性呼吸道症候群為優先研習的項目，進而學習對生物戰偵測之分析。研習過程分為五大主題：一、參與美國疾病管制與預防中心建構 SARS、突發、不明原因疫病與新興傳染病偵測與疫情調查資料庫管理系統與接觸者追蹤資料庫管理系統之建立；學習疫情調查分析方式與疫情調查：介紹美國疾病管制及預防中心開發之「突發疫情管理系統」(Outbreak Management System, OMS)，透過統一化的欄位型態、格式與長度，可因應突發疫情立即擴充與修改，兼俱有條碼列印功能，並可在膝上型及口袋型電腦執行，透過安全網路傳送彙整於中心的統一資料庫供統計分析之用。；二、學習美國疾病管制中心生物感應偵測系統（BioSense）與症候群偵測系統（Syndromic Surveillance）之建構與分析：介紹生物感應偵測系統（BioSense）建製之緣由，前述系統係由「丟入式通報偵測（Dropping Surveillance）」、「快速突發疫情偵測系統（Rapid Outbreak Detection

System, RODS）」、「生物風暴（BioStorm）」、「實驗室應變網路（Lab Response Network, LRN）」、「生物監測系統（BioWatch）」等演變而來，同時介紹症候群偵測系統偵測目的及實際應用狀況；三、參與國際新興傳染病研討會（ICEID），研習新興及再浮現傳染病、生物戰之偵測、疫情調查與應變處理；四、研習傳染病與新興傳染病數學模式之建立；五、建立與該國之良好合作與互動關係。

感謝行政院人事行政局提供筆者參與「建構 SARS 與新興傳染病偵測與疫情調查」短期研究計畫之機會，習後八點建議事項為：一、建構我國「因應突發疫情之網路套餐問卷資料庫」，以解決衛生局（所）公共衛生人力與防疫人力因為頻於流動所造成的疫情調查經驗與統計分析技術無法延續、疫情調查資料難以即時流通與整合的問題。二、提供多元化教育訓練，建置 e-learning 自學教育訓練系統。將重要的不明原因疫情調查案例蒐集彙整，改寫成為教案，供流行病學訓練班學員、公共衛生防疫人力、疫情調查備援人力與有志參與防疫工作的人員可以循序漸進的學習不明原因疫情調查工作如何進行。三、派駐疫情調查與公共衛生人員至鄰近與需要協助的國家，以訓練我國防疫人員偵測與調查分析之能力，並建立長久之合作機制，強化我國與國際間之疫病偵測與處理應變網路；四、建立國內公共衛生人員資料庫，並設立遠距會議系統；五、整合實驗室專長，建構我國不明原因疫病之快速檢驗能力；六、強化國內合作；七、選擇國家重點方針；八、拓展國際交流。

目　次

目　　的

「建構ＳＡＲＳ與新興傳染病偵測與疫情調查」出國報告

壹、目的：

一、 學習美國疾病管制中心生物感應偵測系統（BioSense）與症候群偵測系統（Syndromic Surveillance）之建構與分析。

二、 參與美國疾病管制與預防中心建構 SARS、突發、不明原因疫病與新興傳染病偵測與疫情調查資料庫管理系統與接觸者追蹤資料庫管理系統之建立；學習疫情調查分析方式與疫情調查。

三、 參與國際新興傳染病研討會（ICEID），研習新興及再浮現傳染病、生物戰之偵測、疫情調查與應變處理。

四、 研習傳染病與新興傳染病數學模式之建立。

五、 建立與該國之良好合作與互動關係。

前　言

貳、前言

二〇〇三年春天，變種的冠狀病毒—嚴重急性呼吸道症候群病毒（SARS-CoV）造成香港、中華人民共合國、新加坡、加拿大與中華民國等國新興的嚴重急性呼吸道症候群（Severe Acute Respiratory Syndrome, SARS）疫情，除了造成人民健康的危害、心靈的創傷、政治的不安與經濟的損失之外，也喚醒了民眾對新興及再浮現傳染病的認知與警覺。

歷史的經驗告訴我們，除了新興及再浮現傳染病外，基因重組後的新型病毒，如流行性感冒，將可能是造成大量健康危害的可怕致病原。近年來的嚴重急性呼吸道症候群、禽流感、重症流行性感冒、登革出血熱、瘧疾、肺結核、愛滋病與人類免疫缺失病毒感染、庫賈氏症、西尼羅腦炎等傳染性疾病，不論屬於新興傳染病或屬於再浮現傳染病，都造成了不可估計之社會的、經濟的與健康的衝擊。這些具有傳染性的生物性物質，伴隨著人類直接或間接、蓄意或無意的行為，而擴張其生命版圖，造成人類生命與健康的威脅。氣候變遷、交通普及與自由化、都市化、去森林化，迫使致病原不得不擴張其生命版圖，以求生存，卻也使新興及再浮現傳染病的問題，成為眾所矚目的一環。

而在九一一事件與炭疽粉末郵件攻擊事件爆發之後，在恐怖主義的環伺之下，生物恐怖之疑慮，更是方興未艾。回首人類的疫病史，新興傳染病與生物事件造成的死傷人數，遠超過戰爭折損的人數，可見新興傳染病與生物事件對於人類健康的重要性。有鑑於此，流行病學家、數理學家、決策分析專家與統計學家，莫不期盼藉由建立完整的偵測與資料收集系統，透過建立預測模式以分析可能發生的、或正在發生中的生物事件，以求早期發現、立即阻斷流行；或以數學模式來量化傳染病的傳染動力學與防治的方法，並評估防治的成本效益的方法，協助傳染病防治政策的建立、評估與修正。

目前美國疾病管制中心所使用的偵測系統乃是整合早期由國防

部所發起的即時性重要都會區生物性感染物質偵測系統（BioWatch）、急診與救護車偵測系統、生物感應偵測系統（BioSense），整合症候群偵測系統，進行不明原因疫情、疑似生物事件與與圖發疫情流行之偵測。

美國在西元二〇〇三年的嚴重急性呼吸道症候群雖然受創不深，但因應國際流動日益頻繁，為了防範嚴重急性呼吸道症候群入侵美國，仍仍毅然決然地投入大量的人力與資源建構突發疫情管理系統，將猴痘、嚴重急性呼吸道症候群與新興傳染病偵測與疫情調查納入統一的法定傳染病疫情調查資料庫中，透過整合式的資料庫，協助衛生主管機關有效運用有限的資源，在最需要的傳染病與正確的防治措施上。

過　程

參、過程

本「建構 SARS 與新興傳染病偵測與疫情調查」研究計畫出國進修的時間為 2003 年 10 月 27 日至 4 月 27 日，假美國疾病管制及預防中心舉行。研究計畫主題為新興及再浮現傳染病與生物戰偵測，因適逢嚴重急性呼吸道症候群的疫情，故於溝通協調過程中就著眼於以剛剛發生不久的嚴重急性呼吸道症候群為優先研習的項目，進而學習對生物戰偵測之分析。

一、 參與美國疾病管制與預防中心建構 SARS、突發、不明原因疫病與新興傳染病偵測與疫情調查資料庫管理系統與接觸者追蹤資料庫管理系統之建立；學習疫情調查分析方式與疫情調查。

美國疾病管制及預防中心早於九〇年代，就為因應第一線疫情調查分析與營養學健康分析之需而開發一套 Dos 版兼俱有建立疫情調查資料庫與常用流行病學統計分析功能的調查分析軟體—Epi Info。美國疾病管制及預防中心除了提供該軟體免費使用版權之外，更積極推廣 Epi Info 至各國的衛生人員與疫情調查人員使用。隨著時代與電腦應用系統的演進，於西元二〇〇〇年改版為視窗版的 Epi Info，新增進階的存活分析功能、高階的地理資訊分析功能、同時於西元二〇〇三年強化繪圖分析與多國語言功能，至此功能已漸臻完備，具有問卷設計、資料庫建立、統計分析、繪圖與報表製作的功能。

西元二〇〇三年春天爆發的嚴重急性呼吸道症侯群與同年年中發生的猴痘人類個案聚集等兩個疫情，嚴重地衝擊了美國疾病管制及預防中心及各州郡衛生部門的全國性疫情偵測、疫情調查與研究分析能力。因此，美國疾病管制及預防中心轄下之國家傳染病防治中心立即召集各州衛生部共同開發一套單一疫情調查系統，透過統一化的欄位型態、格式與長度，可因應突發疫情立即擴充與修改，兼俱有條碼

列印功能，並可在膝上型及口袋型電腦執行，透過安全網路傳送彙整於中心的統一資料庫供統計分析之用，本系統稱之為突發疫情管理系統（Outbreak Management System, OMS）。在突發疫情管理系統剛開發完成初期，部份的州郡衛生部門並不願意開放其疫情調查資料提供美國疾病管制及預防中心參考使用，導致難以一窺疫情全貌之憾，嚴重急性呼吸道症侯群與猴痘人類個案聚集疫情間接促成了衛生部門，開始體認到單一疫情調查系統對於全面防疫的重要性。

在嚴重急性呼吸道症侯群肆虐我國的時侯，我國同樣也面臨與美國相同的困境。在筆者抵達美國疾病管制及預防中心之時，適逢美國疾病管制及預防中心正在建構突發疫情管理系統，規劃將猴痘、嚴重急性呼吸道症侯群納入本疫調系統中，而要求筆者參與協助規劃突發疫情管理系統，貢獻筆者在我國遭受嚴重急性呼吸道症侯群疫情時參與疫情調查分析工作的經驗。

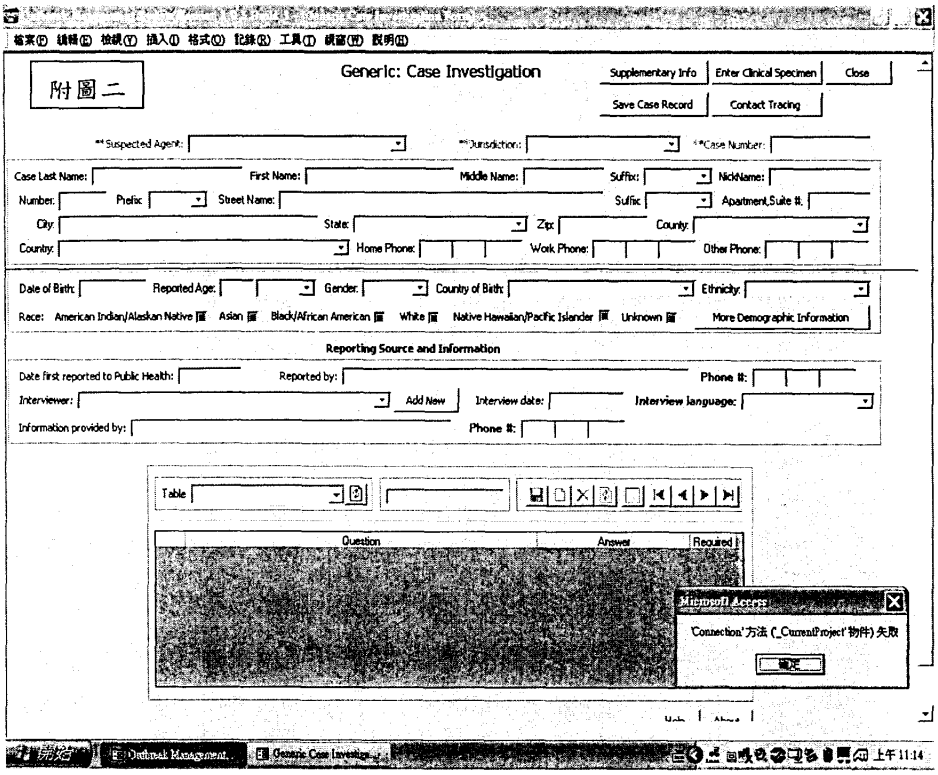
美國疾病管制中心的突發疫情管理系統是一套可以架構於單機作業，同時也可以透過 MSDE 或 Microsoft SQL Server 2000 版，經由網路安全機制與美國疾病管制中心的中央資料庫連線傳輸疫情調查資料庫，以維持中央資料庫的完整與統一。突發疫情管理系統所需消耗的軟硬體的資源要求很低（如附表一），因此可以很容易地在手持電腦或膝上型電腦中操作使用，待完成疫情調查回到辦公室後，上網傳送疫情調查資料庫同步至中央資料庫（如附圖一），可兼顧行動性與便利性。

附表一、OMS Version 1.0.X 系統軟硬體需求	
作業系統	Microsoft Windows Professional Workstation / Server / Advanced Server 2000 / XP
軟體	Microsoft Office Professional 2000 / XP Microsoft SQL Server 2000 SP3 (preferred) Microsoft Data Engine (MSDE 1.0 SP3)

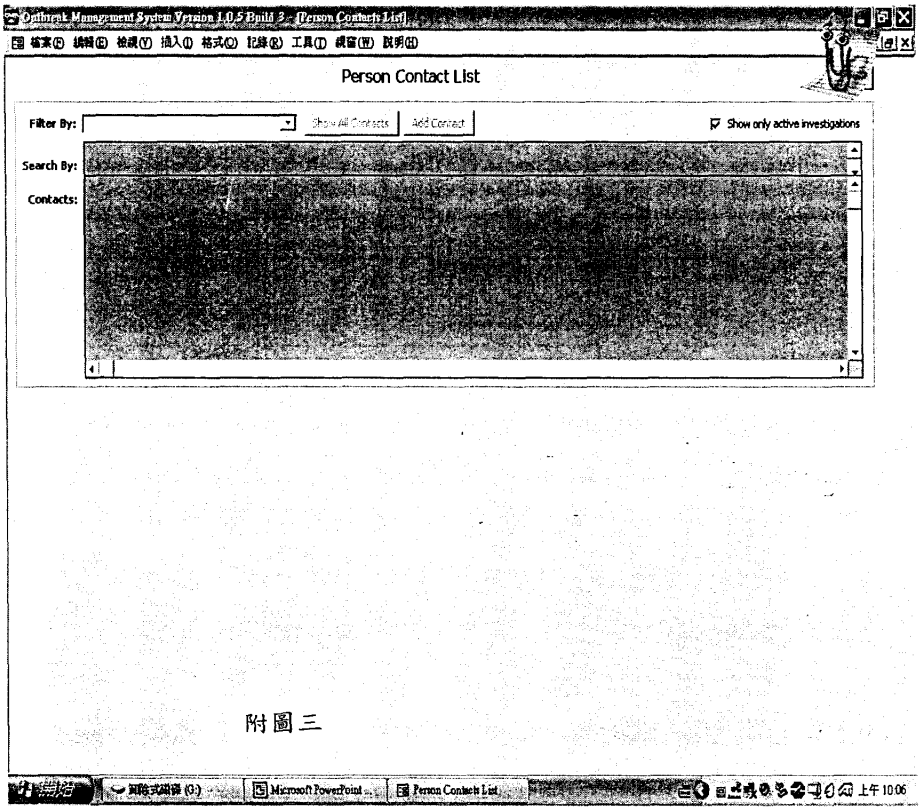
可用磁碟空間	使用本地伺服器，至少 100 MB； 使用遠端伺服器，至少 60 MB
RAM	操作端 OMS 約使用 25 MB，建議至少 256 MB
運算器	依作業系統需求而定（建議至少 Pentium III）

為了整合所有的相關疫情調查系統於同一個資料庫當中，突發疫情管理系統將所有的可能的致病原選項都整合於個案疫情調查資料頁的開頭端，同時開放可以同時選取多個致病原（如附圖二），有效地避免同一個個案需要做許多的疫情調查表，同時也將同一名個案的所有疫情調查資料都彙整於同一個疫情調查資料庫中，避免發生見樹不見林的遺憾。

對於新興傳染病，如：猴痘與嚴重急性呼吸道症候群...等的疫情調查，與其他一般傳染病或疾病的疫情調查最大的不同處，在於進行疫情調查的時候，必須要特別著重於感染源與接觸者的調查與分析。新興傳染病由於絕大部分的人群都是未曾暴露於該新興致病原的個體，因此，並不具有體液免疫反應與細胞免疫反應，而往往容易造成較為明顯的症狀與較高的侵襲率。透過感染源與接觸者的調查分析，可以往前回溯到可能的感染來源，擴大追蹤這些可能感染來源的所有接觸人員或曾到過的地區、接觸的媒介物等；並可同時由接觸的時間點之後，預測可能的被感染者，藉以找到這些可能的被感染者，針對這些高危險群進行自我健康管理、居家隔離、檢疫與防疫的措施，避免致病原進一步地傳染到社區、醫院與其他可能造成廣泛傳染的機構。



美國疾病管制及預防中心所設計的突發疫情管理系統，對於接觸者的疫情調查部分，做成了單一的接觸者清單（如附圖三），所有的接觸者都經由關聯式資料庫的方式，與通報個案或確認病例進行串聯。所有的接觸者清單均置於單一的整體資料庫中，每一次要輸入一個個案的接觸者時，皆必須要先經由查詢的方式，如果這個接觸者已經存在於這個資料庫當中，則在確認接觸者的相關資料都正確無誤後，就可以進一步地輸入其可能的感染來源、疫情調查的各項危險因子的結果、採集檢體的項目與檢驗結果...等，並與這個新的通報個案或確認病例進行關聯。這樣的做法可以很容易地將多源接觸或多源來源的接觸者，很容易的界定出來，易於串聯接觸網絡，同時與其血清流行病學結果進行串聯比對，這是對於新興傳染病的疫情調查時，較之於其他的地方性流行疾病或季節性傳染病更為重要之處。



附圖三

在突發疫情管理系統改版的過程中，美國疾病管制及預防中心組成了任務性編組的工作小組，成員包括：流行病學家、公共衛生學家、感染科醫師、內科醫師、小兒科醫師、生物恐怖應變處理專家、院內感染管制專家、災難應變處理專家、病毒學家、細菌學家、分子生物學家、資料庫分析師、程式設計師與分項專案經理。

自從嚴重急性呼吸道症候群席捲美國的時候，許多的飛航交通或遭到限制、或造成許多的不便利。為了節省時間與成本、並且避免這些專業人員遭到感染的危險性，美國疾病管制及預防中心立即洽詢電話公司設計電話會議系統（Teleconference），作為緊急應變的即時對談討論之用。該工作小組平常的時候是透過網路硬碟工作區與電子郵件，進行各種疫情調查欄位的詳細格式、屬性等的設定工作，達到資

料版本同步與即時分享的功能；而對於重大的議題、調查內容的方向等必需要集思廣益、即時討論的議題，則透過不定期的電話會議進行小組討論、或經由定期的嚴重急性呼吸道症候群接觸者追蹤調查會議（SARS Contact Tracing Meeting）討論後，提到「嚴重急性呼吸道症候群準備應變工作會議（SARS Preparedness Plan Meeting）」中進行需要高層決策的討論。

突發疫情管理系統內容包括有：

（一）病例調查表—人、延伸功能表（Generic Case Investigation – Person, DB Extension）

（二）臨床檢體（Clinical Speicmens）

（三）病例調查表—機關組織（Generic Case Investigation – Organization）

（四）環境檢體 （Environmental Specimens）

（五）手持電腦版環境檢體功能（Handheld for Environmental Specimens）

（六）實驗室檢驗結果（Lab Results）

（七）接觸者調查分析（Contact Tracing）

（八）報表（Reporting）

其中，突發疫情管理系統改版工作小組的工作任務主要是：

1. 要將延伸功能表的功能納入突發疫情管理系統中，以確保本突發疫情管理系統在未來面臨其他新興傳染病時，可以不受既有資料庫格式的限制，而可以快速地新增所需的問卷題目，以符合疫情調查隨時所需要的需求。
2. 整合臨床檢體與環境檢體登錄與追蹤功能，透過條碼列印的方式，方便全程追蹤檢體的動向，並且隨時可以掌握檢體檢驗的結果，供作防疫決策的參考。
3. 接觸者調查分析，功能為新增、修訂與管理接觸者的各項

接觸與危險因子情形。

突發疫情管理系統主要的修訂內容、定義、屬性、欄位設定與編碼分述如下：

（一）突發疫情管理系統的嚴重急性呼吸道症候群疫情調查部分；

個案:

- ❖ SARS ID
  - ➢ 單一的識別碼，由SARS疫情調查網頁自動給予
  - ➢ 不同的權責衛生部門具有獨一的識別碼
- ❖ 州衛生部的SARS ID
  - ➢ 由不同的州權責衛生部給予的獨一的識別碼，便於州權責衛生部於權責內追蹤個案
- ❖ 郡衛生單位 SARS ID
  - ➢ 由不同的郡權責衛生單位給予的獨一的識別碼，便於郡權責衛生單位於權責內追蹤個案
- ❖ 個案的狀態
  - ➢ 個案的目前與最後的狀態
  - ➢ 標準字彙：
    - RUI-1 Symptomatic
    - RUI-2 WHO-defined Suspect Case
    - RUI-3 WHO-defined Probably Case
    - RUI-4
    - Probably SARS - CoV Case
    - Confirmed SARS - CoV Case
    - Not a Case: Negative Serology
    - Not a Case: Alternative Diagnosis Accounts for Illness
- ❖ 人口學資料
  - ➢ 人口學資料將會由標準的突發疫情管理系統資料庫中自動擷取姓名、住址、電話等

- 可以自突發疫情管理系統資料庫中自動擷取多重的姓名、住址、電話等

❖ 工作執勤

- 個案的工作時段必須追蹤，尤其是衛生工作者
- 一天工作的時數與工作時段可以由突發疫情管理系統資料庫中自動擷取

❖ 最初的權責單位

- 最初的權責單位將由突發疫情管理系統資料庫中自動擷取
- 標準字彙：
  - 美國的州、郡與大城市的權責單位

❖ 中介的權責溝通轉介

- 聯繫 between jurisdictions may take place
- 中介的權責溝通轉介欄位包括：
  - 溝通日期
    - 標準的日期格式(mm/dd/yyyy)；
  - 溝通時間
    - Free-text輸入；
  - 與哪個權責單位溝通轉介
  - 標準字彙美國的州、郡與大城市的權責單位；
  - 對話人員
    - Free-text輸入；
  - 訪視人員
    - Free-text輸入；

❖ 個案的交通情形

- 嚴重急性呼吸道症候群可能會搭乘哪些交通工具
- 可能包括的資訊包括：
  - 旅行日期
    - 標準的日期格式(mm/dd/yyyy)；
  - 旅行時間

- Free-text輸入；

- 交通型態
  - 標準字彙：
    - 航空器
    - 汽車
    - 公車
    - 遊艇
    - 旅遊團
    - 火車
    - 其他
- 啟程 城市
  - Free-text輸入
- 啟程 州
  - 標準州 字彙 使用 FIPS Alpha-codes
- 啟程 郡
  - 標準郡 字彙 使用 FIPS Alpha-codes
- 目的地 城市
  - Free-text輸入
- 目的地 州
  - 標準州 字彙
- 目的地 郡
  - 標準郡 字彙
- 交通工具
  - Free-text輸入
- 航班
  - Free-text輸入
- 座位
  - Free-text輸入

接觸者：

- ❖ 州 衛生部 接觸者 ID
  - ➢ 由不同的州權責衛生部給予的獨一的識別碼，便於州權責衛生部於權責內追蹤個案
- ❖ 美國疾病管制及預防中心 接觸者 ID
  - ➢ 美國疾病管制及預防中心 SARS 接觸者識別碼
  - ➢ 權責區內的單一識別碼
- ❖ 郡衛生部 接觸者 ID
  - ➢ 由不同的郡權責衛生單位給予的獨一的識別碼，便於郡權責衛生單位於權責內追蹤個案
- ❖ 調查情況
  - ➢ 接觸者的最近調查情況
  - ➢ 標準字彙：
    - ▪ 調查中－正在調查接觸者
    - ▪ 待決中－接觸者疫情調查尚未開始
    - ▪ 關案 － 嚴重急性呼吸道症候群確認個案
    - ▪ 關案 － 嚴重急性呼吸道症候群可能個案
    - ▪ 關案 － 未感染
- ❖ 人口學資料（可以自突發疫情管理系統資料庫中自動擷取多重的姓名、住址、電話等）
  - ➢ 名
  - ➢ 姓
  - ➢ 住址
  - ➢ 城市
  - ➢ 州
  - ➢ 郡
  - ➢ 郵遞區號
  - ➢ 住家電話

- 工作電話
- 手機電話
- 呼叫器
- 電子郵件
- 職業
  - 參考標準工業碼的標準字彙 (Standard Industry Codes, SIC)：
    - 診療人員
    - 護士、護佐與看護
    - 醫技與醫檢人員
    - 交通運輸
    - 嚮導
    - 消防與救難隊員
    - 警官與執法人員
    - 矯正教育人員
    - 大專教師
    - 國小老師
    - 國中老師
    - 幼保
    - 軍職
    - 一般辦公室職員
    - 工程師
    - 電腦、數學與研究職業
    - 社會學家、社會工作者、宗教工作者、律師
    - 農業、林業與漁業
- 雇主資訊
- 工作執勤
  - 個案的工作時段必須追蹤，尤其是衛生工作者
  - 一天工作的時數與工作時段可以由突發疫情管理系統資料

庫中自動擷取

- 美國公民(Y/N)
  - 標準字彙：
    - 是
    - 否
- 生日
  - 標準的日期格式(mm/dd/yyyy)；
- 種族
  - 標準字彙：
    - 印地安裔與阿拉斯加裔
    - 亞裔
    - 菲裔
    - 白人
    - 夏威夷與太平洋群島居民
    - 其他
- 族群
  - 標準字彙：
    - 西班牙或拉丁裔
    - 非西班牙或拉丁裔
    - 不明
- 性別
  - 標準字彙：
    - 男
    - 女
    - 不明
- 懷孕(Y/N)
  - 標準字彙：
    - 是
    - 否

- 不明

❖ 最初的權責單位

➢ 最初的權責單位將由突發疫情管理系統資料庫中自動擷取

➢ 標準字彙：

- 美國的州、郡與大城市的權責單位

❖ 調查的權責單位

➢ 調查的權責單位將由突發疫情管理系統資料庫中自動擷取

➢ 標準字彙：

- 美國的州、郡與大城市的權責單位

❖ 中介的權責溝通轉介

➢ 聯繫 between jurisdictions may take place

➢ 中介的權責溝通轉介欄位包括：

- 溝通日期
  - 標準的日期格式(mm/dd/yyyy)；
- 溝通時間
  - Free-text輸入；
- 與哪個權責單位溝通轉介
- 標準字彙美國的州、郡與大城市的權責單位；
- 對話人員
  - Free-text輸入；
- 訪視人員
  - Free-text輸入；

❖ 接觸者的交通情形

➢ 嚴重急性呼吸道症候群個案的接觸者可能會有搭乘交通工具

➢ 可能包括的資訊包括：

- 旅行日期
  - 標準的日期格式(mm/dd/yyyy)；
- 旅行時間
  - Free-text輸入；

- 交通型態
  - 標準字彙：
    - 航空器
    - 汽車
    - 公車
    - 遊艇
    - 旅遊團
    - 火車
    - 其他
- 啟程 城市
  - Free-text輸入
- 啟程 州
  - 標準州 字彙 使用 FIPS Alpha-codes
- 啟程 郡
  - 標準郡 字彙 使用 FIPS Alpha-codes
- 目的地 城市
  - Free-text輸入
- 目的地 州
  - 標準州 字彙
- 目的地 郡
  - 標準郡 字彙
- 交通工具
  - Free-text輸入
- 航班
  - Free-text輸入
- 座位
  - Free-text輸入

嚴重急性呼吸道症候群暴露資料 - 接觸者

- 與個案的關係
  - 描述接觸者與嚴重急性呼吸道症候群個案的關係
  - 標準字彙：
    - 家庭
    - 安養或延伸家庭
    - 工作
    - 醫療照護人員 - 照顧病患
    - 醫療照護人員 - 非照顧病患
    - 醫院病患
    - 醫院訪客
    - 交通工具
    - 學校
    - 長期照護
    - 其他
- 最初暴露日期
  - 接觸者與嚴重急性呼吸道症候群個案接觸的第一天
  - 日期型態（mm/dd/yyyy）
- 最後暴露日期
  - 接觸者與嚴重急性呼吸道症候群個案接觸的最後一天
  - 日期型態（mm/dd/yyyy）
- 暴露地點
  - 可能的暴露地點如：工作、住家等
  - 標準字彙：
    - 住家
    - 旅行團
    - 醫護人員

- 工作
- 其他

❖ 危險因子矩陣

➢ 依據該接觸者與嚴重急性呼吸道症候群個案的接近程度與接觸期間，建構危險因子矩陣用以決定優先調查序位

➢ 標準字彙：

- H1
- H2
- H3
- M1
- M2
- M3
- L1
- L2
- L3

行動限制資訊 – 接觸者

- ❖ 行動限制(Y/N)
  - ➢ 該接觸者是否正接受某種行動限制？
  - ➢ 標準字彙：
    - ▪ 是
    - ▪ 否
- ❖ 限制種類
  - ➢ 標準字彙：
    - ▪ 被動監控
    - ▪ 主動監控不包含行動限制
    - ▪ 主動監控包含行動限制 – 居家
    - ▪ 主動監控包含行動限制 – 機構
    - ▪ 工作隔離
- ❖ 限制的地點
  - ➢ 如果該接觸者有遭到行動限制，限制的地點為何?
  - ➢ 標準字彙：
    - ▪ 居家
    - ▪ 醫院
    - ▪ 其他
- ❖ 限制的地址
  - ➢ Free text
- ❖ 行動限制處電話號碼
  - ➢ Free text
- ❖ 執行令的型態
  - ➢ 標準字彙：
    - ▪ 自主
    - ▪ 強制
- ❖ 執行令的日期

- 日期型態（mm/dd/yyyy）

❖ 執行令的結束日期

- 日期型態（mm/dd/yyyy）

接觸者每日聯繫

- ❖ 聯繫日期
  - ➢ 日期型態（mm/dd/yyyy）
- ❖ 聯繫時間
  - ➢ Free text
- ❖ 聯繫人員
  - ➢ 與接觸者聯繫的人員
  - ➢ Free-text
- ❖ 聯繫型態
  - ➢ 標準字彙：
    - ▪ 電話
    - ▪ 居家訪視
    - ▪ 其他
- ❖ 聯繫時的健康狀態
  - ➢ 標準字彙：
    - ▪ 無症狀
    - ▪ 無法聯繫—無回應
    - ▪ 無法聯繫—留下訊息
    - ▪ 發病—之前的狀態(非-嚴重急性呼吸道症候群)
    - ▪ 發病—待決
    - ▪ 其他
- ❖ 追蹤日期
  - ➢ 日期型態（mm/dd/yyyy）
- ❖ 追蹤原因
  - ➢ 標準字彙：
    - ▪ 狀況未明
    - ▪ 過早排除
    - ▪ 持續與個案有接觸

- 可能病例

❖ 採取行動

➢ 標準字彙：

- 無
- 轉介醫療照顧
- 行動限制

❖ 發燒?

➢ 該接觸者自從最後聯繫後是否發燒?

➢ 標準字彙：

- 是
- 否

❖ 發燒日期

➢ 日期型態（mm/dd/yyyy）

❖ 如果發燒了，體溫變化狀況？

➢ 該發燒接觸者的體溫?

➢ 數值型

❖ 流鼻水?

➢ 該接觸者自從最後聯繫後是否流鼻水?

➢ 標準字彙：

- 是
- 否

❖ 流鼻水日期

➢ 日期型態（mm/dd/yyyy）

❖ 寒顫?

➢ 該接觸者自從最後聯繫後是否寒顫?

➢ 標準字彙：

- 是
- 否

❖ 寒顫日期

- 日期型態（mm/dd/yyyy）

❖ 咳嗽?

- 接觸者自從最後聯繫後是否咳嗽?
- 標準字彙：
  - 是
  - 否

❖ 咳嗽日期

- 日期型態（mm/dd/yyyy）

❖ 呼吸窘迫？

- 接觸者自從最後聯繫後是否呼吸窘迫?
- 標準字彙：
  - 是
  - 否

❖ 呼吸窘迫日期

- 日期型態（mm/dd/yyyy）

❖ 接觸者是否住院或就醫?

- 接觸者自從最後聯繫後是否住院或就醫?
- 標準字彙：
  - 是
  - 否

❖ 醫療照護型態

- 接觸者尋求的醫療照護型態？（如急診）
- Free-Text

❖ 醫療設施

- 採用了何種醫療設施?
- 標準字彙：
  - 醫院
  - 嚴重急性呼吸道症候群-專責醫院
  - 門診

- 私人診所
- 其他

❖ 醫療照護入院日期或約診日期

➢ 日期型態（mm/dd/yyyy）

❖ 醫療設施或醫師名稱

➢ Free-text

❖ 醫療設施或醫師街道住址

➢ Free-text

❖ 醫療設施或醫師城市住址

➢ Free-text

❖ 醫療設施或醫師州住址

➢ 標準字彙：

- 州

❖ 醫療設施或醫師電話

➢ Free-text

❖ 如果行動限制；接觸者在監測的時間是否在家?

➢ 標準字彙：

- 是
- 否

❖ 如果行動限制而不在家：接觸者被找到的日期

➢ 行動限制而不在家接觸者被找到的日期

➢ 日期型態（mm/dd/yyyy）

❖ 如果行動限制而不在家：接觸者被找到的時間(與上一說明相似?)

➢ 行動限制而不在家接觸者被找到的日期

➢ Free-text

❖ 找到接觸者的方法

➢ 標準字彙：

- 接觸者自己來訪
- 留言在家

- 衛生部找到
- 執法人員找到

❖ 接觸者失聯的原因

➢ 標準字彙：

- 檢疫執行令
- 保護令
- 電子偵測
- 拘禁機構

治療/醫療後送/實驗室檢驗

- ❖ 治療或檢驗日期
  - ➢ 日期型態（mm/dd/yyyy）
- ❖ 治療或檢驗型態
  - ➢ 標準字彙：
    - ▪ 預防治療
    - ▪ 胸部X光
    - ▪ 高壓氧治療
    - ▪ 其他
- ❖ 實驗室檢驗
  - ➢ 鼻咽沖洗夜
  - ➢ 鼻咽拭子
  - ➢ 咽喉拭子
  - ➢ 氣管沖洗液
  - ➢ 氣管抽出液
  - ➢ Pleaural tap
  - ➢ 痰
  - ➢ 急性期血清
  - ➢ 恢復期血清
  - ➢ EDTA血或血漿
  - ➢ 糞便
  - ➢ CBC with differential
  - ➢ 痰革蘭氏染色檢驗
  - ➢ Influenza A檢驗
  - ➢ Influenza B檢驗
  - ➢ RSV檢驗
  - ➢ 其他

❖ 使用預防治療?

➢ 標準字彙：

- Ribavirine
- 其他抗病毒藥物
- 類固醇
- 其他

❖ 特殊治療

➢ 特殊治療的計量與期間

（二）危險因子矩陣：

危險因子矩陣為衡量判定一個通報個案或確定病例的接觸者危險程度的估計表，當通報的疫情越來越多的時候，為了有效的進行接觸者疫情調查，必須將有限的防疫人力資源優先配置於具有較高危險性的接觸者疫情調查，以求及早找出所有可能的接觸者，進行自我健康管理、居家隔離或檢疫措施，及早阻斷疫情流行。因此，設計本危險因子矩陣，有助於在接獲個案通報的時候，快速判定該個案或接觸者的危險性或重要性，依據其重要性，分配疫情調查的人力優先調查序位。

本危險因子矩陣由筆者負責規劃主筆，經美國疾病管制及預防中心的嚴重急性呼吸道症候群準備應變工作會議審核通過後採用。本危險因子矩陣的設計理念為同時考量通報個案或確定病例的可能為病例的危險程度與接觸者的接觸行為的可能遭到感染的危險程度進行交叉分析。其中，通報個案或確定病例總共區分為高可能性個案（H）、中可能性個案（M）與低可能性個案（L）；而接觸者則區分為高劑量接觸行為（第 1 級）、中劑量接觸行為（第 2 級）與低劑量接觸行為（第 3 級），總共區分為 H1、H2、H3、M1、M2、M3、L1、L2、L3 等九個區塊。

H1 表示確定或可能嚴重急性呼吸道症候群個案與接觸者的接觸危險性為第一優先調查序位、H2 表示確定或可能嚴重急性呼吸道症

候群個案與接觸者的接觸危險性為第二優先調查序位、H3 表示確定或可能嚴重急性呼吸道症候群個案與接觸者的接觸危險性為第三優先調查序位；

附表二

		Case Characteristics		
		H: a. Confirmed SARS-CoV case; b. Probable SARS-CoV case;	M: a. RUI-2; b. RUI-3; c. RUI-4;	L: a. RUI-1
Contact Characteristics	1: a. HCW with Patient Contact; b. Caregiver; c. Intimate partner; d. Household Contact.	H1	M1	L1
	2: a. Contact Distance < 3 feet for more than 30 mins; b. Stay in a closed environment including the same conveyance for more than 1 hour or < 3 feet despite duration.	H2	M2	L2
	3: a. Classmates / Colleagues / Friends other than above; b. Conveyance Contacts other than above	H3	M3	L3

M1 表示自嚴重急性呼吸道症候群流行或病毒活躍地區返國的通報個案（RUI- 2, 3, 4）與接觸者的接觸危險性為第一優先調查序位、M2 表示自嚴重急性呼吸道症候群流行或病毒活躍地區返國的通報個案（RUI- 2, 3, 4）與接觸者的接觸危險性為第二優先調查序位、M3 表示自嚴重急性呼吸道症候群流行或病毒活躍地區返國的通報個案（RUI- 2, 3, 4）與接觸者的接觸危險性為第三優先調查序位；

L1 表示自嚴重急性呼吸道症候群未被歸為病毒活躍地區返國的通報個案（RUI- 1）與接觸者的接觸危險性為第一優先調查序位、L2 表示自嚴重急性呼吸道症候群未被歸為病毒活躍地區返國的通報個案（RUI- 1）與接觸者的接觸危險性為第二優先調查序位、L3 表示自嚴重急性呼吸道症候群未被歸為病毒活躍地區返國的通報個案（RUI- 1）與接觸者的接觸危險性為第三優先調查序位。

深灰色的格子表示最高的優先調查序位（H1、H2）、淺灰色的格子表示中等優先調查序位（H3、M1 與 M2）、白色的格子代表低優先調查序位（M3 與 L1、L2、L3）。

（三）嚴重急性呼吸道症候群準備應變工作計劃

在每次的嚴重急性呼吸道症候群準備應變工作會議中，逐步修訂的嚴重急性呼吸道症候群個案接觸者疫情調查追蹤分析指引、院內感

染管控指引、治療與照護指引、學校檢疫與停課指引、孕婦治療與照顧指引等，而在我國十二月中旬的進行嚴重急性呼吸道症候群病毒（SARS-CoV）研究而感染嚴重急性呼吸道症候群的軍醫官事件之後，美國疾病管制中心也據以修訂了實驗室安全指引，相關的資料變更後經研討修訂於新版的嚴重急性呼吸道症候群準備應變工作計劃中（如附件一，http://www.cdc.gov/ncidod/sars/guidance/index.htm）。

二、 學習美國疾病管制中心生物感應偵測系統（BioSense）與症候群偵測系統（Syndromic Surveillance）之建構與分析。

美國國防部研究計劃與行政部門自九〇年代開始，為了因應恐怖主義的興起，即已經開始著手進行疾病發生聚集的偵測與預測工作。當年，在世界經貿組織（ＷＴＯ）假西雅圖舉辦全球貿易年會的時候，美國國防部為了偵測是否遭到恐怖攻擊或是有其他聚集性的健康危害發生，著手進行急診就診人數的偵測工作，每日蒐集具有代表性的醫院、診所與緊急醫療中心的每日急診人數，紙本數字傳回後，由國防部人員登錄至資料庫中分析是否有突發聚集的情形發生，一旦出現突發聚集，立即派遣疫情調查人員分別進行疫情調查、病歷調閱與疫情防制等事宜。該系統有效地在全球貿易年會的時候，偵測到腹瀉聚集的情形，雖然經過調查以後，排除為人為造成之可能，卻也驗證有系統地收集急診個案就診人數具有偵測生物事件或突發疫情的能力。

隨後，美國國防部與疾病管制及預防中心、匹茲堡大學的維格納教授研究室（Dr. M Wagner）攜手合作，更進一步地整合原有的急診就診人數資料加上購買成藥情形的監測資料，促成了「快速突發疫情偵測系統（Rapid Outbreak Detection System, RODS）」的發展。隨著科技的進步，「快速突發疫情偵測系統」由最早期使用紙本寄送與傳真的「丟入式通報偵測（Dropping Surveillance）」，單純地蒐集性別、年齡、郵遞區號、主訴與症狀等通報欄位，演變至使用網路電子郵件與網路直接透過安全機制傳送通報，大幅地縮短了通報、資料鍵入、資料整理與分析所需要的時間，更逼近了快速偵測疫情突發流行的目的。而約莫同一時期加州衛生部也開始發展類似觀念的生物事件偵測系統，名為「生物風暴（BioStorm）」，透過對急診通報、抗生素與抗病毒藥物處方登記等登錄資料庫系統中，進行資料分析，偵測疑似生物事件。美國紐約州自從九一一事件之後，立即因應防疫與緊急醫療之需要，針對呼叫緊急醫療網電話與患者的主訴與症狀進行分析，用以偵測在九一一恐怖攻擊之後是否有第二波的恐怖攻擊發生或因應衛生與醫療系統癱瘓之疾病聚集狀況發生。

這些快速偵測系統的目的，在於於非常短的時間內，盡可能地偵測出所有可能的生物事件或突發疫情，而是否真的有疫情發生，仍須經由疫情的調查與微生物學與血清學的檢驗方能確認。因此，為了使整個有關生物事件的偵測功能更為即時與完整，展開了「實驗室應變網路（Lab Response Network, LRN）」，整合了各州、郡政府部門與衛生部門、學校、醫院，針對選定的症候群，如：急性呼吸道症候群、急性腹瀉症候群、急性神經症候群、急性出血熱症候群與急性黃疸症候群等，進行通報與採集檢體送驗，隨時分析所偵測到的致病原，偵測可能的新興傳染病、生物事件與突發疫情流行。

除此之外，因應可能發生的生物恐怖攻擊事件，美國國防部在美國重要的大型都會區、經貿城市與可能遭受恐怖攻擊的重點目標區設置有空氣採樣器，針對名列最有可能用做為生物恐怖攻擊的致病原（Category A agents，如：炭疽桿菌等），進行即時快速檢驗，如果測出來有疑似最有可能用做為生物恐怖攻擊的致病原生物跡象陽性，立即由該空氣採樣器發出緊急通報訊號給當地的生物事件緊急應變小組，副知國防部，由生物事件緊急應變小組派遣專人至現場進行詳細採樣與人體病例偵測，儘速確認是否為真實生物事件，或是過度敏感的偵測，這個系統稱為「生物監測系統（BioWatch）」。

美國國防部與美國疾病管制及預防中心將前述的這些系統整合成一個單一的網路版的輸入與監視分析系統，即為生物感應偵測系統（BioSense），做為生物事件與突發疫情偵測的快速偵測系統。

美國疾病管制及預防中心國家傳染病研究中心的生物恐怖應變準備組亦於九一一事件之後，開始開設網路版的電子資料交換系統，系統性地蒐集各醫療院所就診患者的主訴與 ICD-9 碼，透過程式轉換為急性呼吸道症候群、急性腹瀉症候群、急性神經症候群、急性出血熱症候群與急性黃疸症候群等症候群資料，藉以偵測是否有症候群的聚集情形，對於疑似症候群聚集情形，由疫情調查人員進行調查以確認是否為生物事件。這個以症候群為偵測目標的偵測系統即為症候群偵測系統（Syndromic Surveillance），本系統曾經於露營音樂會與運會

時，成功地偵測到急性腹瀉症候群聚集，經由疫情調查與鑑驗後，確認為食物中毒事件。這個系統經過不斷的修正症候群的組合症狀，並且透過人工與經驗值修正偵測的閥值，已經能夠較為敏感地偵測罕見的症候群、疾病與不明原因死亡聚集個案。

三、 參與國際新興傳染病研討會（ICEID），研習新興及再浮現傳染病、生物戰之偵測、疫情調查與應變處理。

在美國研習期間，適逢年度的國際婦女傳染病研討會（International Conference on Women and Infectious Disease, ICWID）、國際新興傳染病研討會（International Conference on Emerging Infectious Diseases, ICEID）與流行病學調查員年會（2004 Epidemiology Intelligence Service (EIS) Scientific Conference）等會議，因此有幸得以就近與來自世界各國的學者共同學習。

國際新興傳染病研討會的大會主軸在於新興傳染病防制、禽流感與流行性感冒全球性流行防制、抗藥性致病原防制、生物戰應變準備、人畜共通傳染病與蟲媒傳染病等。會中的專家們一致地共識廿一世紀的疫病傳染與發生，已經明顯地異於以往。為了防杜新興及再浮現傳染病的疫情，必需要跨越國家與地區的觀念侷限，應該要以更宏觀的方式，整合區域聯盟的方式進行偵測與防疫的工作，時時偵測國家、區域與全球的疫情流行；而且必須重新整合動員跨國的防疫工作團隊，為未來的疫病先行做好準備。

因應新興傳染病，必須要同時整合醫師、護理人員、實驗專業人力、公共衛生防疫人力、獸醫師、社區志工、學校老師等資源，集思廣益地整合在一起。對於新興傳染病的防制也必須要提升到國家層級的防疫作為，積極地謀求國際間的整合與合作夥伴、加強疫病資訊的交流。

教育訓練與衛生溝通，是從基本面落實防疫的觀念的全民的最經濟做法，因此，整合社區資源，由社區自發的開展教育訓練與衛生溝

通，透過認知—態度—行為的改變，可以在中長程看見防疫的效果。平日應建立好流行病學專業人員的動員資料庫，透過平日的溝通討論平台，即時蒐集國際疫病資訊，偵測可能發生的生物事件或新興傳染病。

國際婦女傳染病研討會的大會議題主軸在於促進婦女、少數族群的健康，由於許多的新興傳染病的發生率都是女性高於男性，性侵害所衍生的相關傳染病蔓延、錯誤的性迷思造成東南亞與非洲地區女性異常高的人類免疫缺失病毒感染/愛滋病疫情；而少數族群、低社會經濟地位、聾盲人員等都較難獲得相關的衛生資源、健康資訊，造成防疫資源不對等的情形，也逐漸累積成新興傳染病的缺口。

本會議主要的與會人員以女性為主，美國疾病管制及預防中心主任葛博汀女士（Dr. Julie L Gerburdin）在開幕致詞的時候，就已經一針見血地指出傳染病防制的五大重點方向與三大主要做法。首當其衝的是國際間女性、母子垂直傳染與少數族群的人類免疫缺失病毒感染/愛滋病疫情日益嚴重，因此世界衛生組織規劃了一個 3*5 的防疫政策：公元二〇〇〇年達到三百萬人接受人類免疫缺失病毒的治療、周產期 B 型肝炎病毒與 E 型肝炎病毒感染、蟲媒傳染病的再浮現與生態領域擴張、新興多重抗生素抗藥性菌株的院內感染、免疫缺失病患、結核病患、社區健康間的交互作用、傳染病的免疫反應與致病機轉等，在在都挑戰著醫護人員、防疫人員的智慧、信心與勇氣。葛博汀女士明確的指引出從西元二〇〇四年開始，傳染病防治的重點目標族群已經轉移為女性與少數族群，因此必須要有更多的女性與少數族群的人，自發性地投入參與傳染病的防治工作，採用自我啟動（self initiate）、社區動員（community-based）與基層推動（bottom up）落實知識擴散（knowledge dissemination）、健康溝通（health communication）與社區動員（community-based）的做法至每一個基層的社區之中，轉化健康衛生的行為於日常生活。

會中多森達祿女士（Dazon Doxon Dallo）、沛佐夫思基博士（Dr.

Monique Petrofosky）分別分享了他們的團隊採用社區動員（community-based）方法在人類免疫缺失病毒感染/愛滋病防疫與非洲干那國的麥地那龍線蟲（一種熱帶線蟲,寄生於人、馬等皮下深處）（Guinea Worm （Dracunculiasis））防治經驗。

多森達祿女士是美國姊妹之愛基金會（Sister Love Fundation）的成員，姊妹之愛基金會的使命是要阻斷人類免疫缺失病毒感染/愛滋病的衝擊、人權代言、促進家庭計畫與生育衛生。由於成員以女性為主，最能了解女性的需求，因此由該基金會的成員與義工，動員整合社區資源，先從每個社區自我探討社區最重要的衛生需求因子，如：經過探討發現人類免疫缺失病毒感染最高的心發生率都在女性、17% 的貧窮人口都是女性、種族歧視、貧窮區隔、性別歧視等都造成衛生資訊可及性不對等、未能充分利用女性資源進行防疫措施。因此，姊妹之愛基金會就針對這些急需改進的部分，整合社區動員與州、郡的草根性組織成一個女性人類免疫缺失病毒感染/愛滋病防疫資源計畫（Women's HIV/AIDS Resources Project, WHARP）。

沛佐夫思基博士則是發現干那國有很嚴重的地區流行的麥地那龍線蟲感染的問題，這些麥地那龍線蟲的感染主要經由飲入或接觸遭到麥地那龍線蟲幼蟲污染的水而感染，經過約十到十二的月的潛伏期後，逐漸發病。目前並沒有有效的治療方法，只能用機械式移除蟲體的方式，如果不能即時移除，會造成終身殘障，成為住家中的經濟負擔。但其實麥地那龍線蟲的防治非常的簡單，只要教導每個民眾落實遠離可能遭到污染的水源、過濾飲用水等簡單的兩個健康行為就可以了。沛佐夫思基博士詳細觀察研究後發現負責民生用水的女性，正是扮演麥地那龍線蟲疫情防制的關鍵，因此動員社區的女性，採用女性督導女性（women supervising women）的做法，將干那國區分為六個區，共有 393 個村落，每個指導員督導一個區，督導員下的輔導員一個人負責輔導五至六個村落。由社區媽媽每天挨家挨戶進行以村落為單位的每日主動偵測、衛生教育與病患隔離工作。男性成員也不能置身事外，自願者被集中起來協助尋找乾淨的水源、挖井、過濾（由於

當地民眾並不喜歡喝煮沸的水，所以只好推廣利用過濾的方式，將麥地那龍線蟲幼蟲濾除掉），提供衛生的用水。這些自願參與社區動員防治計畫的人可獲得一部腳踏車做為回饋的禮物，而來上課學習還可以獲得T恤、食物、紀念品甚至出席費，因此參與的自願者非常的多，也很快的讓個案發生區域縮小，同時減少個案，非常的成功！可以作為我國透過社區發展進行傳染病防制的參考。

另一個實例與台灣更是密切相關，悉達博士（Dr. Hilda Seda）在中南美洲進行登革熱疫情防治，却發現採用超微量噴射殺蟲劑的方式，動用了大量的人力與資源，不僅疫情沒有消失，更日益增加。經與蟲媒防治學家深入研討發現，控制成蚊無法有效的遏止疫情，最好的方法是清除孳生源，撲滅卵或蛹的孳生源，最能快速地控制疫情，而最容易被遺忘的孳生源是飼養寵物的飲水盒。因此，悉達博士發起了所謂先鋒媽媽部隊（Head Start Mothers）的社區動員組織，對這些先鋒媽媽進行密集的教育訓練，從病媒蚊的生活史、登革病毒的流行病學特徵與致病機轉，病毒、蟲媒與人體的交互作用等。同時，先鋒媽媽部隊也成立工作小組，與家中的小孩共同腦力激盪如何有效地控制病媒蚊疫情，並且到各學校、家戶進行病媒蚊防治的衛生教育。隨後進行挨家挨戶的蟲媒指數調查與知識—態度—行為的各項指標。研究發現，採用先鋒部隊媽媽的社區每100家戶的陽性容器數、每100家戶的幼蟲指數明顯低於未實施先鋒媽媽部隊的社區，也對防治登革熱病媒蚊的方法有比較正確與全面的知識、態度與行為。而該團隊USAID 的合作案中也將動員社區的志願工作者的表現當成重要的指標，包括持續性、成本效益等評估，對於表現良好的志願工作者，除了發給證書、舉辦歡樂慶功遊行外，更提供正式職缺的就業機會，因此成為很大的誘因。

除此之外，動員社區進行傳染病防治已經在奈及利亞落實於瘧疾、性病、結核病、人類免疫缺失病毒、破傷風、腹瀉、上呼吸道感染、皮膚感染等疾病施行過，也常被用來作為預防接種、化學預防治療與鐵和葉酸補充的推廣採用社區動員的方式進行。

另一個與水污染有關的新興傳染病是血吸蟲（Schistosomiasis），華茲博士（Dr. Susan Watts）發現埃及地區的血吸蟲疫情問題出現在當地的用水管理、儲存、不衛生的幼兒照護行為與不喜歡洗臉等衛生行為。因此，動員社區開始進行國家血吸蟲控制計畫，建立以學校為基礎的防疫控制計畫，透過學童將相關的防疫政策帶回家傳達給家人，同時教導學童協助進行蝸牛防制工作，並且開始請醫師進行義診與治療。而民間團體也積極的參與教育計畫，減少文盲，在數管旗下後，也有效地控制血吸蟲疫情。

綜上所述，新時代的傳染病防制重點在於婦女與少數族群，而且端賴政府機關、學術機構、世界衛生組織、社區動員志工、民間團體、家庭成員、學生與幼童的同心協力整合進行，才能達到立竿見影的防制傳染病效果。最重要的，應是不恃敵之不來，恃吾有以待之！

四、 研習傳染病與新興傳染病數學模式之建立。

筆者在美期間的短期研究，於哈佛大學公共衛生學院流行病學研究所的穆瑞博士研究室進行（Dr. Megan Murray），研究主題為蟲媒傳染病的數學模式分析。筆者嘗試以傳染病的數學模式估計登革出血熱的傳染模式與防制的重要因子。

基本的蟲媒傳染病傳染模式與控制成效分析模型修改自巴莎藥茲博士（Dr. María-Gloria Basáñez），同時參酌巴特理博士（L. M. Bartley ）與英國佛鼓聲博士（Dr. Neil Ferguson）的登革熱及登革出血熱傳染數學模式的研究。巴氏的研究著重於季節因素，包括溫度和雨量對蟲媒的影響，但並未同時考量目前有關登革出血熱致病機轉的兩大假說：病毒嚴重性假說與抗體增強效應（antibody dependent enhancement, ADE）假說。佛氏的研究過於著重新穎複雜數學的理論，卻忽略了基本的蟲媒、病毒與人體的巨生態與微生態與此三項重要因子間的交互互動，同時，如同巴氏的研究，也忽略了登革出血熱的致病機轉，故難以有合宜且直觀的生物性解釋。因此，筆者與穆瑞博士就針對二〇〇二年造成台灣南部地區大流行的登革熱病毒傳染

模式進行傳染病的數學模式分析，用以推估連續兩年分別不同病毒型的登革熱病毒流行時，可能的登革出血熱個案數，同時比較不同的防疫政策下，其控制的成效與經濟效益。

五、 建立與該國之良好合作與互動關係。

筆者在美期間，積極且活躍地與在美國疾病管制及預防中心工作的華裔人士、該中心的腸道傳染病、呼吸道傳染病、新興傳染病、特殊致病原、不明原因死亡調查、生物恐怖應變預防組等專家進行經驗交流與互動，除了學習仿效美國疾病管制及預防中心的專家們熱誠、公正與不藏私的團隊精神之外，也針對台灣新興及再浮現傳染病、生物恐怖、不明原因疫情調查等政策與實際上遭遇的困難進行討論。在美期間兢兢業業，期盼能建立良好的互動與分享經驗；同時，也努力地協助規劃並幫助已經申請到或正在申請出國研究計畫的學弟妹，找到符合他們的研究興趣領域，且非常熱心傾囊相授的專家學者，除了減少學弟妹們辛苦摸索的時間體力，更能夠延續我國與美國疾病管制及預防中心持續交流的生力軍！

心　得

肆、心得

非常感謝行政院人事行政局提供這個參與「建構SARS與新興傳染病偵測與疫情調查」短期研究計畫的機會，除了學習目前最新的新興傳染病偵測、疫情調查與應變處理的做法（如：症候群偵測系統（Syndromic Surveillance）、生物感應偵測系統（BioSense）之建構與分析、不明原因疫情調查的理論與執行方式、參與美國疾病管制與預防中心建構SARS、突發、不明原因疫病與新興傳染病偵測、疫情調查與接觸者追蹤資料庫資料庫管理系統，重要的收穫是認識了來自世界各國、各個領域的同好，並且浸淫仿效美國疾病管制及預防中心的專家們熱誠、公正與不藏私的團隊精神。

研究初期，本局同時有另外兩位科長也在美國疾病管制及預防中心接受短期的醫院院內感染管制訓練課程。初來乍到，端賴兩位科長熱心協助解決食衣住行等安頓事宜，讓我能夠很快地進入狀況，專注於短期研究的內容。因此，在美期間，適逢部分同仁與學弟妹正在規劃到美國進修或短期研究，在協助他們規劃的同時，都會盡量與他們溝通，若能在行程上配合，或前後期的人可以有所重疊銜接的時間，有助於大幅縮短摸索的時間，減少租賃與日常生活用品資源的浪費，快速地進入狀況，開始研究計畫。

這個研究計畫讓我有機會與美國疾病管制及預防中心的，最新的新興傳染病偵測、疫情調查與應變處理的做法（如：症候群偵測系統（Syndromic Surveillance）、生物感應偵測系統（BioSense）之建構與分析、不明原因疫情調查的理論與執行方式、參與美國疾病管制與預防中心建構 SARS、突發、不明原因疫病與新興傳染病偵測、疫情調查與接觸者追蹤資料庫資料庫管理系統，重要的收穫是認識了來自世界各國、各個領域的同好，並且浸淫仿效美國疾病管制及預防中心的專家們熱誠、公正與不藏私的團隊精神。

從這次的短期研究中，不斷地與許多疫情調查專家、特殊致病原專家、生物統計專家與傳染病數學模式不同領域的專家討論，透過實

際參與「建構SARS與新興傳染病偵測與疫情調查系統」，按部就班地逐步拆解、思考、分析與研究建構一個新興傳染病偵測與疫情調查資料庫可能需要包含的功能、內容與分析方式，以及這些資料庫中可能含有的訊息，對於衛生政策或防疫措施可能隱含的意義為何。隨後再腦力激盪，設法將這些實務的疫情調查需要的欄位設計到「突發疫情管理系統」中。

台灣在這次的嚴重急性呼吸道症候群疫情的偵測、調查與防制工作深受國際的矚目，美國也極力的希望從我國的經驗中與我們共同成長與學習。這次的出國研究，最大的感觸在於美國疾病管制及預防中心的專家們熱誠、公正與不藏私的團隊精神。也體認到我國許多很好的防疫、偵測與醫療等工作專業上有著很寶貴的經驗可以供其他國家參考，而每個時空中的交流，都是日後國際合作的種子。因此，積極爭取設立駐外疫情調查員，除了在學術與衛生外交上，讓我們的經驗更應該推廣到有需要我們的國家，更能夠協助國際間新興傳染病的防制！

建　　議

伍、建議

一、 建構我國「因應突發疫情之網路套餐問卷資料庫」：建立一個統整的疫情調查管理系統，內建法定與通報傳染病之既定格式疫調問卷與資料庫。因應不明原因或群突發疫情，先行準備好各種可能的題庫（設定構想如下表）、情境（如：學校、工廠、公司、軍隊、收容中心 (含：安養院、育幼院等)）與模組（如：人口學基本資料模組、臨床資料模組、感染危險因素模組、生活習慣模組、工作與就學模組、飲食與營養模組、環境品質模組、疾病史模組、預防接種模組、就醫行為模組、接觸史模組、後遺症模組、先天因子模組、認知與教育訓練模組、防疫措施

疾病管制局因應突發疫情之網路版疫情調查問卷開發案題庫設計構想

題號	模組	法定或通報傳染病*	症候群#	情境$
A1	A	J I S	I II III	甲 丙
A2	A	J I S	I II	甲 乙
A3	A	J I S	I III	乙 丙
A4	A	J	I II III	甲 乙 丙
B1	B	J I S	II III	乙 丙
B2	B	S	I III	甲 乙 丙
B3	B	J I S	I II	甲 丙
B4	B	I S	II III	甲 乙
C1	C	J S	I II III	甲
C2	C	J	I III	丙
C3	C	I S	II III	丙
C4	C	J I S	I III	甲 丙
D1	D	J S	I II III	甲 乙 丙
D2	D	J I	I II	甲 乙
D3	D	J S	I III	乙 丙
D4	D	I S	II III	甲 乙 丙

*法定或通報傳染病依據權責疾病組所提供之題庫圈選各題庫中的模組或題號，若有通報爲該法定傳染病時，則自動帶出，例如法定傳染病"J"與通報傳染病"I"。

若爲新興或不明原因傳染病，則由疾病管制局權責疾病組依據國際疫情調查處理之初步分析、專家意見與患者臨床病徵，後另行設定於"法定或通報傳染病"新增疾病"S"，或依據"其症候群"或"情境"分別設定。

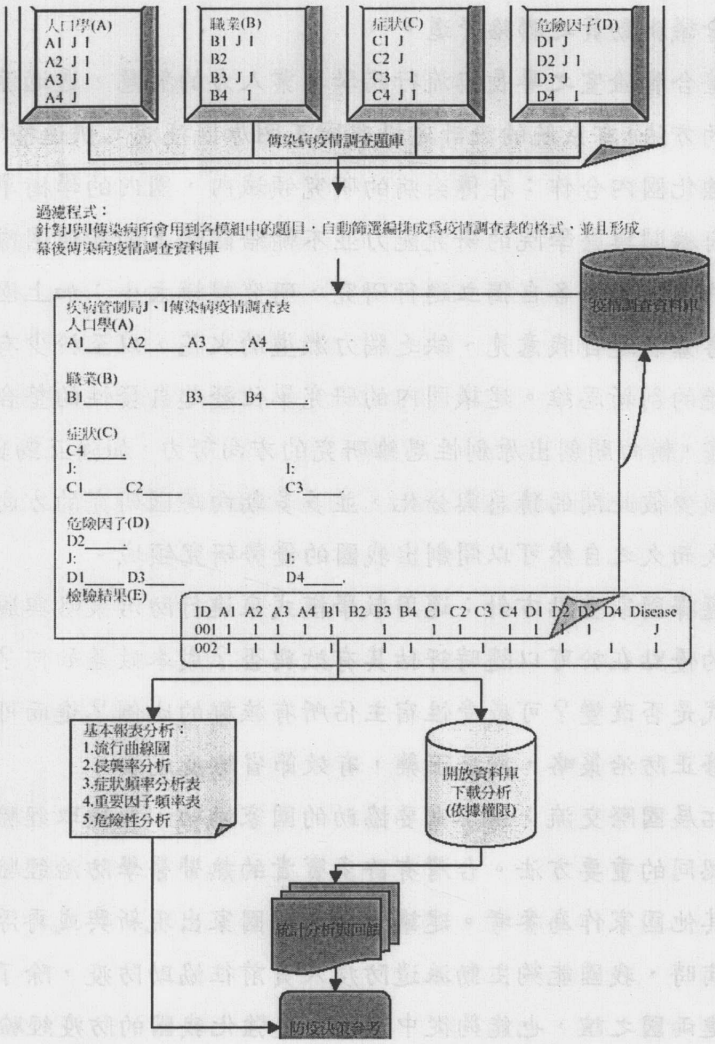
#依據不同的症候群所需的疫情調查題庫或模組，先行規劃設計呼吸道症候群、腹瀉症候群、急性出血熱症候群與急性神經症候群，並且開放可供隨時新增題庫或模組。

$依據不同的情境所需的疫情調查題庫或模組，先行規劃設計軍營、醫院、學校、安養中心、收容中心等，開放可供隨時新增題庫或模組，並且可以隨時修定與新增情境。

模組、結案紀錄模組、檢驗分析模組、備註模組 、報告與分析模組）。透過過濾轉換模式自動篩選適合不同情境之疫調模組題，可供不同情境隨時使用，同時開放自我排組與新增問題功能（設計構想如下圖）。輸入方式儘可能的簡化成為模組化的方式，納併衛星定位與勾稽戶役政及法定傳染病系統，並且設定權限，定時進行自動上傳與分析回饋下載。

這樣的單一疫情調查管理系統的優點是易於維護、整合與分析；同時透過統一化的欄位型態、格式與長度，易於整合；模組化題庫，設計簡易、套用容易；可塑性佳，可因應突發疫情立即擴充與修改；可於膝上與行動電腦上執行，易於田野疫調之進行；具有統計分析、報表回饋功能。未來，將可以解決衛生局（所）公共衛生人力與防疫人力因為頻於流動所造成的疫情調查經驗與統計分析技術無法延續、疫情調查資料難以即時流通與整合的問題。

二、 提供多元化的教育訓練，建立不明原因疫情調查 elearning 自學教育訓練系統：許多有志於傳染病防治研究工作的人，往往缺乏橫向與縱向的溝通聯繫，跨領域整合不足，建議能多鼓勵由國內的學術單位、政府機關與醫學院校辦理多元化的教育訓練，讓有志進行傳染病防治研究工作的人，得以有機會旁徵博引，不斷提升研究的思維能力與創意，迎頭趕上國際團隊。因此建議將重要的不明原因疫情調查案例蒐集彙整，改寫成為教案，供流行病學訓練班學員、公共衛生防疫人力、疫情調查備援人力與有志參與防疫工作的人員可以循序漸進的學習不明原因疫情調查工作如何進行、應有的準備項目有哪些，如何分析疫情調查的結果，並且透過互動式學習紀錄與批閱審查方式，掌握學生的進度與學習情形。



三、 輪流派駐疫情調查員與公共衛生人員至鄰近與需要協助的國家，平時協助建立該國之疫情偵測與調查；遇有不明原因疫病直接就近配合世界衛生組織或美國疾病管制中心派駐之新興傳染病防治計畫人員共同進行疫情調查與研究。除可以訓練我國之防疫人員偵測與調查分析之能力外，更可以建立可長可久的合作機制，強化我國與國際間之疫病偵測與處理應變網路。

四、 建立國內公共衛生人員資料庫，並設立遠距會議系統。平日供公共衛生人員進行疫情資訊的分享交流，遇有突發疫情、群突發流行、新興傳染病或生物恐怖事件時，可同時作為疫情通報、

會議與動員之聯絡管道。

五、 整合實驗室之專長與流行病學專業人力的智慧，透過流行病學的方法，有系統的設計建構我國不明原因疫病之快速檢驗能力。

六、 強化國內合作：在傳染病的研究領域內，國內的學術單位、政府機關與醫學院的研究能力並不輸給國際上的其他團隊，但是往往受限於各自獨立進行研究，研究規模太小；加上國人普遍害羞表達自我意見、缺乏腦力激盪的火花，以至於少有令人驚艷的創新思維。建議國內的研究單位發起自發性的整合研究計畫，朝向開創出原創性思維研究的方向努力，加強互動與溝通，減少彼此間的猜忌與分化，並多多朝向跨國研究的方向進行，久而久之自然可以開創出我國的優勢研究領域。

七、 選擇國家重點方針：運用數學模式來進行防治策略與風險評估的優點在於可以隨時評估其有效與否？成本效益如何？傳染模式是否改變？可感受性宿主佔所有族群的比例？進而可以隨時修正防治策略，對症下藥，有效節省防疫成本。

八、 拓展國際交流：給予需要協助的國家協助，是換取經驗與獲得認同的重要方法。台灣有許多寶貴的熱帶醫學防治經驗，可資其他國家作為參考。建議當鄰近的國家出現新興或再浮現傳染病時，我國能夠主動派遣防疫人員前往協助防疫，除了可以增進兩國之誼，也能夠從中學習，更強化我國的防疫經驗。

六、附件

陸、附件

一、 美國疾病管制及預防中心嚴重急性呼吸道症候群個案通報表

二、 美國疾病管制及預防中心嚴重急性呼吸道症候群疫情調查標準語彙表

三、 美國疾病管制及預防中心嚴重急性呼吸道症候群疫情調查模組定義、屬性與格式表

四、 美國疾病管制及預防中心嚴重急性呼吸道症候群偵測、準備與防治工作手冊

美國疾病管制及預防中心嚴重急性呼吸道症候群
個案通報表

Version 4-29-03 12 pm

Form Approved
OMB No. 0920-0008
Exp. Date _____

SARS Report Intake Form **CDC ID#**

1. Name/affiliation of person filling out form				STATE ID # *(if any)*			
Date of Report:	MM	DD	2003	**Time of Report:**	:	AM PM	
2. State Health Department Contact	Last Name:		First Name:		**State:**		
Phone: ( )	Pager: ( )		Other ( )	☐ Phone ☐ Fax	Other ( )	☐ Phone ☐ Fax	
If reporter is not from State Health Department, has HD been notified?	☐ Yes ☐ No ☐ N/A	Notified by EOC? ☐ Yes Date:					
3. Reporter or Clinician Contact	Last Name:		First Name:				
Hospital or Clinic Name:					City:		
County/Borough:	State:				ZIP:		
Phone: ( )	Pager: ( )		Other ( )	☐ Phone ☐ Fax	Other ( )	☐ Phone ☐ Fax	
4. Patient Information	Last Name:		First Name:				
City of residence:	County/Boro of residence:		State of Residence:		ZIP:	Country:	
Phone 1: ( )	☐ Patient ☐ Other		Phone 2: ( )		☐ Patient ☐ Other		
Date of Birth: MM DD YYYY	Age _____	☐ Years ☐ Months	Sex	☐ Male ☐ Female			
Is the patient pregnant now?	☐ Yes ☐ No ☐ Don't Know	Expected Delivery Date: ___/___/____	Is the patient breast feeding now?	☐ Yes ☐ No			
Ethnicity: ☐ Hispanic ☐ Non-Hispanic	Race: ☐ American Indian/Alaskan Native ☐ Asian ☐ Black ☐ Native Hawaiian /Other Pacific Islander ☐ White ☐ Other: _____						
Nationality: _____	Residency:	☐ U.S. Resident ☐ Non-U.S. Resident					
5. Occupation	Healthcare worker?	☐ Yes ☐ No	***If yes, specify*** ☐ Physician ☐ Nurse/PA ☐ Laboratory ☐ **Other:** _____				
If ***not a*** healthcare worker, list occupation:							

Patient Name: _____ **CDC ID #:** _____

6. Signs and Symptoms	Date of symptom onset:	MM	DD	YYYY
	Date of fever onset:	MM	DD	YYYY

Check all signs and symptoms that apply

Measured Temperature?	☐ Yes ☐ No	If no, was an unmeasured Temperature reported?			☐ Yes ☐ No
☐ Measured Temperature > 38°C (100.4°F)	Highest Measured Temperature _____	☐°C ☐°F	☐ Cough	☐ Shortness of breath/ difficulty breathing	
☐ Hypoxia (Room air O_2 saturation < 94%)		☐ Respiratory Distress Syndrome—(ARDS)			

☐ Other symptoms or relevant findings, List:

7. Clinical status at the time of report	☐ Outpatient ☐ Emergency Room ☐ Inpatient ☐ Died ☐ Left Against Medical Advice ☐ Transferred to Another Facility ☐ Unknown

Date of first health care evaluation for this illness: ___/___/_____	Date of this health care evaluation: ___/___/_____

Was patient hospitalized for > 24 hours during course? ☐ Yes ☐ No ☐ Unknown

Was patient admitted to the intensive care unit (ICU)?	☐ Yes ☐ No ☐ Unknown	Is patient currently in ICU?	☐ Yes ☐ No ☐ Unknown
Was patient placed on mechanical ventilation?	☐ Yes ☐ No ☐ Unknown	Is patient currently on mechanical ventilator?	☐ Yes ☐ No ☐ Unknown

Date of Hospitalization:	MM	DD	YY	**Date of Discharge or Death**	MM	DD	YY
Name of Hospital:		**City:**		**State:**	**Phone number:**		
***If transferred,* Date of transfer:**	MM	DD	YY	**Date of Discharge or Death from receiving hospital**	MM	DD	YY
Name of Receiving Hospital:		**City:**		**State:**	**Phone number:**		

Did the patient **donate** blood or plasma:

a. in the 14 days before fever or respiratory symptoms began?	☐ Yes ☐ No ☐ Don't Know	b. while symptomatic or in the 28 days after symptoms stopped?	☐ Yes ☐ No ☐ Don't Know
Did the patient receive a blood transfusion in the 14 days before fever or respiratory symptoms began?			☐ Yes ☐ No ☐ Don't Know

If patient died: Was an autopsy performed?	☐ Yes ☐ No ☐ Unknown	Was pathology consistent with Respiratory Distress Syndrome?	☐ Yes ☐ No ☐ Unknown
What was the cause of death based on autopsy? _____			☐ Unknown

Patient Name: _____ **CDC ID #:** _____

8. Diagnostic evaluation:	Was a chest X-Ray performed?	☐ Yes ☐ No ☐ Don't Know

☐ Radiographic findings of pneumonia - Lobar consolidation
☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Radiographic findings of pneumonia - Interstitial infiltrate
☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Radiographic findings of pneumonia - Pleural effusion
☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Radiographic findings of pneumonia - ARDS
☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Radiographic findings of pneumonia - Other: _____
☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Blood culture(s) ☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Sputum gram stain ☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Rapid Influenza test ☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Respiratory Syncytial Virus ☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Lowest **WBC** Count: _____ ☐ Lowest **Platelet** Count: _____

☐ Convalescent Serum Due Date ___ / ___ / _____ Date Specimen Collected ___ / ___ / _____

Other pertinent diagnostic tests:

☐ Test _____ ☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Test _____ ☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

☐ Test _____ ☐ Positive ☐ Negative ☐ Pending **Comment/Result:** _____

Has an etiology for patient's illness been determined? *If yes*: list: _____	☐ Yes ☐ No

9. Travel History	Did patient travel to any the following destinations within 10 days of symptom onset? ☐ Yes, ***specify below*** ☐ No ☐ Unknown travel history								
1. Hanoi, Vietnam	☐ Yes ☐ No ☐ Unk	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
2. Singapore	☐ Yes ☐ No ☐ Unk	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
3. Toronto, Canada	☐ Yes ☐ No ☐ Unk	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
4. Taiwan	☐ Yes ☐ No ☐ Unk	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
5. China, mainland	☐ Yes ☐ No ☐ Unk	If Yes, specify which locations in sections 1a.-1gg. If No or Unk, please skip to section 2.							
a. ☐ Anhui Province, PRC		**DATES** From:	MM	DD	YY	To:	MM	DD	YY

Patient Name: _____ **CDC ID #:** _____

b. ☐ Beijing city	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
c. ☐ Chongqing city	**DATES** From:	MM	DD	YY	To:		DD	YY
d. ☐ Fujian Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
e. ☐ Gansu Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
f. ☐ Guizhou Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
g. ☐ Guangdong Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
h. ☐ Guangxi Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
i. ☐ Hainan Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
j. ☐ Hebei Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
k. ☐ Heilongjiang Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
l. ☐ Henan Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
m. ☐ Hong Kong city	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
n. ☐ Hubei Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
o. ☐ Hunan Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
p. ☐ Jiangsu Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
q. ☐ Jiangxi Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
r. ☐ Jilin Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
s. ☐ Liaoning Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
t. ☐ Macao city	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
u. ☐ Inner Mongolia (Nei Mongol) Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
v. ☐ Ningxia Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
w. ☐ Qinghai Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
x. ☐ Shanxi Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
y. ☐ Shandong Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY

Patient Name: _____ **CDC ID #:** _____

z. ☐ Shanghai city	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
aa. ☐ Shanxi Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
bb. ☐ Sichuan Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
cc. ☐ Tianjin city	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
dd. ☐ Tibet (Xizang) Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
ee. ☐ Xinjiang Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
ff. ☐ Yunnan Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
gg. ☐ Zhejiang Province, PRC	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
6. ☐ Other _____ City/State/Country	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
7. ☐ Other _____ City/State/Country	**DATES** From:	MM	DD	YY	To:	MM	DD	YY
8. ☐ Other _____ City/State/Country	**DATES** From:	MM	DD	YY	To:	MM	DD	YY

Purpose(s) of trip and activities: ☐ Business ☐ Visit Family/Friends ☐ Vacation ☐ Other

Did patient travel with a group or a group tour? *If yes, give the contact information for the group organizer below:*	☐ Yes ☐ No ☐ Unknown

Name of group or organization:	Name of contact person in charge:	
Contact Phone: ( )	Contact Fax: ( )	Contact Email:

Please answer following questions only if patient spent time in Hong Kong (including only airline transfers):

Did patient overnight or have a day room in a hotel in Hong Kong?	☐ Yes ☐ No ☐ Unknown

At which hotel did patient overnight or have a day room in Hong Kong?

Dates of hotel contact: ____/____/_____ to ____/____/_____	Nights spent in hotel:	Floor(s) of hotel visited:	Room number(s):

Did patient ever go into the Metropole Hotel for any reason?
☐ Yes, ***specify below*** ☐ No ☐ Don't know

If yes, please describe what patient did in the hotel?

Did the patient share any form of transportation with persons that patient knew where Metropole Hotel guests?
☐ Yes, ***specify below*** ☐ No ☐ Don't know

If yes, please describe the circumstances:

Patient Name: _____ **CDC ID #:** _____

10. Flight History *List all travel by plane or ship in the 10 days before onset:*

Date?	Departure Location?	Arrival Location?	Cruise Line?	Airline?	Flight #?

Did the patient receive a yellow card as they disembarked from their return flight from Asia instructing them to seek medical evaluation if they became ill? ☐ Yes ☐ No ☐ Unknown

11. Contact history In the 10 days prior to onset of symptoms, did the patient have close contact with any person with respiratory illness and travel to the areas mentioned above? ***If yes, give contact information below*** ☐ Yes ☐ No ☐ Unknown

In the 10 days prior to onset of symptoms, did the patient have close contact with any person under investigation for SARS? ***If yes, give contact information below*** ☐ Yes ☐ No ☐ Unknown

Contact Last: First: CDC ID# ☐ Household ☐ Healthcare worker ☐ Other ________ Contact Date Initial ___/___/___ End ___/___/___

Did contact travel to area with SARS transmission? ☐ Yes ☐ No ☐ Unknown ***If yes, where?*** ____________________

Contact Last: First: CDC ID# ☐ Household ☐ Healthcare worker ☐ Other ________ Contact Date Initial ___/___/___ End ___/___/___

Did contact travel to area with SARS transmission? ☐ Yes ☐ No ☐ Unknown ***If yes, where?*** ____________________

Contact Last: First: CDC ID# ☐ Household ☐ Healthcare worker ☐ Other ________ Contact Date Initial ___/___/___ End ___/___/___

Did contact travel to area with SARS transmission? ☐ Yes ☐ No ☐ Unknown ***If yes, where?*** ____________________

12. FOR CDC use only :

Notes:

Completed forms should be faxed to the CDC Emergency Operations Center at 770-488-7107.

Patient Name: ____________________ **CDC ID #:** ____________________

美國疾病管制及預防中心嚴重急性呼吸道症候群疫情調查標準語彙表

CASE:

- SARS ID
  - Identification given by the SARS Web application
  - Unique ID across jurisdictions
- State Health Department SARS ID
  - Identification given by the state jurisdiction to track the case within the jurisdiction
  - Unique ID within the jurisdiction
- Local Health Department SARS ID
  - Identification given by a local jurisdiction to track the case within the jurisdiction
  - Unique ID within the local jurisdiction.
- Case Status
  - Current/latest state of the case.
  - Standard Vocabulary:
    - RUI-1 Symptomatic
    - RUI-2 WHO-defined Suspect Case
    - RUI-3 WHO-defined Probably Case
    - RUI-4
    - Probably SARS –CoV Case
    - Confirmed SARS-CoV Case
    - Not a Case: Negative Serology
    - Not a Case: Alternative Diagnosis Accounts for Illness
- Demographic Information
  - Demographic information will be captured in the standard OMS data
  - Name; Address; Telephone, etc.
  - Multiple names, address, telephone numbers may be captured in OMS.
- Work Shift
  - The hours worked by a case may need to be tracked, especially in the situation of a health care worker.
  - Days of week worked and hours of shift worked will be captured.
- Initiating Jurisdiction
  - The initiating jurisdiction will be captured for the case.
  - Standard Vocabulary:
    - The standard jurisdiction list of US states, protectorates and large-city jurisdictions.
- Inter-Jurisdiction Communication
  - Communication between jurisdictions may take place
  - Information about the communication includes:
    - Date of communication
      - standard date format (mm/dd/yyyy);
    - Time of communication
      - free-text input;
    - Jurisdiction spoken with
      - Standard Jurisdiction vocabulary of US states, protectorates and large-city jurisdictions;
    - Person spoken with
      - Free-text entry
    - Interviewer Name
      - Free-text entry
- Case Relationship to a Travel Conveyance

  - A SARS Case may have a link to a conveyance.
  - Information about this link would include
    - Date of travel
      - standard date format (mm/dd/yyyy);
    - Time of travel
      - free-text input;
    - Type of conveyance
      - Standard Vocabulary:
        - Airline
        - Automobile
        - Bus
        - Cruise
        - Tour Group
        - Train
        - Other
    - Originating City
      - Free-text input
    - Originating State
      - Standard State Vocabulary using FIPS Alpha-codes
    - Originating Country
      - Standard Country Vocabulary using FIPS Alpha-codes
    - Destination City
      - Free-text input
    - Destination State
      - Standard State Vocabulary
    - Destination Country
      - Standard Country Vocabulary
    - Carrier
      - Free-text input
    - Flight/Route Number
      - Free-text input
    - Seat Assignment
      - Free-text input

CONTACT:

- State Health Department Contact ID
  - Identification given by the state jurisdiction to track the contact within the jurisdiction
  - Unique ID within the jurisdiction
- CDC Contact ID
  - The CDC SARS contact identifier
  - Unique ID across jurisdictions
- Local Health Department Contact ID
  - Identification given by a local jurisdiction to track the contact within the jurisdiction
  - Unique ID within the jurisdiction.
- Status of Investigation
  - The most current status of the contact investigation.
  - Standard Vocabulary:
    - Active – Contact Investigation is under way
    - Pending – Contact Investigation not yet begun
    - Closed-SARS Confirmed
    - Closed-SARS Probable
    - Closed-Not Infected.
- Demographic Information (Multiple names, address, telephone numbers may be captured in OMS.)
  - First Name
  - Last Name
  - Street Address
  - City
  - State
  - County
  - Zip
  - Home Telephone
  - Work Telephone
  - Cellular Telephone
  - Pager
  - Email Address
  - Occupation
    - Standard Vocabulary from Standard Industry Codes (SIC):
      - Health Diagnosing and Treating Practitioners
      - Nursing Aides, Orderlies, and Attendants
      - Clinical Laboratory Technologists and Technicians
      - Transportation Occupations
      - Guides
      - Firefighting and Fire Prevention Occupations
      - Sheriffs, Bailiffs, and Other Law Enforcement Officers
      - Correctional Institution Officers
      - Teachers College, University, and Other Post Secondary Institutions
      - Elementary School Teachers
      - Secondary School Teachers
      - Child Care Workers, Except Private Household
      - Military Occupations
      - General Office Occupations
      - Engineering and Related Technologists and Technicians

      - Computer, Mathematical, and Operations Research Occupations
      - Social Scientists, Social Workers, Religious Workers, and Lawyers
      - Agricultural, Forestry, and Fishing Occupations
  - Employer Information
  - Work Shift
    - The hours worked by a case may need to be tracked, especially in the situation of a health care worker. Days of week worked and hours of shift worked will be captured
  - US Citizen (Y/N)
    - Standard Vocabulary:
      - Yes
      - No
  - Date of Birth
    - Date Format (mm/dd/yyyy)
  - Race
    - Standard Vocabulary:
      - American Indian/Alaskan Native
      - Asian
      - Black/African American
      - White
      - Native Hawaiian/Pacific Islander
      - Unknown
  - Ethnicity
    - Standard Vocabulary:
      - Hispanic or Latino
      - Not Hispanic or Latino;
      - No information given
  - Gender
    - Standard Vocabulary:
      - Male
      - Female
      - Unknown
  - Pregnant (Y/N)
    - Standard Vocabulary:
      - Yes
      - No
      - Unknown
- Initiating Jurisdiction
  - The initiating jurisdiction may be captured at the following level: Country; State or County
  - Standard Vocabulary:
    - The standard vocabularies for: Country, State Jurisdictions (including protectorates and large-city); and State/Counties will be presented.
- Investigating Jurisdiction
  - The investigating jurisdiction may be captured at the following level: Country; State or County
  - Standard Vocabulary:
    - The standard vocabularies for: Country; State Jurisdictions (including protectorates and large-city); and State/Counties will be presented.
- Inter-Jurisdiction Communication
  - Communication between jurisdictions may take place.

- Information about the communication includes:
  - Date of communication
    - standard date format (mm/dd/yyyy);
  - Time of communication
    - free-text input;
  - Jurisdiction spoken with.
    - Standard Jurisdiction vocabulary;
  - Notes
    - free-text input
  - Person spoken with
    - free-text entry,
  - Notes
    - free-text entry
  - Interviewer Name
    - Free-text entry

- Contact Relationship to a Travel Conveyance
  - A SARS Contact may have a link to a conveyance. Information about this link would include.
    - Date of travel
      - standard date format (mm/dd/yyyy);
    - Time of travel
      - free-text input;
    - Type of conveyance
      - From Standard Vocabulary of
        - Airline
        - Automobile
        - Bus
        - Cruise
        - Tour Group
        - Train
        - Other
    - Originating City
      - Free-text input
    - Originating State
      - Standard State Vocabulary
    - Originating Country
      - Standard Country Vocabulary
    - Destination City
      - Free-text input
    - Destination State
      - Standard State Vocabulary
    - Destination Country
      - Standard Country Vocabulary

SARS Exposure Information – Person Contact

- Relationship to Case
  - A description of the relationship which may exist between the contact and the case.
  - Standard Vocabulary
    - Household
    - Social/Extended Family
    - Work
    - Health Care Worker – Patient Care
    - Health Care Worker – Non-Patient Care
    - Hospital Patient
    - Hospital Visitor
    - Common Conveyance
    - School
    - Long Term Care Facility
    - Other.
- Date of First Exposure
  - This is the first date in which the contact was exposed to the case.
  - Date Format (mm/dd/yyyy)
- Date of Last Exposure
  - This is the last date in which the contact was exposed to the case.
  - Date Format (mm/dd/yyyy)
- Place of Exposure
  - A place of exposure may be work; household, etc.
  - Standard Vocabulary
    - Household
    - Travel Companion
    - Healthcare
    - Work
    - Other.
- Priority
  - Based upon the contact proximity and duration to the case and the Case a matrix of priority values determines a "priority of exposure".
  - Standard Vocabulary:
    - H1
    - H2
    - H3
    - M1
    - M2
    - M3
    - L1
    - L2
    - L3.

Restriction Information – Person Contact

- Activity Restriction (Y/N)
  - Is this contact on some type of activity restriction?
  - Standard Vocabulary:
    - Yes
    - No
- Type of Restriction
  - Standard Vocabulary:
    - Passive Monitoring;
    - Active monitoring without activity restriction
    - Active monitoring with activity restriction – Home
    - Active monitoring with activity restriction – Facility
    - Work quarantine.
- Place of Restriction
  - If the contact is on restriction, where is the place of restriction?
  - Standard Vocabulary:
    - Home
    - Hospital
    - Other
- Address of Restriction
  - Free text
- Telephone Number at Restriction site
  - Free text
- Type of Order
  - Standard Vocabulary:
    - Voluntary
    - Mandatory
- Date of Order
  - Date Format (mm/dd/yyyy)
- Order ending date
  - Date Format (mm/dd/yyyy)

Contact Daily Communications

- Date of Communication
  - Date Format (mm/dd/yyyy)
- Time of communication
  - Free text
- Communication Performed by
  - The name of the person communicating with the contact
  - Free-text
- Communication Type
  - Standard Vocabulary:
    - Telephone Call
    - Home Visit
    - Other
- Health Status at time of communication
  - Standard Vocabulary:
    - Asymptomatic
    - Unable to locate/no answer
    - Unable to locate/left message
    - Ill-previous condition (non-SARS)
    - Ill-pending diagnosis
    - Other.
- Follow-up date
  - Date Format (mm/dd/yyyy)
- Follow-up Reason
  - Standard Vocabulary:
    - Status questionable
    - too early for rule out
    - continued exposure to case
    - potential case
- Action taken
  - Standard Vocabulary:
    - None
    - refer to MD
    - placed on activity restriction
- Developed Fever?
  - Has the contact developed a fever since last communication?
  - Standard Vocabulary:
    - Yes
    - No
- Date of Fever Onset
  - Date Format (mm/dd/yyyy)
- If Fever, Measured Temperature
  - What is the temperature if the contact has a fever?
  - Numeric Decimal
- Developed "Runny Nose"?
  - Has the contact developed a "runny nose" since last communication?
  - Standard Vocabulary:
    - Yes

- No
- Date of "Runny Nose" Onset
  - Date Format (mm/dd/yyyy)
- Developed Chills?
  - Has the contact developed chills since last communication?
  - Standard Vocabulary:
    - Yes
    - No
- Date of Chills Onset
  - Date Format (mm/dd/yyyy)
- Developed Coughing?
  - Has the contact developed a cough since last communication?
  - Standard Vocabulary:
    - Yes
    - No
- Date of Cough Onset
  - Date Format (mm/dd/yyyy)
- Developed Shortness of Breath
  - Has the contact developed shortness of breath since last communication?
  - Standard Vocabulary:
    - Yes
    - No
- Date of SOB Onset
  - Date Format (mm/dd/yyyy)
- Has the contact been hospitalized or sought medical care?
  - Has the contact been hospitalized or sought medical care since last communication?
  - Standard Vocabulary:
    - Yes
    - No
- Type of care sought
  - What type of care did the contact seek out, i.e., emergency, etc.
  - Free-Text
- Type of Medical Facility
  - What type of facility did the medical care take place?
  - Standard Vocabulary:
    - Hospital
    - SARS-designated facility
    - Outpatient Clinic
    - Private MD office
    - Other
- Medical Care Admission Date or Appointment Date
  - What is the admission date or date of appointment if medical care or hospitalization has taken place?
  - Date Format (mm/dd/yyyy)
- Name of Medical Facility or Physician
  - Free-text
- Street Address of Facility or Physician
  - Free-text
- Address City of Facility or Physician

  - Free-text
- Address State of Facility or Physician
  - Standard Vocabulary:
    - List of States
- Telephone of Facility or Physician
  - Free-text
- If Restricted, was contact present at monitoring time?
  - Standard Vocabulary:
    - Yes
    - No
- If Restricted and not present; when contact was located - Date
  - Date when non-present restricted contact was located
  - Date Format (mm/dd/yyyy)
- If Restricted and not present, when contact was located - Time
  - Time when non-present restricted contact was located.
  - Free-text
- Actions Required to Locate Contact
  - Standard Vocabulary:
    - Contact came in on own
    - Message left at Home
    - Health Department sent to locate
    - Law Enforcement Sent to Locate
- Responses to Contact Disappearance
  - Standard Vocabulary:
    - Quarantine Order
    - Guard
    - Electronic Surveillance
    - Detention Facility

Treatment/Evaluations/Lab

- Date of Treatment/Test
  - Date Format (mm/dd/yyyy)
- Type of Treatment/Test
  - Standard Vocabulary:
    - Prophylaxis
    - Chest X-Ray
    - Pulse oximetry
    - Other
- Lab
  - (Kristi reviewing the lab vocabulary To include:
  - Nasopharyngeal wash/aspirate
  - Nasopharyngeal swabs
  - Oropharyngeal swabs
  - Broncheoalveolar lavage
  - Tracheal aspirate
  - Pleaural tap
  - Sputum
  - Acute serum
  - Convalescent Serum
  - EDTA blood/plasma
  - Stool
  - CBC with differential
  - Sputum Gram's stain and culture
  - testing for Influenza A
  - testing for Influenza B
  - testing for RSV
  - Other
- If prophylaxis: Which used?
  - Standard Vocabulary:
    - Ribavirine
    - Other Anti-Viral
    - Steroid
    - Other
- Treatment Specifics
  - List the specifics of the treatment, i.e., dosage/duration of prophylaxis

美國疾病管制及預防中心嚴重急性呼吸道症候群疫情調查模組定義、屬性與格式表

CaseDefinition	CaseDefinitionId		Long Integer	4	Positive integer	N/A	System assigned unique ID for a case definition.
CaseDefinition	DateFrom		Date/Time	8	Date	N/A	Case start date.
CaseDefinition	DateTo		Date/Time	8	Date	N/A	Case end date.
CaseDefinition	CaseDefDesc		Memo	0	Freeform text	N/A	Case descriptions.
CaseDefinition	Organization		Text	100	Freeform text	N/A	Organization name.
CaseDefinition	CurrentDef		Long Integer	4	1 or null	1=active record, null=inactive	Is this record active?
Conveyance	ConveyanceId		Numeric	9	Positive integer	N/A	System assigned ID for a specific conveyance.
Conveyance	ConveyanceInstance		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific conveyance.
Conveyance	DeptAirCodeId		Long Integer	4	Defined in IkuAirCode.AirCodeId	See IkuAirCode	Departure airport.
Conveyance	ArrAirCodeId		Long Integer	4	Defined in IkuAirCode.AirCodeId	See IkuAirCode	Arrival airport.
Conveyance	CompanyId		Long Integer	4	Defined in IkuCompany.CompanyId	See IkuCompany	Company the conveyance belongs to.
Conveyance	DeptCountryId		Long Integer	4	Defined in IkuCountry.CountryID	See IkuCountry	Departure country.
Conveyance	ArrCountryId		Long Integer	4	Defined in IkuCountry.CountryID	See IkuCountry	Arrival country.
Conveyance	DeptStateProv		Text	100	Freeform text	N/A	Departure state/province.
Conveyance	ArrStateProv		Text	100	Freeform text	N/A	Arrival state/province.
Conveyance	DeptCity	DeptCity	Text	100	Freeform text	N/A	Depature city.
Conveyance	ArrCity	ArrCity	Text	100	Freeform text	N/A	Arrival city.
Conveyance	ConveyanceIdent		Text	50	Freeform text	N/A	Conveyance ID, flight number...
Conveyance	ConveyanceTypeId	ConveyanceType	Long Integer	4	Defined in IkuCOnveyanceType.ConveyanceTypeId	1=Airline, 2=Train, 3=Cruise, 4=Tour Group, 5=Bus	Conveyance type.
Conveyance	Comments		Text	250	Freeform text	N/A	Comments, details about the conveyance.
Conveyance	DeptDate	DeptDate	Date/Time	8	Date	N/A	Departure date.
Conveyance	ArrDate		Date/Time	8	Date	N/A	Arrival date.
Conveyance	PaxNum		Long Integer	4	Positive integer	N/A	Total number of passengers.
Conveyance	CrewNum	CrewNum	Long Integer	4	Positive integer	N/A	Total number of crew.
ConveyanceQA	ConveyanceID		Numeric	9			This table is not used.
ConveyanceQA	ConveyanceInstanceID		Numeric	9			This table is not used.
ConveyanceQA	ManifestRequestedId		Long Integer	4			This table is not used.
ConveyanceQA	ManifestRequestedDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestReceivedId		Long Integer	4			This table is not used.
ConveyanceQA	ManifestReceivedDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestCustomsDeclRequestedId		Long Integer	4			This table is not used.
ConveyanceQA	ManifestContactInfoRequestedDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestCustomsDeclReceivedId		Long Integer	4			This table is not used.
ConveyanceQA	ManifestContactInfoReceivedDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestSortedId		Long Integer	4			This table is not used.
ConveyanceQA	ManifestSortedDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestToStateId		Long Integer	4			This table is not used.
ConveyanceQA	ManifestToStateDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestE1Staff		Text	70			This table is not used.
ConveyanceQA	ManifestE1DistdDate		Date/Time	8			This table is not used.

ConveyanceQA	ManifestE1RetndDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestE2Staff		Text	70			This table is not used.
ConveyanceQA	ManifestE2DistdDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestE2RetndDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestQ1Staff		Text	70			This table is not used.
ConveyanceQA	ManifestQ1DistdDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestQ1RetndDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestQ2Staff		Text	70			This table is not used.
ConveyanceQA	ManifestQ2DistdDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestQ2RetndDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestQ3Staff		Text	70			This table is not used.
ConveyanceQA	ManifestQ3DistdDate		Date/Time	8			This table is not used.
ConveyanceQA	ManifestQ3RetndDate		Date/Time	8			This table is not used.
ConveyanceQA	DeQrComplete		Long Integer	4			This table is not used.
dtproperties	id		Long Integer	4			This table is not used.
dtproperties	objectid		Long Integer	4			This table is not used.
dtproperties	property		Text	64			This table is not used.
dtproperties	value		Text	255			This table is not used.
dtproperties	uvalue		Text	255			This table is not used.
dtproperties	lvalue		OLE object	0			This table is not used.
dtproperties	version		Long Integer	4			This table is not used.
FormIntake	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person who may have contracted SARS.
FormIntake	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person who may have contracted SARS.
FormIntake	PersonFillingForm		Text	50	Freeform text	N/A	Name of persone filling out form.
FormIntake	CreatedDate		Date/Time	8	Date	N/A	Date form was created.
HealthDepartment	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person who may have contracted SARS.
HealthDepartment	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person who may have contracted SARS.
HealthDepartment	StateID	HDCStateID + HDCStateName	Long Integer	4	Defined in lkuState.StateID	See lkuState	Health Dept. St ID
HealthDepartment	Phone	HDCPhone	Text	20	Freeform text	N/A	Health Dept. Contact Phone Number
HealthDepartment	Pager	HDCPager	Text	20	Freeform text	N/A	Health Dept. Contact Pager Number
HealthDepartment	OtherPhone1	HDCOtherPhone1	Text	20	Freeform text	N/A	HD Contact Alt. Phone Number 1
HealthDepartment	OtherPhone1Type	HDCOtherPhone1typeID	Long Integer	4	Defined in lkuPhoneType.PhoneTypeID	0=Other, 1=Phone, 2=Fax, 3=Patient, 4=Other	HD Contact Alt. Phone Number 1 type ID
HealthDepartment	OtherPhone2	HDCOtherPhone2	Text	20	Freeform text	N/A	HD Contact Alt. Phone Number 2
HealthDepartment	OtherPhone2Type	HDCOtherPhone2typeID	Long Integer	4	Defined in lkuPhoneType.PhoneTypeID	See lkuPhoneType	HD Contact Alt. Phone Number 2 type ID
HealthDepartment	LName	HDCLName	Text	50	Freeform text	N/A	Health Dept. Contact Last Name
HealthDepartment	FName	HDCFName	Text	50	Freeform text	N/A	Health Dept. Contact First Name
HealthDepartment	CountryId	HDCountryID	Long Integer	4	Defined in lkuCountry.CountryID	See lkuCountry	Health Dept. Country ID
HealthDepartment	email	HDEmail	Text	50	Freeform text	N/A	Health Dept. Contact E-mail address
Location	LocationID		Numeric	9	Positive integer	N/A	System assigned unique id for a location.
Location	LocationName		Text	100	Freeform text	N/A	Name of the location.
Location	CountryID		Long Integer	4	Defined in lkuCountry.CountryID	See lkuCountry	Location country ID.

Location	StateID		Long Integer	4	Defined in IkuState.StateID	See IkuState	Location state ID.
Location	City		Text	100	Freeform text	N/A	Location city name.
Person	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person.
Person	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person.
Person	LName	PLName	Text	50	Freeform text	N/A	Person Last Name
Person	FName	PFName	Text	50	Freeform text	N/A	Person First Name
Person	Phone1	PPhone1	Text	20	Freeform text	N/A	Person Phone Number 1
Person	Phone1TypeID	PPhone1TypeID	Long Integer	4	Defined in IkuPhoneType.PhoneTypeID	See IkuPhoneType	Person Phone Number 1 Type Id
Person	Phone2	PPhone2	Text	20	Freeform text	N/A	Person Phone Number 2
Person	Phone2TypeID	PPhone2TypeID	Long Integer	4	Defined in IkuPhoneType.PhoneTypeID	See IkuPhoneType	Person Phone Number 2 Type ID
Person	email		Text	100	Freeform text	N/A	Person email address
Person	City	PCity	Text	100	Freeform text	N/A	Person City
Person	CountyBorough	PCountyBorough	Text	100	Freeform text	N/A	Person county/borough
Person	StateID	PStateID + PStateName	Long Integer	4	Defined in IkuState.StateID	See IkuState	Patient State ID
Person	ZIP	PZip	Text	10	Freeform text	N/A	Person Zip Code
Person	CountryID	PCountryID + PCountryName	Long Integer	4	Defined in IkuCountry.CountryID	See IkuCountry	Person Country ID
Person	DOB	PDate_Birth	Date/Time	8	Date	N/A	Person Date of Birth
Person	SexID	PSexID + PSexName	Long Integer	4	Defined in IkuSex.SexID	1=Male, 2=Female	Person Sex ID
Person	RaceID	PRaceID + PRaceName	Long Integer	4	Defined in IkuRace.RaceID	1=White, 2=Black, 3=Asian, 4=American Indian/Alaska Native, 5=Other, 6=Native Hawaiian/Other Pacific Islander	Person Race ID
Person	RaceOtherName	PRaceOtherName	Text	50	Freeform text	N/A	Person race details or if not listed in IkuRace.
Person	EthnicityID	PEthnicityId + PEthnicityName	Long Integer	4	Defined in IkuEthnicity.EthnicityID	1=Hispanic, 2=non-Hispanic	Person Ethnicity ID
Person	Nationality	PNationality	Text	100	Freeform text	N/A	Person Nationality
Person	Age	PAge	Long Integer	4	Positive integer	N/A	Person Age
Person	AgeTypeID	PAgeTypeId	Long Integer	4	Defined in IkuAgeType.AgeTypeID	1=Years, 2=Months	Person Age Type ID
Person	HealthCareWorker	PHealthCareWorkerID + PHealthCareWorkerName	Long Integer	4	Yes, No	1=Yes, 2=No	Is this person a healthcare worker.
Person	HCWTypeID	PHCWTypeID +PHCWTypeName	Long Integer	4	Defined in IkuHCWType.HCWTypeID	1=Physician, 2=Nurse/PA, 3=Laboratory	Person Health Care Worker Type ID
Person	HCWOtherName	PHCWOtherName	Text	100	Freeform text	N/A	Name of healthcare worker type if no listed in IkuHCWType.
Person	NonHCWOccupation	PNonHCWOccupation	Text	100	Freeform text	N/A	Person Non-HCW Occupation
Person	CreatedByUserID		Text	20	Freeform text	N/A	User ID of the person who created this record.
Person	LocalCaseNum		Text	20	Freeform text	N/A	Local case ID number.

Person	SuspectCaseID		Long Integer	4	Define in IkuSuspectCase.SuspectCaseId	1=Suspected Case, 2=Not a Case, 3=Probable Case, 4= Confirmed Case, 5=Specimens Testing, 6=Special Interest	Suspected case status.
Person	DomesticIntID		Long Integer	4	Defined in IkuDomesticInt.DomesticIntID	1=Domestic, 2=International	Is this case domestic or international?
Person	HDNotifiedID	HDNotifiedID + HDNotifiedYN	Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo	If reporter is not from State Health Department, has HD been notified?
Person	NotifiedByEOCID	NotifiedByEOCID	Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo	Notified by EOC?
Person	NotifiedDate	NotifiedDate	Date/Time	8	Date	N/A	EOC Notification Date
Person	JurID		Long Integer	4	Defined in IkuJurisdiction.JurId	See IkuJurisdiction	Jurisdiction.
Person	DateOfReport	DateOfReport	Date/Time	8	Date	N/A	Date of report.
Person	CreateDate		Date/Time	8	Date	N/A	Date this person record is created.
Person	LastMod		Date/Time	8	Date	N/A	Date this person record is last modified.
Person	PResidencyID	PResidencyID	Long Integer	4	Defined in IkuResidency.ResidencyID	1=US Resdent, 2=non-Resident	U.S. Residency?
Person	Province	Province	Text	50	Freeform text	N/A	Province of Person
Person	PassportNum		Text	75	Freeform text	N/A	Passport number.
Person	VisaType		Text	30	Freeform text	N/A	Type of Visa.
Person	EntityID		Long Integer	4	Defined in IkuEntity.EntityID	1=Person, 2=Object, 3=Animal	Entity type.
PersonAlias	PersonId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person
PersonAlias	InstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person.
PersonAlias	AliasId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person's alias.
PersonAlias	AliasInstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person's alias.
PersonAlias	fName		Text	50	Freeform text	N/A	First name.
PersonAlias	lName		Text	50	Freeform text	N/A	Last name.
PersonCaseStatus	PersonCaseStatusId		Numeric	9	Positive integer	N/A	System assigned case status ID for a specific person.
PersonCaseStatus	PersonCaseStatusInstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific case status.
PersonCaseStatus	PersonId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person.
PersonCaseStatus	InstanceId	InstanceId	Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person.
PersonCaseStatus	CaseStatusId	CaseStatusId	Long Integer	4	Defined in IkuCaseStatus.CaseStatusId	1=Suspected Case, 2=Not a Case, 3=Probable Case, 4= Confirmed Case, 5=Specimens Testing, 6=Special Interest	Case status.

PersonCaseStatus	SourceId	CaseStatusSourceID	Long Integer	4	Defined in IkuSource.SourceId	1=Clinical, 2=ontact	Case source.
PersonCaseStatus	dateChanged	CaseStatusDateChanged	Date/Time	8	Date	N/A	Date the case status record is created.
PersonCaseStatus	CurrDef		Long Integer	4	1 or null	1=active record, null=inactive	Is this record active?
PersonCaseStatusDyn	PersonCaseStatusDynId		Numeric	9	Positive integer	N/A	System assigned case status ID for a specific person.
PersonCaseStatusDyn	PersonCaseStatusDynInstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific case status.
PersonCaseStatusDyn	PersonId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person.
PersonCaseStatusDyn	InstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person.
PersonCaseStatusDyn	CaseStatusId		Long Integer	4	Defined in IkuCaseStatus.CaseStatusId	See IkuCaseStatus	Case status.
PersonCaseStatusDyn	SourceId		Long Integer	4	Defined in IkuSource.SourceId	See IkuSource	Case source.
PersonCaseStatusDyn	dateChanged		Date/Time	8	Date	N/A	Date the case status record is created.
PersonCaseStatusDyn	CurrDef		Long Integer	4	1 or null	1=active record, null=inactive	Is this record active?
PersonClinicalInformation	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person who may have contracted SARS.
PersonClinicalInformation	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person who may have contracted SARS.
PersonClinicalInformation	SymptomNote	SymptomNote	Text	200	Freeform text	N/A	List of other symptoms or relevant findings.
PersonClinicalInformation	DateSympOnset	DateSympOnset	Date/Time	8	Date	N/A	Symptom onset date.
PersonClinicalInformation	DateFeverOnset	DateFeverOnset	Date/Time	8	Date	N/A	Feaver onset date.
PersonClinicalInformation	ClinicalStatusID	ClinicalStatusID	Long Integer	4	Defined in IkuClinicalStatus.ClinicalStatusID	See IkuClinicalStatus	Clinical status at the time of report.
PersonClinicalInformation	HospitalizedID	HospitalizedID	Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo.	Was the person hospitalized for > 24 hour during course?
PersonClinicalInformation	ICUAdmittedID	ICUAdmittedID	Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo.	Was the person admitted to the intensive care unit?
PersonClinicalInformation	ICUCurrentID	ICUCurrentID	Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo.	Is the person currently in ICU?
PersonClinicalInformation	VentilatorID	VentilatorID	Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo.	Was the person placed on mechnical ventilation?
PersonClinicalInformation	VentilatorCurrentID	VentilatorCurrentID	Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo.	Is the person currently on mechanical ventilator?
PersonClinicalInformation	HospDate	HospDate	Date/Time	8	Date	N/A	Date of hospitalization.
PersonClinicalInformation	DischargeDate	DischargeDate	Date/Time	8	Date	N/A	Date of discharge or death.
PersonClinicalInformation	HospName	HospName	Text	100	Freeform text	N/A	Name of hospital.
PersonClinicalInformation	HospCity	HospCity	Text	100	Freeform text	N/A	City name for the hospital.
PersonClinicalInformation	HospStateID	HospStateID	Long Integer	4	Defined in IkuState.StateID	See IkuState	State ID for the hospital.
PersonClinicalInformation	HospPhone	HospPhone	Text	20	Freeform text	N/A	Hospital phone number.
PersonClinicalInformation	TransferDate	TransferDate	Date/Time	8	Date	N/A	Date of transfer if transferred.
PersonClinicalInformation	DisDeathDate	DisDeathDate	Date/Time	8	Date	N/A	Date of discharge or death from receiving hospital.
PersonClinicalInformation	RecHospName	RecHospName	Text	100	Freeform text	N/A	Name of receiving hospital.
PersonClinicalInformation	RecHospCity	RecHospCity	Text	100	Freeform text	N/A	City name for the receiving hospital.
PersonClinicalInformation	RecHospStateID	RecHospStateID	Long Integer	4	Defined in IkuState.StateID	See IkuState	State ID for the receiving hospital.

PersonClinicalInformation	RecHospPhone	RecHospPhone	Text	20	Freeform text	N/A	Receiving hospital phone number.
PersonClinicalInformation	AutopsyID	AutopsyID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	If the person died, was an autopsy performed?
PersonClinicalInformation	PathSARSConsistentID	PathSARSConsistentID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	If the person died, was pathology consistent with Respiratory Distress Syndrome?
PersonClinicalInformation	PathSARSNote		Text	200	Freeform text	N/A	Pathology notes.
PersonClinicalInformation	DeathCause	DeathCause	Text	200	Freeform text	N/A	What was the cause of death?
PersonClinicalInformation	DeathCauseUnkID	DeathCauseUnkID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Is the cause of death unknown?
PersonClinicalInformation	EtiologyID	EtiologyID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Has an etiology for the person's illness been determined?
PersonClinicalInformation	EtiologyNote	EtiologyNotes	Text	200	Freeform text	N/A	List details here if "EtiologyID" is "Yes".
PersonClinicalInformation	MeasuredTempId	MeasuredTempID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Was temperature measured for the person?
PersonClinicalInformation	UnMeasuredTempId	UnMeasuredTempID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Was an unmeasured temperature reported?
PersonClinicalInformation	PDeliveryDate	PDeliveryDate	Date/Time	8	Date	N/A	Expected deliver date if the person is pregnant.
PersonClinicalInformation	BreastFeedingID	BreastFeedingID + BreastFeedingYN	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Is the person currently breast feeding a child?
PersonClinicalInformation	PregnantID	PregnantID + PregnancyYN	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Is the person pregnant now?
PersonClinicalInformation	DateFirstHCEval	DateFirstHCEval	Date/Time	8	Date	N/A	Date of first health care evaluation for this illness.
PersonClinicalInformation	DateThisHCEval	DateThisHCEval	Date/Time	8	Date	N/A	Date of this health care evalutation.
PersonClinicalInformation	DonateBeforeID	DonateBeforeID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Did the person donate blood or plasma in the 14 days before fever or respiratory symptoms began?
PersonClinicalInformation	DonateAfterID	DonateAfterID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Did the person donate blood or plasma while symptomatic or in the 28 days after symptoms stopped?
PersonClinicalInformation	TransfusionID	TransfusionID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Did the person receive a blood transfusion in the 14 days before fever or respiratory symptoms began?
PersonClinicalInformation	ChestXRayID	ChestXRayID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Was a chest x-ray performed for the person?
PersonClinicalInformation	ConvSerumDueDate	ConvSerumDueDate	Date/Time	8	Date	N/A	Convalescent serum due date.
PersonClinicalInformation	DateSpecColl	DateSpecColl	Date/Time	8	Date	N/A	Date specimen collected.
PersonClinicalInformation	HospCountryId		Long Integer	4	Defined in lkuCountry.CountryID	See lkuCountry	Country ID for the hospital.
PersonClinicalInformation	SupOxygenId		Long Integer	4	Date	N/A	Did the person need supplemental oxygen?
PersonClinicalInformation	HospProvince		Text	100	Freeform text	N/A	Province for the hospital.
PersonClinicalInformation	RecHospProv		Text	100	Freeform text	N/A	Province for the receiving hospital.
PersonClinicalInformation	RecHospCountryId		Long Integer	4	Defined in lkuCountry.CountryID	See lkuCountry	Country ID for the receiving hospital.
PersonContact	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person who may have contracted SARS.
PersonContact	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person who may have contracted SARS.
PersonContact	ContactPersonID		Numeric	9	Positive integer	N/A	System assigned object ID for another person who was in contact with the person identified by PersonID & InstanceID.
PersonContact	ContactInstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for another person who was in contact with the person identified by PersonID & InstanceID.

PersonContact	ContactTypeID	ContactTypeID1 .. ContactTypeID5	Long Integer	4	Defined in IkuContactType.ContactTypeID	1=Household, 2=Healthcare Worker, 3=Other	Contact type.
PersonContact	OtherContactTypeName	ContactTypeName1 .. ContactTypeName5	Text	100	Freeform text	N/A	Other contact type if "Contact Type" is "Other".
PersonContact	TravelToSARSArea		Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo.	Did contact travel to area with SARS Transmission?
PersonContact	CityName		Text	100	Freeform text	N/A	City name of the travel if "TravelToSARSArea" is yes.
PersonContact	StateProvinceName		Text	100	Freeform text	N/A	State/Province name of the travel if "TravelToSARSArea" is yes.
PersonContact	CountryID		Long Integer	4	Defined in IkuCountry.CountryID	See IkuCountry	Country ID of the travel if "TravelToSARSArea" is yes.
PersonContact	ContactStart		Date/Time	8	Date	N/A	Initial contact date.
PersonContact	ContactEnd		Date/Time	8	Date	N/A	End contact date.
PersonConveyance	PersonId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person who may have contracted SARS.
PersonConveyance	InstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person who may have contracted SARS.
PersonConveyance	ConveyanceId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific conveyance.
PersonConveyance	ConveyanceInstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific conveyance.
PersonConveyance	AliasId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person's alias.
PersonConveyance	AliasInstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person's alias.
PersonConveyance	ConveyanceNote		Text	250	Freeform text	N/A	Notes/Details of this person-conveyance association.
PersonConveyance	SeatRoomNum		Text	50	Freeform text	N/A	Seat or room number in the conveyance.
PersonConveyance	SympOnConveyanceId		Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo.	Did the person show any symptom while on board of the conveyance?
PersonDiagnostic	PersonDiagnosticID		Long Integer	4	Positive integer	N/A	System assigned unique ID for a diagnostic evaluation.
PersonDiagnostic	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person who may have contracted SARS.
PersonDiagnostic	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person who may have contracted SARS.
PersonDiagnostic	DiagnosticID	Diagnosis1 .. Diagnosis12 (1/0 variables, Suffix defined by values in Lookup tables)	Long Integer	4	Defined in IkuDiagnostic.DiagnosticID	See IkuDiagnostic	Diagnostic test name.
PersonDiagnostic	OutcomeID		Long Integer	4	Defined in IkuOutcome.OutcomeID	1=Positive, 2=Negative, 3=Pending	Diagnostic test result.
PersonDiagnostic	DiagnosticComment	DiagnosisComment1 .. DiagnosisComment12	Text	250	Freeform text	N/A	Comments on the diagnotstic test.
PersonDiagnostic	OtherDiagnosticName	OtherDiagnosis	Text	100	Freeform text	N/A	Diagnostic test name if "Other" is selected in DiagnosticID.
PersonExposureHistory	PersonId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person who may have contracted SARS.
PersonExposureHistory	InstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person who may have contracted SARS.

PersonExposureHistory	ExpHistoryId		Long Integer	4	Positive integer	N/A	System assigned unique ID for an exposure history.
~~PersonExposureHistory~~	~~OtherComment~~		~~Text~~	~~200~~	~~Freeform text~~	~~N/A~~	~~Exposure history comments.~~ Note: this field is dropped.
PersonExposureInformation	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person who may have contracted SARS.
PersonExposureInformation	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person who may have contracted SARS.
PersonExposureInformation	Trav10DaysPriorID	Trav10DaysPriorID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Did the person travel to any of the destinations within 10 days of symptom onset?
PersonExposureInformation	TravelPurposeID	TravelPurposeID	Long Integer	4	Defined in lkuTravelPurpose.TravelPurposeID	See lkuTravelPurpose	Purpose(s) of trip and activities.
PersonExposureInformation	TourGroupID	TourGroupID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Did the person travel with a group or a group tour?
PersonExposureInformation	TourGroupName	TourGroupName	Text	200	Freeform text	N/A	Name of group or organization.
PersonExposureInformation	TourGroupContactPersonID	TourGroupContactPersonID	Numeric	9	Positive integer	N/A	System assigned object ID for the group/organization contact person.
PersonExposureInformation	TourGroupContactInstanceID	TourGroupContactInstanceID	Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the group/organization contact person.
PersonExposureInformation	HongKongID	HongKongID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Did the person overnight or have a day room in a hotel in Hong Kong?
PersonExposureInformation	HongKongHotelName	HongKongHotelName	Text	100	Freeform text	N/A	Name of the hotel.
PersonExposureInformation	HongKongStart	HongKongStart	Date/Time	8	Date	N/A	Hotel check in date.
PersonExposureInformation	HongKongEnd	HongKongEnd	Date/Time	8	Date	N/A	Hotel check out date.
PersonExposureInformation	HongKongNights	HongKongNights	Long Integer	4	Positive integer	N/A	Number of nights spent in hotel.
PersonExposureInformation	HongKongFloors	HongKongFloors	Text	50	Freeform text	N/A	Floor(s) of hotel visited.
PersonExposureInformation	HongKongRoomNum	HongKongRoomNum	Text	50	Freeform text	N/A	Room number(s) visited.
PersonExposureInformation	flightYellowCardID	flightYellowCardID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	Did the person receive a yellow card as they disembarked from their return flight from Asia instructing them to seek medical evaluation if they became ill?
PersonExposureInformation	ContactAndTravelID	ContactAndTravelID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	In the 10 days prior to onset of symptoms, did this person have close contact with any person with respiratory illness and travel to the areas mentioned previously?
PersonExposureInformation	ContactSarsID	ContactSarsID	Long Integer	4	Defined in lkuYesNo.YesNoID	See lkuYesNo.	In the 10 days prior to onset of symptoms, did this person have close contact with any person under investigation for SARS?
PersonIsoQuar	PersonId		Numeric	9	Positive integer	N/A	System assigned object ID for the person who is being isolated/quarantined
PersonIsoQuar	InstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who is being isolated/quarantined.
PersonIsoQuar	PersonIsoQuarId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific isolation/quarantine on a specific person who may have contracted SARS.
PersonIsoQuar	PersonIsoQuarInstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific isolation/quarantine on a specific person who may have contracted SARS.
PersonIsoQuar	StartDate		Date/Time	8	Date	N/A	Isolation/Quarantine start date.
PersonIsoQuar	EndDate		Date/Time	8	Date	N/A	Isolation/Quarantine end date.
PersonIsoQuar	BrokenId		Long Integer	4	Defined in lkuYesNo.YesNoID	1=Yes, 2=No, 3=Unknown, 4=N/A	Is this isolation/quarantine broke?
PersonIsoQuar	BrokenDate		Date/Time	8	Date	N/A	If broken, when did it break.

PersonIsoQuar	LocationTypeId		Long Integer	4	Defines in IkuLocationType.LocationTypeId	1=Residence, 2=Hotel, 3=Hospital	Type of isolation/quarantine location.
PersonIsoQuar	Note		Text	250	Freeform text	N/A	Note, details of this isolation/quarantine.
PersonIsoQuar	IsoQuarid		Long Integer	4	Defined in IkuIsoQuar.IsoQuarId	1=Quarantine, 2=Isolation	Isolation or quarantine.
PersonLineListComment	LineListCommentID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific line list comment on a specific person who may have contracted SARS.
PersonLineListComment	LineListCommentInstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific line list comment on a specific person who may have contracted SARS.
PersonLineListComment	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for the person who may have contracted SARS.
PersonLineListComment	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who may have contracted SARS.
PersonLineListComment	Comment		Memo	0	Freeform text	N/A	Text for line list comment.
PersonLineListComment	CommentDate		Date/Time	8	Date	N/A	Date and time this line list comment is created or modified.
PersonLineListComment	ShowOnList		Long Integer	4	1 or null	N/A	1=show this comment on a daily generated report.
PersonLocation	PersonLocationID		Numeric	9	Positive integer	N/A	System assigned unique ID.
PersonLocation	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person.
PersonLocation	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person.
PersonLocation	LocationID		Numeric	9	Defined in Location.LocationID	See Location	Identifies a location that the person may have been to.
PersonLocation	VisitedID	VisitedID	Long Integer	4	Defined in IkuYesNo.YesNoID	1=Yes, 2=No, 3=Unknown, 4=N/A	Has the person visited the location?
PersonLocation	VisitedNote	VisitedNote	Text	200	Freeform text	N/A	Notes/Details on the visit.
PersonLocation	SharedTransportWithVisitorID	SharedTransportWithVisitorID	Long Integer	4	Defined in IkuYesNo.YesNoID	See IkuYesNo	Has the person shared transportation with others when visiting identified location?
PersonLocation	SharedTransportNote	SharedTransportNote	Text	200	Freeform text	N/A	Notes/Details on shared transportation.
PersonNote	NoteID		Numeric	9	Positive integer	N/A	System assigned unique ID.
PersonNote	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for a specific person.
PersonNote	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific person.
PersonNote	Note		Memo	0	Freeform text	N/A	Note/Comments for a specific person.
PersonNote	EnteredBy		Text	20	Freeform text	N/A	The person who entered the note.
PersonNote	CreateDt		Date/Time	8	Date	N/A	Date when the note is created.
PersonObservation	PersonId		Numeric	9	Positive integer	N/A	System assigned object ID for the person who is being observed
PersonObservation	InstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who is being observed.
PersonObservation	ObservationId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific observation on a specific person who may have contracted SARS.
PersonObservation	ObservationInstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific observation on a specific person who may have contracted SARS.
PersonObservation	City		Text	100	Freeform text	N/A	City name for the site where the observation is being conducted.

PersonObservation	State		Text	100	Freeform text	N/A	State name for the site where the observation is being conducted.
PersonObservation	CountryId		Long Integer	4	Defined in IkuCountry.CountryID	See IkuCountry	Country ID for the site where the observation is being conducted.
PersonObservation	Phone		Text	50	Freeform text	N/A	Phone number of the observation site.
PersonObservation	LocationTypeId		Long Integer	4	Defined in IkuLocationType.LocationTypeId	1=Residence, 2=Hotel, 3=Hospital	Type of the site being observed.
PersonObservation	DateFrom		Date/Time	8	Date	N/A	Observation start date.
PersonObservation	DateTo		Date/Time	8	Date	N/A	Observation end date.
PersonObservation	address		Memo	0	Freeform text	N/A	Obsrvation site address.
PersonStudy	PersonStudyId		Numeric	9	Positive integer	N/A	System assigned object ID for a specific supplemental investigation on a specific person who may have contracted SARS.
PersonStudy	PersonStudyInstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific supplemental investigation on a specific person who may have contracted SARS.
PersonStudy	PersonId		Numeric	9	Positive integer	N/A	System assigned object ID for the person who may have contracted SARS.
PersonStudy	InstanceId		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who may have contracted SARS.
PersonStudy	StudyId		Long Integer	4	Defined in IkuStudy.studyId	See IkuStudy	Type of study.
PersonStudy	enrolledBy		Text	10	Freeform text	N/A	The person who started the study.
PersonStudy	StudyIdent		Text	100	Freeform text	N/A	Supplemental investigation file number.
PersonStudy	enrollDate		Date/Time	8	Date	N/A	Date the supplemental investigation started.
PersonSymptom	PersonSymptomID		Long Integer	4	Positive integer	N/A	System assigned object ID for a specific sympton from a specific person who may have contracted SARS.
PersonSymptom	PersonSymptomInstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for a specific sympton from a specific person who may have contracted SARS.
PersonSymptom	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for the person who may have contracted SARS.
PersonSymptom	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who may have contracted SARS.
PersonSymptom	SymptomID	Symptom1 .. Symptom24 (1/0 variables for each symptom. Suffix defined by lookup table, eg. Symptom1 is Temp>38C, Symptom2 is cough, etc.)	Long Integer	4	Defined in IkuSymptom.SymptomID	See IkuSymptom	ID for a specific type of symptom.
PersonSymptom	ValA		Text	50	Freeform text	N/A	Detailed information for the symptom.
PersonSymptom	ValB		Text	50	Freeform text	N/A	Additional information for the symptom.
PersonSymptom	OtherSymptomName		Text	50	Freeform text	N/A	Description for symptoms not listed on IkuSymptom table.
PersonSymptom	OnsetDate		Date/Time	8	Date	N/A	Symptom onset date.
PersonSymptom	EndDate		Date/Time	8	Date	N/A	Symptom end date.
PersonToDoList	ToDoID		Numeric	9	Positive integer	N/A	System assigned unique ID for a specific "ToDo" task.
PersonToDoList	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for the person who may have contracted SARS.
PersonToDoList	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who may have contracted SARS.
PersonToDoList	ToDoTask		Memo	0	Freeform text	N/A	Things to do for the person who my have contracted SARS.

PersonToDoList	EntryDate		Date/Time	8	Date	N/A	When is the task entered into the system.
PersonToDoList	ProjectedCompletionDate		Date/Time	8	Date	N/A	Expected completion date for this task.
PersonToDoList	ActualCompletionDate		Date/Time	8	Date	N/A	When the task is completed.
PersonToDoList	CompletedID		Long Integer	4	Defined in lkuYesNo.YesNoID	1=Yes, 2=No, 3=Unknown, 4=N/A	Task completion status.
PersonToDoList	AssignedTo		Text	50	Freeform text	N/A	Person who has been assigned to the task.
PersonToDoList	AssignedBy		Text	50	Freeform text	N/A	Person who assigned the task to someone.
PersonTransport	PersonTransportID		Long Integer	4	Positive integer	N/A	System assigned unique ID for a specific transport.
PersonTransport	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for the person who traveled.
PersonTransport	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who traveled.
PersonTransport	TransportTypeID		Long Integer	4	Defined in lkuTransportType.TransportTypeID	1=Airline, 2=Cruise	Transport type.
PersonTransport	DepartureDate		Date/Time	8	date	N/A	Departure date.
PersonTransport	DepartureLocation		Text	100	Freeform text	N/A	Departure location.
PersonTransport	ArrivalLocation		Text	100	Freeform text	N/A	Arrival location.
PersonTransport	TransportCompanyName		Text	100	Freeform text	N/A	Company that provided the transportation.
PersonTransport	TransportIDNumber		Text	10	Freeform text	N/A	Flight number, cruise number...
PersonTransport	ArrivalDate		Date/Time	8	Date	N/A	Arrival date.
PersonTransport	OtherTransportTypeName		Text	50	Freeform text	N/A	Other transportation type, if it is not listed on lkuTransportType table.
PersonTravel	PersonTravelID		Long Integer	4	Positive integer	N/A	System assigned unique ID for a specific travel.
PersonTravel	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for the person who traveled.
PersonTravel	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who traveled.
PersonTravel	DestinationID	Destination1 .. Destination38 (1/0 variables for each destination as defined by lookup table)+C306	Long Integer	4	Defined in lkuDestination.DestinationID	See lkuDestination	Travel destination.
PersonTravel	DateFrom	DestDateFrom1 .. DestDateFrom38	Date/Time	8	Date	N/A	Travel start date.
PersonTravel	DateTo	DestDateTo1 .. DestDateTo38	Date/Time	8	date	N/A	Travel end data.
PersonTravel	OtherName	OtherDestinationName1 .. OtherDestinationName38	Text	100	Freeform text	N/A	Other travel destination, if it is not listed on lkuDestination table.
PersonTravelPurpose	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for the person who traveled.
PersonTravelPurpose	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who traveled.
PersonTravelPurpose	TravelPurposeID		Long Integer	4	Defined in lkuTravelPurpose.TravelPurposeID	1=Business, 2=Visit Family/Friends, 3=Vacation, 4=Other	Purpose of the travel.
ReporterClinician	PersonID		Numeric	9	Positive integer	N/A	System assigned object ID for the person being reported.
ReporterClinician	InstanceID		Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person being reported.
ReporterClinician	RCPersonID	RCCLName + RCCFName	Numeric	9	Positive integer	N/A	System assigned object ID for the person who reported the case.

ReporterClinician	RCInstanceID	RCCLName + RCCFName	Long Integer	4	Positive integer	N/A	System assigned remote workstation ID for the person who reported the case.
ReporterClinician	HospClinName	RCCHospital	Text	100	Freeform text	N/A	Name of the hospital/clinic reported the case.
ReporterClinician	City	RCCCity	Text	100	Freeform text	N/A	City name for the hostipal/clinic.
ReporterClinician	CountyBorough	RCCCountyBorough	Text	100	Freeform text	N/A	County/Borough name for the hospital/clinic.
ReporterClinician	StateID	RCCStateID + RCCStateName	Long Integer	4	Defined in lkuState.StateID	See lkuState	State ID for the hospital/clinic.
ReporterClinician	ZIP	RCCZip	Text	10	Freeform text	N/A	ZIP for the hospital/clinic.
ReporterClinician	Phone	RCCPhone	Text	20	Freeform text	N/A	Phone number for the reporting person.
ReporterClinician	Pager	RCCPager	Text	20	Freeform text	N/A	Pager number for the reporting person.
ReporterClinician	OtherPhone1	RCCOtherPhone1	Text	20	Freeform text	N/A	Alternate phone number 1 for the reporting person.
ReporterClinician	OtherPhone1Type	RCCOtherPhone1TypeID	Long Integer	4	Defined in lkuPhoneType.PhoneTypeID	0=Other, 1=Phone, 2=Fax, 3=Patient, 4=Other	Alternate phone 1 type.
ReporterClinician	OtherPhone2	RCCOtherPhone2	Text	20	Freeform text	N/A	Alternate phone number 2 for the reporting person.
ReporterClinician	OtherPhone2Type	RCCOtherPhone2TypeID	Long Integer	4	Defined in lkuPhoneType.PhoneTypeID	0=Other, 1=Phone, 2=Fax, 3=Patient, 4=Other	Alternate phone 1 type.
ReporterClinician	CountryId		Long Integer	4	Defined in lkuCountry.CountryID	See lkuCountry	Country ID for the hospital/clinic.
ReporterClinician	Province		Text	50	Freeform text	N/A	Province for the hospital/clinic.
ReporterClinician	email		Text	100	Freeform text	N/A	email address for the reporting person.

```
proc format;
  value yesno 1=yes
        2=no
             3,.=unknown
        4=N/A;

  value clinst
        1=Outpatient
             2=ER
             3=Inpatient
             4=Died
             5=Left against med. advice
             6=Unknown
             7=Transferred to another facility;


  value travp
        1=Business
             2=Visit fam./friends
             3=Vacation
             4=Other;


  value outid 1=yes
        2=no
             3=pending;


  value casetyp 1=Domestic
          2=International;


  value contype 1=Household
          2=Health care worker
               3=Other;


  value casestat  1= Suspected Case
            2=Not a Case
            3=Probable Case
            4=Confirmed Case
            5=Specimens Testing
            6=Special Interest;

run;
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美國疾病管制及預防中心嚴重急性呼吸道症候群偵測、準備與防治工作手冊

In the Absence of SARS-CoV Transmission Worldwide: Guidance for Surveillance, Clinical and Laboratory Evaluation, and Reporting Version 2

This is an updated version of a document first issued by CDC in December 2003. The document provides guidance for surveillance, clinical and laboratory evaluation, and reporting in the setting of no known person-to-person transmission of SARS-CoV worldwide. Recommendations are derived from *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)* www.cdc.gov/ncidod/sars/guidance/index.htm.

Summary of Changes in Version 2

This version of the guidance document clarifies that the recommendations apply to situations in which no known person-to-person transmission of SARS-CoV is occurring in the world. Some wording has also been revised for consistency with the companion documents, *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)*, and *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness*.

I. Background

Severe acute respiratory syndrome (SARS) came to global attention in February 2003, when officials in China informed the World Health Organization (WHO) about 305 cases of atypical pneumonia that had occurred in Guangdong Province. By the time the new infectious disease was declared contained in July 2003, more than 8,000 cases and 780 deaths had been reported from 29 countries worldwide. Since then, active global surveillance for SARS-associated coronavirus (SARS-CoV) disease in humans has detected no laboratory-confirmed person-to-person transmission of SARS-CoV.

No one knows if, when, or where person-to-person transmission of SARS-CoV will recur. However, the rapidity of spread of infection and the high levels of morbidity and mortality associated with SARS-CoV call for careful monitoring for the recurrence of transmission and preparations for the rapid implementation of control measures. The 2003 global outbreaks demonstrated the ease with which SARS-CoV can seed and spread in human populations when cases remain undetected or when infected persons are not cared for in controlled environments that reduce the risk of transmission to others. The two laboratory-acquired infections and the recent cases in Southern China show that SARS-CoV continues to be a threat. Early detection of SARS cases and contacts, plus swift and decisive implementation of containment measures, are therefore essential to prevent transmission. Although the United States had only a limited SARS-CoV outbreak during the 2003 epidemic -- with only eight laboratory-confirmed cases and no significant local spread -- the U.S. population is clearly vulnerable to the more widespread, disruptive outbreaks experienced in other countries. During this period of no known person-to-person transmission of SARS-CoV in the world, healthcare and public health officials must therefore do what they can to prepare for the possibility that SARS-CoV transmission may recur.

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This document provides guidance for surveillance, clinical and laboratory evaluation, and reporting in the setting of no known person-to-person transmission of SARS-CoV worldwide. Recommendations are derived from *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)* www.cdc.gov/ncidod/sars/guidance/index.htm. If such transmission recurs anywhere in the world, CDC will promptly review all available information and provide additional guidance via the Health Alert Network (HAN), Epi-X, and partner organizations. Current information will also be posted on CDC SARS website: www.cdc.gov/sars.

II. Clinical Features of SARS-CoV Disease

The median incubation period for SARS-CoV appears to be approximately 4 to 6 days; most patients become ill within 2 to 10 days after exposure. Early clinical features of SARS-CoV disease can be similar to other viral illnesses and are not sufficiently distinct to enable diagnosis by signs and symptoms alone. The illness usually begins with systemic symptoms such as fever, headache, and myalgias. Respiratory complaints often develop 2 to 7 days after illness onset and usually include a non-productive cough and dyspnea. Upper respiratory symptoms such as rhinorrhea and sore throat may occur but are uncommon. Almost all patients with laboratory evidence of SARS-CoV disease evaluated to date developed radiographic evidence of pneumonia by day 7-10 of illness, and most (70% -90%) developed lymphopenia. The overall case-fatality rate of approximately 10% can increase to >50% in persons older than age 60.

Key Clinical Features of SARS-CoV Disease

- Incubation period of 2-10 days
- Early systemic symptoms followed within 2-7 days by dry cough and/or shortness of breath, often without upper respiratory tract symptoms
- Development of radiographically confirmed pneumonia by day 7-10 of illness
- Lymphopenia in most cases

III. Surveillance: Early Case Detection

Potential sources of virus for a recurrence of person-to-person spread of SARS-CoV include reintroduction to humans from an animal reservoir, persistent infection in previously ill persons, or the laboratory. Since SARS-CoV currently exists in the animals in southern China -- the apparent source of the 2003 outbreak -- this area remains under scrutiny for SARS-CoV disease activity. Potential sources of recurrence also include other areas where SARS-CoV transmission occurred and large cities that are international travel hubs connecting to locales that might harbor persistent infections in humans. Laboratory personnel working with SARS-CoV might also become infected as a result of compromised laboratory techniques.[1]

[1] Persons who work in laboratories that contain live SARS-CoV should report any febrile and/or respiratory illnesses to the supervisor. They should be evaluated for possible exposures, and their clinical features and course of illness should be closely monitored, as described in Appendix F6, Supplement F, in *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)* www.cdc.gov/ncidod/sars/guidance/F/pdf/app6.pdf.
If laboratory workers with fever and/or lower respiratory illness are found to have an exposure to SARS-CoV, they should be managed according to the algorithm in Figure 2, *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease*

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Because persons with SARS-CoV disease tended to appear in clusters (e.g., in healthcare facilities, households, and a few special settings) during the 2003 outbreaks, early signals of the reappearance of the illness in U.S. communities could include unusual clusters of unexplained pneumonia.

In the absence of person-to-person transmission of SARS-CoV worldwide, the goal of domestic surveillance is to maximize early detection of cases of SARS-CoV disease while minimizing unnecessary laboratory testing, concerns about SARS-CoV, implementation of control measures, and social disruption. Early and efficient detection of SARS cases is not, however, a straightforward task. In the absence of known transmission worldwide, the overall likelihood that a person in the United States with fever and respiratory symptoms will have SARS-CoV disease is exceedingly low. Moreover, the non-specific clinical features of early SARS-CoV disease and the current lack of diagnostic tests that can reliably detect the virus during the first few days of illness pose challenges to finding SARS-CoV-infected persons during the predictable seasonal upsurge in respiratory infections.

Nonetheless, lessons learned from the 2003 outbreaks have identified three features of SARS-CoV disease that can be used to focus surveillance activities during the period of no transmission worldwide: 1) most patients infected with SARS-CoV develop radiographic evidence of pneumonia; 2) most SARS-CoV transmission occurs when patients are seriously ill and require hospitalization; and 3) most infected patients have an identifiable exposure to a known SARS-CoV case or a suggestive cluster of SARS-like illness or a location with known SARS transmission.

Given these features, the potential sources of recurrence of SARS-CoV, and the predilection for SARS-CoV transmission to occur in healthcare settings or to be associated with geographically focused pneumonia clusters, surveillance efforts in the absence of person-to-person SARS-CoV transmission should aim to **identify patients who require hospitalization for radiographically confirmed pneumonia or acute respiratory distress syndrome without identifiable etiology AND who have one of the following risk factors in the 10 days before the onset of illness:**

- Travel to mainland China, Hong Kong, or Taiwan, or close contact[2] with an ill person with a history of recent travel to one of these areas, *OR*
- Employment in an occupation associated with a risk for SARS-CoV exposure (e.g., healthcare worker[3] with direct patient contact; worker in a laboratory that contains live SARS-CoV), *OR*
- Part of a cluster of cases of atypical pneumonia without an alternative diagnosis

Infection control practitioners and other healthcare personnel should also be alert for clusters of pneumonia among two or more healthcare workers who work in the same facility.

The 2003 SARS-CoV outbreak likely originated in mainland China, and neighboring areas such as Taiwan and Hong Kong are thought to be at higher risk due to the large volume of travelers from mainland China. Although less likely, SARS-CoV may also reappear from other previously affected areas. Therefore, clinicians should obtain a complete travel history. If clinicians have concerns about the possibility of SARS-CoV disease in a patient with a history of travel to other previously affected areas (e.g., while

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among Persons Presenting with Community-Acquired Illness (www.cdc.gov/ncidod/sars/clinicalguidance.htm). In an exposed laboratory worker, symptoms that should trigger the clinical algorithm in Figure 2 should be expanded to include the presence of any of the following: sore throat, rhinorrhea, chills, rigors, myalgia, headache, diarrhea (see Figure 2, footnote 1, for more details).

[2] Close contact: A person who has cared for or lived with a person with SARS-CoV disease or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS-CoV disease. Examples of close contact include kissing or hugging, sharing eating or drinking utensils, talking within 3 feet, and direct touching. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

[3] Healthcare worker: Any employee in a healthcare facility who has close contact with patients, patient-care areas, or patient-care items.

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traveling abroad, had close contact with another person with pneumonia of unknown etiology or spent time in a hospital in which patients with acute respiratory disease were treated), they should contact the health department.

In the absence of person-to-person transmission of SARS-CoV in the world, the screening of persons requiring hospitalization for radiographically confirmed pneumonia for risk factors suggesting SARS-CoV exposure should be limited to adults, unless there are special circumstances that make the clinician and public health personnel consider a child to be of potentially high risk for having SARS-CoV disease. During the 2003 global outbreaks, infants and children accounted for only a small percentage of SARS cases and had a much milder disease and better outcome than adults. Although information on SARS-CoV disease in pediatric patients is limited, the role of children in transmission is likely much less significant than the role of adults.

Case Detection

Severe respiratory illness in the context of a documented exposure risk is the key to diagnosing SARS-CoV disease. Providers should therefore consider SARS-CoV disease in patients requiring hospitalization for:

- Radiographically confirmed pneumonia or acute respiratory distress syndrome of unknown etiology, AND
- One of the following risk factors in the 10 days before illness onset:
  - Travel to mainland China, Hong Kong or Taiwan, or close contact with an ill person with a history of recent travel to one of these areas, *OR*
  - Employment in an occupation associated with a risk for SARS-CoV exposure (e.g., healthcare worker with direct patient contact; worker in a laboratory that contains live SARS-CoV), *OR*
  - Part of a cluster of cases of atypical pneumonia without an alternative diagnosis

Infection control practitioners and other healthcare personnel should be alert for clusters of pneumonia among two or more healthcare workers who work in the same facility.

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IV. Infection Control and Clinical Evaluation

SARS-CoV disease provides a reminder of the risks of nosocomial transmission of respiratory pathogens and an opportunity to improve overall infection control in healthcare facilities. All healthcare facilities need to re-emphasize the importance of basic infection control measures for the control of SARS-CoV disease and other respiratory illnesses. Facilities should also consider adopting a espiratory hygiene/cough etiquette? strategy to help limit nosocomial transmission of respiratory pathogens. To contain respiratory secretions, all persons with signs and symptoms of a respiratory infection, regardless of presumed cause, should be instructed to:

- Cover the nose and mouth when coughing or sneezing.
- Use tissues to contain respiratory secretions.
- Dispose of tissues in the nearest waste receptacle after use.
- Perform hand hygiene after contact with respiratory secretions and contaminated objects and materials.

Healthcare facilities should ensure the availability of materials for adhering to respiratory hygiene/cough etiquette in waiting areas for patients and visitors:

- Provide tissues and no-touch receptacles for used tissue disposal.
- Provide conveniently located dispensers for alcohol-based hand rug.
- Provide soap and disposable towels for hand washing where sinks are available.

During periods of increased respiratory infection in the community, healthcare facilities should offer procedure or surgical masks to persons who are coughing and encourage coughing persons to sit at least 3 feet away from others in waiting areas. Healthcare workers should practice Droplet Precautions, in addition to Standard Precautions, when examining a patient with symptoms of a respiratory infection. Droplet precautions should be maintained until it is determined that they are no longer needed (see www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm). An algorithm for patient evaluation is provided in Appendix 1.

If the clinician and health department have a high index of suspicion for SARS-CoV disease or if laboratory evidence of SARS-CoV disease is found, then the patient should be placed immediately on SARS isolation precautions, and contacts should be immediately identified, evaluated, and monitored for evidence of respiratory disease. Prompt SARS-CoV laboratory diagnostics should be arranged through the health department. Initial diagnostic evaluation to look for an alternative diagnosis in suspected SARS-CoV patients should be performed as clinically indicated, and may include:

- Chest radiograph
- Pulse oximetry
- Complete blood count with differential
- Blood cultures
- Sputum Gram stain and culture
- Testing for viral respiratory pathogens, notably influenza A and B and respiratory syncytial virus
- Specimens for Legionella and pneumococcal urinary antigen testing

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Infection Control and Clinical Evaluation

- Healthcare facilities should re-emphasize the importance of basic infection control measures for respiratory infections and consider adopting a espiratory hygiene/cough etiquette? strategy.
- All patients admitted to the hospital with radiographically confirmed pneumonia should be:
  - Placed on Droplet Precautions
  - Screened for risk factors for possible exposure to SARS-CoV
  - Evaluated with a chest radiograph, pulse oximetry, complete blood count, and etiologic workup as indicated.
- If there is a high index of suspicion for SARS-CoV disease (by clinicians and health department), the patient should immediately be placed on SARS isolation precautions, and all contacts of the ill patient should be identified, evaluated, and monitored. Prompt SARS-CoV laboratory diagnostics should be arranged through the health department.

V. Laboratory Testing for SARS-CoV

Laboratory testing for SARS-CoV is now available at many state public health laboratories. Available tests include antibody testing using an enzyme immunoassay (EIA) and reverse transcription polymerase chain reaction (RT-PCR) tests for respiratory, blood, and stool specimens. In the absence of person-to-person transmission of SARS-CoV, the positive predictive value of a diagnostic test is extremely low. False-positive test results may generate tremendous anxiety and concern and expend valuable public health resources. Therefore, **SARS-CoV testing should be performed judiciously, and preferably only in consultation with the local or state health department.** SARS-CoV testing should be considered if no alternative diagnosis is identified 72 hours after initiation of the clinical evaluation and the patient is thought to be at high risk for SARS-CoV disease (e.g., is part of a cluster of unexplained pneumonia cases).

Providers should immediately report all positive SARS-CoV test results to the local or state health department. Confirmatory SARS-CoV testing at an appropriate confirmatory test site should be arranged through the local or state health department as outlined in Supplement F, *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)* www.cdc.gov/ncidod/sars/guidance/index.htm.

Guidelines for the collection and transport of specimens for SARS-CoV testing are provided in Appendix F4, Supplement F, in *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)* www.cdc.gov/ncidod/sars/guidance/F/pdf/app4.pdf.

CDC is working with the Association of Public Health Laboratories (APHL) and the Laboratory Response Network (LRN) to ensure that SARS RT-PCR and EIA tests meet quality control guidelines. CDC will also be distributing proficiency testing materials to participating laboratories.

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Laboratory testing for SARS-CoV

- Perform laboratory testing judiciously and in consultation with the local or state health department.
- Providers should report all positive test results immediately to the local or state health department.
- Arrange for confirmatory testing at an appropriate test site through the local or state health department.

VI. Reporting of Potential SARS-CoV Cases

Healthcare providers should report to the state or local health department:

- All persons requiring hospitalization for radiographically confirmed pneumonia who report at least one of the three risk factors for exposure to SARS-CoV outlined in Section III above.
- Any clusters (two or more persons) of unexplained pneumonia, especially among healthcare workers
- Any positive SARS-CoV test result

Note: In the absence of known person-to-person transmission of SARS-CoV in the world, any **SARS-CoV-positive test result** should be phoned in to the state or local health department immediately for confirmation and implementation of urgent and appropriate isolation precautions, contact tracing, and follow-up.

Health departments should immediately report any SARS-CoV positive test result to CDC. Health departments should also inform CDC of other cases or clusters of pneumonia that are of particular concern by calling 770-488-7100.

Report to state or local health department:

- All persons requiring hospitalization for radiographically confirmed pneumonia who report at least one of the three risk factors for exposure to SARS-CoV
- Any clusters of unexplained pneumonia, especially among healthcare workers
- Any positive SARS-CoV test result

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Appendix 1

In the Absence of Person-to-Person Transmission of SARS-CoV Worldwide: Guidance for Evaluation and Management of Patients Requiring Hospitalization for Radiographically Confirmed Pneumonia

In the absence of SARS-CoV transmission in the world, a diagnosis of SARS-CoV disease should be considered only in patients who require hospitalization for radiographically confirmed pneumonia and who have an epidemiologic history that raises the suspicion for SARS-CoV disease. The suspicion for SARS-CoV disease is increased if, within 10 days of the onset of SARS-like symptoms, the patient: 1) traveled to mainland China, Hong Kong, or Taiwan, or had close contact with an ill person with a history of recent travel to one of these areas , 2) is employed in an occupation associated with a risk for SARS-CoV exposure (e.g., healthcare worker with direct patient contact; worker in a laboratory that contains live SARS-CoV), or 3) is part of a cluster of cases of atypical pneumonia without an alternative diagnosis. Persons with such a clinical and exposure history should be evaluated according to the following algorithm.

In some settings, early recognition of SARS-CoV disease may require additional measures:

- Laboratory workers ? Breaks in technique in laboratories that contain live SARS-CoV could result in laboratory cquired cases of SARS. Persons working in laboratories that contain live SARS-CoV should report any fever and/or lower respiratory illness to the supervisor. They should be evaluated for possible exposures, and their clinical features and course of illness should be closely monitored as described in Appendix F6 in Supplement F, *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)* www.cdc.gov/ncidod/sars/guidance/index.htm.

  If laboratory workers with fever and/or lower respiratory illness are found to have an exposure to SARS-CoV, they should be managed according to the algorithm in Figure 2, *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). In an exposed laboratory worker, symptoms that should trigger the clinical algorithm in Figure 2 should be expanded to include the presence of any of the following: sore throat, rhinorrhea, chills, rigors, myalgia, headache, diarrhea (see Figure 2, footnote 1, for more details).

- Pediatric populations ? Information on SARS-CoV disease in pediatric patients is limited. During the global outbreaks of 2003, infants and children accounted for only a small percentage of cases and had a much milder disease and better outcome than adults. Their role in transmission is not well described but is likely much less significant than the role of adults. Therefore, in the setting of no person-to-person SARS-CoV transmission in the world, the evaluation and management algorithm applies only to adults, unless there are special circumstances that make the clinical and health department consider a child to be of potentially high risk for having SARS-CoV disease.

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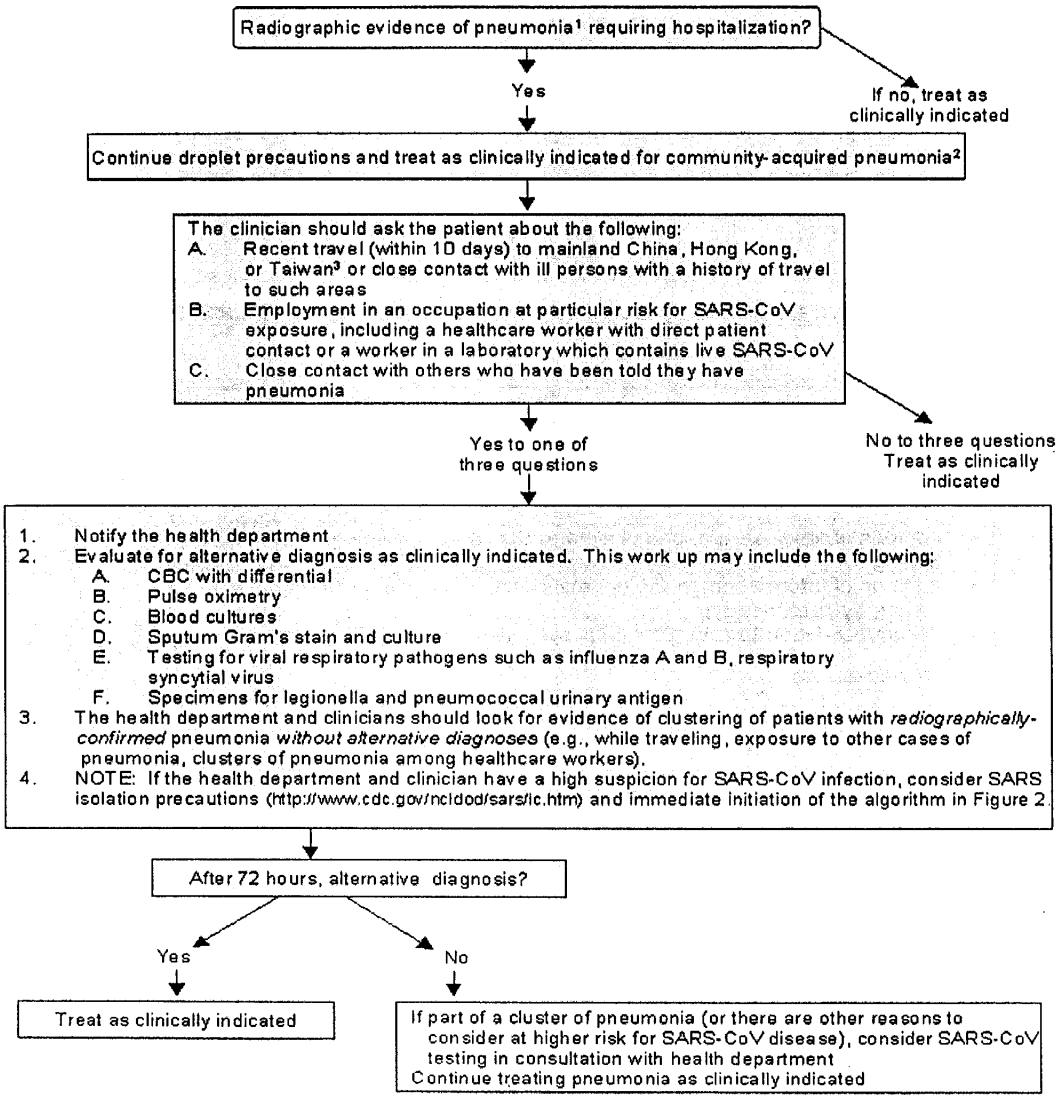
Figure 1. Algorithm for evaluation and management of patients requiring hospitalization for radiographically confirmed pneumonia, in the absence of person-to-person transmission of SARS-CoV in the world



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Footnotes for Figure

[1] Or acute respiratory distress syndrome (ARDS) of unknown etiology

[2] Guidance for the management of community-acquired pneumonia is available from the Infectious Diseases Society of America (IDSA) at: www.journals.uchicago.edu/IDSA/guidelines/.

[3] The 2003 SARS-CoV outbreak likely originated in mainland China, and neighboring areas such as Taiwan and Hong Kong are thought to be at higher risk due to the high volume of travelers from mainland China. Although less likely, SARS-CoV may also reappear from other previously affected areas. Therefore, clinicians should obtain a complete travel history. If clinicians have concerns about the possibility of SARS-CoV disease in a patient with a history of travel to other previously affected areas (e.g., while traveling abroad, had close contact with another person with pneumonia of unknown etiology or spent time in a hospital in which patients with acute respiratory disease were treated), they should contact the health department.

Appendix 2

Guidelines for Collecting Specimens from Potential SARS Patients

This document updates and replaces the guidelines for specimen collection posted previously on CDC SARS website, to reflect the most recent information on laboratory diagnostics for SARS-CoV. The main changes are as follows:[1]

- Addition of stool, serum, and plasma to the list of specimens for RT-PCR testing
- Addition of information on the optimal timing of specimen collection and testing by specimen type
- Recommendation to collect multiple specimens for RT-PCR testing

[1] Pending IRB approval.

Key Messages

- Consult the state or local health department to determine the appropriateness and details of SARS testing.
- If possible, collect multiple specimens from different body sites and at different times during illness.
- A signed consent form is recommended when collecting specimens for SARS-CoV RT-PCR or antibody testing.

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Before collecting and shipping specimens for SARS-CoV testing, consult with the state health department/state epidemiologist to determine whether the patient meets the SARS case definition. Health department contact information is available at: www.cste.org/members/state_and_territorial_epi.asp.

When possible, collect multiple respiratory specimens for testing. For example, collect specimens from two different sites on the same day (e.g., one nasopharyngeal swab and a stool specimen or another respiratory specimen) or from two different times during the illness. The chart on the last page specifies recommended specimen types for SARS-CoV diagnostics by stage of illness, including postmortem specimen collection.

A signed consent form is recommended when collecting specimens for SARS-CoV RT-PCR or antibody testing. Information on the consent process for collection of respiratory specimens, blood or stool for RT-PCR testing is provided at: www.cdc.gov/ncidod/sars/lab/rtpcr/index.htm. Information on the consent process for the collection of blood/serum for antibody testing is provided at: www.cdc.gov/ncidod/sars/lab/eia/index.htm.

RT-PCR Diagnostics

Although studies to date have not definitively determined the best specimens for SARS RT-PCR diagnostics, it is reasonable to collect:

During the first week of illness:	Nasophyaryngeal (NP) swab plus oropharyngeal (OP) swab and a serum or plasma specimen
After the first week of illness:	NP swab plus OP swab and a stool specimen

Serologic Diagnostics

Serum specimens for SARS-CoV antibody testing should be collected when the diagnosis is first suspected and at later times if indicated. An antibody response is occasionally detected during the first week of illness, likely to be detected by the end of the second week of illness, and sometimes may not be detected until >28 days after onset of symptoms.

I. Collecting Respiratory Specimens

Eight types of respiratory specimens may be collected for viral and/or bacterial diagnostics: 1) nasopharyngeal wash/aspirates, 2) nasopharyngeal swabs, 3) oropharyngeal swabs, 4) broncheoalveolar lavage, 5) tracheal aspirate, 6) pleural fluid tap, 7) sputum; and 8) post-mortem tissue. Nasopharyngeal wash/aspirates are the specimen of choice for detection of most respiratory viruses and are the preferred specimen type for children under age 2 years.

In contrast to most respiratory pathogens for which respiratory specimens are optimally collected within 72 hours after the onset of symptoms, levels of SARS-CoV may be higher later in the course of the illness.

Before collecting specimens, review the infection control precautions in Supplement I.

A. Collecting specimens from the upper respiratory tract

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1. Nasopharyngeal wash/aspirate

Have the patient sit with head tilted slightly backward. Instill 1 ml-1.5 ml of nonbacteriostatic saline (pH 7.0) into one nostril. Flush a plastic catheter or tubing with 2 ml-3 ml of saline. Insert the tubing into the nostril parallel to the palate. Aspirate nasopharyngeal secretions. Repeat this procedure for the other nostril. Collect the specimens in sterile vials. Label each specimen container with the patient ID number and the date collected. If shipping domestically, use cold packs to keep the sample at 4蚓. If shipping internationally, pack in dry ice.

2. Nasopharyngeal or oropharyngeal swabs

Use only sterile dacron or rayon swabs with plastic shafts. Do not use calcium alginate swabs or swabs with wooden sticks, as they may contain substances that inactivate some viruses and inhibit PCR testing.

Nasopharyngeal swabs -- Insert a swab into the nostril parallel to the palate. Leave the swab in place for a few seconds to absorb secretions. Swab both nostrils.
Oropharyngeal swabs -- Swab the posterior pharynx and tonsillar areas, avoiding the tongue.

Place the swabs immediately into sterile vials containing 2 ml of viral transport media. Break the applicator sticks off near the tip to permit tightening of the cap. Label each specimen container with the patient ID number and the date the sample was collected. If shipping domestically, use cold packs to keep sample at 4蚓. If shipping internationally, pack in dry ice.

B. Collecting specimens from the lower respiratory tract

1. Broncheoalveolar lavage, tracheal aspirate, pleural fluid tap

Centrifuge half of the specimen, and fix the cell pellet in formalin. Place the remaining unspun fluid in sterile vials with external caps and internal O-ring seals. If there is no internal O-ring seal, then seal tightly with the available cap and secure with Parafilm®. Label each specimen container with the patient ID number and the date the sample was collected. If shipping domestically, use cold packs to keep sample at 4蚓. If shipping internationally, ship fixed cells at room temperature and unfixed cells frozen.

2. Sputum

Educate the patient about the difference between sputum and oral secretions. Have the patient rinse the mouth with water and then expectorate deep cough sputum directly into a sterile screw-cap sputum collection cup or sterile dry container. If shipping domestically, use cold packs to keep sample at 4蚓. If shipping internationally, pack in dry ice.

II. Collecting Blood Components

Serum and blood (plasma) should be collected early in the illness for RT-PCR testing. The reliability of RT-PCR testing performed on blood specimens decreases as the illness progresses.

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Both acute and convalescent serum specimens should be collected for antibody testing. To confirm or rule out SARS-CoV infection, it is important to collect convalescent serum specimens >28 days after the onset of illness.

A. Collecting serum for antibody or RT-PCR testing

Collect 5 ml-10 ml of whole blood in a serum separator tube. Allow the blood to clot, centrifuge briefly, and collect all resulting sera in vials with external caps and internal O-ring seals. If there is no internal O-ring seal, then seal tightly with the available cap and secure with Parafilm®. The minimum amount of serum preferred for each test is 200 microliters, which can easily be obtained from 5 mL of whole blood.

A minimum of 1 cc of whole blood is needed for testing of pediatric patients. If possible, collect 1 cc in an EDTA tube and in a clotting tube. If only 1cc can be obtained, use a clotting tube.

Label each specimen container with the patient ID number and the date the specimen was collected. If unfrozen and transported domestically, ship with cold packs to keep the sample at 4蚓. If frozen or transported internationally, ship on dry ice.

B. Collecting EDTA blood (plasma) for RT-PCR

Collect 5 ml-10 ml of blood in an EDTA (purple-top) tube. Transfer to vials with external caps and internal O-ring seals. If there is no internal O-ring seal, then seal tightly with the available cap and secure with Parafilm®. Label each specimen container with patient ID number and date of collection. Store and ship blood specimens with cold packs to keep the sample at 4蚓.

III. Collecting Stool Specimens for PCR

Begin collecting stool specimens as soon as possible in the course of the illness. Although collecting earlier specimens is ideal, SARS-CoV has been detected in stool as late as one month after the onset of symptoms.

Place each stool specimen -- as large a quantity as can be obtained (at least 10 cc) -- in a leak-proof, clean, dry container, and refrigerate at 4蚓. Patients may drape plastic kitchen wrap across the back half of the toilet, under the toilet seat, to facilitate collection of stool specimens.

IMPORTANT: Refrigerate or freeze tubes after specimens are placed in them. If specimens will be examined within 48 hours after collection, they can be refrigerated. If specimens must be held longer than 48 hours, freeze them as soon as possible after collection. Although storage in an ultra-low freezer (-70蚓) is preferable, storage in a home-type freezer (if properly set at -20蚓) is acceptable for short periods.

Specimens from possible and known SARS cases must be packaged, shipped, and transported according to the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations at (www.iata.org/dangerousgoods/index) and US DOT 49 CFR Parts 171-180 (hazmat.dot.gov/rules.htm). Step-by-step instructions on appropriate packaging and labeling are available at: www.cdc.gov/ncidod/sars/pdf/packingspecimens-sars.pdf.

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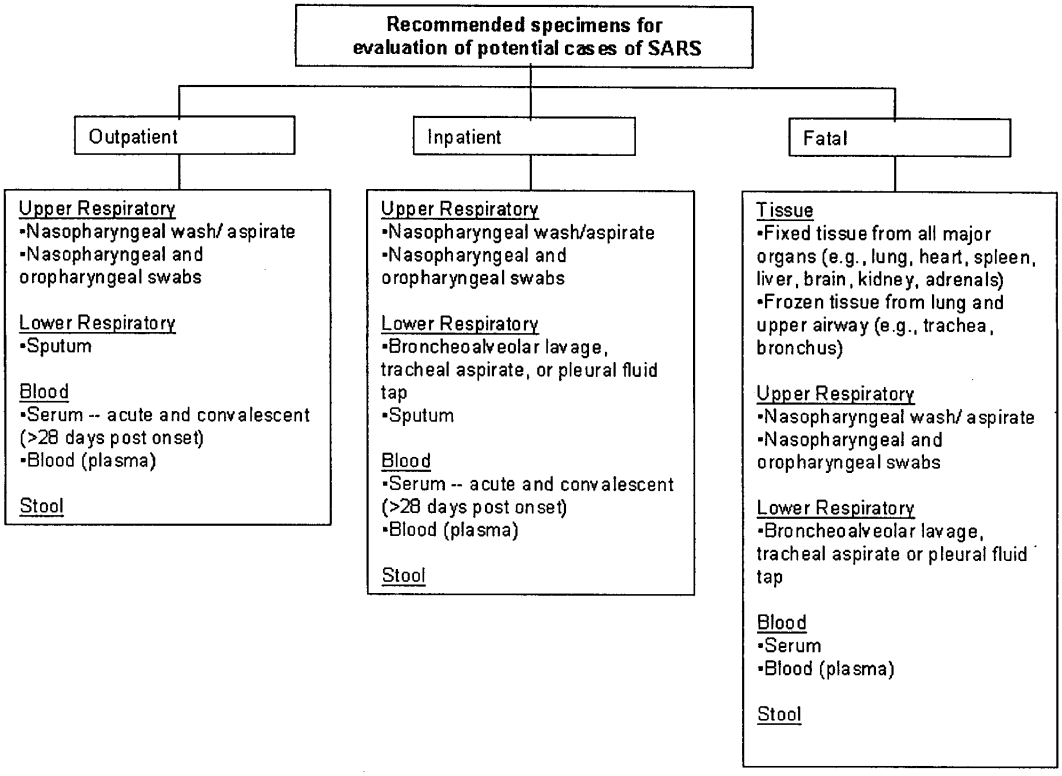

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Specimens for SARS-CoV Testing:
Priority Specimens and Timing for Collection

The likelihood of detecting infection is increased if multiple specimens, e.g., stool, serum, and respiratory tract specimens, are collected during the course of illness.

Specimen, by test type	<1 week after symptom onset	1-3 weeks after symptom onset	>3 weeks after symptom onset
RT-PCR[1] for viral RNA detection			
Sputum[2]	√[3]	√√	√
Bronchoalveolar lavage, tracheal aspirate, or pleural fluid tap[4]	√	√√	√
Nasopharyngeal wash/aspirate	√	√√	√
Nasopharyngeal and oropharyngeal swabs	√	√√	√
Serum (serum separator tube)	√√	√	not recommended
Blood (plasma) (EDTA/purple top tube for plasma)	√√	√	not recommended
Stool (minimum 10 cc specimen)	√	√√	√√
EIA[1] for antibody detection			
Serum[5] (serum separator tube)	√√	√√	√√

[1] Because of the investigational nature of both the SARS RT-PCR (reverse transcription-polymerase chain reaction) and the SARS EIA (enzyme immunoassay), it is recommended that the clinician obtain a signed informed consent form from the patient. The consent form for the RT-PCR test can be found at: www.cdc.gov/ncidod/sars/lab/rtpcr/consent.htm. The consent form for the EIA test can be found at: www.cdc.gov/ncidod/sars/lab/eia/consent.htm.

[2] A sputum specimen is preferred if the patient has a productive cough.

[3] The more checks, the better the results from a particular specimen at a specific point in the illness.

[4] Consider these specimen types if sputum is not available.

[5] Also collect a convalescent specimen >28 days post onset.

For more information, visit www.cdc.gov/ncidod/sars or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Espa隼l), or (866) 874-2646 (TTY)

SEVERE ACUTE RESPIRATORY SYNDROME

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Core Document

This is an updated version of the draft guidance document issued by the Centers for Disease Control and Prevention (CDC) on November 3, 2003. CDC revised the draft based on comments received from public health partners, healthcare providers, professional organizations, and others. CDC will continue to update the document as necessary to incorporate additional comments and to reflect increased understanding of SARS-CoV transmission dynamics and the availability of improved prevention tools. Please submit comments to: sars-plan@cdc.gov

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
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Executive Summary

On March 12, 2003, the World Health Organization (WHO) issued a historic global alert for severe acute respiratory syndrome (SARS), a deadly new infectious disease with the potential for rapid spread from person to person and via international air travel. WHO and its partners, including the Centers for Disease Control and Prevention (CDC), promptly initiated a rapid, intense, and coordinated investigative and control effort that led within 2 weeks to the identification of the etiologic agent, SARS-associated coronavirus (SARS-CoV), and to a series of decisive and effective containment efforts. By the time SARS-CoV transmission was brought to an end in July 2003, more than 8,000 cases and 780 deaths had been reported to WHO.

The emergence of SARS-CoV provided a dramatic illustration of the potential for a new disease to suddenly appear and spread, leading to widespread health, social, and economic consequences. Fortunately, the world also witnessed the power of traditional public health measures ncluding surveillance, infection control, isolation, and quarantine o contain and control an outbreak. Although the United States had a limited SARS outbreak, it is clear that we are susceptible to the more widespread outbreaks experienced in other countries. It is not possible to predict whether SARS-CoV will reappear, but it could from its original animal reservoir, persistent infection in humans, or the laboratory. To achieve the type of swift and decisive response that is required to control a SARS outbreak, we must be prepared.

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) outlines a framework and approach to assist public health and healthcare officials in preparing for and responding rapidly and decisively to the appearance of SARS-CoV in a healthcare facility or a community. The document has its basis in the *United States Government Interagency SARS Concept of Operations Plan (CONPLAN)*, which outlines the Federal government strategy for a coordinated national response to an outbreak of SARS. The CONPLAN provides planning guidance for a timely, coordinated response by federal agencies to a SARS emergency and serves as a foundation for the development of operational plans and procedures at the national, state, and local levels.

Whereas the focus of the CONPLAN is interagency and intergovernmental coordination, CDC *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)* provides planning guidance, strategies, and tools for the local public health and healthcare officials who provide the first line of readiness and action in detecting and containing a SARS outbreak. The guidance has been prepared in close collaboration with domestic and international partners and incorporates many of the concepts and approaches that were successfully used to contain the spread of SARS-CoV in the United States and in other counties with more widespread outbreaks. In addition, it integrates and builds on preparedness and response plans for other public health emergencies, such as pandemic influenza and bioterrorism.

The document includes suggested activities to be conducted both in the absence of SARS-CoV transmission in the world and in the context of a recurrence of person-to-person transmission. A companion document, *In the Absence of SARS-CoV Transmission Worldwide: Guidance for Surveillance, Clinical and Laboratory Evaluation, and Reporting* (www.cdc.gov/ncidod/sars/absenceofsars.htm), consolidates the recommended activities for the setting of no person-to-person transmission. If SARS-CoV transmission is documented anywhere in the world, CDC will promptly review all available information and provide additional guidance as indicated via the Health Alert Network (HAN), Epi-X, and partner organizations. Current information will also be posted on CDC's SARS website: www.cdc.gov/sars.

The basic strategy that controlled SARS outbreaks worldwide was rapid and decisive surveillance and containment. The keys to successful implementation of such a strategy are up-to-date information on

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local, national, and global SARS activity; rapid and effective institution of control measures; and the resources, organizational and decision-making structure, and trained staff vital to swift and decisive implementation. This guidance document accounts for two important features of SARS outbreaks: 1) they are neither regional nor national but rather confined to limited geographic ? and even institutional – settings, and 2) they are dynamic, meaning that the characteristics of an outbreak can change quickly.

The document is divided into four levels of increasingly detailed information: the executive summary, the core plan, stand-alone supplements that address the key measures for SARS preparedness and response, and appendices to each supplement that provide guidance and tools for local-level preparedness and response activities. The document provides guidance on each of the following key components of SARS preparedness and response:

- Command and Control
- Surveillance and Information Technology
- Preparedness and Response in Healthcare Facilities
- Community Containment Measures, Including Non-Hospital Isolation and Quarantine
- Management of International Travel-Related Transmission Risk
- Laboratory Diagnostics
- Communication and Education
- SARS Investigations and Epidemiologic Research
- Infection Control

Using this guidance document, localities can develop operational SARS preparedness and response plans that reflect consistent approaches among and within jurisdictions to outbreaks of similar characteristics, while taking into account available healthcare and public health resources and other factors that are unique to each community. The document will be updated as necessary to reflect increased understanding of SARS-CoV transmission dynamics and availability of improved prevention tools.

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Public Health Guidance For Community-Level Preparedness And Response To Severe Acute Respiratory Syndrome (Sars) Core Document

I. Introduction

Severe acute respiratory syndrome (SARS) is a newly recognized, severe febrile respiratory illness caused by a previously unknown coronavirus, SARS-associated coronavirus (SARS-CoV). SARS emerged in the southern Chinese province of Guangdong in November 2002, but the worldwide epidemic was triggered in late February 2003 when an ill physician from Guangdong infected several other guests at a hotel in Hong Kong (CDC 2003a; Tsang 2003). These persons subsequently became the index patients for large outbreaks of SARS in Hong Kong, Vietnam, Singapore, and Canada (CDC 2003a; CDC 2003b; WHO 2003a).

Recognition of this new microbial threat prompted the World Health Organization (WHO) to issue a historic global alert for SARS on March 12, 2003 (WHO 2003a). WHO coordinated a rapid and intense worldwide response, which led to the identification of the etiologic agent, SARS-CoV, in less than 2 weeks (Drosten 2003; Ksiazek 2003; Peiris 2003) and implementation of control measures that contained the worldwide outbreak within 4 months. On July 5, WHO announced that SARS had been controlled and ended the global public health emergency response (WHO 2003b). During the epidemic, more than 8,000 probable SARS cases and nearly 800 deaths were reported to WHO from 29 countries (WHO 2003c).

The official end of the global public health emergency affirmed the rapid and monumental response effort but also signaled the need for continued vigilance. The rapidity of the spread of disease and the high levels of morbidity and mortality associated with SARS call for careful monitoring for the reappearance of SARS-CoV and preparations for the rapid implementation of appropriate control measures. SARS-CoV may still exist in human or animal reservoirs and thus have the potential to establish itself as a seasonal respiratory illness with ongoing epidemics (Breiman 2003; CDC 2003c; Guan 2003). Although the United States had only eight laboratory-confirmed cases of SARS-CoV disease and no significant local spread, it is clear that we are susceptible to the types of outbreaks experienced in Hong Kong, Singapore, Taiwan, and Toronto.

In the absence of a vaccine, effective drugs, or natural immunity to SARS-CoV, the only currently available public health strategies to limit the impact of SARS are rapid identification of infected persons and activation of the control measures that have proven effective in preventing transmission in other locales. These measures include global and community surveillance, detection and isolation of cases, identification and monitoring of contacts, adherence to infection control precautions, and, in some instances, measures (e.g., quarantine) to restrict the movement of potentially infected persons. These are the traditional public health tools used to prevent the spread of any infectious disease, and they constitute the fundamental strategy for controlling SARS-CoV.

The SARS outbreak during the spring of 2003 convincingly showed that delays in clinical recognition and isolation of SARS patients can trigger rapid transmission of SARS-CoV and generate substantial health, social, and economic consequences (CDC 2003b; CDC 2003d; Lee 2003; Tomlinson 2003; Varia 2003). Rapid detection of SARS cases and contacts and prompt implementation of control measures can, however, interrupt and contain transmission (CDC 2003b; Chan-Yeung 2003; Chowell 2003; Dye 2003; Lipsitch 2003; Riley 2003; Seto 2003; Tomlinson 2003; Varia 2003). Given the possibility that person-to-person transmission of SARS-CoV might recur, the healthcare and public health systems need to be prepared to quickly detect and control disease transmission and minimize the impact of SARS outbreaks. This document is designed to address this need.

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II. Overview of the Guidance Document

A. Purpose and Scope

This document presents a strategic framework for communities and healthcare facilities to plan and prepare for the recurrence of SARS-CoV transmission and respond to a SARS outbreak. Directed to state and local health departments, healthcare facilities, and healthcare personnel, the document addresses both the rationale and the strategies for SARS preparedness and response and provides a foundation for the development of more detailed operational plans and procedures for responding to SARS at the local level. Suggested activities include those needed to prepare for an introduction of SARS-CoV, to quickly detect possible SARS cases and clusters, and to prevent and contain SARS-CoV transmission.

This document includes suggested activities to be conducted both in the absence of SARS-CoV transmission in the world and in the context of a recurrence of person-to-person transmission. A companion document, *In the Absence of SARS-CoV Transmission Worldwide: Guidance for Surveillance, Clinical and Laboratory Evaluation, and Reporting* (www.cdc.gov/ncidod/sars/absenceofsars.htm), consolidates the recommended activities for the setting of no person-to-person transmission. If SARS-CoV transmission is documented anywhere in the world, CDC will promptly review all available information and provide additional guidance as indicated via the Health Alert Network (HAN), Epi-X, and partner organizations. Current information will also be posted on CDC's SARS website: www.cdc.gov/sars.

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) has its basis in the *United States Government Interagency SARS Concept of Operations Plan (CONPLAN)*, which outlines the Federal government strategy for a coordinated national response to an outbreak of SARS. The CONPLAN provides planning guidance for a timely, coordinated response by federal agencies to a SARS emergency and serves as a foundation for the development of operational plans and procedures at the national, state, and local levels. Whereas the focus of the CONPLAN is interagency and intergovernmental coordination, CDC's *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)* provides planning guidance, strategies, and tools for the local public health and healthcare officials who provide the first line of readiness and action in detecting and containing a SARS outbreak.

Many of the approaches and activities for preparedness and response to SARS are similar or identical to those involved in combating other infectious diseases, such as pandemic influenza and intentionally spread smallpox or plague. Therefore, topics covered in this document may be relevant to or already addressed in other local emergency preparedness plans.

B. Development Process

The document was prepared by CDC SARS Preparedness Committee, which was assembled to prepare for the possibility of future SARS outbreaks. The Committee includes eight working groups, each of which addressed a component of SARS preparedness and response: Surveillance, Clinical Management, Preparedness in Healthcare Facilities, Community Response, Laboratory Diagnostics, Information Technology, Communication and Education, and Special Studies. The working groups derived the guidance document from lessons learned during the 2003 epidemic, other CDC preparedness and response plans, and the advice, suggestions, and comments of state and local health officials and representatives of professional organizations, convened by means of teleconferences and meetings. Meetings were held on August 12-13, 2003 (public health preparedness and response), September 12, 2003 (preparedness in healthcare facilities), and September 18, 2003 (laboratory diagnostics).

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C. Objectives

The strategies, guidelines, and tools included in this document are designed to enable states and communities to achieve the following objectives:

- Rapidly and efficiently identify cases of SARS-CoV disease and their exposed contacts
- Ensure rapid information exchange among clinicians, public health officials, and administrators of healthcare facilities about potential SARS cases
- Rapidly and effectively implement measures to prevent the transmission of SARS-CoV
- Continuously monitor the course and characteristics of a SARS outbreak and promptly revise control strategies as needed
- Implement effective communication and education strategies for the public, the media, community officials, healthcare communities, and public health communities to ensure an appropriate response to SARS
- Coordinate and integrate SARS preparedness and response planning efforts with other preparedness plans and systems

III. Approach to SARS Preparedness and Response

The proposed approach to SARS preparedness and response reflects what has been learned to date about SARS-CoV transmission and the interventions that were used to contain the 2003 global outbreaks.

A. Lessons Learned

- SARS-CoV disease is a serious, often fatal, infectious disease with the potential for rapid spread.
- The vast majority of febrile respiratory illnesses will not be SARS-CoV disease.
- Laboratory tests, although sensitive and specific, do not reliably detect SARS-CoV early in the course of disease.
- Clinical features of SARS-CoV disease are nonspecific, but diagnosis can be guided by a history of exposure risk.
- In the absence of effective drugs or a vaccine, SARS-CoV disease can be controlled by the rapid and efficient use of the basic public health control strategies of surveillance and containment.
- SARS-CoV transmission is neither regional nor national but rather confined to limited geographic ? and even institutional ? settings; response strategies must therefore reflect local characteristics and resources.
- SARS response activities can overwhelm public health and healthcare resources.
- The potentially substantial health, social, and economic impact of SARS-CoV requires a swift and bold response that is appropriate to the situation yet minimizes unnecessary disruptions and respects human dignity.

B. Basic and Enhanced Response Elements

The foundation of the proposed approach is a set of fundamental elements on which communities might base their preparedness and response activities. Examples of these basic response elements are:

- Surveillance for cases of SARS-CoV disease or suspicious clusters of pneumonia, with appropriate diagnostic testing
- Rapid isolation and appropriate management of potential cases of SARS-CoV disease
- Rapid and efficient identification, evaluation, and monitoring of contacts
- Issuance of travel alerts/advisories, screening of ill travelers at airports, and implementation of other border control measures to prevent international spread

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- Timely dissemination of communication messages to the public health and healthcare communities and the public

Communities may supplement these basic elements with enhanced control measures that might be needed to address an escalating outbreak, changing transmission patterns or characteristics, variations in compliance, uncertainties about the effectiveness of basic control measures, feasibility and acceptability of specific interventions, or political pressures. Possible enhanced activities might include:

- Establishment of designated sites for evaluation of possible SARS patients
- Screening of incoming and/or departing passengers at airports, ports, and land border crossings
- Quarantine of close contacts of cases or of persons potentially exposed to SARS-CoV by their presence at a particular function, setting, or institution
- Closing schools, canceling large gatherings, or implementing other now day"-type measures for increasing social distance as temporary measures to slow transmission in an affected community

C. Information for Action

As the level of SARS-CoV transmission during an outbreak is dynamic, response activities, by necessity, must also be dynamic. The key to understanding transmission dynamics and knowing when to escalate the response at the local level is a surveillance system that provides ready access to timely information on the number of new cases, the likely source of exposure for cases, the number of cases not previously identified as contacts, and the number of contacts (prospective cases) with high-risk exposures to known cases.

D. Coordination and Consistency

Although jurisdictions will need to adjust the types and level of response measures to local conditions and resources, they will also need to coordinate with adjacent jurisdictions to ensure consistency among responses and minimize confusion or mistrust that may derive from inexplicable differences in outbreak control strategies.

IV. Key Measures for SARS Preparedness and Response

A. Command and Control

Rapid and decisive action in response to a recurrence of SARS-CoV transmission requires local, state, and federal public health authorities to work efficiently and in concert toward the common goal of containing the spread of infection. State and local officials provide the first line of response with respect to preparing and planning for an outbreak at the jurisdictional level; identifying, managing, and reporting cases; and exercising the necessary authority to impose individual and community containment measures. Given the complexity of responding to an outbreak of a serious respiratory illness and the sustained, coordinated efforts required to control transmission, states and localities must determine and clarify operational and legal authorities in advance and make the necessary preparations for a multi-agency, multi-jurisdictional response. Another essential preparedness step for command, control, and coordination of resources during a SARS outbreak response will be the development/adaptation of an incident management structure supported by adequate information systems.

Goals

- Determine and establish operational authority for the response to a SARS outbreak.
- Establish an incident management structure for the response to a SARS outbreak, supported by adequate information systems.

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- Determine and establish legal authority for a response to a SARS outbreak.

Priority Activities

- Conduct local preparedness planning for a re-emergence of SARS-CoV, with participation by persons representing a range of disciplines and expertise. Draft and formally adopt a SARS response plan, or add SARS preparedness and response to an existing preparedness plan.
- Confirm the controlling authorities for actions such as declaring a public health emergency, activating the SARS response plan, and curtailing modes of transportation.
- Develop/reinforce relationships with health authorities of adjoining jurisdictions and with federal agencies to ensure effective communication and collaboration.
- Learn about the legal authorities and statutes for enforcing individual and community containment measures at the local, state, and federal levels.
- Develop/adapt a predetermined incident command system to coordinate and manage SARS response activities.
- Ensure the availability of information system(s) that can document, support, and coordinate the activities generated within an incident command system (e.g., integrate personnel and facilities, expedite real-time communication and flow of information, aid in logistics planning, resource allocation

B. Surveillance

The SARS surveillance strategy is founded on complete and rapid identification of cases -- the key to which is maintaining an appropriate index of suspicion for SARS-CoV disease based on risk of exposure. With no known source of transmission, the most likely sites of SARS-CoV recurrence are locations where SARS-CoV transmission previously occurred, the original site of introduction of SARS-CoV from animals to humans, laboratories in which a break in technique leads to laboratory-acquired infections, and also large international travel hubs that serve as interconnecting nodes to high-risk locations.

The predilection for SARS-CoV transmission to occur among international travelers and in healthcare settings and to cause unusual clusters of pneumonia (Booth 2003; CDC 2003a; Hsu 2003; Lee 2003; Varia 2003) provides a focus for surveillance in the absence of SARS-CoV transmission (i.e., patients requiring hospitalization for pneumonia, pneumonia in healthcare workers, unusual clusters of pneumonia among travelers). If SARS-CoV reappears, then patients or known sites of SARS-CoV transmission become the most likely source of exposure. Contact tracing -- the identification and evaluation of persons who had close contact with a potential SARS case or were exposed to locations with known SARS-CoV transmission -- is important for the identification of persons at risk for SARS-CoV disease and the initiation of appropriate measures to reduce the possible spread of infection.

Goals

- Maximize early detection of cases and clusters of respiratory infections that might signal the global re-emergence of SARS-CoV disease while minimizing unnecessary laboratory testing, concerns about SARS-CoV, implementation of control measures, and social disruption.
- If SARS-CoV transmission recurs, maintain prompt and complete identification and reporting of potential cases to facilitate outbreak control and management.
- Identify and monitor contacts of cases of SARS-CoV disease to enable early detection of illness in persons at greatest risk.

Priority Activities

- Educate clinicians and public health workers on features that can assist in early recognition of SARS and on guidelines for reporting SARS-CoV cases.

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- Develop tools to identify, evaluate, and monitor contacts of SARS-CoV patients.
- Establish an efficient data management system that links clinical, epidemiologic, and laboratory data on cases of SARS-CoV disease and allows rapid sharing of information.
- Identify surge capacity for investigation of cases and identification, evaluation, and monitoring of contacts in the event of a large SARS outbreak.

C. Preparedness and Response in Healthcare Facilities

In most settings with large SARS outbreaks in 2003, healthcare facilities accounted for a large proportion (often >50%) of cases (Booth 2003; CDC 2003b; CDC 2003d; CDC 2003e). In addition to healthcare workers who cared for patients, other hospital patients and visitors were often affected and in many instances propagated the outbreaks in the hospital and into the community. Therefore, rapid isolation of possible cases of SARS-CoV disease and strict adherence to infection control precautions are critical; prompt and decisive use of these measures has consistently been a key and effective part of SARS control strategies. Each hospital in a community should be prepared to identify, triage, and manage SARS patients. Hospital-specific infection control policies related to SARS should guided by the level of SARS activity in the community and the hospital. Identifying adequate resources and staff for an effective response and surge capacity, if needed, are priorities.

Goals

- Rapidly identify and isolate all potential SARS patients.
- Implement infection control practices and contact tracing to interrupt SARS-CoV transmission.
- Ensure rapid communication within healthcare facilities and between healthcare facilities and health departments.

Priority Activities

- Organize a planning committee to develop an institutional preparedness and response plan and a clear decision-making structure.
- Develop surveillance, screening, and evaluation strategies for various levels of SARS-CoV transmission.
- Develop plans to rapidly implement effective infection control measures and contact-tracing procedures.
- Determine the current availability of infrastructure and resources to care for SARS patients and strategies for meeting increasing demands.
- Develop strategies to meet staffing needs for SARS patient care and management.
- Develop strategies to communice with staff, patients, the health department, and the public.
- Develop strategies to educate staff and patients about SARS and SARS control measures.

D. Community Containment Measures, Including Non-Hospital Isolation and Quarantine

Community containment strategies, including isolation, contact tracing and monitoring, and quarantine, are basic infectious disease control measures that proved to be critically important for control of the most severe SARS outbreaks in 2003. Isolation of SARS patients separates them from healthy persons and restricts their movement to prevent transmission to others, preventing healthy persons from becoming ill. It also allows for the focused delivery of specialized health care to ill persons. Quarantine of persons who have been exposed to SARS-CoV but are not ill is intended to prevent further transmission in the event that they develop SARS-CoV disease by reducing the interval between the onset of symptoms and the institution of appropriate precautions.

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Given that most SARS patients have a clearly identified exposure to other SARS patients or to a setting with SARS-CoV transmission and that transmission occurs after onset of illness, rapid identification of exposed persons (contacts) and prompt isolation of contacts if they become ill is a highly effective control strategy. Quarantine of contacts is often a critical part of contact management and should be performed selectively, carefully, and with respect for human dignity. Isolation and quarantine are optimally performed on a voluntary basis, but many levels of government (local, state, federal) have the basic legal authority to compel mandatory isolation and quarantine of persons and communities when necessary to protect the public's health. Broader community containment through now day□measures, such as cancellation of public gatherings and closure of school and businesses, can also be used to reduce transmission by limiting social interactions at the population level. The rationale for such measures, as well as mechanisms to ensure due process and prevent stigmatization of affected persons, need to be clearly articulated.

Goal

- Prevent transmission of SARS-CoV through use of a range of community containment strategies chosen to provide maximum efficacy based on the characteristics of the outbreak while minimizing the adverse impact on civil liberties.

Priority Activities

- Identify, evaluate, and monitor contacts of SARS patients, and consider quarantine of contacts if needed.
- Continually monitor the course and extent of the outbreak, and evaluate the need for community containment measures.
- Establish the infrastructure to deliver essential goods and services to persons in quarantine and isolation.
- Develop tools and mechanisms to prevent stigmatization and provide mental health resources for those in isolation and quarantine.
- Work with community partners to ensure that implementation and communication plans address the cultural and linguistic needs of affected persons.

E. Prevention of International Travel-Related Transmission Risk

In the absence of control measures, SARS-CoV can spread rapidly on a global scale through international travel. Screening and evaluating passengers for SARS-like symptoms, educating them about SARS, and reporting illnesses in travelers can decrease the risk of travel-associated infections.

Goals

- Prevent the introduction of SARS-CoV (and spread from an introduction) into the United States from SARS-affected areas.
- Prevent exportation of SARS-CoV from the United States if domestic transmission presents an increased risk of exportation.
- Reduce the risk of SARS-CoV disease among outbound travelers to SARS-affected areas.
- Prevent the transmission of SARS-CoV to passengers on a conveyance with a SARS patient, and evaluate and monitor other passengers to detect SARS-like illness and prevent further spread.

Priority Activities

- Screen incoming travelers from SARS-affected areas for SARS, and provide guidance about monitoring their health and reporting illness.
- Provide guidance to outbound travelers about active SARS-affected areas and measures to reduce risk of acquiring SARS-CoV disease during travel.

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- If SARS-CoV transmission in the United States presents an increased risk of exporting SARS-CoV to other countries, then screen outbound travelers to prevent such exportation.
- Ensure the appropriate evaluation and management of SARS cases and potentially exposed passengers and crew members on conveyances.

F. Laboratory Diagnostics

Laboratory diagnostics are essential for detecting and documenting a resurgence of SARS, responding to and managing SARS outbreaks, and managing concerns about SARS-CoV disease in patients with other respiratory illnesses. The identification of the etiologic agent, SARS-CoV, led to rapid development of enzyme immunoassays (EIA) and immunofluorescence assays (IFA) for SARS antibody (Ksiazek 2003) and reverse-transcriptase PCR (RT-PCR) assays for SARS-CoV RNA (Emery 2003). These assays can be very sensitive and specific for detecting antibody and RNA, respectively, but are less sensitive for detecting infection, especially early in illness. Diagnostic assays for other respiratory pathogens may be helpful in differentiating SARS-CoV disease from other illnesses, but SARS patients may be simultaneously infected with SARS-CoV and another respiratory pathogen. CDC laboratory diagnostics plan is based on the following goals and activities:

Goals

- Provide the public health community with ready access to high-quality SARS-CoV diagnostics
- Ensure that SARS-CoV laboratory diagnostics are used safely and appropriately and that results are interpreted appropriately

Priority Activities

- Improve the ability to detect SARS-CoV infection by optimizing the selection and timing of specimen collection and processing.
- Provide SARS-CoV assays for RT-PCR testing through Laboratory Response Network (LRN) laboratories and for serologic testing to state public health laboratories.
- Distribute proficiency panels and questionnaires to participating laboratories to determine the ability of laboratories to provide valid SARS-CoV diagnostics.
- Provide guidance on laboratory safety for SARS-CoV and other respiratory diagnostic testing and for potentially SARS-CoV-containing specimens submitted for other tests.
- Provide guidance for interpreting test results, taking into account the potential for false-positive and false-negative results and the availability of applicable clinical and epidemiologic information.
- Identify surge capacity for laboratory testing in the event of a large SARS outbreak.

G. Communication and Education

Rapid and frequent communication of crucial information about SARS -- such as the level of the outbreak worldwide and recommended control measures -- are vital components of efforts to contain the spread of SARS-CoV. Specific communication needs and key messages will vary substantially by level of SARS activity. In the absence of SARS-CoV transmission globally, the preparation and dissemination of messages and materials are designed to maintain vigilance in the healthcare community and general awareness among all parties about the possibility of a SARS outbreak and the steps that would be indicated in such an event. The recurrence of SARS-CoV transmission anywhere in the world will generate immediate and intense media attention and require an enormous effort to respond to the demand from the public, the media, policymakers, and healthcare workers for information and guidance. A domestic outbreak of SARS will result in even greater demands to manage media requests, disseminate up-to-date outbreak information and messages, assist local hospitals and healthcare providers in responding to the public, and respond to inquiries from special interest groups.

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Goals

- Instill and maintain public confidence in the nation's public health system and its ability to respond to and manage the reappearance of SARS-CoV.
- Contribute to the maintenance of order, minimization of public panic and fear, and facilitation of public protection through the provision of accurate, rapid, and complete information before, during, and after a SARS outbreak.
- Provide accurate, consistent, and comprehensive information about SARS-CoV disease.
- Address rumors, inaccuracies, and misperceptions as quickly as possible, and prevent stigmatization of specific groups.

Priority Activities

- Identify key messages about SARS-CoV disease for specific audiences and the most effective methods to deliver these messages.
- Issue local public health announcements and updated information on the outbreak and response.
- Provide a location for state, local, and federal communication and emergency response personnel to meet and work side-by-side in developing key messages and handling media inquiries.
- Respond to frequently occurring media questions by preparing fact sheets, talking points (key messages), and question-and-answer documents.
- Coordinate requests for spokespersons and subject matter experts.

H. Plans for SARS Investigations and Epidemiologic Research

[This section is currently under development.]

I. Infection Control in Healthcare, Home, and Community Settings

Transmission of SARS-CoV in healthcare settings was a major factor in the propagation of the 2003 global SARS epidemic. In each of the major outbreak areas, SARS-CoV caused unprecedented levels of morbidity and mortality among healthcare personnel and disrupted healthcare delivery systems. Rapid implementation and adherence to infection control measures proved essential for controlling transmission in healthcare facilities and containing the outbreaks. Ensuring readiness for a reappearance for SARS-CoV therefore means maintaining emphasis on the importance of infection control in healthcare facilities and correcting any deficiencies in infection control training and practice.

If person-to-person SARS-CoV transmission recurs, many patients may be isolated in residential settings. In the United States, hospitalization of patients with SARS-CoV disease is recommended only when medically indicated. Given the risk of exposure to household members, strict infection control measures are also needed to prevent SARS-CoV transmission from patients isolated in residential settings. In addition, if a large outbreak overwhelms the capacity of the healthcare system, patients may be isolated in community facilities. As in the case of healthcare and residential settings, appropriate infection control measures will be required to prevent transmission of infection in these facilities.

Goals

- Ensure early recognition of patients at risk for SARS-CoV disease.
- Prevent transmission of SARS-CoV by implementing appropriate infection control precautions.

Priority Activities

- Reinforce basic infection control practices among healthcare workers.
- Take steps to reduce transmission of respiratory viruses from symptomatic persons at the time of initial encounter with the healthcare setting.

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- Develop triage strategies that ensure early recognition of patients at risk for SARS-CoV disease.
- Develop plans for appropriate SARS infection control precautions in inpatient and outpatient healthcare facilities, homes, and community isolation facilities.
- Ensure appropriate management and follow-up monitoring of healthcare workers who have had exposures to and other contacts with SARS patients.

J. Information Technology

During the 2003 epidemic, the internet played an important part in global efforts to identify the etiologic agent of SARS and control its spread. Unfortunately, in many outbreak settings, the lack of useful information management systems made outbreak control less efficient in many areas and in some instances may have actually delayed the containment and control of SARS. Although a web-based system to manage all aspects of a SARS outbreak would be ideal, issues of confidentiality, data security, data ownership, and availability of technical expertise to support new information systems make the ideal system a long-term goal. In the short term, a web-based case reporting system -- plus efficient means to link clinical, epidemiologic, and laboratory data -- will provide an efficient process for quickly recording and reporting the status of SARS activity in the United States for federal, state, and local response needs.

Rapid identification, tracking, evaluation, and monitoring of contacts of SARS cases will be key to early detection of symptoms in persons at greatest risk of SARS, and development of a data management system to facilitate this process is vital. Contact tracing can be particularly challenging and resource intensive in large-scale outbreaks or among highly mobile populations such as international travelers. Ideally, such a system should be integrated with the case reporting system to allow rapid exchange of information. Finally, the tracking of contacts of SARS cases on conveyances (e.g., airplanes) will require rapid availability of electronic passenger manifests that provide information on the proximity of the contact to the case. This information needs to be rapidly assimilated and disseminated to a large number of state and local health departments for notification and monitoring of contacts.

Goal

- Deploy an integrated data management system that efficiently and effectively supports SARS outbreak response needs at the federal, state, and local levels.

Priority Activities

- Develop and deploy a case-reporting system for SARS surveillance that supports federal, state, and local health department needs and makes data readily available to the submitting health department. The system can be based on either web-based data entry or data downloads.
- Implement an outbreak-management system that can track and link clinical, laboratory, and epidemiologic data and can be used to monitor all aspects of an outbreak response at the local level. The system should allow state and local health departments to track the monitoring and follow-up of contacts for clinical illness and compliance with isolation and quarantine measures, as applicable.
- Collaborate with the Department of Transportation to rapidly obtain passenger manifests for conveyances with ill travelers.
- Use electronic communication mechanisms (e.g., Epi-X, Health Alert Network) to disseminate contact information to state and local health departments.

V. Organization of the Guidance Document

The document is organized into four levels of progressively more detailed information: 1) executive summary; 2) core document; 3) stand-alone supplements that address the key measures for SARS

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preparedness and response; and 4) attachments to each supplement that provide guidance and tools for local-level preparedness and response activities.

The Supplements included in this document are:

Supplement A:	Command and Control
Supplement B:	SARS Surveillance
Supplement C:	Preparedness and Response in Healthcare Facilities
Supplement D:	Community Containment Measures, Including Non-Hospital Isolation and Quarantine
Supplement E:	Managing International Travel-Related Transmission Risk
Supplement F:	Laboratory Diagnosis
Supplement G:	Communication and Education
Supplement H:	Plans for SARS Investigations and Epidemiologic Research UNDER DEVELOPMENT
Supplement I:	Infection Control in Healthcare, Home, and Community Settings NEW!

Each Supplement outlines, and in some cases describes in some detail, many of the interrelated and multifaceted activities that need to or could be undertaken at the local level to prepare for and respond to the reemergence of SARS. Also included are guidelines and resource materials to assist public health officials and healthcare facilities in planning and implementing a response. To address the dynamic nature of a SARS outbreak and each jurisdiction's unique situation, each Supplement considers, as applicable:

- Recommendations for preparedness and contingency planning that should occur prior to the reappearance of SARS
- Strategies for a basic level of response in U.S. communities to the reappearance of SARS in other parts of the world
- Options for enhancing the intensity and scope of local strategies to address changing dynamics of the outbreak or response
- Options for modifying the response in reaction to new information on transmission dynamics, improved diagnostic testing, or introduction of new therapeutic or prophylactic interventions
- Criteria and approaches for de-escalating the response as SARS-CoV transmission is controlled and eliminated

Using this guidance document, localities can develop operational SARS preparedness and response plans that reflect consistent approaches among and within jurisdictions to outbreaks of similar characteristics, while taking into account available healthcare and public health resources, public perceptions, and other factors that are unique to each community. The document will be updated as necessary to reflect increased understanding of SARS-CoV transmission dynamics and availability of improved prevention tools.

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Appendix 1
Clinical, Epidemiologic, and Virologic Features of SARS-CoV

Emergence of SARS-CoV

SARS first came to global attention on February 11, 2003, when Chinese officials informed WHO of the occurrence of 305 cases of atypical pneumonia and 5 deaths in Guangdong Province since November 2002 (WHO 2003). On February 21, a Chinese physician with SARS traveled from Guangdong to Hong Kong and spent the night in a hotel there. During the next two days, he developed increasingly severe respiratory symptoms and was hospitalized in a Hong Kong hospital, where he died from his illness. His one-night stay in a Hong Kong hotel led to infection by yet unexplained mechanisms in several other guests, who subsequently traveled to and seeded SARS outbreaks in Vietnam, Singapore, Hong Kong, and Canada (CDC 2003a; Hsu 2003; WHO 2003). In these areas, local spread was initiated and maintained in hospitals, where healthcare personnel, patients, and visitors ? unaware of the emergence of a new disease ? acquired SARS-CoV from persons with unrecognized infection (Booth 2003; CDC 2003b; CDC 2003c; Lee 2003; Varia 2003). During March-May, the spread of the virus from Guangdong to other parts of China established additional foci of infection, such as Beijing and Taiwan (CDC 2003d).

Once SARS was recognized in these locations and widespread community transmission was noted in several outbreak sites, the spread of SARS-CoV was controlled by aggressive community infection control measures including active case finding, contact tracing and monitoring, travel restrictions, and quarantine and other containment strategies. These measures were implemented in many geopolitical jurisdictions and involved intense, sustained collaboration among institutions and persons beyond the traditional public health infrastructure. Areas with high transmission rates experienced severe economic consequences and social disruption rivaling that seen in other global epidemics (e.g., plague) of centuries past.

On March 14, 2003, CDC launched an emergency public health response and established national surveillance for SARS to identify case-patients in the United States and discover if domestic transmission was occurring. Through July 2003, a total of 159 suspect and 33 probable cases had been reported in the United States. Of the 33 probable cases, only 8 had laboratory evidence of SARS-CoV infection (CDC 2003e; CDC 2003f; CDC 2003g; CDC 2003h). All of the eight cases with documented SARS-CoV infection occurred in persons who had traveled to SARS-affected areas. One of these case-patients might have acquired infection either abroad or from her spouse, who was one of the other seven SARS-CoV-positive cases. Except for this one person with possible transmission from a household contact, no evidence of SARS-CoV infection was detected by serologic testing of household contacts of SARS cases or of healthcare workers who cared for SARS patients.

During the global epidemic, transmission of SARS-CoV in hospitals was a major factor in the amplification of outbreaks and the initiation of spread into the community (Booth 2003; CDC 2003b; CDC 2003c; CDC 2003d; Lee 2003). In areas characterized by extensive outbreaks, early SARS-CoV transmission occurred predominantly among healthcare workers, patients, and visitors; these groups accounted for 18% to 58% of all SARS cases in the five countries with the largest outbreaks. The concentration of illness in previously healthy hospital staff placed an enormous strain on hospital facilities and staff. The apparent ease of nosocomial transmission ? added to the far-reaching public health ramifications of SARS-CoV transmission in single hospitals ? posed great challenges for healthcare institutions in maintaining high levels of vigilance and infection control.

Clinical Features

The median incubation period for SARS appears to be approximately 4 to 6 days; most patients become ill within 2 to 10 days after exposure (Booth 2003; CDC 2003b; Donnelly 2003; Varia 2003). The clinical presentation of SARS-CoV infection has some but not enough distinctive features to enable diagnosis by clinical signs and symptoms alone (Hsu 2003). Respiratory symptoms typically do not begin until 2 to 7

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days after onset of systemic symptoms such as fever, headache, myalgias. Respiratory complaints usually include a non-productive cough and dyspnea but not upper respiratory symptoms such as rhinnorhea and sore throat (Booth 2003; Donnelly 2003; Drosten 2003a; Lee 2003; Peiris 2003a; Poutanen 2003; Rainer 2003; Tsang 2003). Almost all patients with laboratory evidence of SARS-CoV infection evaluated thus far developed radiographic evidence of pneumonia (Poutanen 2003; Rainer 2003), and most (70% -90%) developed lymphopenia (Booth 2003; Lee 2003; Peiris 2003a; Poutanen 2003; Tsang 2003; Wong 2003). The overall case-fatality rate of approximately 10% can increase to >50% in persons older than age 60 (Peiris 2003a).

Transmission

Epidemiologic features of SARS provide keys to its diagnosis and control. The pattern of spread suggests that SARS-CoV is transmitted primarily through droplets and close personal contact (Seto 2003; Varia 2003). Studies documenting stability of the virus for days in the environment suggest the possibility of fomite transmission. There is also suggestive evidence that, in a few instances, SARS-CoV may have been transmitted by small-particle aerosols. Epidemiologic data suggest that infected persons do not transmit SARS-CoV before the onset of symptoms and that most transmission occurs late in the course of illness when patients are likely to be hospitalized (Peiris 2003a). The lack of transmission before symptom onset and during early illness explains the infrequency of community transmission and the preponderance of hospital-associated transmission. Although evidence indicates that most patients do not transmit SARS-CoV efficiently (Lipsitch 2003), documentation of uper-spreaders? and uper-spreading events? shows that, in certain situations, viral transmission can be highly efficient (CDC 2003b).

Control Strategies

The rapidity with which SARS spread globally and the severity of the disease require a rapid and integrated global response to SARS. SARS anywhere in the world can potentially affect all other global regions. In response to the 2003 SARS epidemic, WHO orchestrated a rapid and intense effort to control transmission, which ultimately was effective in stopping all global spread by early July 2003. The classic public health control measures of isolation, contact tracing and monitoring, infection control, and quarantine were an important part of the global control of SARS and will be the key to controlling SARS if it returns.

The Virus and Its Re-emergence

SARS is caused by the newly identified SARS-associated coronavirus (SARS-CoV) (Drosten 2003b; Ksiazek 2003). As SARS-CoV is distantly related to all previously described coronaviruses, it is likely that the virus or its parent virus has been circulating in some location for a long period. Antibodies to SARS-CoV were not found in human serum samples banked before the SARS outbreak, suggesting that the virus is new to the human population. Evidence suggests that it is a previously unknown coronavirus, probably from an animal host, that crossed the species barrier and somehow acquired the ability to infected humans. No one knows if SARS-CoV will reappear, but the most likely potential sources for its reintroduction are: 1) the original animal or a new animal reservoir; 2) undetected transmission in humans; 3) persistent infection in humans; or 4) the laboratory (as occurred recently in Singapore). Since most other respiratory viruses are seasonal, with outbreaks in fall, winter, or spring that spontaneously resolve, it is possible that SARS may also be seasonal and spread more efficiently during the respiratory virus season. Recurrence of or concern about SARS during respiratory virus season will likely challenge the healthcare and public health communities with large numbers of SARS-like illnesses.

Laboratory Diagnostics

Laboratory diagnostics are essential for detecting and documenting a resurgence of SARS, responding to and managing outbreaks of SARS, and addressing concerns about SARS in patients with other respiratory illnesses. Two assays are most often used to diagnose SARS CoV infection: PCR assays for viral RNA and

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serologic testing for virus-specific antibodies (Drosten 2003b; Ksiazek 2003; Peiris 2003b). Both assays can be very specific and sensitive in detecting RNA and antibodies, respectively. However, because of the low titer of virus in clinical specimens from most patients and the time it takes persons to mount an antibody response to infection, neither assay can reliably detect SARS-CoV infection early in illness (Ksiazek 2003; Peiris 2003). Interpretation of these assays needs to account for the possibility of false-negative results, which are frequent occurrences early in infection, and false-positive results, which are especially important concerns for PCR assays.

Prophylaxis and Treatment

No vaccines have yet been developed for SARS and no anti-viral treatment has been shown to be effective. CDC, the National Institutes of Health (NIH), the Food and Drug Administration (FDA) and academicians are developing protocols to assess antiviral drugs that show activity in vitro against SARS-CoV. It is not yet clear whether persons who recover from SARS-CoV infection develop long-lasting protective immunity or whether they are susceptible to re-infection and disease, as is the case with other human coronaviruses.

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Appendix 2
Glossary

Air changes: Ratio of the volume of air flowing through a space in a certain period of time (air flow rate) to the volume of that space (room volume); usually expressed as the number of room air changes per hour (ACH).

Airborne infection isolation room (AIIR): Single-occupancy patient-care room in which environmental factors are controlled to minimize transmission of infectious agents spread from person to person by droplet nuclei associated with coughing or aerosolization of contaminated fluids; AIIRs typically have specific requirements for controlled ventilation, air pressure, and air filtration.

Airborne infection isolation precautions: Measures to reduce the risk of airborne transmission of infectious agents; an AIIR with negative pressure relative to the surrounding area is required for full implementation.

Airborne transmission: Occurs by dissemination of either airborne droplet nuclei (small-particle residue [5 疫 or smaller] of evaporated droplets containing microorganisms that remain suspended in the air for long periods of time) or dust particles containing the infectious agent. Microorganisms carried in this manner can be dispersed widely by air currents and may become inhaled by a susceptible host in the same room or over a longer distance from the source patient, depending on environmental factors.

Bronchoscopy: Procedure for visually examining the respiratory tract and/or obtaining specimens for diagnostic purposes; requires inserting an instrument (bronchoscope) through a patient mouth or nose into the trachea.

Close contact: A person who has cared for or lived with a person with SARS or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS either during the period the person was clinically ill or within 10 days of resolution of symptoms. Examples of close contact include kissing or embracing, sharing eating or drinking utensils, talking within 3 feet, physical examination, and any other direct physical contact between persons. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

Community containment: Measures to separate infected or exposed persons by use of isolation, quarantine, or other restrictions on movement and activities; isolation and quarantine are common practices in public health, and both aim to control exposure to infected or potentially infected persons; both may be used voluntarily or compelled by public health authorities.

Community transmission: In the context of SARS, transmission of SARS-CoV outside of well-defined settings (i.e., hospitals; households of SARS patients).

Contact: A person who has been exposed to someone with a communicable disease during the infectious period. (See lose contact.?

Contact precautions: Work practices to reduce the risk of transmitting infectious agents by direct or indirect contact with an infectious person.

Contact tracing: Identification and location of persons who may have been exposed to a person with SARS-CoV infection; may result in regular monitoring for evidence of illness and strict or modified quarantine.

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Coronavirus: One of a group of viruses that have a halo or crown-like (corona) appearance when viewed under a microscope. These viruses are a common cause of mild to moderate upper-respiratory illness in humans and are associated with respiratory, gastrointestinal, liver and neurologic disease in animals.

Droplet precautions: Measures to reduce the risk of droplet transmission of infectious agents.

Droplet transmission: Occurs when droplets containing infectious agents are propelled a short distance through the air (e.g., by coughing, sneezing, or talking) and deposited in the eyes, nose or mouth of a susceptible person.

Exposure: Condition of being subjected to something (e.g., an infectious agent) that could have a harmful effect.

Fit test: he use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual to assess the adequacy of fit of that respirator brand/model on that individual.

Hand hygiene: A general term that applies to any one of the following: 1) handwashing with plan (non-antimicrobial) soap and water, 2) antiseptic handwash (soap containing antiseptic agents and water), 3) antiseptic hand rub (waterless antiseptic product, most often alcohol-based, rubbed on surfaces of hands), or 4) surgical hand antisepsis.

Healthcare worker: Any employee in a healthcare facility who has close contact with patients, patient-care areas, or patient-care items; also referred to as ealthcare personnel.?

High-efficiency particulate air (HEPA) filter: Type of air filter that removes >99.97% of particles 0.3 um or larger at a specified flow rate of air.

Incident command system: Predetermined organizational structure for potential mass casualty events that address planning, operations, logistics, finance, and administration.

Incubation period: Time interval between infection (i.e., introduction of the infectious agent into the susceptible host) and the onset of the first symptom of illness known to be caused by the infectious agent.

Infection control: Measures practiced by healthcare personnel in healthcare facilities to decrease transmission and acquisition of infectious agents (e.g., proper hand hygiene, scrupulous work practices, use of personal protective equipment (PPE) [masks or respirators, gloves, gowns, and eye protection]; infection control measures are based on how an infectious agent is transmitted and include standard, contact, droplet, and airborne precautions.

Isolation: Separation of an ill person who has a communicable disease (e.g., SARS patient) from those who are healthy. Isolation prevents transmission of infection to others and also allows for the focused delivery of specialized health care to ill persons.

Monitoring: Watching, keeping track of, or checking for a specific purpose. In the context of SARS, monitoring refers to assessment (by phone or in person) of a person who has a known or possible exposure to SARS-CoV to detect the development of symptoms and ensure prompt implementation of precautions if

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necessary. **Passive monitoring** relies on self-assessment by the affected person, who is asked to contact health authorities if symptoms develop. **Active monitoring** involves direct assessment of each affected person at least once a day by healthcare or public health staff or designee.

N-95 respirator: Respirator whose filtering efficiency has been determined to be at least 95% for the most penetrating sized particle (~0.3 um); an N-95 respirator may either be a disposable filtering facepiece respirator (the entire face piece serves as the filter) or an elastomeric facepiece respirator equipped with an appropriate particulate filter cartridge.

Negative pressure: Pressure less than that of the ambient atmosphere.

Nosocomial: Acquired in a healthcare setting or as a result of medical care.

PCR (polymerase chain reaction): Laboratory method for detecting the genetic material of an infectious disease agent in specimens.

Personal protective equipment (PPE): Specialized clothing and equipment designed to create a barrier against health and safety hazards; examples include goggles, face shields, gloves, and respirators.

Powered air-purifying respirator (PAPR): Respirator equipped with a face piece, hood, or helmet, breathing tube, air-purifying filter, cartridge and/or canister, and fan; air is pulled through the air-purifying element and pushed through the breathing tube and into the face piece, hood, or helmet.

Quarantine: Separation or restriction of activities of well persons who are not ill but who are believed to have been exposed to a communicable disease and are therefore at high risk of becoming infected. In the context of SARS, quarantine refers to a combined approach to managing contacts, which consists of active monitoring plus activity restrictions.

Respirator: A personal protective device that is worn over the nose and mouth to reduce the risk of inhaling hazardous airborne particles, gases, or vapors.

Respiratory hygiene/cough etiquette: A group of infection control measures used to contain infection at its source by covering the mouth and nose during coughing and sneezing, using tissues to contain respiratory secretions with prompt disposal in a no-touch receptacle, and maintaining spatial separation when coughing. These measures are targeted to patients and the persons accompanying them beginning at the point of initial encounter with a healthcare setting.

Respiratory symptoms: When screening patients for potential SARS-CoV disease, espiratory symptoms□generally refers to symptoms of infection of the lower respiratory tract (e.g., cough, shortness of breath, difficulty breathing). However, when screening patients who have a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), respiratory symptoms used to screen patients should be expanded to include upper respiratory symptoms such as sore throat and rhinorrhea (in addition to other early non-respiratory symptoms of SARS-CoV disease such as subjective fever, chills, rigors, myalgia, headache, and diarrhea).

SARS: Severe acute respiratory syndrome; a clinical syndrome characterized by fever, lower respiratory symptoms, and radiographic evidence of pneumonia.

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SARS-CoV: SARS-associated coronavirus; a newly described coronavirus that is genetically and antigenically distinct from other human coronaviruses.

SARS isolation precautions: The combined use of Standard, Contact, and Droplet Precautions plus Airborne Infection Isolation for the care of SARS patients. This combination of isolation precautions is recommended until the dynamics of SARS-CoV transmission are more fully defined.

Seroconversion: Four-fold or greater increase in antibody titer between acute- and convalescent-phase serum specimens tested in parallel, or negative antibody test on acute-phase serum with positive test on convalescent-phase serum tested in parallel.

Serologic assay: A laboratory method for detecting the presence and/or level of antibodies to an infectious agent in serum from a person. Antibodies are substances made by the body's immune system to fight a specific infection.

Snow-day measure: One type of community containment measure designed to prevent transmission of a communicable disease by limiting social interactions and preventing inadvertent exposures. Community members are asked to stay home as they would during a major snowstorm. Schools are closed, work sites are closed or restricted, large public gatherings are cancelled, and public transportation is halted or scaled back.

Standard Precautions: Work practices required for the basic level of infection control; they center on proper hand hygiene and also include use of protective barriers and appropriate handling of clinical waste.

Surge capacity: Ability to obtain additional resources when needed during an emergency.

Transmission: Any mechanism through which an infectious agent, such as a virus, is spread from a reservoir or source to a human.

Travel advisory: One type of notification of an outbreak of disease occurring in a geographic area. A travel advisory provides information about the disease outbreak and informs travelers how to reduce their risk of acquiring the infection. An advisory recommends against nonessential travel to the area.

Travel alert: One type of notification of an outbreak of disease occurring in a geographic area. A travel alert provides information about the disease outbreak and informs travelers how to reduce their risk of acquiring the infection. An alert does not include a recommendation against nonessential travel to the area.

Triage: The process for sorting or "ranking" ill or injured people into groups based on their need for or benefit from immediate medical treatment

For more information, visit www.cdc.gov/ncidod/sars or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)

GUIDANCE AND RECOMMENDATIONS

Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness Version 2

This document provides guidance on the clinical evaluation and management of patients who present from the community with fever and/or respiratory illnesses. The material in this document supplements the information provided in *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS),* available at: http://www.cdc.gov/ncidod/sars/guidance/index.htm.

Summary of Changes in Version 2

This updated version of the clinical guidance clarifies that, in a setting of ongoing SARS-CoV transmission in a facility or community, the presence of either fever *or lower* respiratory symptoms should prompt further evaluation for SARS-CoV disease. In addition, in accordance with the new SARS case definition, when persons have a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), the clinical screening criteria should be expanded to include, in addition to fever or lower respiratory symptoms, the presence of other early symptoms of SARS-CoV disease.

I. Introduction

Severe acute respiratory syndrome (SARS) is a recently recognized febrile severe lower respiratory illness that is caused by infection with a novel coronavirus, SARS-associated coronavirus (SARS-CoV). During the winter of 2002 through the spring of 2003, WHO received reports of >8,000 SARS cases and nearly 800 deaths. No one knows if SARS-CoV transmission will recur, but it is important to be prepared for that possibility. Early recognition of cases and application of appropriate infection control measures will be critical in controlling future outbreaks.

Many studies have been undertaken or are underway to evaluate whether there are specific laboratory and/or clinical parameters that can distinguish SARS-CoV disease from other febrile respiratory illnesses. Researchers are also working on the development of laboratory tests to improve diagnostic capabilities for SARS-CoV and other respiratory pathogens. To date, however, no specific clinical or laboratory findings can distinguish with certainty SARS-CoV disease from other respiratory illnesses rapidly enough to inform management decisions that must be made soon after the patient presents to the healthcare system. Therefore, **early clinical recognition of SARS-CoV disease still relies on a combination of clinical and epidemiologic features.**

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Key Concepts

- The vast majority of patients with SARS-CoV disease 1) have a clear history of exposure either to a SARS patient(s) or to a setting in which SARS-CoV transmission is occurring, and 2) develop pneumonia.
- Laboratory tests are helpful but do not reliably detect infection early in the illness.

II. Identification of Potential Cases of SARS-CoV Disease

The diagnosis of SARS-CoV disease and the implementation of control measures should be based on the risk of exposure. In the absence of any person-to-person transmission of SARS-CoV worldwide, the overall likelihood that a patient being evaluated for fever or respiratory illness has SARS-CoV disease will be exceedingly low unless there are both typical clinical findings and some accompanying epidemiologic evidence that raises the suspicion of exposure to SARS-CoV. Therefore, one approach in this setting would be to consider the diagnosis only for patients who require hospitalization for unexplained pneumonia and who have an epidemiologic history that raises the suspicion of exposure, such as recent travel to a previously SARS-affected area (or close contact with an ill person with such a travel history), employment as a healthcare worker with direct patient contact or as a worker in a laboratory that contains live SARS-CoV, or an epidemiologic link to a cluster of cases of unexplained pneumonia. Once person-to-person SARS-CoV transmission has been documented anywhere in the world, the positive predictive value of even early clinical symptoms (e.g., fever or lower respiratory symptoms in the absence of pneumonia), while still low, may be sufficiently high -- when combined with an epidemiologic link to settings in which SARS-CoV has been documented -- to lead clinicians to consider a diagnosis of SARS-CoV disease.

In that context, the guidance that follows should be considered in the evaluation and management of patients who present from the community with fever or lower respiratory illnesses. For more detailed guidance on infection control, see Supplement I in *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)*: http://www.cdc.gov/ncidod/sars/guidance/index.htm.

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III. Guidelines for Evaluation of SARS-CoV Disease among Persons Presenting with Community-Acquired Illness (Figures 1 and 2)

The following is an approach for the evaluation of possible SARS-CoV disease among persons presenting with community-acquired illness. As part of the evaluation, in addition to identification of suggestive clinical features, clinicians should routinely incorporate into the medical history questions that may provide epidemiologic clues to identify patients with SARS-CoV disease.

Diagnosis of SARS-CoV Disease

In the absence of person-to-person transmission of SARS-CoV anywhere in the world, the diagnosis of SARS-CoV disease should be considered only in patients who require hospitalization for radiographically confirmed pneumonia and who have an epidemiologic history that raises the suspicion of SARS-CoV disease. The suspicion for SARS-CoV disease is raised if, within 10 days of symptom onset, the patient:

- Has a history of recent travel to mainland China, Hong Kong, or Taiwan (see Figure 1, footnote 3) or close contact[1] with ill persons with a history of recent travel to such areas, OR
- Is employed in an occupation at particular risk for SARS-CoV exposure, including a healthcare worker with direct patient contact or a worker in a laboratory that contains live SARS-CoV, OR
- Is part of a cluster of cases of atypical pneumonia without an alternative diagnosis

Persons with such a clinical and exposure history should be evaluated according to the algorithm in **Figure 1.**

Once person-to-person transmission of SARS-CoV has been documented in the world, the diagnosis should still be considered in patients who require hospitalization for pneumonia and who have the epidemiologic history described above. In addition, all patients with fever or lower respiratory symptoms (e.g., cough, shortness of breath, difficulty breathing) should be questioned about whether within 10 days of symptom onset they have had:

- Close contact with someone suspected of having SARS-CoV disease, OR
- A history of foreign travel (or close contact with an ill person with a history of travel) to a location with documented or suspected SARS-CoV, OR
- Exposure to a domestic location with documented or suspected SARS-CoV (including a laboratory that contains live SARS-CoV), or close contact with an ill person with such an exposure history.

Persons with such an exposure history should be evaluated for SARS-CoV disease according to the algorithm in **Figure 2.**

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[1] Close contact: A person who has cared for or lived with a person with SARS-CoV disease or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS-CoV disease. Examples of close contact include kissing or hugging, sharing eating or drinking utensils, talking within 3 feet, and direct touching. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

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IV. Additional Considerations

In some settings, early recognition of SARS-CoV disease may require additional measures. The following guidance is provided to assist in the evaluation of patients in settings or with characteristics not detailed/outlined in Figures 1 and 2. These include SARS outbreaks in the surrounding community, management of patients who become ill while already in the hospital, workers from laboratories that contain live SARS-CoV, pediatric patients, the elderly, and persons with chronic underlying diseases.

A. Additional epidemiologic risk factors to consider in community outbreak settings

The risk factors that should trigger suspicion for SARS-CoV disease may vary depending on the level of SARS-CoV transmission occurring in the community. Specifically, as outbreaks become more widespread, the types of epidemiologic characteristics that are considered as risk factors for SARS-CoV disease should be broadened appropriately. Two examples are given below.

1. Evaluating patients in the midst of a community outbreak in which more extensive secondary transmission of SARS-CoV is occurring **in well-defined settings with all cases linked to other cases (e.g., an outbreak in a local hospital)**

   - **Continue the activities for evaluation of persons with 'fever and/or lower respiratory illness' outlined in Figure 2, but in addition:**
   - **Consider the diagnosis of SARS-CoV disease** among *all* persons with radiographic evidence of pneumonia (*even if not requiring hospitalization*) if they:
     - Have had exposure to hospitals in the 10 days before onset of symptoms (e.g., patient, visitor, or staff), *or*
     - Are employed in an occupation at particular risk for SARS-CoV exposure, including a healthcare worker with *or without* direct patient contact or a worker in a clinical or research virology laboratory, *or*
     - Have close contact with a patient with documented pneumonia.

2. Evaluating patients in the midst of a community outbreak in which transmission is widespread and epidemiologic linkages between cases are not well defined

   - Since epidemiologic links to persons with SARS-CoV disease may not be identifiable at this point, SARS-CoV disease should be considered in any patient presenting with fever or lower respiratory illness, even in the absence of known epidemiologic risk factors.

B. Persons with a high risk of exposure

For persons with a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), symptoms that should trigger the clinical algorithm should be expanded to include the presence of any of the following: sore throat, rhinorrhea, chills, rigors, myalgia, headache, diarrhea. For more details on the clinical features of SARS-CoV disease, see Figure 2, footnote 1.

C. Management of patients who acquire illness while in the hospital

This document focuses on the evaluation and management of patients who present from the community, although many of the same principles apply to hospitalized patients who develop nosocomial fever or lower respiratory symptoms. The diagnosis of nosocomial SARS-CoV disease may be particularly challenging, however, since many inpatients may have other reasons for developing nosocomial fever, lower respiratory symptoms, and pneumonia. Therefore, in hospitals known to have or suspected of having patients with SARS-CoV disease, clinicians and public health officials must be particularly vigilant about evaluating fever and respiratory illnesses among inpatients. Additional guidance on when to apply Figure 2 in the evaluation of patients who develop fever and/or respiratory illness while hospitalized is provided in Supplement C, *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)*: http://www.cdc.gov/ncidod/sars/guidance/index.htm.

D. Laboratory workers

Breaks in technique in laboratories that contain live SARS-CoV can result in laboratory-acquired cases of SARS-CoV disease. Personnel working in laboratories that contain live SARS-CoV should report any febrile and/or lower respiratory illnesses to the supervisor, be evaluated for possible exposures, and be closely monitored for clinical features and course of illness. If laboratory workers with fever and/or lower respiratory illness are found to have an exposure to SARS-CoV, they should be managed according to the guidance in Figure 2. In addition, in an exposed laboratory worker, symptoms that should trigger the clinical algorithm in Figure 2 should be expanded to include the presence of any of the following: sore throat, rhinorrhea, chills, rigors, myalgia, headache, diarrhea (see Figure 2, footnote 1, for more information). Detailed information for persons who work in laboratories that contain live SARS-CoV is provided in Supplement F, *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)*, http://www.cdc.gov/ncidod/sars/guidance/index.htm.

E. Considerations for the pediatric population

The document does not specifically address the evaluation and management of infants and children. Much less is known about SARS-CoV disease in pediatric patients than in adults. During the 2003 outbreaks, infants and children accounted for only a small percentage of patients and had much milder disease with better outcome. Their role in transmission is not well described but is likely much less significant than the role of adults. Taking these factors into account, the following guidance may change as more information becomes available on SARS-CoV disease in the pediatric population:

- In the absence of person-to-person SARS-CoV transmission in the world, evaluation and management for possible SARS-CoV disease should be considered only for adults, unless special circumstances make the clinician and health department consider a child to be of potentially high risk for having SARS-CoV disease.
- In the presence of person-to-person SARS-CoV transmission in the world, the evaluation algorithm established for adults can be used in children with the following caveats:
    - Both the rate of development of radiographically confirmed pneumonia and the timing of development of such radiographic changes in children are unknown.
    - The positive predictive value of rapid virus antigen detection tests (e.g., RSV) "in season" will be higher in a pediatric population.
    - Pneumococcal and legionella urinary antigen testing are not recommended for routine diagnostic use in children.

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F. Elderly persons and patients with underlying chronic illnesses

Typical symptoms of SARS-CoV disease may not always be present in elderly patients and those with underlying chronic illnesses, such as renal failure. Therefore, the diagnosis should be considered for almost any change in health status, even in the absence of typical clinical features of SARS-CoV disease, when such patients have epidemiologic risk factors for SARS-CoV disease (e.g., close contact with someone suspected to have SARS-CoV disease or exposure to a location [domestic or international] with documented or suspected recent transmission of SARS-CoV).

Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness (*Version 2)*
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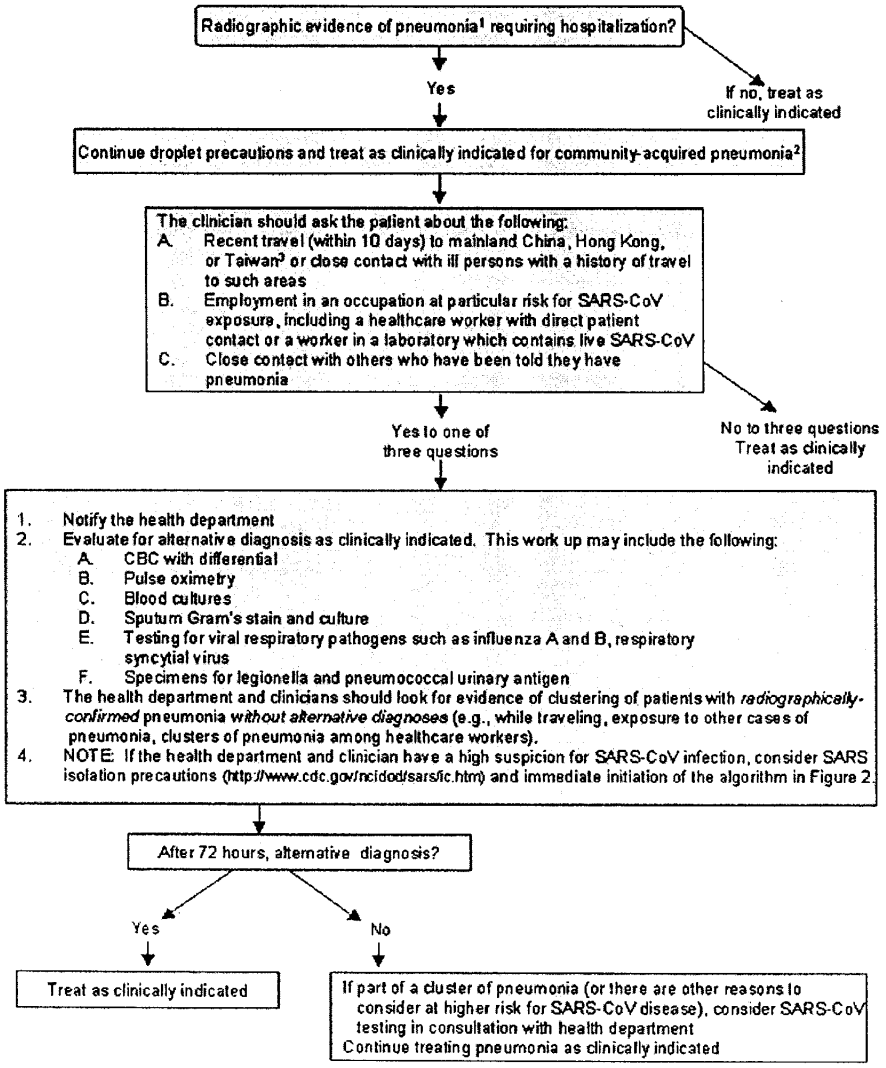
Figure 1: Algorithm for evaluation and management of patients requiring hospitalization for radiographically confirmed pneumonia, in the absence of person-to-person transmission of SARS-CoV in the world



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FOOTNOTES FOR FIGURE 1

[1] Or Acute Respiratory Distress Syndrome (ARDS) of unknown etiology

[2] Guidance for the management of community-acquired pneumonia is available from the Infectious Diseases Society of America (IDSA) and can be found at www.journals.uchicago.edu/IDSA/guidelines/.

[3] The 2003 SARS-CoV outbreak likely originated in mainland China, and neighboring areas such as Taiwan and Hong Kong are thought to be at higher risk due to the high volume of travelers from mainland China. Although less likely, SARS-CoV may also reappear from other previously affected areas. Therefore, clinicians should obtain a complete travel history. If clinicians have concerns about the possibility of SARS-CoV disease in a patient with a history of travel to other previously affected areas (e.g., while traveling abroad, had close contact with another person with pneumonia of unknown etiology or spent time in a hospital in which patients with acute respiratory disease were treated), they should contact the health department.

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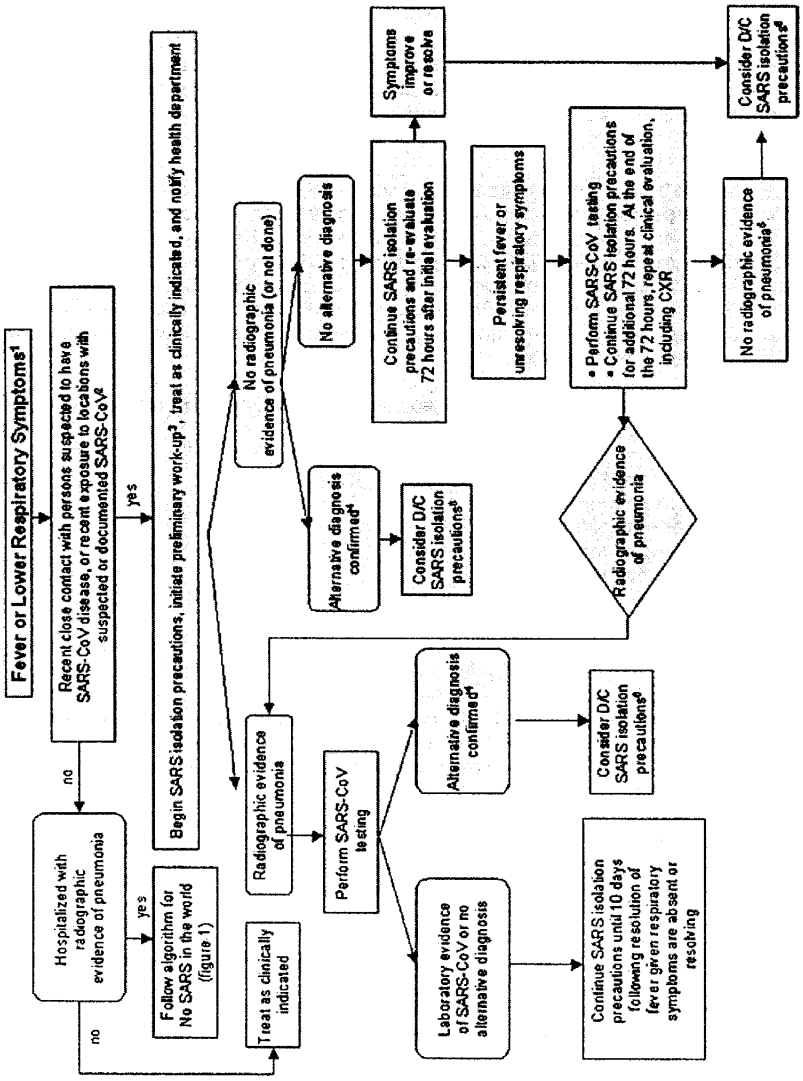
Figure 2: Algorithm for management of patients with fever or lower respiratory symptoms when person-to-person transmission of SARS-CoV is occurring in the world



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FOOTNOTES FOR FIGURE 2:

[1] **Clinical description of SARS-CoV disease and approach to treatment:**
Clinical judgment should be used to determine when symptoms trigger initiation of the algorithm in Figure 2. The early symptoms of SARS-CoV disease usually include fever, chills, rigors, myalgia, and headache. In some patients, myalgia and headache may precede the onset of fever by 12-24 hours. Respiratory symptoms often do not appear until 2-7 days after the onset of illness and most often include shortness of breath and/or dry cough. Diarrhea, sore throat, and rhinorrhea may also be early symptoms of SARS-CoV disease.

In the absence of fever, when screening patients for potential SARS-CoV disease, respiratory symptoms that would trigger the clinical algorithm are generally defined as lower respiratory tract symptoms (e.g., cough, shortness of breath, difficulty breathing). However, when screening patients who have a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), symptoms that should trigger the clinical algorithm should be expanded to include any of the following: sore throat, rhinorrhea, chills, rigors, myalgia, headache, diarrhea.

Although not diagnostic, the following laboratory abnormalities have been seen in some patients with laboratory-confirmed SARS-CoV disease:

- Lymphopenia with normal or low white blood cell count
- Elevated hepatic transaminases
- Elevated creatine phosphokinase
- Elevated lactate dehydrogenase
- Elevated C-reactive protein
- Prolonged activated partial thromboplastin time

As of 1 December 2003, no specific treatment recommendations can be made for management of SARS-CoV disease. Empiric therapy for community-acquired pneumonia should include treatment for organisms associated with any community-acquired pneumonia of unclear etiology, including agents with activity against both typical and atypical respiratory pathogens. Treatment choices may be influenced by both the severity of and the circumstances surrounding the illness. Infectious disease consultation is recommended. The Infectious Diseases Society of America has guidelines for the management of community-acquired pneumonia (www.journals.uchicago.edu/IDSA/guidelines/).

[2] **Exposure history for SARS-CoV, once SARS-CoV transmission is documented in the world:**
In settings of no or limited local secondary transmission of SARS-CoV, patients are considered exposed to SARS-CoV if, within 10 days of symptom onset, the patient has:

- Close contact with someone suspected of having SARS-CoV disease, *OR*
- A history of foreign travel (or close contact with an ill person with a history of travel) to a location with documented or suspected SARS-CoV, *OR*
- Exposure to a domestic location with documented or suspected SARS-CoV (including a laboratory that contains live SARS-CoV), or close contact with an ill person with such an exposure history.

In settings with more extensive transmission, all patients with fever or lower respiratory symptoms should be evaluated for possible SARS-CoV disease, since the ability to determine epidemiologic links will be lost.

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For up-to-date information on where recent SARS-CoV transmission is suspected or documented, see the CDC and WHO websites: www.cdc.gov/sars and www.who.int.

[3] **Clinical work-up:** Clinicians should work up patients as clinically indicated. Depending on symptoms and exposure history, initial diagnostic testing for patients with suspected SARS-CoV disease may include:

- Complete blood count (CBC) with differential
- Chest radiograph
- Pulse oximetry
- Blood cultures
- Sputum Gram's stain and culture
- Testing for viral respiratory pathogens, notably influenza A and B and respiratory syncytial virus
- Legionella and pneumococcal urinary antigen testing if radiographic evidence of pneumonia (adults only)

An acute serum sample and other available clinical specimens (respiratory, blood, and stool) should be saved for additional testing until a specific diagnosis is made.

SARS-CoV testing may be considered as part of the initial work-up if there is a high level of suspicion for SARS-CoV disease based on exposure history. For additional details on specialized laboratory testing options available through the health department and the Laboratory Response Network (LRN), see CDC's SARS website (www.cdc.gov/sars/).

[4] **Alternative diagnosis:**
An alternative diagnosis should be based only on laboratory tests with high positive-predictive value (e.g., blood culture, viral culture, Legionella urinary antigen, pleural fluid culture, transthoracic aspirate). In some settings, PCR testing for bacterial and viral pathogens can also be used to help establish alternative diagnoses. The presence of an alternative diagnosis does not necessarily rule out co-infection with SARS-CoV.

[5] **Radiographic testing:**
Chest CT may show evidence of an infiltrate before a chest radiograph (CXR). Therefore, a chest CT should be considered in patients with a strong epidemiologic link to a known case of SARS-CoV disease and a negative CXR 6 days after onset of symptoms. Alternatively, the patient should remain in SARS isolation, and the CXR should be repeated on day 9 after symptom onset.

[6] **Discontinuation of SARS isolation precautions:**
SARS isolation precautions should be discontinued only after consultation with the local public health authorities and the evaluating clinician. Factors that might be considered include the strength of the epidemiologic exposure to SARS-CoV, nature of contact with others in the residential or work setting, strength of evidence for an alternative diagnosis, and evidence for clustering of pneumonia among close contacts. Isolation precautions should be discontinued on the basis of an alternative diagnosis only when the following criteria are met:

- Absence of strong epidemiologic link to known cases of SARS-CoV disease
- Alternative diagnosis confirmed using a test with a high positive-predictive value
- Clinical manifestations entirely explained by the alternative diagnosis
- No evidence of clustering of pneumonia cases among close contacts (unless >1 case in the cluster is confirmed to have the same alternative diagnosis)

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- All cases of presumed SARS-CoV disease identified in the surrounding community can be epidemiologically linked to known cases or locations in which transmission is known to have occurred.

For more information, visit www.cdc.gov/sars or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Supplement A: Command and Control

Summary of Changes in Version 2

The content of this Supplement is unchanged. The format has been modified for consistency with the other Supplements.

Contents

Supplement A: Command and Control
(continued from previous page)

Command and Control

Goals

- Determine and establish operational authority for a response to a SARS outbreak.
- Establish an incident management structure for the response to a SARS outbreak, supported by adequate information systems.
- Determine and establish legal authority for a response to a SARS outbreak.

Key concepts

- A clear organizational structure with well-defined roles and responsibilities and operational authority is necessary for an effective response to SARS.
- Strong leadership is essential to coordinate a SARS response, allow efficient allocation of resources, and dissemination of consistent information.
- An incident command structure supported by the adequate information systems allows for rapid and efficient implementation of a SARS response.
- A suitable legislative framework is necessary to impose a variety of emergency public health and containment measures, at both the individual and community levels.

Priority activities

- Conduct local preparedness planning for a re-emergence of SARS-CoV, with participation by persons representing a range of disciplines and expertise. Draft and formally adopt a SARS response plan, or add SARS preparedness and response to an existing preparedness plan.
- Confirm the controlling authorities for actions such as declaring a public health emergency, activating the SARS response plan, and curtailing modes of transportation.
- Develop/reinforce relationships with health authorities of adjoining jurisdictions and with federal agencies to ensure effective communication and collaboration.
- Learn about the legal authorities and statutes for enforcing individual and community containment measures at the local, state, and federal levels.
- Develop/adapt a predetermined incident command system to coordinate and manage SARS response activities.
- Ensure the availability of information system(s) that can document, support, and coordinate the activities generated within an incident command system (e.g., integrate personnel and facilities, expedite real-time communication and flow of information, aid in logistics planning, resource allocation, and operational coordination).

Supplement A: Command and Control
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I. Rationale and Goals

Because of the multifaceted nature of a SARS response and the impact of a SARS outbreak on many sectors of society ? political, economic, social, healthcare, and others ? a well-defined command and control structure with strong leadership is required to coordinate the response, allocate resources appropriately, and ensure the dissemination of consistent information in a timely manner. Control of SARS requires policymakers, healthcare and public health professionals, community leaders, and the public to work in a coordinated manner within a well-defined collaborative framework. Emergency preparedness and response capacities at the national, state, and local levels must be harmonized to allow a seamless response. The sustained, coordinated efforts required to control SARS lend themselves to the principles and structure of incident command and management systems. These systems use a predetermined organizational structure for potential mass casualty events that addresses planning, operations, logistics, finance, and administration. They are useful in maximizing the use of limited resources, monitoring the status of an outbreak, and consolidating the control of a large number of individual resources.

Legal preparedness is another key component of SARS preparedness and response. A response to an outbreak of SARS may require coordination of federal, state, and local legal authorities to impose a variety of emergency public health and containment measures, at both the individual and community levels. Experience from the 2003 SARS outbreak demonstrates how closely legal issues are intertwined with public health responses. Within days of the appearance of SARS, Canada, Hong Kong, and Singapore instituted health measures, including large-scale community-based restrictions, to prevent the further spread of SARS-CoV. In Ontario, Canada, the provincial government made SARS a reportable communicable disease under Ontario Health Protection and Promotion Act. This gave Ontario public health officials the legal authority to issue orders to enjoin SARS patients from engaging in activities that could facilitate transmission. In the United States, the President signed an executive order on April 4, 2003, adding SARS to the list of quarantinable diseases (www.cdc.gov/ncidod/sars/executiveorder040403.htm). This executive order provides CDC with the legal authority to implement isolation and quarantine measures for SARS, as part of its transmissible disease-control measures.

The overall goals of preparedness for appropriate command and control of a SARS response are to:

- Determine and establish operational authority for a response to a SARS outbreak.
- Establish an incident management structure for the response to a SARS outbreak, supported by adequate information systems.
- Determine and establish legal authority for a response to a SARS outbreak.

II. Lessons Learned

- A clear organizational structure with well-defined roles and responsibilities and operational authority is necessary for an effective response to SARS.
- Strong leadership is essential to coordinate a SARS response, allow efficient allocation of resources, and disseminate consistent information.
- An incident command structure supported by the adequate information systems allows for rapid and efficient implementation of a SARS response.
- A suitable legislative framework is necessary to impose a variety of emergency public health and containment measures, at both the individual and community levels.

III. Operational Authority

The preparation for and response to an outbreak of SARS requires a coordinated response by public health authorities and possibly other emergency response entities at the local, state, and federal levels of government. In the United States, state and local governments have primary responsibility for responding to an outbreak of SARS within their jurisdictions. The federal government has authority to support affected states or jurisdictions as necessary.

Objective 1: Determine and understand the federal authority for the response to a SARS outbreak.

Activities

The U.S. Government Interagency SARS Concept of Operations Plan (CONPlan) describes the proposed federal response to a future outbreak of SARS. According to this plan, the Department of Health and Human Services (HHS) is the U.S. Government lead agency for the preparation, planning, and response to a SARS outbreak. As such, HHS will coordinate the U.S. Government's response to the public health and medical requirements of a SARS outbreak. The HHS Secretary Command Center (SCC) will serve as the national incident command center for all health and medical preparedness, response, and recovery activities. The national response is based on overall geographic risk levels in the United States, as delineated in the CONPlan.

As the component of HHS responsible for disease prevention and control, CDC will have primary responsibility for tracking a SARS outbreak and managing the operational aspects of the public health response. To this end, CDC will augment local and state resources for disease surveillance, epidemiologic response, diagnostic laboratory services and reagents, education and communication, and disease containment and control.

Objective 2: Determine and understand the state, local, and jurisdictional authority for the response to a SARS outbreak.

Activities

State and local officials provide the first line of response with respect to preparing and planning for a SARS outbreak at their own jurisdictional level, identifying, managing, and reporting SARS cases, exercising necessary authority to isolate ill persons and quarantine contacts, and imposing other community containment measures. The division of responsibilities between state and local levels varies among states, and often within states, according to the size of the population served by local health agencies.

Local planning for a re-emergence of SARS encompasses a variety of activities and involves persons representing a range of disciplines and expertise. Suggested action steps for local and state SARS preparedness planning are provided below. These will need to be interpreted in the context of the responsibilities of particular health agencies and the division of responsibilities in the jurisdiction.

- Designate an executive committee to oversee a SARS planning process, in cooperation with local health agencies and other partners. Draft/formally adopt a SARS response plan, or add SARS preparedness and response activities to existing preparedness plan(s).

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- Ensure that the jurisdiction has an incident command structure (www.cdc.gov/ncidod/sars/guidance/a/pdf/incident.pdf) in place to govern roles and responsibilities during a multi-agency, multi-jurisdictional response.
- Establish a legal preparedness plan (www.cdc.gov/ncidod/sars/guidance/a/pdf/legal.pdf).
- Identify the authority responsible for declaration of a public health emergency and for officially activating the SARS response plan during an outbreak.
- Identify key stakeholders responsible for development and implementation of specific components of the SARS plan, including enforcement of isolation, quarantine and other community containment measures, and closure and decontamination of premises.
- Ensure that the jurisdiction elected officials, appointed officials, and other agency heads know their respective responsibilities during a SARS outbreak.
- Understand the controlling authority over intrastate and interstate modes of transportation in the event that these need to be curtailed during an outbreak.
- Develop/reinforce relationships with health authorities of adjoining jurisdictions and with federal agencies to ensure effective communication.
- Identify an overall authority in charge of coordinating different medical personnel groups during an outbreak.
- Identify the key individuals from the state and local authorities who will assist in maintaining public order and enforcing control measures during an outbreak.
- Review procedures for enlisting the assistance of the National Guard and other emergency response organizations.

Appendix A1 is a checklist developed by CDC, the Association of State and Territorial Health Officials (ASTHO), and the National Association of County & City Health Officials (NACCHO) that provides a more comprehensive list of preparedness issues and activities for local and state health public health agencies.

IV. Incident Command and Management System

Objective 1: Develop or adapt an incident command system for activation during a SARS outbreak.

Activities

SARS preparedness and response capacities at the national, state, and local levels must be carefully organized and controlled to ensure unified and consistent actions over a significant period. These requirements are best met by use of an incident command system. Such systems use a predetermined organizational structure to manage the planning, operational, logistical, financial, and administrative components of a mass casualty event to maximize the use of limited resources. For a SARS outbreak, these might include:

- Collecting and organizing real-time information on the status of the outbreak
- Managing staffing needs and requirements
- Monitoring/supplying persons in isolation and quarantine
- Maintaining an inventory of respirators and other PPE equipment
- Tracking the status of/procuring essential supplies
- Operating special/temporary facilities
- Managing administrative and financial aspects of the response

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An incident management structure that can address these needs is an essential tool for command, control, and coordination of resources during a SARS outbreak.

A component of CDC incident management structure is the agency Emergency Operations System, which includes the Director Emergency Operations Center (DEOC). The goals are to: 1) support the response of federal, state, local, and international health systems in public health emergencies, 2) support the deployment of health assets in response to or anticipation of a public health emergency, and 3) provide real-time situational information to and from federal, state, local, and international agencies, organizations, and field teams. Elements of the Emergency Operations System are operational, health and technical response teams, specialized laboratories and subject matter experts, and alert, notification, and escalation systems. These would all be available for activation and deployment in the event of a recurrence of SARS-CoV transmission.

Objective 2: Be prepared to activate information management system(s) that can document, support, and coordinate the activities generated within an incident command system.

Activities

The success of efforts to rapidly detect, respond to, and contain an outbreak also depends in large part on the availability of information systems that can support and coordinate the activities generated within an incident command system. During the 2003 SARS outbreaks in Toronto, Canadian health officials noted the constant and high demand for information on the dynamics and public health management of the outbreak. These requests derived not only from local, national, and international public health officials but also from clinicians, healthcare organizations, government officials, the media, and the public. Lack of a reliable, centralized, electronic database of outbreak-associated information posed a challenge to tracking the outbreak, monitoring and assessing the outbreak response, and meeting information needs in a timely and complete manner.

Management of future outbreaks will be aided by use of systems that can seamlessly integrate all facilities (public and private) and personnel involved in the response, expedite real-time communication and flow of information, aid in logistics planning and resource management/allocation, and facilitate decision-making and operational coordination, as well as manage information regarding suspected and confirmed cases, exposed contacts, and related laboratory findings.

V. Legal Authority

Legal preparedness is another key component of SARS preparedness and response. A response to an outbreak of SARS may require coordination of federal, state, and local legal authorities to impose a variety of emergency public health and containment measures, at both the individual and community levels. These measures might include: 1) active monitoring of potential cases and their contacts, 2) isolation of SARS patients to stop the spread of infection, 3) restriction of activities of SARS contacts.

Objective: Ensure legal preparedness for a SARS response.

In general, the federal government has primary responsibility for preventing the introduction of communicable diseases from foreign countries into the United States, and states and local jurisdictions have primary responsibility for isolation and quarantine within their borders. The authority to compel isolation and quarantine is derived from each state inherent olice power,? the authority of all state governments to enact laws and promote regulations to safeguard the health, safety, and welfare of its citizens. By statute, the HHS Secretary may accept state and

local assistance in the enforcement of federal quarantine and other health regulations and may assist state and local officials in the control of communicable diseases. Because isolation and quarantine are olice power? functions, public health officials at the federal, state, and local levels may occasionally seek the assistance of their respective law enforcement counterparts to enforce a public health order.

Activities

U.S. public health officials need to be knowledgeable about the legal authorities and statutes that exist at the local, state, and federal levels for enforcing these measures. Three issues related to legal authorities that might be required to contain SARS are essential to ensuring preparedness for a rapid response:

- Prior identification of relevant legal authorities, persons, and organizations empowered to invoke and enforce such authorities
- Public trust and compliance with government directives, which includes due process protections to treat individuals with dignity and fairness
- Protection of personnel required to implement and enforce the measures

Appendices A2 and A3 were developed by CDC in consultation with external partners. Appendix A2 is a checklist of legal considerations related to SARS preparedness and response at the community level. Appendix A3 is a fact sheet that outlines some practical steps for SARS legal preparedness. Additional considerations related to community containment measures, including isolation and quarantine, are addressed in Supplement D.

Appendix A1

ASTHO
ASSOCIATION OF STATE AND TERRITORIAL HEALTH OFFICIALS

NACCHO NATIONAL ASSOCIATION OF COUNTY & CITY HEALTH OFFICIALS

STATE AND LOCAL HEALTH OFFICIAL EPIDEMIC SARS CHECKLIST

Are You and Your Jurisdiction Ready for Epidemic Severe Acute Respiratory Syndrome (SARS)?

This checklist, developed in collaboration with the Centers for Disease Control and Prevention, has been modeled on a previous Association of State and Territorial Health Officials (ASTHO) checklist for pandemic influenza preparedness (*Preparedness Planning for State Health Officials: Nature Terrorist Attack - Pandemic Influenza* www.astho.org/pubs/PandemicInfluenza.pdf). Preparations made to respond to other public health emergencies, including bioterror events, will generally be applicable to epidemic SARS planning.

The items on this checklist are intended for use by health officers at all levels ? state, regional, district and local. The division of responsibilities between state and local levels varies among states, and often within states, according to the size of the population served by local health agencies. The items on this checklist should be interpreted in the context of the responsibilities of your public health agency and the division of responsibilities within your community, regardless of level of government. For some local public health agencies, for example, the capabilities needed for certain items may be available from a state health department but are not present locally.

Every locality should plan for the possibility of a local public health crisis such as widespread SARS-CoV transmission, in which help from other public health agencies is not available because they are facing similar crises. At the same time, there are advantages to coordinating response plans on a regional and statewide basis, partly so that isolation and quarantine procedures are applied uniformly and equitably.

SARS would be considered to be widespread in the United States if and when cases occur throughout the nation, in multiple locations, in persons without known epidemiologic links to places with community transmission of SARS-CoV or to known SARS cases. Local, district, and state public health agencies should be prepared to address all of the following items when the disease is present elsewhere in the world and to implement those preparations when widespread disease occurs in the United States.

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LEGAL AND POLICY ISSUES

- ❑ 1. My jurisdiction has a draft or formally adopted epidemic SARS plan.
- ❑ 2. Agreements have been obtained with my state healthcare insurers, Medicaid program, and healthcare product and service providers for cooperation with public health recommendations during an epidemic.
- ❑ 3. I have reviewed with legal counsel my jurisdiction laws and procedures on quarantine, isolation, closing premises and suspending public meetings and know how to implement them to help control an epidemic.
- ❑ 4. I am familiar with my state medical volunteer licensure, liability, and compensation laws for in-state, out-of-state, returning retired, and non-medical volunteers.
- ❑ 5. I know whether my state allows hospitals and other licensed healthcare institutions to use temporary facilities for provision of medical care in the event of a public health emergency.
- ❑ 6. My jurisdiction epidemic plan addresses Worker Compensation and Unemployment Compensation issues related to health care and other workers missing work because of isolation or quarantine.
- ❑ 7. I have identified any deficiencies in my jurisdiction's laws and procedures on quarantine, isolation and related capacities and initiated steps to have those deficiencies corrected.
- ❑ 8. I know what provisions are in place, if any, for compensation of persons with economic or health injury resulting from needed SARS control measures and for limitation of liability of health care providers and agencies.

AUTHORITY

- ❑ 9. My state has an executive SARS epidemic planning committee that oversees the planning process, in cooperation with local health agencies.
- ❑ 10. My state has identified the authority responsible for declaration of a public health emergency and for officially activating our plan during a SARS epidemic.
- ❑ 11. My jurisdiction has identified key stakeholders responsible for development and implementation of specific components of the SARS epidemic plan, including enforcement of isolation, quarantine, and closure and decontamination of premises.
- ❑ 12. My jurisdiction elected officials, appointed officials, and other agency heads know their respective responsibilities in the event of an epidemic.
- ❑ 13. My jurisdiction has a command system in place (e.g., the Incident Command System) to govern roles and responsibilities during a multi-agency, multi-jurisdictional event.
- ❑ 14. I am familiar with the controlling authority over intrastate and interstate modes of transportation, should these need to be curtailed during an epidemic (e.g., airplanes, trains, ships, highways).
- ❑ 15. My staff has relationships with health authorities of adjoining counties or states and with federal agencies to ensure effective communication during a public health emergency.
- ❑ 16. My jurisdiction has identified an overall authority in charge of coordinating different medical personnel groups during an epidemic.
- ❑ 17. I know personally the key individuals from the state and local authorities who will assist in maintaining public order and enforcing control measures, if needed, during an epidemic.
- ❑ 18. I am familiar with the procedure for enlisting the National Guard assistance during a public health emergency.

SURGE CAPACITY

- ❑ 19. I know how to access current recommendations on treatment of cases and prevention of transmission in the hospital, long-term care and home care settings.
- ❑ 20. My jurisdiction emergency response planning has involved health care product and service providers to determine how to best prevent and control disease spread and manage the health care of the population during an epidemic.

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- ❑ 21. I am familiar with the required protocol for securing needed emergency healthcare services and supplies during a public health emergency.
- ❑ 22. My jurisdiction has identified ways to augment medical, nursing, and other health care staffing to maintain appropriate standards of care during an epidemic.
- ❑ 23. My jurisdiction has identified ways to augment public health laboratory, epidemiology and disease control staffing to meet emergency needs and in the event public health workers are affected by an epidemic.
- ❑ 24. My jurisdiction has a process to recruit and train medical volunteers for provision of care and vaccine administration during a public health emergency.
- ❑ 25. My jurisdiction has identified alternate facilities where overflow cases from hospitals and well persons needing quarantine away from home can be cared for and has developed processes with Emergency Medical Services to assess, communicate, and direct patients to available beds.
- ❑ 26. My jurisdiction has identified facilities for outpatient and inpatient care of children with SARS and their families.
- ❑ 27. My jurisdiction's epidemic plan addresses the mechanics of how isolation and quarantine will be carried out, such as providing support services for people who are isolated or quarantined to their homes or temporary infirmary facilities and protection for workers providing these services.
- ❑ 28. My jurisdiction has a plan for ensuring that appropriate personal protective equipment, including N-95 or higher level respirators, is made available for persons whose job requires exposure to people with SARS, and that needed training and fit-testing are provided.
- ❑ 29. My jurisdiction has a plan for dealing with mass mortality, including transportation and burial of bodies.
- ❑ 30. My jurisdiction has a plan for providing mental health services to mitigate the impact of a SARS epidemic.

COMMUNICATIONS AND EDUCATION

- ❑ 31. I have conveyed the importance of epidemic preparedness, and its overlap with bioterrorism preparedness, to my jurisdiction's chief executive and to other state and local law and policy makers.
- ❑ 32. I know personally the key individuals from public health agencies, the medical community, and the political community with whom I will need to communicate during an epidemic.
- ❑ 33. My jurisdiction has begun educating the public on epidemic SARS to instill acceptance of the epidemic response (including quarantine and isolation) and to optimize public assistance during an epidemic.
- ❑ 34. My jurisdiction has opened a regular channel of communication and begun educating health care providers (including first responders) and their organizations and unions on epidemic SARS (including diagnosis, treatment, and management of cases and contacts to prevent transmission).
- ❑ 35. My jurisdiction has opened a regular channel of communication and begun educating chief executive officers of health care organizations on epidemic SARS (including management of patients in health care settings, health care worker protection, physical facility needs, voluntary or forced furloughs of exposed workers, etc.).
- ❑ 36. My jurisdiction has established a multi-component communications network and plan for sharing of timely and accurate information among public health and other officials, medical providers, first responders, the media and the general public.
- ❑ 37. My jurisdiction has begun identifying and planning to produce and provide education and information materials for media, providers, the public, and occupational groups whose duties may expose them to SARS, in appropriate languages and in forms suitable for limited literacy populations.
- ❑ 38. Whoever is selected as the primary public spokesperson for my jurisdiction during an epidemic is ready to clearly and consistently answer the following types of questions:
  - ❑ How is the SARS-associated coronavirus (SARS-CoV) transmitted?

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- ❑ How long are people infectious after they have SARS?
- ❑ What is isolation? What is quarantine?
- ❑ What is the justification for isolation of cases and quarantine of contacts?
- ❑ What is the legal authority for isolation of cases and quarantine of contacts?
- ❑ What is the difference between a probable and a suspected SARS case?
- ❑ Who should be tested for the SARS-associated coronavirus?
- ❑ What can members of the public do to protect themselves?
- ❑ In the event a vaccine or antiviral treatment become available, what specific priority groups might be vaccinated or treated first?

❑ 39. My jurisdiction has identified the most effective media to get messages out to the public during an epidemic (e.g., TV, radio, print media, internet, Web sites, hotlines).

❑ 40. My jurisdiction has planned how to coordinate state, local, and federal public messages and ensure they are consistent and timely.

LABORATORY AND SURVEILLANCE

❑ 41. In the event of a SARS epidemic, I will have available daily counts of key community health indicators, such as numbers of emergency department visits, hospital admissions, deaths, available hospital beds and staff, facility closings, numbers of contacts being traced and numbers under quarantine.

❑ 42. The public health laboratory that serves my jurisdiction can test for the SARS-associated coronavirus by serology and/or PCR.

❑ 43. My state has identified those labs that can test for the SARS-associated coronavirus.

❑ 44. The public health laboratory that serves my jurisdiction has linked to clinical laboratories and provided training on the use of SARS tests, biosafety, specimen collection, packing and shipping, and rule-out testing.

❑ 45. Public health laboratories in my state have computerized record-keeping to help with data transmission, tracking, reporting of results to patients and facilities, and analysis during an epidemic.

❑ 46. My jurisdiction has determined how to assess and document the spread and impact of disease throughout the population, including special populations at risk (such as health care workers and first responders), during a SARS epidemic, including enhancements to routine surveillance.

❑ 47. My jurisdiction has computerized record-keeping for cases, suspected cases, contacts, and persons under public health isolation or quarantine orders to help with data transmission, tracking and analysis during an epidemic.

❑ 48. My jurisdiction's epidemiology staff, in cooperation with other public health agencies, has the capacity to investigate clusters of SARS cases, to determine how disease is being transmitted, to trace and monitor contacts, to implement and monitor quarantine measures, and to determine whether control measures are working.

❑ 49. My jurisdiction has plans for educating health care providers about recognition and reporting of SARS, about the current case definition, and about sources of current information on all aspects of SARS.

PREPAREDNESS IN OTHER AGENCIES

❑ 50. The emergency response system is ready to deal with epidemic SARS as called for in an all-hazards or epidemic plan.

❑ 51. My jurisdiction has carried out a community-wide epidemic SARS table-top or field exercise, to train on and evaluate its epidemic plan.

❑ 52. Community partners such as hospitals, EMS services, law enforcement agencies, health care practitioners, environmental hygiene/remediation services, news media, schools, and colleges know what part they are expected to play during an epidemic and are prepared to do so.

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- ❑ 53. The law enforcement and court system in this jurisdiction are prepared to enforce isolation and quarantine orders and to promptly adjudicate appeals to public health orders, as provided by statute.

VACCINATION / ANTIVIRALS

At present (May, 2003), there is neither a vaccine nor effective antiviral chemotherapy available for SARS. The items below will become relevant when one or both of these become available.

- ❑ V1. My jurisdiction has identified the method(s) of epidemic vaccine and antiviral delivery (i.e., public sector, private sector, or a combination of these two) that will be most efficient for the jurisdiction, and developed and tested methods for mass administration.
- ❑ V2. I know whether my state statutes provide for providing or requiring vaccination or treatment during an infectious disease emergency, and know how to implement them in my jurisdiction to help control an epidemic.
- ❑ V3. My jurisdiction has the infrastructure in place to vaccinate or treat at-risk and hard-to-reach populations during a SARS epidemic.
- ❑ V4. My jurisdiction epidemic plan outlines a process for identifying essential workers (those people whose jobs/skills are critical for maintenance of public safety and an efficient epidemic response) and "highest risk" groups who will need to receive priority vaccination and/or antiviral prophylaxis.
- ❑ V5. My jurisdiction has developed a documentation process for administered epidemic vaccine and antiviral doses, with recall capacity if more than one dose is required to induce immunity.
- ❑ V6. My jurisdiction has determined how adverse vaccine or medication side effects will be documented, in cooperation with local health agencies, during a mass or targeted vaccination or prophylactic treatment campaign.
- ❑ V7. My jurisdiction has compiled a list of health care workers and institutions that will assist in mass vaccination or prophylactic treatment during an epidemic or other public health emergency.
- ❑ V8. My jurisdiction has identified ways to secure and protect a limited supply of essential medicines, supplies, equipment and vaccines.
- ❑ V9. My jurisdiction has developed and tested, through a simulated exercise, a plan for mass or targeted immunization, prophylactic treatment, and clinical care including: accepting delivery of large quantities of vaccine, drugs, supplies or equipment (e.g., as part of the Strategic National Stockpile); storing and handling vaccine, drugs, supplies or equipment; setting up and staffing clinics; administering vaccine or antiviral drugs; and educating the public, media, and medical providers.

Appendix A2
Checklist of Legal Considerations for SARS Preparedness in Your Community

The global emergence of SARS-CoV presents challenges to the public health system at all levels of government. If SARS-CoV transmission recurs, the potential exists for implementation of isolation and/or quarantine within a given community. There is great variation among state and local laws regarding compelled isolation and quarantine.

The following checklist is a planning tool for lawyers highlighting the relevant partners, resources, planning considerations, due process considerations, and issues of legal liability and immunity that may arise in the context of any public health emergency whether natural or manmade. This checklist specifically addresses SARS. Next to each consideration are listed the legal partners (e.g., public health, hospitals, public safety, emergency management, judiciary) who may be called upon to address these considerations as part of the affected community response. The challenge of the public health response is to protect the health of many, while safeguarding the rights of the individual. An integrated and coordinated response by attorneys at all levels in the community is essential to achieving this goal.

The checklist format is not intended to set forth mandatory requirements or establish a national standard for legal preparedness. Rather, each state and local jurisdiction should determine for itself whether it is adequately prepared for disease outbreaks in accordance with its own laws and procedures.

Planning Considerations

- ❑ Ensure that public health personnel have a basic understanding of the **intersection among federal, state, and local laws** regarding quarantine and isolation as they relate to international airports and interstate border crossings. [public health/public safety/emergency management]
- ❑ Where applicable, draft legal orders, motions, and templates authorizing **medical evaluation of non-compliant persons** who meet the SARS case definition and have symptoms of SARS-CoV disease. [public health/hospitals]
- ❑ Ensure that legal counsel has reviewed the feasibility of requiring persons to **self-monitor for medical conditions** (e.g., temperature checks) and (where applicable) drafted legal orders or agreements. [public health]
- ❑ Ensure that legal counsel has reviewed the feasibility of issuing **"exclusion? orders** (i.e., excluding contacts from using public transportation, attending public meetings) and, where applicable, drafted templates and legal orders. [public health/public safety/emergency management]
- ❑ Ensure the existence of a statute, regulation, or other administrative mechanism authorizing SARS isolation/quarantine. [public health/public safety/judiciary]
- ❑ Draft legal orders, motions, and templates for isolation/quarantine in **homes, hospitals, or other designated facilities**. [public health/hospitals/ emergency management/public safety]
- ❑ Ensure that legal counsel has reviewed the feasibility of using **electronic methods to monitor** suspected non-compliant individuals in home isolation and/or quarantine. [public health/public safety]
- ❑ Ensure that legal counsel has reviewed draft legal orders, motions, and templates to **quarantine facilities** and to credential ingress and egress into such facilities. [public health/public safety/emergency management]
- ❑ Ensure that legal counsel has reviewed the feasibility of using **faith-based organizations** to assist or provide services to persons in isolation and quarantine. [public health]

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- ❑ Ensure that public health officials have reviewed the availability of workers?compensation and/or other forms of **financial support** for persons unable to return to work because of a isolation/quarantine order. [public health]
- ❑ Ensure that legal counsel has considered whether the health department should issue documents designed to assist with **reintegration of persons** subject to isolation/quarantine order (e.g., letter to employer or school explaining that patient is no longer infectious). [public health]
- ❑ Ensure that legal counsel has reviewed agreements relating to **overtime and/or flexibility of hours** for staff during public health emergencies. [public health/hospitals/public safety/emergency management]
- ❑ Ensure that legal counsel has a clear understanding of legal authorities relevant to **environmental remediation** of buildings. [public health/ hospitals/emergency management]

Partnerships/Outreach

- ❑ Assemble a **legal preparedness task force** with representation from public health, public safety, hospitals, emergency management, judiciary, and other relevant individuals and/or organizations at various levels of authority (federal, state, local, cross-border). [public health/public safety/hospitals/ emergency management/judiciary]
- ❑ Establish procedures for **enforcement of isolation/quarantine orders**. [public health/public safety]
- ❑ Provide public safety personnel with **educational materials** relating to SARS and have a clear understanding for how to enforce an isolation/quarantine order. [public health/public safety]
- ❑ Ensure that procedures or protocols exist between hospitals and public health to manage a possible or known SARS case-patient who attempts to **leave the hospital against medical advice**. [public health/hospitals/public safety]
- ❑ Where applicable, draft memoranda of agreement (MOA) or understanding (MOU) to allow for the **loaning of facilities or other services** necessary to implement a quarantine and/or isolation order for person who cannot be isolated at home (e.g., travelers, homeless populations). [public health/ hospitals/emergency management]
- ❑ Ensure that judges and attorneys in the area, through **local bar organizations** or other entities, have received educational materials, training, or information related to SARS and the potential use of isolation/quarantine to interrupt disease transmission. [public health/ judiciary]
- ❑ Ensure that legal counsel has reviewed and/or drafted **data sharing/data use/confidentiality agreements** related to sharing of confidential patient medical information between public health and other partners. [public health/hospitals/public safety/emergency management]
- ❑ Consider the implementation of a **"Forensic Epidemiology? training course** in the jurisdiction. [public health/public safety]

Due Process Considerations

- ❑ Draft legal orders and templates using terms such as "quarantine," "isolation," and "detention" **consistently**. [public health/judiciary)
- ❑ Ensure that legal counsel has reviewed all draft isolation/quarantine orders and forms, as well as applicable administrative hearing procedures, to ensure concurrence with **basic elements of due process** (e.g., adequate notice, opportunity to contest, administrative determination) [public health/

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judiciary]

- ❑ Ensure that procedures or protocols exist to ensure that persons subject to an isolation/quarantine order have **access to legal counsel**, if desired (e.g., list of attorneys willing to provide services at little or no cost). [public health/ judiciary]
- ❑ Ensure that legal counsel has analyzed procedures needed to satisfy **due process** in **different isolation/quarantine scenarios** (e.g., oluntary□home isolation, isolation in a guarded facility, exclusion from certain public activities). [public health/judiciary]
- ❑ Where applicable, ensure that public health officials have worked with the local court system to develop a 24/7 **"on call? list of judges or hearing officers** to review emergency requests for isolation/quarantine. [public health/judiciary]
- ❑ Ensure that public health officials have worked with the local court system to develop a **plan for hearing cases and/or appeals** for persons subject to isolation/quarantine orders (e.g., participation via telephone, video conference). [public health/judiciary]

Legal Resources and Statutes

- ❑ Ensure that legal counsel has reviewed and has a clear understanding of the **legal resources and tools** relevant to a community public health response. [public health/judiciary/emergency management]
  Such resources and tools include:
  - Draft Model State Emergency Health Powers Act
    www.publichealthlaw.net/MSEHPA/MSEHPA2.pdf
  - Emergency Management Assistance Compact (model agreement)
    www.emacweb.org/EMAC/About_EMAC/Model_Legislation.cfm
  - Emergency Management Assistance Compact (as implemented in a state or jurisdiction)
  - Memorandum of Understanding for Establishment of Local Public Health Mutual Aid and Assistance System
    www.publichealthlaw.net/Resources/ResourcesPDFs/MOU.pdf
  - American Bar Association Draft Checklist for State and Local Government Attorneys to Prepare for Possible Disasters
    www.publichealthlaw.net/Resources/ResourcesPDFs/ABA_checklist.pdf
  - Buncombe County Health Center Forensic Epidemiology Quarantine Task Force Report
    www.phppo.cdc.gov/od/phlp/ (to be posted)
  - Communicable Disease Control Measures in Texas: A Guide for Health Authorities in a Public Health Emergency
    www.tdh.state.tx.us/ophp/phwd/commdis.htm.

  Additional materials and resources may be posted at www.phppo.cdc.gov/od/phlp/
- ❑ Distribute draft letters or fact sheets to hospitals and other healthcare providers describing permissible uses and disclosures of health information for public health purposes under the **Privacy Rule of the Health Insurance Portability and Accountability Act (HIPAA)** (www.hhs.gov/ocr/hipaa/). [public health/hospitals]
- ❑ Where applicable, ensure that legal counsel understands procedures for **declaring a public health emergency** (at various levels of government) and consequences of such a declaration. [public health/public safety/emergency management]
- ❑ Ensure that legal counsel is familiar with the requirements of the **Emergency Medical Treatment and Active Labor Act (EMTALA)** (www.aaem.org/emtala/index.shtml) and has determined if such requirements have been incorporated into public health and hospital planning for SARS. [public health/hospitals]

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- ❑ Ensure that legal counsel has reviewed **hospital screening and admission procedures** for potential SARS patients (e.g., establishment of evaluation clinics for persons with SARS-like symptoms) for compliance with **EMTALA** [public health/hospitals]
- ❑ Ensure that legal counsel has reviewed potential **EMTALA** implications of a **community-wide EMS protocol** for transport of SARS patients (e.g., protocol requiring transport of SARS patients to a hospital or facility other than the hospital that owns the ambulance). [public health/hospitals/emergency management]

Legal Liability and Immunity

- ❑ Ensure that legal counsel has reviewed the potential legal liability of implementing **orking" quarantine for essential service personnel**. [public health/hospitals]
- ❑ Ensure that legal counsel has reviewed the potential legal liability of housing SARS patients in **home isolation with non-exposed residents** subject to infection control precautions. [public health]
- ❑ Ensure that legal counsel has reviewed liability/immunity for **volunteers** providing assistance or services to persons in isolation/quarantine. [public health/emergency management]

Appendix A3
Fact Sheet: Practical Steps for SARS Legal Preparedness

Step 1: Know your legislation
State and local public health officers need to be familiar with the legal requirements in their jurisdictions regarding isolation of infectious persons and quarantine of exposed persons. Although most states have laws to compel isolation and/or quarantine, procedures may vary widely from jurisdiction to jurisdiction. Key persons, such as legal counsel, judges, and policymakers, should be identified and made part of your jurisdiction planning for SARS.

Step 2: Plan due process
Procedural due process is implicated when the government seeks to deprive an individual of liberty" interests within the meaning of the Due Process Clause of the Fifth or Fourteenth Amendment to the U.S. Constitution. Many states, through statute or regulation, have established specific administrative and judicial schemes for affording due process to a person subject to a quarantine and/or isolation order. Schemes in other jurisdictions may not directly address this issue.

Although due process is a flexible concept and calls for procedural protections as the particular situation demands, the basic elements of due process include: adequate notice (typically through written order) of the action the agency seeks to compel; right to be heard (typically through the right to present evidence and witnesses and to contest the government evidence and witnesses); access to legal counsel; and a final administrative decision that is subject to review in a court of law. These due process protections should not impede the immediate isolation or quarantine of an individual for valid public health reasons in an emergency situation.

Step 3: Draft key documents in advance
State and local public health officers should consider drafting key documents in advance of an emergency. These template documents can be critical time savers in an emergency. Documents that jurisdictions should consider preparing in advance include: draft quarantine and/or isolation orders; supporting declarations and/or affidavits by public health and/or medical personnel; and an explanation of the jurisdiction due process procedures for persons subject to an isolation/quarantine order. Examples of documents created by other jurisdictions are found at: www.phppo.cdc.gov/od/phlp/

Step 4: Contact other jurisdictions
It is possible for federal, state, and local health authorities simultaneously to have separate but concurrent legal quarantine power in a particular situation (e.g., an arriving aircraft at a large city airport). Furthermore, public health officials at the federal, state, and local level may occasionally seek the assistance of their respective counterparts, e.g., law enforcement, to assist in the enforcement of a public health order. State and local public health officers should therefore be familiar with the roles and responsibilities of other jurisdictions: vertically (local, state, federal), horizontally (public health, law enforcement, emergency management, and health care), and in geographical clusters (overlapping state/local neighbors).

Step 5: Engage the courts in advance
Some jurisdictions may rely on older public health statutes that have not been amended in over half a century, while other jurisdictions may have recently revised their legal authorities to respond to bioterrorism or other public health emergencies. Judges who may be called upon to review a public health order may not be familiar with the state or local health authority broad public health powers. During the SARS outbreak in Toronto, Canada, for example, many judges were unaware of the health officer broad *ex parte* authority to compel isolation/quarantine under rarely used laws.

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Step 6: Anticipate practical problems
State and local public health officers need to be prepared for the practical problems that may arise in affording adequate due process protections to persons subject to isolation and/or quarantine orders. Such problems may include how to arrange for the appearance and representation of persons in quarantine (e.g., video conference or other remote means); how to serve an isolation/quarantine order (likely through law enforcement) and other procedures to advise persons of their legal rights; and isolation arrangements for transient or homeless populations.

Step 7: Communication ? communication ? communication
Communication planning is vital not only for an effective public health response but also for an effective legal response to a public health emergency. Public health agency counsel should be aware of media training available to other public health officers. During the SARS and monkeypox outbreaks, CDC, through the Public Health Law Program (www.phppo.cdc.gov/od/phlp/index.asp), established telephone conferences for public health legal counsel to share experiences and engage in peer-to-peer consultations. Efforts are now underway to develop materials to assist state and local public health agencies in conducting further outreach on emergency public health issues to the legal community through local bar associations.

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Supplement B: SARS Surveillance

Summary of Changes in Version 2

This version of Supplement B includes the revised U.S. SARS surveillance case definition and an updated domestic case reporting form. The revised surveillance case definition reflects changes in the interim position statement on SARS surveillance adopted by the Council of State and Territorial Epidemiologists (CSTE) in November 2003.

The current version of Supplement B clarifies and revises questions to be used by healthcare providers to screen persons requiring hospitalization for radiographically confirmed pneumonia. The screening question related to travel now includes specific geographic locations that are likely sites for a reappearance of SARS-CoV. Employment in a laboratory that contains live SARS-CoV has been added as an epidemiologic risk factor for SARS-CoV exposure.

The revised Supplement clarifies that, in the absence of SARS-CoV transmission in the world, children hospitalized for radiographically confirmed pneumonia need not be screened for potential SARS-CoV disease, unless circumstances suggest that a child might be at high risk for exposure to SARS-CoV.

The recommendations for surveillance in healthcare settings have been revised for consistency with the recommendations in Supplement C. The guidance clarifies that, in a setting of ongoing SARS-CoV transmission in a facility or community, the presence of either fever *or* lower respiratory symptoms should prompt further evaluation. In addition, in accordance with the new SARS case definition, when persons have a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), the clinical screening criteria should be expanded to include, in addition to fever or lower respiratory symptoms, the presence of any early symptoms of SARS-CoV disease.

The current version provides some guidance for prioritization of contacts for monitoring if health department resources become overburdened during an ongoing outbreak. General reporting requirements have also been clarified.

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SARS Surveillance

Goals

- Maximize early detection of cases and clusters of respiratory infections that might signal the re-emergence of SARS-CoV disease while minimizing unnecessary laboratory testing, concerns about SARS-CoV, implementation of control measures, and social disruption.
- If SARS-CoV transmission recurs, maintain prompt and complete identification and reporting of potential cases to facilitate outbreak control and management.
- Identify and monitor contacts of cases of SARS-CoV disease to enable early detection of illness in persons at greatest risk.

Key concepts

- The early clinical features of SARS-CoV disease are not specific enough to reliably distinguish it from other respiratory illnesses.
- Risk of exposure is key to considering the likelihood of a diagnosis of SARS-CoV disease.
- Most patients with SARS-CoV disease have a clear history of exposure to another SARS patient or to a setting where SARS-CoV transmission is occurring.
- SARS-CoV transmission is usually localized and often limited to healthcare settings or households.
- A cluster of atypical pneumonia in healthcare workers may indicate undetected SARS-CoV transmission.
- In a setting of extensive SARS-CoV transmission, the possibility of SARS-CoV disease should be considered in all persons with a fever or lower respiratory illness, even if an epidemiologic link cannot be readily established.
- Up-to-date information on the transmission of SARS-CoV globally is needed to accurately assess exposure risks.
- Contact tracing is resource intensive yet critical to containment efforts as it allows early recognition of illness in persons at greatest risk.
- Frequent communication among public health officials and healthcare providers, real-time analysis of data, and timely dissemination of information are essential for outbreak management.
- Swift action to contain disease should be initiated when a potential case is recognized, even though information sufficient to determine case status may be lacking.

Priority activities

- Educate clinicians and public health workers on features that can assist in early recognition of SARS and on guidelines for reporting SARS-CoV cases.
- Develop tools to identify, evaluate, and monitor contacts of SARS-CoV patients.
- Establish an efficient data management system that links clinical, epidemiologic and laboratory data on cases of SARS-CoV disease and allows rapid sharing of information.
- Identify surge capacity for investigation of cases and identification, evaluation, and monitoring of contacts in the event of a large SARS outbreak.

Supplement B: SARS Surveillance
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I. Rationale and Goals

The key to controlling a SARS outbreak is prompt detection of cases and their contacts, followed by rapid implementation of control measures. Identification of SARS cases is the basic step in prevention efforts, whereas contact tracing provides a means to focus case-finding and containment efforts on persons who are at greatest risk of SARS-CoV disease. Two features of SARS-CoV disease pose challenges for case surveillance. First, the early signs and symptoms are not specific enough to reliably distinguish SARS-CoV disease from other common respiratory illnesses. Second, existing laboratory diagnostic tests are not adequately sensitive early in the course of illness. Therefore, risk of exposure (i.e., to another case of SARS-CoV disease or to a setting where SARS-CoV transmission is occurring) is key to considering the likelihood of a diagnosis of SARS-CoV disease.

Potential sources of SARS-CoV for future exposures include persistent infection in previously ill persons or reintroduction to humans from an animal reservoir. In the absence of SARS-CoV transmission worldwide, the most likely sites of recurrence are the original site of introduction of SARS-CoV from animals to humans and locations where person-to-person SARS-CoV transmission previously occurred. Laboratories that contain live SARS-CoV could be a source of further transmission if compromised laboratory techniques result in laboratory-acquired infections (see Singapore Ministry of Health report (www.moh.gov.sg/corp/sars/pdf/Report_SARS_Biosafety.pdf) and report from the Department of Health, Taiwan (sars.doh.gov.tw/news/2003121701.html). Because persons with SARS-CoV disease tended to appear in clusters (e.g., in healthcare facilities, households, and a few special settings) during the 2003 outbreaks, early signals of the reappearance of the illness in U.S. communities could include unusual clusters of unexplained pneumonia.

In the presence of person-to-person SARS-CoV transmission anywhere in the world, patients with SARS-CoV disease or sites of SARS-CoV transmission become the most likely sources of exposure. Contact tracing, the identification of persons who had contact with a potential case of SARS-CoV disease or may have been exposed while present in locations (e.g., hospitals) with known SARS-CoV transmission, is essential for the implementation of appropriate measures to reduce further spread of the disease.

The overall goals of SARS surveillance are to:

- Maximize early detection of cases and clusters of respiratory infections that might signal the re-emergence of SARS-CoV disease while minimizing unnecessary laboratory testing, concerns about SARS-CoV, implementation of control measures, and social disruption.
- If person-to-person SARS-CoV transmission recurs, maintain prompt and complete identification and reporting of potential cases to facilitate outbreak control and management.
- Identify and monitor contacts of cases of SARS-CoV disease to enable early detection of illness in persons at greatest risk.

II. Lessons Learned

The following lessons from the global experience with SARS surveillance have been considered in developing this document:

- Astute healthcare providers will likely be the key to early detection and reporting of initial cases of SARS-CoV disease.
- The key to recognizing persons with SARS-CoV disease is identification of an epidemiologic link of exposure to another case of SARS-CoV disease or to a setting (e.g., hospital) where SARS-CoV transmission is occurring.

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- Screening criteria for epidemiologic linkages need to reflect 1) the status of SARS-CoV transmission globally and the risk of exposure from international and domestic travel, and 2) the status of SARS activity in the community, at the work site, or in other settings where a patient with SARS-like illness may have been.
- In a setting of extensive SARS-CoV transmission, the possibility of SARS-CoV disease should be considered in all persons with a fever or lower respiratory illness, even if an epidemiologic link cannot be readily established.
- Healthcare facilities were disproportionately affected by SARS-CoV, and healthcare workers were among the first and most severely affected groups in every large outbreak reported.
- Contact tracing is resource intensive yet critical to containment efforts since it allows early recognition of illness in persons at greatest risk.
- Collection of appropriate and timely clinical specimens for laboratory testing is central to monitoring the status of SARS-CoV transmission at the local, state, and federal levels.
- Timely reporting of cases, updates on the clinical status and disposition of patients, real-time analysis of data, and timely dissemination of information are essential for outbreak-management decisions.
- Paper-based reporting systems are too slow and labor intensive to manage a large SARS outbreak. A rapid and efficient electronic reporting system that facilitates real-time analysis of clinical, epidemiologic, and laboratory information at the local level is essential.
- Frequent communication and data sharing among public health officials and healthcare providers are needed to update the status of potential and confirmed cases of SARS-CoV disease.

III. SARS-CoV Disease: Case Definition and Status as a Nationally Notifiable Disease

During the 2003 epidemic, CDC and the Council of State and Territorial Epidemiologists (CSTE) (www.cste.org) developed surveillance criteria to identify persons with SARS. The surveillance case definition changed throughout the epidemic as understanding of the clinical, laboratory, and transmission characteristics of SARS-CoV increased. On June 26, 2003, CSTE adopted a position statement to add SARS-CoV disease (www.cste.org//ps/2003pdfs/2003finalpdf/03-ID-12revised12-11.pdf) to the list of nationally reportable diseases. The position statement included criteria for defining a SARS case for national reporting. On October 30, CSTE issued a new interim position statement (www.cste.org/position%20statements/searchbyyear2004.asp), with a revised SARS case definition. The position statement and case definition were revised further on November 3. The revised CSTE case definition, subsequently adopted by CDC (www.cste.org/PS/2004pdf/CSTESARScasedefrevision2003-12-11.pdf), will be the basis for ongoing SARS surveillance. Future revisions to the CSTE SARS position statement will be posted on the CSTE website (www.cste.org) as necessary.

Surveillance case definitions are used primarily for identifying and classifying cases for national reporting purposes. However, for conditions of public health importance such as SARS-CoV disease, disease-control activities should be initiated as soon as possible after a potential case is recognized, even though information sufficient to determine case status may be lacking. Therefore, the revised case definition distinguishes 1) cases of SARS-CoV disease that are classified as confirmed (i.e., clinically compatible illness with laboratory confirmation) or probable (i.e., severe respiratory illness with epidemiologic linkage to a laboratory-confirmed case), from 2) other SARS reports under investigation (RUI), which include patients whose illnesses are less severe or whose exposures to SARS-CoV are not definitive.

Detailed descriptions of revised criteria and classifications for cases of SARS-CoV disease and SARS RUI criteria are provided in Appendix B1 (www.cdc.gov/ncidod/sars/guidance/a/app1.htm) and MMWR of December 12, 2003 (www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm). SARS case definitions may be modified as the understanding of the clinical, virologic, and transmission characteristics of SARS-

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CoV evolves. Up-to-date versions of SARS case definitions will be available on CDC's SARS website: www.cdc.gov/sars.

IV. Plan for Surveillance of Cases of SARS-CoV Disease

A. Surveillance in the Absence of Person-to-Person Transmission of SARS-CoV in the World

Objective: Establish surveillance aimed at early detection of cases and clusters of severe unexplained respiratory infections (i.e., pneumonia) that might signal the re-emergence of SARS-CoV.

Continued vigilance is critical to ensure the rapid recognition and appropriate management of SARS patients if person-to-person SARS-CoV transmission recurs. In the absence of known areas with SARS-CoV transmission, the likelihood that a patient with fever or respiratory symptoms has SARS-CoV disease will be exceedingly low unless the patient has both typical clinical findings and some accompanying epidemiologic evidence that raises the suspicion of exposure to SARS-CoV. Therefore, U.S. surveillance efforts should focus on specific clinical syndromes (i.e., cases of pneumonia requiring hospitalization) in groups likely to be first affected by the re-emergence of SARS-CoV (e.g., travelers to areas previously affected with SARS-CoV; healthcare workers).

The 2003 SARS-CoV outbreak likely originated in mainland China, and neighboring areas such as Taiwan and Hong Kong are thought to be at higher risk due to the large volume of travelers from mainland China. Although less likely, SARS-CoV may also reappear from other previously affected areas. Therefore, clinicians should obtain a complete travel history. If clinicians have concerns about the possibility of SARS-CoV disease in a patient with a history of travel to other previously affected areas (e.g., while traveling abroad, had close contact with another person with pneumonia of unknown etiology or spent time in a hospital in which patients with acute respiratory disease were treated), they should contact the health department.

In the absence of SARS-CoV transmission in the world, the screening of persons requiring hospitalization for radiographically confirmed pneumonia for risk factors suggesting SARS-CoV exposure should be limited to adults, unless there are special circumstances that make the clinician and public health personnel consider a child to be of potentially high risk for having SARS-CoV disease. During the 2003 global outbreaks, infants and children accounted for only a small percentage of SARS cases and had a much milder disease and better outcome than adults. Although information on SARS-CoV disease in pediatric patients is limited, the role of children in transmission is likely much less significant than the role of adults.

Activities: Healthcare providers

- Consider SARS-CoV disease in patients who require hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology *and* who have one of the following risk factors in the 10 days before illness onset:
  - Travel to mainland China, Hong Kong or Taiwan, or close contact[1] with an ill person with a history of recent travel to one of these areas, *or*

[1] Close contact: A person who has cared for or lived with a person with SARS-CoV disease or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS-CoV disease. Examples of close contact include kissing or hugging, sharing eating or drinking utensils, talking within 3 feet, and direct touching. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

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  - Employment in an occupation associated with a risk for SARS-CoV exposure (e.g., healthcare worker with direct patient contact; worker in a laboratory that contains live SARS-CoV [2]), *or*
  - Part of a cluster of cases of atypical pneumonia without an alternative diagnosis
- Use SARS-CoV testing judiciously and in consultation with local or state public health officials, given that: 1) the positive predictive value of a positive laboratory test in the absence of SARS-CoV transmission is extremely low, and 2) false-positive tests may generate tremendous anxiety and concern and expend valuable public health resources.
- Be alert for clusters of unexplained pneumonia among two or more healthcare workers who work in the same facility.
- Report to the state or local health department:
  - All persons requiring hospitalization for radiographically confirmed pneumonia who report at least one of the three risk factors listed above
  - Any clusters of unexplained pneumonia requiring hospitalization, especially among healthcare workers
  - Any positive SARS-CoV test result (requires immediate notification of the health department by telephone).

Activities: State and local health departments

- Disseminate surveillance guidelines regarding timely recognition, evaluation, and reporting of possible SARS-CoV cases to healthcare providers, particularly triage, emergency department, and hospital-based providers.
- Establish a surveillance system to receive reports of:
  - Persons who require hospitalization for radiographically confirmed pneumonia and who are found to be at greater risk for SARS-CoV disease based on the provider-based screening described above,
  - Clusters of persons with unexplained pneumonia, and
  - Positive SARS-CoV test results.
- Review and obtain information needed to assess reported pneumonia cases and clusters for the likelihood of SARS-CoV disease. Considerations that increase the likelihood of SARS-CoV disease include:
  - Illness onset dates grouped within a 10-day period
  - Ill travelers who had contact with healthcare settings or persons hospitalized for unexplained respiratory infection while abroad and within 10 days of illness onset
  - Clusters of pneumonia among any group of persons for whom alternative diagnoses have been reliably excluded or clusters in which one case is linked to travel to a previously affected area or to an ill healthcare worker
- Review reports of persons who are hospitalized for pneumonia and are at increased risk for SARS-CoV disease to ensure that:
  - Adequate testing is done to rule out other infectious causes of pneumonia
  - SARS-CoV testing is ordered only when appropriate (see *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness*, www.cdc.gov/ncidod/sars/clinicalguidance.htm).
- Consult CDC as needed about cases or clusters of special concern.
- Report to CDC any positive SARS-CoV test results.

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[2] Persons who work in laboratories that contain live SARS-CoV should report any febrile and/or respiratory illnesses to the supervisor. They should be evaluated for possible exposures, and their clinical features and course of illness should be closely monitored. If laboratory workers with fever and/or respiratory illness are found to have an exposure to SARS-CoV, they should be managed according to the recommendations in Supplement F, Appendix F6.

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- Inform CDC of other cases or clusters of pneumonia that are of particular concern by calling 770-488-7100.

Activities: CDC

- Provide guidance to health departments, hospitals, and healthcare providers on SARS surveillance.
- Assist state and local health departments in the development of an electronic reporting system and related forms to facilitate uniform reporting.
- Assist states, as requested, in investigations of cases and clusters of persons with possible SARS-CoV disease.
- Collect and review reports of pneumonia requiring hospitalization in travelers and clusters of healthcare workers associated with a high index of suspicion for SARS-CoV disease, as specified in the preceding section.

B. Surveillance in the Presence of Person-to-Person Transmission of SARS-CoV in the World

Objective: Establish surveillance to promptly identify and report all new U.S. cases of SARS-CoV disease to facilitate outbreak management and control.

If person-to-person SARS-CoV transmission is documented in the United States or abroad, the likelihood that a person with fever or lower respiratory symptoms might be infected with SARS-CoV will increase but will remain low unless the person has a history of recent exposure to a known case of SARS-CoV disease or to a setting in which SARS-CoV transmission is occurring. Surveillance efforts should be modified to incorporate available risk factor information, particularly regarding geographic transmission patterns. The scope of surveillance activities in specific communities may differ substantially depending on the extent of disease in both the community and local healthcare facilities or institutions. Ongoing analysis of surveillance data and other information will be critical to inform decisions about the need to implement or discontinue various elements of enhanced surveillance.

Surveillance activities should also be enhanced or accelerated as needed by a particular community or institution. *Basic surveillance activities* should be initiated in areas with no or little SARS-CoV transmission and continued in areas with increased transmission. *Enhanced surveillance activities* should be considered if a community or facility experiences a significant increase in number of cases, if epidemiologic links between cases cannot be readily established, or if changing transmission patterns are identified. Enhanced surveillance activities should focus both on increasing the sensitivity of case detection through use of less specific clinical criteria when screening cases (see note below) and on evaluation of suspicious illnesses regardless of identification of an epidemiologic link.

NOTE: For persons with a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), respiratory symptoms used to screen patients should be expanded to include upper respiratory symptoms such as sore throat and rhinorrhea, in addition to any other early non-respiratory symptoms of SARS-CoV disease such as chills, rigors, myalgia, headache, or diarrhea. The more common early symptoms include chills, rigors, myalgia, and headache; in some patients, myalgia and headache may precede the onset of fever by 12-24 hours. However, diarrhea, sore throat, and rhinorrhea may also be early symptoms of SARS-CoV disease.

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Activities: Healthcare providers

Community-based surveillance

Basic Activities

- Continue case detection and reporting as detailed above (absence of SARS-CoV transmission in the world) to identify potential SARS cases with no known epidemiologic links.
- Consider screening all patients presenting to outpatient clinics with a fever or lower respiratory symptoms for SARS risk factors. SARS risk factors include:
  - Travel within 10 days of illness onset to a foreign or domestic location with documented or suspected transmission of SARS-CoV (see www.cdc.gov/ncidod/sars/travel.htm), *or*
  - Close contact within 10 days of illness onset with a person with known or possible SARS-CoV disease.
- If a patient with a fever or evidence of respiratory illness has a SARS risk factor, notify the local health department, and evaluate and isolate the patient according to the algorithm in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm).

Enhanced Activities

- If epidemiologic links between some local SARS cases cannot be readily established (i.e., the source of infection is unclear), consider SARS-CoV disease in the differential diagnosis and management of all patients with fever or lower respiratory symptoms, regardless of whether the patient has SARS risk factors (see Supplement C and Supplement I for guidance on triage and infection control).

Hospital-based surveillance

This section includes recommendations for SARS surveillance in healthcare facilities. For detailed recommendations on screening and triage, access controls, and infection control measures in healthcare settings, see Supplement C and Supplement I.

Healthcare facility with no cases of SARS

Basic Activities

- Continue to implement case detection and reporting efforts as detailed above (absence of SARS-CoV transmission in the world) to identify potential SARS patients for whom an epidemiologic link is unknown.
- Screen all patients presenting to emergency rooms or hospital clinics with a fever or respiratory symptoms for SARS risk factors.
- Infection control personnel, occupational health officials, and providers should be alert for clusters of pneumonia requiring hospitalization among healthcare workers. Any clusters with illness with onset within the same 10-day period should be reported to local or state health officials.
- *Report* any potential SARS cases to the state or local health department according to their instructions.

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Enhanced Activities

- If SARS-CoV transmission is occurring in the surrounding community, screen all visitors upon entry to the facility for fever or lower respiratory symptoms. Screen symptomatic persons for SARS risk factors. Patients with risk factors should be isolated and evaluated according to the algorithm in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm).

Healthcare facility with a few SARS cases, but no evidence of nosocomial transmission

Basic Activities

- Continue all recommended surveillance plans outlined in the previous section.
  Implement daily monitoring of all healthcare workers caring for SARS patients. If a healthcare worker caring for SARS patients develops fever or lower respiratory symptoms or two or more early symptoms of SARS-CoV disease (chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea), notify the local health department, begin SARS isolation precautions, and initiate a clinical evaluation as outlined in the algorithm in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). The more common early symptoms of SARS-CoV disease include chills, rigors, myalgia, and headache; in some patients, myalgia and headache may precede the onset of fever by 12-24 hours. However, diarrhea, sore throat, and rhinorrhea may also be early symptoms of SARS-CoV disease.

Enhanced Activities

- Screen all patients, visitors, and employees upon entry to the facility for fever or lower respiratory symptoms. Screen symptomatic persons for SARS risk factors. Patients with risk factors should be isolated and evaluated for both alternative respiratory illnesses and SARS-CoV disease (www.cdc.gov/ncidod/sars/clinicalguidance.htm).

Healthcare facility with a larger number of SARS cases OR nosocomial transmission with all cases linked to a clearly identified source

Activities

- Continue all recommended surveillance plans outlined in the previous section.
- Monitor *all* healthcare workers daily for fever or lower respiratory symptoms. If a healthcare worker has fever or lower respiratory symptoms, begin SARS isolation precautions (Supplement I), obtain a chest x-ray, and initiate a preliminary clinical evaluation (www.cdc.gov/ncidod/sars/clinicalguidance.htm). Continue to screen all healthcare workers caring for SARS patients using the expanded clinical criteria. In addition to fever or lower respiratory symptoms, screen for the presence of any of the following: chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea.
- Begin inpatient surveillance. Monitor patients daily for new or worsening respiratory symptoms. If found, investigate the patient for exposure to known or suspected SARS patients. If there is evidence of exposure, isolate the patient and test for alternative respiratory illnesses and SARS-CoV disease (www.cdc.gov/ncidod/sars/clinicalguidance.htm).

Supplement B: SARS Surveillance
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Healthcare facility with cases attributed to nosocomial transmission with no clearly identified source

Activities

- Continue all recommended surveillance plans outlined in the previous section.
- Expand inpatient surveillance. Test any patient with new or worsening fever or respiratory symptoms for SARS-CoV regardless of whether the patient has an epidemiologic link to a SARS case (www.cdc.gov/ncidod/sars/clinicalguidance.htm).
- Consider surveillance for illness and absenteeism among healthcare workers.

Activities: State and local health departments

- Continue activities outlined above, as appropriate.
- Identify, evaluate, and monitor exposed contacts of SARS cases to identify previously unrecognized or secondary cases, as outlined below.
- Disseminate modified surveillance and patient screening guidelines to providers through the state/local Health Alert Network.
- Facilitate reporting from hospitals. If necessary, consider placing surveillance staff in hospitals with multiple SARS admissions.
- Review reports daily of persons reported from hospitals/providers to: 1) evaluate the level of risk for SARS, 2) ensure adequate testing to rule out SARS-CoV, 3) identify new clusters that might require special attention, 4) identify contacts and ensure that they are evaluated and monitored (as outlined below), and 5) monitor trends.
- Once person-to-person SARS-CoV transmission is documented anywhere in the world, report to CDC any person who meets the case definition for a probable case of SARS-CoV disease or a confirmed case of SARS-CoV disease, as defined by CSTE (see Appendix B1).
- Immediately report to CDC any positive SARS-CoV test results.
- Following discussions between CDC and CSTE, CDC may also require reporting of other potential SARS-CoV cases (e.g., SARS reports under investigation [SARS RUIs]) as needed to meet national surveillance objectives. Updated national reporting requirements will be circulated to state and local health departments and posted on CDC's SARS website (www.cdc.gov/sars) as indicated.

Activities: CDC

- Continue activities outlined above, as appropriate.
- Ensure that all states have systems to identify and monitor potential SARS cases and contacts.
- Ensure that states and hospitals have adequate guidance to implement effective surveillance and containment measures.
- As SARS activity evolves, work with CSTE to determine what surveillance information and related reporting mechanisms are needed to meet national surveillance objectives.
- Monitor the level of activity of SARS-CoV disease nationwide to:
  - Monitor the effectiveness of U.S. efforts to diagnose and contain SARS-CoV
  - Provide timely feedback to states in the form of data and other information
  - Mobilize additional resources, and arrange surge capacity as needed
  - Report activity to WHO to assist with global surveillance and control
- Oversee surveillance at ports of entry to aid in the identification of possible imported SARS-related illnesses, as outlined in Supplement E.
- Facilitate coordinated surveillance and related activities in settings that may not be under state/local jurisdiction (e.g., military bases).
- Provide guidance regarding possible laboratory-acquired SARS-CoV infections, as outlined in Supplement F.

Supplement B: SARS Surveillance
(continued from previous page)

V. Reporting of Cases of SARS-CoV Disease

A. Reporting in the Absence of Person-to-Person Transmission of SARS-CoV in the World

Objective: Ensure adequate reporting of cases of severe respiratory illness (pneumonia requiring hospitalization) among persons who have risk factors for potential exposure to SARS-CoV.

Activities: Healthcare providers

- Report to the state or local health department:
  - All persons requiring hospitalization for radiographically confirmed pneumonia who report at least one of the three risk factors for exposure to SARS-CoV outlined above
  - Any clusters (two or more persons) of unexplained pneumonia, especially among healthcare workers
  - Any positive SARS-CoV test result

Note: In the absence of SARS-CoV transmission worldwide, any **SARS-CoV-positive test result** should be communicated immediately by telephone to the state or local health department for confirmation and implementation of urgent and appropriate isolation precautions, contact tracing, and follow-up. See www.cdc.gov/ncidod/sars/absenceofsars.htm for details.

Activities: State and local health departments

- Report any SARS-CoV-positive test result to CDC.
- Inform CDC of cases or clusters of pneumonia that are of particular concern by calling 770-488-7100.

B. Reporting in the Presence of Person-to-Person Transmission of SARS-CoV in the World

Objective: Ensure adequate reporting of all new potential and confirmed U.S. cases of SARS-CoV disease.

Activities: Healthcare providers

- Continue to report to the state or local health department:
  - Persons requiring hospitalization for radiographically confirmed pneumonia who report at least one of the three risk factors for exposure to SARS-CoV outlined above and for whom an alternate diagnosis is not made
  - Any clusters of unexplained pneumonia
  - Any positive SARS-CoV test result
- Also report to state or local health departments:
  - Any patient with fever or lower respiratory illness who has a SARS risk factor (travel within 10 days of illness onset to a foreign or domestic location with ongoing transmission of SARS-CoV infection [www.cdc.gov/ncidod/sars/travel.htm] or close contact within 10 days of illness onset with a person with known or suspected SARS-CoV disease).

Supplement B: SARS Surveillance
(continued from previous page)

Activities: State and local health departments

- Report to CDC any person who meets the case definition for a probable case of SARS-CoV disease or a confirmed case of SARS-CoV disease, as defined by CSTE (see Appendix B1).
- Immediately report to CDC any positive SARS-CoV test result.
- Following discussions between CDC and CSTE, CDC may also require reporting of other potential SARS-CoV cases (e.g., SARS RUIs) as needed to meet national surveillance objectives. Updated national reporting requirements will be circulated to state and local health departments and posted on the CDC's SARS website (www.cdc.gov/sars) as indicated.

Activities: CDC

- CDC will report confirmed or potential cases of SARS-CoV disease to WHO, as required per international reporting guidelines.

VI. Plan for Surveillance of Contacts of SARS Cases

Surveillance of contacts of SARS cases is essential to control efforts. Rapid identification, evaluation, and monitoring of exposed asymptomatic contacts and prompt isolation of those who are found to be clinically ill can prevent further transmission of disease.

Infectiousness in patients with SARS-CoV disease appears to begin with the onset of clinical illness. Although the exact duration of infectiousness is not known, it is recommended that patients with SARS-CoV disease avoid contact with other persons for up to 10 days after resolution of fever and improving or absent respiratory symptoms. *Contact tracing* is the systematic identification of persons who may have been exposed to patients with suspected or confirmed SARS-CoV disease during the infectious period. In some instances, public health officials should also consider identifying persons who had contact with a SARS patient *before* the patient's onset of illness – if there is a chance that the contacts might have been exposed to the same source of infection as the case. Such situations would include those in which the SARS patient's source of infection is unclear or not previously recognized (e.g., an index case among a group of tourists).

Objective 1: Prepare to conduct surveillance of contacts by ensuring the availability of personnel and other resources.

Activities: State and local health departments

- Designate one person to coordinate activities related to contact tracing, interviewing, evaluation, and monitoring.
- Identify additional personnel to manage contact tracing and monitoring in different regions of the state. Personnel can be provided from state or other resources as needed. Ideally, select staff with field experience involving contact tracing (e.g., from STD, TB, or HIV control programs).
- As needed, modify and adopt sample forms provided by CDC (Appendix B3).

Additional recommendations related to preparedness planning for surveillance and management of SARS contacts, including community containment measures such as non-hospital isolation and quarantine, are provided in Supplement D.

Supplement B: SARS Surveillance
(continued from previous page)

Objective 2*:* Identify all contacts of all SARS cases.

Activities: State and local health departments

- Identify contacts of known or possible cases of SARS-CoV disease. Obtain information from the case-patient, next of kin, workplace representative, or others with appropriate knowledge of the case-patient's recent whereabouts and activities.
- Trace each contact whose name, address, and/or telephone number is provided.
- When contact information is unknown or incomplete, use a variety of resources (e.g., work and school contact numbers, telephone directories, voting lists, neighborhood interviews, site visits, visits to "hangouts") to trace contacts. If contacts cannot be found through these mechanisms, other methods for notifying potential contacts (e.g., media announcements) may have to be considered.
- Locate and interview each contact to: 1) confirm exposure to the SARS case, 2) document the presence or absence of fever or lower respiratory symptoms,[3] and 3) identify additional contacts.
- For persons who are free of symptoms at the time of interview, initiate plans for ongoing symptom monitoring or other restrictions implemented by public health officials (see Supplement D) for 10 days after the last contact with the SARS case.

Objective 3: Prioritize contacts on the basis of estimated risk of exposure if necessary.

Contact tracing should include detailed interviews so that contacts can be prioritized on the basis of their estimated risk of SARS-CoV exposure. This process allows identification of the contacts at greatest risk and more efficient use of the resources needed for follow-up and monitoring. In some instances, however, resource limitations (e.g., limited number of skilled interviewers) or large numbers of potential contacts may preclude focused contact tracing and require follow-up and monitoring of a large number of contacts with less definite risks.

Activities: State and local health departments

- Consider establishing priorities among contacts based on the following factors:
  - Probability of SARS-CoV disease in the index case (e.g., contacts of confirmed and probable SARS-CoV cases would be highest priority)
  - Duration and spatial proximity (e.g., < 3 feet) of the contact's exposure to the case
  - History of exposure(s) known or suspected to be at higher risk for transmission (e.g., SARS patient care; participation in an aerosol-generating procedure; intimate contact)
  - Documented secondary cases resulting from exposure to the index patient
- After a review of contact priority lists and available resources, state authorities may decide to adopt different levels of contact follow-up and monitoring activities for different categories of contacts. For detailed recommendations for management of contacts, see Supplement D.

[3] For persons with a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), clinical criteria should be expanded to include, in addition to either fever or lower respiratory symptoms, the presence of any of the early symptoms of SARS-CoV disease (i.e., chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea) as a potential trigger to initiate a clinical evaluation for SARS-CoV disease.

(continued from previous page)

VII. Information Management

Rapid and timely reporting of cases of SARS-CoV disease and dissemination of surveillance information are key to the management of a SARS outbreak. As part of the SARS Incident and Command Management System (see Supplement A), CDC has developed a web-based reporting system for SARS RUI and SARS-CoV disease cases. This system allows states to report data on SARS RUIs and cases via one of two secure mechanisms based on the capacities at the state health departments: 1) direct entry into a web-based interface, available to all states with minimal technological requirements, or 2) upload of data from electronic databases maintained at the state into the web-based interface. Data that are reported to CDC will be exported to state health departments daily as an analyzable data set in a pre-defined format. Results of laboratory testing at CDC will be integrated into the data transmitted to the states. For more information on the web-based reporting system, contact the CDC Secure Data Network staff via telephone (800-532-9929) or email (cdcsdn@cdc.gov).

SARS-CoV disease has recently been designated a nationally notifiable disease to be reported to the Nationally Notifiable Diseases Surveillance System (NNDSS). CDC is encouraging states to use either direct entry into or data upload to the SARS web information system for SARS RUI and SARS-CoV disease cases. When clinical, epidemiologic, and laboratory data reported from states to the CDC SARS web-based reporting system meet the criteria for a reportable SARS-CoV disease case, a record will automatically be added to NNDSS and states will be notified of the transfer of data to NNDSS.

Contact tracing and monitoring will require substantial data management resources. The information technology needs for timely surveillance and management of contacts of SARS cases are currently under discussion among CDC and partners in state and local health departments, and development of a contact tracing database is ongoing.

Supplement B: SARS Surveillance
(continued from previous page)

Appendix B1
Revised CSTE SARS Surveillance Case Definition

December 2003

Clinical Criteria

Early illness
- Presence of two or more of the following features: fever (might be subjective), chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea

Mild-to-moderate respiratory illness
- Temperature of >100.4° F (>38° C)[1] *and*
- One or more clinical findings of lower respiratory illness (e.g., cough, shortness of breath, difficulty breathing)

Severe respiratory illness
- Meets clinical criteria of mild-to-moderate respiratory illness, *and*
- One or more of the following findings:
  - Radiographic evidence of pneumonia, *or*
  - Acute respiratory distress syndrome, *or*
  - Autopsy findings consistent with pneumonia or acute respiratory distress syndrome without an identifiable cause

Epidemiologic Criteria

Possible exposure to SARS-associated coronavirus (SARS-CoV)
One or more of the following exposures in the 10 days before onset of symptoms:
- Travel to a foreign or domestic location with documented or suspected recent transmission of SARS-CoV[2] *or*
- Close contact[3] with a person with mild-to-moderate or severe respiratory illness and with history of travel in the 10 days before onset of symptoms to a foreign or domestic location with documented or suspected recent transmission of SARS-CoV[2]

Likely exposure to SARS-CoV
One or more of the following exposures in the 10 days before onset of symptoms:
- Close contact[3] with a confirmed case of SARS-CoV disease *or*
- Close contact[3] with a person with mild-moderate or severe respiratory illness for whom a chain of transmission can be linked to a confirmed case of SARS-CoV disease in the 10 days before onset of symptoms

Laboratory Criteria

Tests to detect SARS-CoV are being refined, and their performance characteristics assessed; therefore, criteria for laboratory diagnosis of SARS-CoV are changing[4]. The following are the general criteria for laboratory confirmation of SARS-CoV:
- Detection of serum antibody to SARS-CoV by a test validated by CDC (e.g., enzyme immunoassay [EIA]), *or*
- Isolation in cell culture of SARS-CoV from a clinical specimen, *or*
- Detection of SARS-CoV RNA by a reverse-transcription-polymerase chain reaction (RT-PCR) test validated by CDC and with subsequent confirmation in a reference laboratory (e.g., CDC)

Information regarding the current criteria for laboratory diagnosis of SARS-CoV is available at www.cdc.gov/ncidod/sars/labdiagnosis.htm.

Exclusion Criteria

A person may be excluded as a SARS report under investigation (SARS RUI), including as a CDC-defined probable SARS-CoV case, if any of the following applies:

- An alternative diagnosis can explain the illness fully[5]
- Antibody to SARS-CoV is undetectable in a serum specimen obtained >28 days after onset of illness[6]
- The case was reported on the basis of contact with a person who was excluded subsequently as a case of SARS-CoV disease; then the reported case also is excluded, provided other epidemiologic or laboratory criteria are not present

Case Classification

SARS RUI

Reports in persons from areas where SARS is not known to be active:

- SARS RUI-1: Patients with severe illness compatible with SARS in groups likely to be first affected by SARS-CoV[7] if SARS-CoV is introduced from a person without clear epidemiologic links to known cases of SARS-CoV disease or places with known ongoing transmission of SARS-CoV

Reports in persons from areas where SARS activity is occurring:

- SARS RUI-2: Patients who meet the current clinical criteria for mild-to-moderate illness and the epidemiologic criteria for possible exposure (spring 2003 CDC definition for suspect cases[8])
- SARS RUI-3: Patients who meet the current clinical criteria for severe illness and the epidemiologic criteria for possible exposure (spring 2003 CDC definition for probable cases[8])
- SARS RUI-4: Patients who meet the clinical criteria for early or mild-moderate illness and the epidemiologic criteria for likely exposure to SARS-CoV

SARS-CoV disease classification

- Probable case of SARS-CoV disease: in a person who meets the clinical criteria for severe respiratory illness and the epidemiologic criteria for likely exposure to SARS-CoV
- Confirmed case of SARS-CoV disease: in a person who has a clinically compatible illness (i.e., early, mild-to-moderate, or severe) that is laboratory confirmed

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[1]A measured documented temperature of >100.4° F (>38° C) is expected. However, clinical judgment may allow a small proportion of patients without a documented fever to meet this criterion. Factors that might be considered include patient's self-report of fever, use of antipyretics, presence of immunocompromising conditions or therapies, lack of access to health care, or inability to obtain a measured temperature. Initial case classification based on reported information might change, and reclassification might be required.

[2]Types of locations specified will vary (e.g., country, airport, city, building, floor of building). The last date a location may be a criterion for exposure for illness onset is 10 days (one incubation period) after removal of that location from CDC travel alert status. The patient's travel should have occurred on or before the last date the travel alert was in place. Transit through a foreign airport meets the epidemiologic criteria for possible exposure in a location for which a CDC travel advisory is in effect. Information regarding CDC travel alerts and advisories and assistance in determining appropriate dates are available at www.cdc.gov/ncidod/sars/travel.htm.

Supplement B: SARS Surveillance
(continued from previous page)

[3]Close contact is defined as having cared for or lived with a person with SARS or having a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS (during encounters with the patient or through contact with materials contaminated by the patient) either during the period the person was clinically ill or within 10 days of resolution of symptoms. Examples of close contact include kissing or embracing, sharing eating or drinking utensils, close conversation (<3 feet), physical examination, and any other direct physical contact between persons. Close contact does not include activities such as walking by a person or sitting across a waiting room or office for a brief time.

[4]The identification of the etiologic agent of SARS (SARS-CoV) led to the rapid development of EIAs and immunofluorescence assays (IFAs) for serologic diagnosis and RT-PCR assays for detection of SARS-CoV RNA in clinical samples. These assays can be very sensitive and specific for detecting antibody and RNA, respectively, in the later stages of SARS-CoV disease. However, both are less sensitive for detecting infection early in illness. The majority of patients in the early stages of SARS-CoV disease have a low titer of virus in respiratory and other secretions and require time to mount an antibody response. SARS-CoV antibody tests might be positive as early as 8–10 days after onset of illness and often by 14 days after onset of illness, but sometimes not until 28 days after onset of illness. Information regarding the current criteria for laboratory diagnosis of SARS-CoV is available at www.cdc.gov/ncidod/sars/labdiagnosis.htm.

[5]Factors that may be considered in assigning alternate diagnoses include the strength of the epidemiologic exposure criteria for SARS-CoV disease, the specificity of the alternate diagnostic test, and the compatibility of the clinical presentation and course of illness for the alternative diagnosis.

[6]Current data indicate that >95% of patients with SARS-CoV disease mount an antibody response to SARS-CoV. However, health officials may choose not to exclude a case based on lack of a serologic response if reasonable concern exists that an antibody response could not be mounted.

[7]Consensus guidance between CDC and CSTE on which groups are most likely to be first affected by SARS-CoV if it re-emerges is in development. In principle, SARS-CoV disease should be considered at a minimum in the differential diagnosis for persons requiring hospitalization for radiographically confirmed pneumonia or acute respiratory distress syndrome without identifiable etiology and who have one of the following risk factors in the 10 days before the onset of illness:

- Travel to mainland China, Hong Kong, or Taiwan, or close contact with an ill person with a history of recent travel to one of these areas, *or*
- Employment in an occupation associated with a risk for SARS-CoV exposure (e.g., healthcare worker with direct patient contact or worker in a laboratory that contains live SARS-CoV), *or*
- Part of a cluster of cases of atypical pneumonia without an alternative diagnosis

Guidelines for the identification, evaluation, and management of these persons are available at www.cdc.gov/ncidod/sars/absenceofsars.htm.

[8]During the 2003 SARS epidemic, CDC case definitions were the following:

Suspect case
- Meets the clinical criteria for mild-to-moderate respiratory illness and the epidemiologic criteria for possible exposure to SARS-CoV but does not meet any of the laboratory criteria and exclusion criteria *or*
- Unexplained acute respiratory illness resulting in death in a person on whom an autopsy was not performed and who meets the epidemiologic criteria for possible exposure to SARS-CoV but does not meet any of the laboratory criteria and exclusion criteria

Probable case
Meets the clinical criteria for severe respiratory illness and the epidemiologic criteria for possible exposure to SARS-CoV but does not meet any of the laboratory criteria and exclusion criteria

(continued from previous page)

Appendix B2

SARS Domestic Case Reporting Form

Form Approved
OMB No. 0920-0008

Person Details

1. IDs	
CDC ID #: *CDC ID WILL BE AUTOMATICALLY GENERATED*	Date reported to CDC: __ __ / __ __ / __ __ __ __ (m m d d y y y y)
State ID #: _____	Jurisdiction:
Date reported to state or local health department: __ __ / __ __ / __ __ __ __ (m m d d y y y y)	
2. Submitted By	
Last Name:	First Name:
State:	Affiliation:
Phone:	E-mail:
3. Patient Information	
City of Residence:	
County of Residence:	
State of Residence:	
Age at onset: _____ ☐ Years ☐ Months	Sex: ☐ Male ☐ Female
Ethnicity: ☐ Non Hispanic ☐ Hispanic	Race *(Mark one or more)* ☐ American Indian/Alaska Native ☐ Asian ☐ Black ☐ Native Hawaiian/Other Pacific Islander ☐ White ☐ Unknown
Nationality/Citizenship:	
Residency: ☐ US Residency ☐ Non-US Residency	
4. Optional Patient Information	
Last Name: _____	First Name: _____

Supplement B: SARS Surveillance
(continued from previous page)

Clinical Information

5. Signs and Symptoms

Date of symptom onset: __ __ / __ __ / __ __ __ __
m m d d y y y y

Did the person have a fever (subjective or objective)?
☐ Yes
☐ No
☐ Unknown

If yes:

Date of fever onset: __ __ / __ __ / __ __ __ __
m m d d y y y y

Was temperature > 38° C (100.4° F)?
☐ Yes
☐ No
☐ Unknown

Did the patient have any lower respiratory symptoms (e.g. cough, shortness of breath, difficulty breathing)?
☐ Yes
☐ No
☐ Unknown

Was a chest X-ray or CAT scan performed?
☐ Yes
☐ No
☐ Unknown

If yes:

Did the patient have radiographic evidence of pneumonia or respiratory distress syndrome (RDS)?
☐ Yes
☐ No
☐ Unknown

6. Clinical Status

Date of the first health care evaluation for this illness: __ __ / __ __ / __ __ __ __
m m d d y y y y

Was patient hospitalized for > 24 hours during course?
☐ Yes
☐ No
☐ Unknown

If yes:

Name of Hospital: _____ City: _____ State: _____

Date of Hospitalization: __ __ / __ __ / __ __ __ __
m m d d y y y y

Date of Discharge: __ __ / __ __ / __ __ __ __
m m d d y y y y

Was patient ever admitted to the intensive care unit (ICU)?
☐ Yes
☐ No
☐ Unknown

Supplement B: SARS Surveillance
(continued from previous page)

Was patient ever placed on mechanical ventilation?	☐ Yes ☐ No ☐ Unknown
Did patient die as a result of his/her illness?	☐ Yes ☐ No ☐ Unknown
If yes: Date of Death: __ __ / __ __ / __ __ __ __ m m d d y y y y	
Was an autopsy performed?	☐ Yes ☐ No ☐ Unknown
Was pathology consistent with pneumonia or RDS?	☐ Yes ☐ No ☐ Unknown

Epidemiologic Risk Factors

7. Occupation	
Is the individual a healthcare worker?* ** A person who has close contact to patients, patient care areas (e.g., patient room) or patient care items (e.g. linens, patient specimens).*	☐ Yes ☐ No ☐ Unknown
If yes: Specify healthcare worker type:	☐ Physician ☐ Nurse/PA ☐ Lab ☐ Other Specify: _____
Does patient have DIRECT patient care responsibilities?	☐ Yes ☐ No ☐ Unknown
If not a healthcare worker, please list occupation: _____	

8. Contact and Travel	
In the 10 days prior to symptom onset, did the patient have the following?	
A. Close contact in the 10 days prior to symptom onset with a confirmed SARS-CoV case or a probable SARS-CoV case? * ** SEE APPENDIX B1 FOR CLASSIFICATION DEFINITIONS*	☐ Yes If yes, go to section 9, then return ☐ No ☐ Unknown
B. Close contact with a person considered an RUI-2 or RUI-3? * ** SEE APPENDIX B1 FOR CLASSIFICATION DEFINITIONS*	☐ Yes If yes, go to section 9, then return ☐ No ☐ Unknown

(continued from previous page)

C. Travel to **foreign** or **domestic** area with documented or suspected recent local transmission of SARS cases? *(See list of areas at end of document)*

☐ Yes **Enter Destination Below**
☐ No
☐ Unknown

If yes to C, list travel destination(s) *(See list of areas at end of document)*

Destination: ______________________________

Date of Arrival: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

Date of Departure: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

Destination: ______________________________

Date of Arrival: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

Date of Departure: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

Destination: ______________________________

Date of Arrival: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

Date of Departure: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

Destination: ______________________________

Date of Arrival: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

Date of Departure: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

Contact History

9. Information on Ill Contacts

Add Contact information for ill contacts identified by question 8A or 8B above. These ill contacts should have been identified previously and have been given either a CDC or STATE ID. If an ID has not been given, enter contact name, but update when ID number is available.

Contact Information (1)

Contact CDC ID: ______________ OR Contact STATE ID: ______________

OR *(only if ID unavailable)* Name of Contact (first, middle initial, last): ______________________________

Supplement B: SARS Surveillance
(continued from previous page)

Classification of Contact (SEE APPENDIX B1):	Nature of contact:	Contact Start:
☐ RUI-2 ☐ RUI-3 ☐ Probable SARS CoV case ☐ Confirmed SARS CoV case	☐ Same household ☐ Coworker ☐ Healthcare environment ☐ Other _____	__ __ / __ __ / __ __ __ __ m m d d y y y y Contact End: __ __ / __ __ / __ __ __ __ m m d d y y y y

Did the **ill contact** recently travel to an area with SARS transmission?
(see list of areas at end of document)
☐ Yes
☐ No
☐ Unknown

If Yes, where? _____

Contact Information (2)

Contact CDC ID: _____ OR Contact STATE ID: _____

OR *(only if ID unavailable)* Name of Contact (first, middle initial, last): _____

Classification of Contact (SEE APPENDIX B1):	Nature of contact:	Contact Start:
☐ RUI-2 ☐ RUI-3 ☐ Probable SARS CoV case ☐ Confirmed SARS CoV case	☐ Same household ☐ Coworker ☐ Healthcare environment ☐ Other _____	__ __ / __ __ / __ __ __ __ m m d d y y y y Contact End: __ __ / __ __ / __ __ __ __ m m d d y y y y

Did the **ill contact** recently travel to an area with SARS transmission?
(see list of areas at end of document)
☐ Yes
☐ No
☐ Unknown

If Yes, where? _____

Contact Information (3)

Contact CDC ID: _____ OR Contact STATE ID: _____

OR *(only if ID unavailable)* Name of Contact (first, middle initial, last): _____

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(continued from previous page)

Classification of Contact (SEE APPENDIX B1):	Nature of contact:	Contact Start:
☐ RUI-2 ☐ RUI-3 ☐ Probable SARS CoV case ☐ Confirmed SARS CoV case	☐ Same household ☐ Coworker ☐ Healthcare environment ☐ Other _____	__ __ / __ __ / __ __ __ __ m m d d y y y y Contact End: __ __ / __ __ / __ __ __ __ m m d d y y y y
Did the ill contact recently travel to an area with SARS transmission? *(see list of areas at end of document)* *If Yes, where?*		☐ Yes ☐ No ☐ Unknown

Travel History

10. Patient Travel Information			
If recent foreign travel, did the patient receive a **Health Alert** or other SARS educational information on arrival in the United States?			☐ Yes ☐ No ☐ Unknown
Was the patient **symptomatic** during travel from a SARS affected area of within 24 hours of return to the US or local area?			☐ Yes ☐ No ☐ Unknown
If yes: 1) Please provide to the CDC the name of the SARS suspect who has traveled *(enter name from section 3)*			
2) If yes, list all travel either by public conveyance (airplane, train bus) or with a tour group, 24 hours before onset of fever or symptoms and thereafter:			
List each portion or leg or the trip below:			
Trip or portion (1)			
Departure Date: __ __ / __ __ / __ __ __ __ m m d d y y y y	Departure City: _____	Arrival City: _____	Transport Type: ☐ Auto ☐ Airline ☐ Tour Group ☐ Train ☐ Other ☐ Cruise ☐ Bus
Transport Company:		Transport No:	
Comment:			
Trip or portion (2)			
Departure Date: __ __ / __ __ / __ __ __ __ m m d d y y y y	Departure City: _____	Arrival City: _____	Transport Type: ☐ Auto ☐ Airline ☐ Tour Group ☐ Train ☐ Other ☐ Cruise ☐ Bus

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(continued from previous page)

Transport Company:	Transport No:
Comment:	

Trip or portion (3)

Departure Date:	Departure City:	Arrival City:	Transport Type:
__ __ / __ __ / __ __ __ __ m m d d y y y y	_____	_____	☐ Airline ☐ Auto ☐ Train ☐ Tour Group ☐ Cruise ☐ Other ☐ Bus

Transport Company:	Transport No:
Comment:	

Trip or portion (4)

Departure Date:	Departure City:	Arrival City:	Transport Type:
__ __ / __ __ / __ __ __ __ m m d d y y y y	_____	_____	☐ Airline ☐ Auto ☐ Train ☐ Tour Group ☐ Cruise ☐ Other ☐ Bus

Transport Company:	Transport No:
Comment:	

(This page may be duplicated if needed)

Classification of Patient

11. Classification of patient by state of municipality (using CSTE/CDC definitions): SEE APPENDIX B1

Initial Classification (check one only):	Updated Classification (check one only):
Report Under Investigation (RUI) ☐ RUI-1 ☐ RUI-2 ☐ RUI-3 ☐ RUI-4 *OR SARS disease classification* ☐ Probable SARS-CoV Case ☐ Confirmed SARS-CoV Case	☐ RUI-1 ☐ RUI-2 ☐ RUI-3 ☐ RUI-4 ☐ Probable SARS-CoV Case ☐ Confirmed SARS-CoV Case ☐ Not a case: negative serology (>28 days post onset) ☐ Not a case: alternative diagnosis accounts for illness
	Date Updated (most recent): __ __ / __ __ / __ __ __ __ m m d d y y y y

Supplement B: SARS Surveillance
(continued from previous page)

Laboratory Evaluation

12. Local SARS testing

Chose from the following specimens to enter for each test:
Whole blood, serum (acute), serum (convalescent), NP swab, NP aspirate, Broncheoalveolar lavage specimen, OP swab, urine, stool, tissue.

Specimen 1

Specimen:	If 'Tissue,' specify:	Date Collected:
_____	_____	__ __ / __ __ / __ __ __ __ m m d d y y y y
Test Requested:	**Source of Local Testing:**	**Result:**
☐ PCR	☐ Public Health Lab	☐ Positive
☐ Convalescent serology	☐ LRN	☐ Negative
☐ Acute serology	☐ Commercial lab	☐ Pending
☐ Culture	☐ other	☐ Indeterminate

Specimen 2

Specimen:	If 'Tissue,' specify:	Date Collected:
_____	_____	__ __ / __ __ / __ __ __ __ m m d d y y y y
Test Requested:	**Source of Local Testing:**	**Result:**
☐ PCR	☐ Public Health Lab	☐ Positive
☐ Convalescent serology	☐ LRN	☐ Negative
☐ Acute serology	☐ Commercial lab	☐ Pending
☐ Culture	☐ other	☐ Indeterminate

Specimen 3

Specimen:	If 'Tissue,' specify:	Date Collected:
_____	_____	__ __ / __ __ / __ __ __ __ m m d d y y y y
Test Requested:	**Source of Local Testing:**	**Result:**
☐ PCR	☐ Public Health Lab	☐ Positive
☐ Convalescent serology	☐ LRN	☐ Negative
☐ Acute serology	☐ Commercial lab	☐ Pending
☐ Culture	☐ other	☐ Indeterminate

Specimen 4

Specimen:	If 'Tissue,' specify:	Date Collected:
_____	_____	__ __ / __ __ / __ __ __ __ m m d d y y y y
Test Requested:	**Source of Local Testing:**	**Result:**
☐ PCR	☐ Public Health Lab	☐ Positive
☐ Convalescent serology	☐ LRN	☐ Negative
☐ Acute serology	☐ Commercial lab	☐ Pending
☐ Culture	☐ other	☐ Indeterminate

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Specimen 5		
Specimen: _____	If 'Tissue,' specify: _____	Date Collected: __ __ / __ __ / __ __ __ __ m m d d y y y y
Test Requested: □ PCR □ Convalescent serology □ Acute serology □ Culture	Source of Local Testing: □ Public Health Lab □ LRN □ Commercial lab □ other	Result: □ Positive □ Negative □ Pending □ Indeterminate
Specimen 6		
Specimen: _____	If 'Tissue,' specify: _____	Date Collected: __ __ / __ __ / __ __ __ __ m m d d y y y y
Test Requested: □ PCR □ Convalescent serology □ Acute serology □ Culture	Source of Local Testing: □ Public Health Lab □ LRN □ Commercial lab □ other	Result: □ Positive □ Negative □ Pending □ Indeterminate
Specimen 7		
Specimen: _____	If 'Tissue,' specify: _____	Date Collected: __ __ / __ __ / __ __ __ __ m m d d y y y y
Test Requested: □ PCR □ Convalescent serology □ Acute serology □ Culture	Source of Local Testing: □ Public Health Lab □ LRN □ Commercial lab □ other	Result: □ Positive □ Negative □ Pending □ Indeterminate
Specimen 8		
Specimen: _____	If 'Tissue,' specify: _____	Date Collected: __ __ / __ __ / __ __ __ __ m m d d y y y y
Test Requested: □ PCR □ Convalescent serology □ Acute serology □ Culture	Source of Local Testing: □ Public Health Lab □ LRN □ Commercial lab □ other	Result: □ Positive □ Negative □ Pending □ Indeterminate

13. Alternative Diagnosis	
Was an alternative respiratory pathogen detected?	□ Yes □ No □ Unknown
If yes indicate which one (see list below): _____	

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(continued from previous page)

Alternative pathogen (e.g., Influenza A, Influenza B, RSV, rhinovirus, adenovirus, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Mycoplasma*, *Chlamydia pneumoniae*, human parainfluenza virus 1, human parainfluenza 2, human parainfluenza 3, human metapneumovirus, *Legionella* sp., other.):

14. List specimens sent to the CDC

Chose from the following specimens to enter below:
Whole blood, plasma, serum (acute), serum (convalescent), NP swab, NP aspirate, broncheoalveolar lavage specimen, OP swab, tracheal aspirate, pleural tap, urine, stool, tissue.

Specimen 1: _____	If 'Tissue', Specify: _____	Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y)
Specimen 2: _____	If 'Tissue', Specify: _____	Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y)
Specimen 3: _____	If 'Tissue', Specify: _____	Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y)
Specimen 4: _____	If 'Tissue', Specify: _____	Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y)
Specimen 5: _____	If 'Tissue', Specify: _____	Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y)
Specimen 6: _____	If 'Tissue', Specify: _____	Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y)
Specimen 7: _____	If 'Tissue', Specify: _____	Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y)
Specimen 8: _____	If 'Tissue', Specify: _____	Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

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Notes

15. Notes:

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Note: List of areas with current confirmed or suspected SARS transmission

(If SARS-CoV transmission recurs, the list of foreign or domestic areas with documented or suspected recent local transmission of SARS-CoV will be listed here.)

Types of locations specified will vary (e.g., country, airport, city, building, floor of building). The last date a location may be a criterion for exposure for illness onset is 10 days (one incubation period) after removal of that location from CDC travel alert status. The patient's travel should have occurred on or before the last date the travel alert was in place. Transit through a foreign airport meets the epidemiologic criteria for possible exposure in a location for which a CDC travel advisory is in effect. Information regarding CDC travel alerts and advisories and assistance in determining appropriate dates are available at www.cdc.gov/ncidod/sars/travel.htm.

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Appendix B3
SARS Contact Report Forms

(Under development)

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Supplement C: Preparedness and Response in Healthcare Facilities

Summary of Changes in Version 2

The current version of Supplement C emphasizes that SARS preparedness and response planning in healthcare facilities should not occur in a vacuum but rather should build on existing preparedness activities and relationships with the public health community. Although healthcare facilities will likely play a key role in the follow-up of exposed patients and healthcare workers, it will be important to coordinate these activities with the local health department, especially for patients being discharged and for healthcare workers who live in the community. Supplement C now recommends that healthcare facilities work with health departments to coordinate this follow-up. Because activity restrictions for healthcare workers who have been exposed to SARS-CoV might depend on the level of SARS-CoV transmission in the community, Supplement C now recommends coordinating decisions on these restrictions with the health department, in accordance with the guidance in Supplement D.

The recommendations for surveillance in healthcare settings have been revised for consistency with the recommendations in Supplement B. The guidance clarifies that, in patients who have epidemiologic links to SARS-CoV, the presence of either fever or lower respiratory symptoms should prompt further evaluation. In addition, in accordance with the new SARS case definition, when persons have a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or lower respiratory symptoms, the presence of two or more other early symptoms of SARS-CoV disease.

The term niversal respiratory etiquette? has been changed to espiratory hygiene/cough etiquette.? Because patients with respiratory infections may not present with fever, the document clarifies that the recommended practices apply to all patients with symptoms of a respiratory infection.

The section on staffing emphasizes that healthcare workers will need logistical and emotional support to help them cope with the challenges of responding to a SARS outbreak.

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Contents

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Preparedness and Response in Healthcare Facilities

Goals

- Rapidly identify and isolate all potential SARS patients.
- Implement infection control practices and contact tracing to interrupt SARS-CoV transmission.
- Ensure rapid communication within healthcare facilities and between healthcare facilities and health departments.

Key concepts

- Rapid decision making and implementation of control strategies are essential to limiting the spread of SARS-CoV.
- Significant transmission of SARS-CoV occurs in hospitals and other healthcare settings.
- Healthcare workers, patients, and visitors can propagate and disseminate infection within and outside healthcare facilities.
- SARS-CoV transmission occurs primarily during unprotected exposures to unrecognized cases in both inpatient and outpatient settings.
- SARS-CoV transmission occurs primarily through large respiratory droplets and close-contact exposures (probably including fomites).
- SARS-CoV transmission may also occur through small-particle aerosols, especially during aerosol-generating procedures.
- Strict adherence to appropriate infection control practices, including use of personal protective equipment, is very effective in preventing transmission.

Priority activities

- Organize a planning committee to develop an institutional preparedness and response plan and a clear decision-making structure.
- Develop surveillance, screening, and evaluation strategies for various levels of SARS-CoV transmission.
- Develop plans to rapidly implement effective infection control measures and contact-tracing procedures.
- Determine the current availability of infrastructure and resources to care for SARS patients and strategies for meeting increasing demands.
- Develop strategies to meet staffing needs for SARS patient care and management.
- Develop strategies to communicate with staff, patients, the health department, and the public.
- Develop strategies to educate staff and patients about SARS and SARS control measures.

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I. Rationale and Goals

Transmission of SARS-CoV in healthcare facilities was a major factor in the spread of SARS during the 2003 global epidemic. In areas with extensive outbreaks, the virus spread most readily among hospital workers caring for SARS patients, other patients, and visitors. In Toronto, 77% of the patients in the first phase of the outbreak were infected in the hospital setting, and half of all SARS cases in Toronto were in healthcare workers (Booth 2003). Even in Hong Kong, where there was significant community transmission, 21% of all SARS cases occurred in healthcare workers (Ho 2003). Factors that likely contribute to the disproportionate rate of transmission in healthcare settings include: 1) a higher virus titer in respiratory secretions during the second week of illness when patients are likely to be hospitalized (Peiris 2003), 2) use of ventilators, nebulizers, endotracheal intubation, and other droplet- and aerosol-generating devices and procedures, and 3) frequent exposures of workers to patients, their secretions, and potentially contaminated environments (Varia 2003).

The large number of hospital personnel who contracted SARS-CoV disease demonstrates the importance of early detection, infection control, and contact tracing in limiting the spread of disease. In every region in which major outbreaks were reported, a substantial proportion of cases resulted from delays in clinical recognition and isolation of patients. SARS-CoV was also transmitted by infected visitors and by hospitalized patients with other medical conditions that masked the symptoms of SARS (Varia 2003). Case recognition and implementation of appropriate precautions greatly reduced the risks of SARS-CoV transmission. However, even with appropriate precautions, there were isolated reports of transmission to healthcare workers in the settings of aerosol-producing procedures and lapses in infection control technique (CDC 2003).

SARS-CoV transmission in a healthcare facility presents occupational and psychological challenges that, in the 2003 outbreaks, required heroic efforts to overcome. Experience also indicates, however, that early detection and isolation of cases, strict adherence to infection control precautions, and aggressive contact tracing and monitoring can minimize the impact of a SARS outbreak (Seto 2003). The success of these measures depends on exhaustive planning, clear communication, collaboration among disciplines, authoritative leadership, and provision of relevant support.

This Supplement provides recommendations for how to prepare for and respond to an introduction of SARS-CoV in a healthcare facility. It outlines basic response measures as well as the enhanced activities that may be needed to address larger outbreaks. **As preparedness and response activities for SARS are in many ways analogous to those required for other types of emergency and mass-casualty events, planning for SARS may only require integration of SARS-specific activities into existing preparedness plans and protocols**.

The goals of a preparedness and response plan in a healthcare facility are:

- Rapidly identify and isolate all potential SARS patients.
- Implement infection control practices and contract tracing to interrupt SARS-CoV transmission.
- Ensure rapid communication within healthcare facilities and between healthcare facilities and health departments.

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II. Lessons Learned

The following lessons from the global experience with SARS-CoV in healthcare settings have been considered in developing this document:

- Strict adherence to contact and droplet precautions, along with eye protection, seems to prevent SARS-CoV transmission in most instances. Airborne precautions may provide additional protection in some instances.
- Undetected cases of SARS-CoV disease in staff, patients, and visitors contribute to rapid spread of the virus.
- Optimal control efforts require continuous analysis of the dynamics of SARS-CoV transmission in the facility and the community.
- A response to SARS can strain the resources and capacity of a healthcare facility.
- The social and psychological impact of SARS can be substantial, both during and after an outbreak.
- The most effective systems for controlling a nosocomial outbreak are those that are developed and tested before an outbreak occurs.
- Communication needs can overwhelm and paralyze response capacity; good information management strategies are essential to an efficient and effective response.

III. Preparedness Planning for Healthcare Facilities

All U.S. healthcare facilities need to be prepared for the rapid pace and dynamic features of a SARS outbreak. All hospitals should be equipped and ready to care for a limited number of SARS patients as part of routine operations and also to care for a larger number of patients in the context of escalating transmission. Plans should outline the administrative, environmental, and communication measures and the individual work practices required to detect the introduction of SARS-CoV, prevent its spread, and manage the impact on the facility and the staff.

This document details planning issues that should be addressed in preparing for potential SARS outbreaks. It will be important for planning committees to consider the logistics of both basic and enhanced control measures. Section IV: Recommended Preparedness and Response Activities in Healthcare Facilities, below, details activities that should be discussed by a planning committee. The response matrices in Appendix C1 provide specific recommendations on implementing these measures.

Ideally, SARS planning will not occur in a vacuum but will build on existing preparedness and response plans for bioterrorism or other infectious disease emergencies and will be addressed by the same groups responsible for developing those plans.

Objective 1: Develop a planning and decision-making structure that ensures the capacity of the healthcare facility to detect and respond effectively to SARS.

Activities

- Designate an internal, multidisciplinary planning committee with responsibility for SARS preparedness and response. Select persons with decision-making authority and appropriate technical expertise, and include representatives from all potentially affected groups. An existing preparedness team with appropriate membership (e.g., bioterrorism response) could take on this role.
- Identify a local or state health department staff member who will serve as liaison for SARS preparedness planning and response. If possible, include this person on the planning committee.

Supplement C: Preparedness and Response in Healthcare Facilities
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- Identify a SARS coordinator to direct planning and response efforts and serve as the facility's point of contact for communication internally (i.e., in the facility and/or healthcare system) and externally (i.e., to public health agencies, other healthcare facilities, law enforcement agencies, media, and other partners).
- Consider including representatives from the following groups on the planning committee:
    - Administration/senior management (including fiscal officer)
    - Infection control/hospital epidemiology
    - Hospital disaster/emergency coordinator
    - Engineering/physical plant/industrial hygiene/institutional safety
    - Nursing administration
    - Medical staff (including outpatient areas)
    - Intensive-care unit
    - Emergency department
    - Laboratory services
    - Respiratory therapy
    - Environmental services (housekeeping, laundry)
    - Public relations
    - Security
    - Materials management
    - Education/training/staff development
    - Occupational health
    - Diagnostic imaging
- Consider including representatives from the following areas as adjunct members to provide additional expertise and support:
    - Infectious diseases
    - Mental health
    - Risk management
    - Labor and unions
    - Human resources
    - Pharmacy
    - Emergency medical technicians (irst responders?
    - Social work
    - Director of house staff/fellowship and other training programs
    - Pulmonary medicine
    - Pathology
    - Local law enforcement

Objective 2: Develop a written SARS preparedness and response plan.

Activities

- Develop a written plan that considers/accounts for each of the topics addressed in the box below and in Section IV: Components of Preparedness and Response in Healthcare Facilities.
- Ideally, the logistics of both basic and enhanced measures (see Core Document, III.B) should be discussed in advance of a SARS outbreak.
- Formulate written policies and work practices to ensure the prompt triage, identification, and management of possible SARS patients while minimizing the risk of transmission to other patients, personnel, and visitors.
- Devise a system for periodic review and updating of the plan as indicated.

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Objective 3: Assess the capacity of the facility to respond to SARS.

Activities

- Consider using simulations (□table top□or other exercises) to test the facility response capacities.
- Identify criteria and methods for measuring compliance with response measures (e.g., infection control practices, case reporting, patient placement, healthcare worker illness surveillance).
- Develop strategies to quickly correct deficiencies.

IV. Recommended Preparedness and Response Activities in Healthcare Facilities

Components of Preparedness and Response in Healthcare Facilities

- Surveillance and Triage
- Clinical Evaluation
- Infection Control and Respiratory Hygiene
- Patient Isolation and Cohorting
- Engineering and Environmental Controls
- Exposure Reporting and Evaluation
- Staffing Needs and Personnel Policies
- Hospital Access Controls
- Supplies and Equipment
- Communication and Reporting

A. Surveillance and Triage

As with any disease control effort, surveillance for cases of SARS-CoV disease is the basis for control. SARS case surveillance, including surveillance in healthcare facilities, is also discussed in Supplement B and in the SARS response matrices for healthcare facilities (Appendix C1). Some key surveillance activities specific to healthcare facilities are described below.

Objective 1: ***In the absence of SARS-CoV transmission worldwide***, establish surveillance aimed at early detection of cases and clusters of severe unexplained respiratory infections (i.e., pneumonia) that might signal the re-emergence of SARS-CoV.

Activities

- Participate in surveillance activities to detect new cases of SARS-CoV disease, in accordance with public health guidelines (See Supplement B).
- Consider SARS-CoV disease in patients who require hospitalization for radiographically confirmed pneumonia or acute respiratory distress syndrome of unknown etiology and who have one of the following risk factors in the 10 days before illness onset:

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  - Travel to mainland China, Hong Kong, or Taiwan,[1] or close contact[2] with an ill person with a history of recent travel to one of these areas, *OR*
  - Employment in an occupation associated with a risk for SARS-CoV exposure (e.g., healthcare worker with direct patient contact; worker in a laboratory that contains live SARS-CoV), *OR*
  - Part of a cluster of cases of atypical pneumonia without an alternative diagnosis
- Be alert for clusters of pneumonia among two or more healthcare workers who work in the same facility.
- Post visual alerts (in appropriate languages) at the entrances to all outpatient facilities (emergency departments, physicians□offices, clinics) instructing patients to inform healthcare personnel of lower respiratory symptoms when they first register for care and to practice espiratory hygiene/cough etiquette? precautions (detailed below).
- Ensure that clinicians know where and how to promptly report a potential SARS case to hospital and public health officials (See Supplement B).

Objective 2: In the *presence* of person-to-person SARS-CoV transmission anywhere in the world, establish surveillance to promptly identify and report all new U.S. cases of SARS-CoV disease in persons who present for evaluation at the facility.

Basic Activities

- Continue to implement case detection and reporting efforts as detailed above and in Supplement B.
- Develop a strategy and assign responsibility for regularly updating clinicians and intake and triage staff on the status of SARS-CoV transmission locally, nationally, and internationally.
- Train intake and triage staff on how to assess for SARS risks and to use any applicable screening tools.
- Educate clinical healthcare providers about the signs and symptoms of and current risk factors for SARS-CoV disease (e.g., locations where there is SARS-CoV transmission).
- Institute a strategy to identify, evaluate, and monitor the health of staff and patients who are potentially exposed to SARS-CoV.
- Determine the threshold at which screening of persons entering the facility will be initiated and at what point screening will escalate from passive (e.g., signs at the entrance) to active (e.g., direct questioning). Screening will likely need to be coordinated with access controls (see Section H: Access Controls). In addition to visual alerts, other potential screening measures include:
  - Priority triage of persons with lower respiratory symptoms
  - Triage stations outside the facility to screen patients before they enter
  - Telephone screening of patients with appointments
- Report cases that meet the screening criteria, in accordance with health department instructions.

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[1] The 2003 SARS-CoV outbreak likely originated in mainland China, and neighboring areas such as Taiwan and Hong Kong are thought to be at higher risk due to the large volume of travelers from mainland China. Although less likely, SARS-CoV may also reappear from other previously affected areas. Therefore, clinicians should obtain a complete travel history. If clinicians have concerns about the possibility of SARS-CoV disease in a patient with a history of travel to other previously affected areas (e.g., while traveling abroad, had close contact with another person with pneumonia of unknown etiology or spent time in a hospital in which patients with acute respiratory disease were treated), they should contact the health department.

[2] Close contact: A person who has cared for or lived with a person with SARS-CoV disease or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS-CoV disease. Examples of close contact include kissing or hugging, sharing eating or drinking utensils, talking within 3 feet, and direct touching. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

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Enhanced Activities

- Develop plans to actively screen all persons entering the facility.
- Determine at what point the facility will open a designated "SARS evaluation center" for evaluation of possible SARS patients, to separate potential SARS patients from other patients seeking care at the healthcare facility (see Section E: Engineering and Environmental Controls).

Objective 3: Conduct surveillance of healthcare workers caring for SARS patients.

Activities

- Healthcare workers caring for SARS patients are at increased risk for becoming infected with SARS-CoV and disseminating the virus to others. Use of personal protective equipment (PPE) will help to minimize this risk, but healthcare workers may not always be aware of minor breaches in PPE. Therefore, healthcare workers who are in close contact with SARS patients should undergo daily monitoring for symptoms suggestive of SARS-CoV disease. Because of their high risk of exposure to SARS-CoV, the clinical criteria for healthcare workers who are in close contact with SARS patients should be expanded to include, in addition to fever or lower respiratory symptoms, the presence of two or more of the other early symptoms of SARS-CoV disease (subjective fever, chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea).

B. Clinical Evaluation of Symptomatic Persons

To date, no specific clinical or laboratory findings can distinguish SARS-CoV disease from other respiratory illnesses reliably and rapidly enough to inform management decisions that must be made soon after a patient presents to the healthcare system. Therefore, *early clinical recognition of SARS-CoV disease still relies on a combination of clinical and epidemiologic features*. Although exposure history is a main factor in the diagnosis, many SARS patients do share some suggestive clinical characteristics. These include: presence of fever and other systemic symptoms 2 to 7 days before onset of a dry cough and dyspnea, infrequent presence of upper respiratory tract symptoms, presence of radiographic evidence of pneumonia in most patients by day 7 to 10 of illness, and lymphopenia.

The clinical set point for considering SARS-CoV disease will vary by likelihood and level of risk of exposure. Potential sources of exposure will vary by the status of SARS-CoV transmission locally, nationally, and globally. Potential SARS patients need to be evaluated and managed in a way that protects healthcare workers, other patients, and visitors.

Objective 1: Ensure that potential SARS patients are evaluated using safe work practices.

Activities

- Assign only trained and respirator fit-tested emergency staff to evaluate possible SARS patients.
- Instruct staff to wear appropriate PPE (see Supplement I).

Objective 2: In the *absence* of SARS-CoV transmission worldwide, perform a routine evaluation of patients with respiratory illnesses and maintain a low index of suspicion for SARS-CoV disease.

In the absence of person-to-person SARS-CoV transmission anywhere in the world, the overall likelihood that a patient with fever or respiratory illness has SARS-CoV disease will be exceedingly

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low unless there are both typical clinical findings and some accompanying epidemiologic evidence that raises the suspicion of exposure to SARS-CoV. Therefore, the diagnosis should be considered only in patients who require hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology and who have an epidemiologic history that raises the suspicion for SARS-CoV disease.

Activities

- Evaluate patients requiring hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology according to the algorithm (Figure 1) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm).

- In the absence of SARS-CoV transmission worldwide, evaluation and management for possible SARS-CoV disease should be considered only for adults, unless special circumstances make the clinician and health department consider a child to be at potentially higher risk.

Objective 3: ***In the presence of person-to-person SARS-CoV transmission worldwide,*** increase the index of suspicion as appropriate based on the patient symptoms and epidemiologic risk factors.

Activities

- Once person-to-person SARS-CoV transmission has been documented anywhere in the world, a diagnosis of SARS-CoV disease should still be considered in patients who require hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology and who have an epidemiologic history that raises the suspicion for exposure to SARS-CoV (see above).

- In addition, all patients with fever or lower respiratory symptoms should be questioned about recent close contact with persons suspected to have SARS-CoV disease and about exposure to locations in which recent SARS-CoV transmission is known or suspected to have occurred. Persons with such an exposure history should be evaluated according to the algorithm (Figure 2) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm).

- For persons with a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or lower respiratory symptoms, the presence of other early symptoms of SARS-CoV disease (subjective fever, chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea). The more common early symptoms include chills, rigors, myalgia, and headache. In some patients, myalgia and headache may precede the onset of fever by 12-24 hours. However, diarrhea, sore throat, and rhinorrhea may also be early symptoms of SARS-CoV disease.

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- Establish procedures for managing symptomatic healthcare workers. Healthcare workers who have cared for or been exposed to a SARS patient and who develop symptoms(s) within 10 days after exposure or patient care should immediately:
  - Contact infection control, occupational health, or a designee in each facility where they work, and
  - Report to the predetermined location for clinical evaluation.

- Manage symptomatic healthcare workers according to the algorithm (Figure 2) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). Decisions on return to work should be guided by policies or regulations defined by the facility and/or health department.

- Typical symptoms of SARS-CoV disease may not always be present in elderly patients and those with underlying chronic illnesses. Therefore, the diagnosis should be considered for almost any change in health status when such patients have strong risk factors.

- Once SARS-CoV transmission has been documented, the evaluation algorithm established for adults can be used in children with the following caveats:
  - Both the rate of development of radiographically confirmed pneumonia and the timing of development of such radiographic changes in children are unknown.
  - The positive predictive value of rapid virus antigen detection tests (e.g., RSV) n season□ will be higher in a pediatric population.
  - Pneumococcal and legionella urinary antigen testing are not recommended for routine diagnostic use in children.

C. Infection Control and Respiratory Hygiene/Cough Etiquette

Objective 1: Reinforce basic infection control practices in the healthcare facility.

SARS highlights the risks of nosocomial transmission of respiratory pathogens and provides an opportunity to improve overall infection control in healthcare facilities. During the 2003 epidemic, public health authorities quickly recognized infection control as a primary means for containing SARS-CoV. All healthcare facilities need to re-emphasize the importance of basic infection control measures for the control of SARS-CoV transmission.

Activities

- Educate staff about the importance of strict adherence to and proper use of standard infection control measures, especially hand hygiene and isolation (see Supplement I).
- Reinforce education on the recommended procedures for Standard, Contact, and Airborne Infection Isolation precautions (www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm and Supplement I).
- Ensure that healthcare workers have access to respirator fit-testing and instructions on respirator use.
- Determine how infection control training and education will be provided for all hospital personnel and visitors who may be exposed to SARS-CoV.
- Develop posters and instructional materials designed to: 1) teach appropriate hand hygiene and Standard Precautions, 2) teach the correct sequence and methods for donning and removing PPE, 3) instruct on actions to take after an exposure, 4) instruct visitors and patients with symptoms and SARS risk factors to report to a specified screening and evaluation site.

Supplement C: Preparedness and Response in Healthcare Facilities
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Objective 2: Emphasize the importance of respiratory hygiene/cough etiquette practices to help decrease transmission of respiratory infections.

Many viral and some bacterial respiratory pathogens (e.g., influenza, adenovirus, respiratory syncitial virus, *Mycoplasma pneumoniae*) share transmission characteristics with SARS-CoV and are also frequently transmitted in healthcare settings. Implementation of "respiratory hygiene/cough etiquette" practices can decrease the risk of transmission from unrecognized SARS patients and also control the spread of other, more common respiratory pathogens.

Activities

- Educate patients about the importance of respiratory hygiene/cough etiquette practices for preventing the spread of respiratory illnesses.
- Consider initiating a standard "respiratory hygiene/cough etiquette strategy" for the facility as described in the box below.

Respiratory Hygiene/Cough Etiquette Strategy for Healthcare Facilities

Respiratory hygiene/cough etiquette

To contain respiratory secretions, all persons with signs and symptoms of a respiratory infection, regardless of presumed cause, should be instructed to:

- Cover the nose/mouth when coughing or sneezing.
- Use tissues to contain respiratory secretions.
- Dispose of tissues in the nearest waste receptacle after use.
- Perform hand hygiene after contact with respiratory secretions and contaminated objects/materials.

Healthcare facilities should ensure the availability of materials for adhering to respiratory hygiene/cough etiquette in waiting areas for patients and visitors:

- Provide tissues and no-touch receptacles for used tissue disposal
- Provide conveniently located dispensers of alcohol-based hand rub
- Provide soap and disposable towels for hand washing where sinks are available

Masking and separation of persons with symptoms of respiratory infection

During periods of increased respiratory infection in the community, offer masks to persons who are coughing. Either procedure masks (i.e., with ear loops) or surgical masks (i.e., with ties) may be used to contain respiratory secretions; respirators are not necessary. Encourage coughing persons to sit at least 3 feet away from others in common waiting areas. Some facilities may wish to institute this recommendation year-round.

Droplet precautions

Healthcare workers should practice Droplet Precautions (i.e., wear a surgical or procedure mask for close contact), in addition to Standard Precautions, when examining a patient with symptoms of a respiratory infection. Droplet Precautions should be maintained until it is determined that they are no longer needed (www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm).

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D. Patient Placement, Isolation, and Cohorting

Appropriate patient placement is a significant component of effective SARS control. Each healthcare facility should develop a strategy and procedures to: 1) quickly separate potential SARS patients from other patients, and 2) implement appropriate isolation precautions.

Objective 1: Develop strategies for triage and admission that minimize the risk of transmission to staff, patients, and visitors.

Activities

- Determine where and how possible SARS patients will be triaged, evaluated, diagnosed, and isolated.
- Admit patients only when medically indicated or if appropriate isolation in the community is not possible.
- If a patient with SARS symptoms and risk factors does not meet the criteria for admission and is to be sent home, discuss the case with the health department to ensure adequate home isolation and follow-up (See Supplement D).
- Review admission procedures, and determine how they can be streamlined to limit the number of patient encounters for healthcare personnel.
- Determine a method for tracking and monitoring all SARS patients in the facility.

Objective 2: Develop a patient transport plan to safely move SARS patients within the facility.

Activities

- Identify appropriate paths, separated from main traffic routes as much as possible, for entry and movement of SARS patients in the facility, and determine how these pathways will be controlled (e.g., dedicated SARS patient corridors, elevators).
- Optimize necessary patient transport (see Supplement I).

Objective 3: Ensure optimal strategies for isolation of possible SARS patients in the healthcare facility.

Although most SARS-CoV transmission appears to occur through droplet and contact exposures, transmission by fomites and by the airborne route remain possibilities. Therefore, patients who require hospitalization should be admitted to an Airborne Infection Isolation room (AIIR) or specially adapted SARS unit or ward where they can be managed safely. In some settings, a lack of AIIRs and/or a need to concentrate infection control efforts and resources within the facility may lead to a strategy of cohorting patients in individual rooms on the same floor, rather than placing them in AIIRs throughout the hospital. This strategy physically isolates SARS patients from non-SARS patients and also makes it possible to dedicate resources and appropriately trained staff to their care. Experience in some settings in Taiwan and Toronto demonstrated that cohorting SARS patients, without use of AIIRs, effectively interrupted transmission. Thus, although single AIIRs are recommended for SARS isolation, other strategies may provide effective overall infection control.

Supplement C: Preparedness and Response in Healthcare Facilities

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Basic Activities

- As possible, admit patients with possible SARS-CoV disease to an AIIR (See Supplement I). An AIIR is a single-patient room in which environmental factors are controlled to minimize the possibility of airborne transmission of infectious agents. These rooms have specific requirements for controlled ventilation, negative pressure, and air filtration and monitoring, which are detailed in the *Guideline for Environmental Infection Control in Health-Care Facilities, 2003* (www.cdc.gov/ncidod/hip/enviro/guide.htm).

- If there is a lack of AIIRs and/or a need to concentrate infection control resources, or if AIIRs are available only in locations housing immunosuppressed patients (e.g., bone marrow transplant wards), patients may be cohorted in single rooms on nursing units that have been modified to accommodate SARS patients (see Section E: Engineering and Environmental Controls, and Supplement I).

- Even if a facility has chosen to cohort SARS patients, AIIRs are preferred for: 1) patients who are known to have transmitted SARS-CoV to other persons and 2) patients in whom the risk of SARS is being assessed (to avoid putting non-SARS-CoV-infected patients on a SARS unit).

- Determine where SARS patients will have various procedures (e.g., collection of respiratory specimens) performed. Whenever possible, perform procedures/tests in the patient room (see Supplement I).

Enhanced Activities

- Determine at what point the facility will designate a special SARS nursing unit, and determine how that unit would be modified to accommodate SARS patients (see Section E: Engineering and Environmental Controls).

- In the context of significant SARS-CoV transmission in the facility, high patient volume, or frequent unprotected exposures, devise and implement a plan for cohorting patients and healthcare workers. Patients might be divided into the following cohorts: 1) patients who are exposed and asymptomatic; 2) patients who are exposed and symptomatic but do not meet the SARS case definition; 3) patients who meet the case definition; 4) non-exposed patients.

- Consider the need/practicality of a designated SARS hospital. In some areas during the 2003 outbreak, a logical expansion of a SARS unit was designation of certain facilities as SARS hospitals. This decision facilitated cohorting of staff and focused resources on one or a few hospitals. As shown by the experience in Toronto and Taiwan, however, designation of SARS hospitals is a difficult policy to implement. Hospitals that were not seriously affected did not want to become the repository of all SARS cases for fear of liability, negative public relations and financial impact. Even where this policy was successful, patients with SARS still presented to other facilities. Thus, all hospitals still needed to be vigilant for SARS and able to handle the initial triage, stabilization, and transfer of patients. The decision to create a SARS hospital requires the involvement of hospital leadership, health departments, and other community officials. The ultimate decision-making authority may vary by jurisdiction. The decision must also take into account the availability of specialty services, both at the designated facility and at other facilities in the area.

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E. Engineering and Environmental Controls

Optimal functioning and maintenance of the facility's environment are important components of SARS control.

Objective 1: Ensure that the capacity of rooms and units that will be used to house SARS patients is adequate for isolation and infection control.

Activities

- Determine the current capacity for isolating SARS patients in ICU and non-ICU settings.
- Ensure that AIIRs are functioning properly and are maintained in accordance with current recommendations (www.cdc.gov/ncidod/hip/enviro/guide.htm).
- Determine how non-AIIR rooms designated for SARS patient care might be modified to achieve appropriate airflow direction and/or air exchanges.
- Determine the best location in the hospital for a SARS unit in which patients and the staff caring for them can be cohorted. Determine how to modify existing rooms/units/floors as needed to meet the engineering requirements for a SARS unit. Ideally this location would have the following characteristics:
  - An air-handling system that allows the unit to be made negative pressure to surrounding areas and allows for a pressure gradient with air flow from the leanest□(nurses?station) to the east clean? (patient room) area.
  - Rooms that can be converted to negative pressure in relation to the hallway
- Identify a designated space for a SARS evaluation center, which may be a temporary structure or make use of existing structures. The purpose is to separate potential SARS patients from other patients seeking care at the healthcare facility during triage and initial evaluation.
  - Determine needed ventilation, imaging, laboratory, and restroom facilities, water supply, etc., for the evaluation center.
  - Determine appropriate traffic routes and modes of transport for patients who must be transported from the evaluation center to the healthcare facility.
- Designate an environmental/housekeeping specialist to verify that cleaning and disinfection methods and staff are appropriately prepared to provide SARS patient care at the facility (see Supplement I).

F. Exposure Reporting and Evaluation

Unrecognized patients were a significant source of transmission during the 2003 SARS outbreak. Thus, rapid reporting and evaluation of persons exposed to SARS-CoV will be an important measure in early identification and isolation. Although healthcare facilities may play an active role in the follow-up of exposed patients and healthcare workers, it will be important for such follow-up to be coordinated with the health department.

Objective 1: Ensure that staff members understand the risks of SARS-CoV exposure, the importance of reporting exposures and illness, and the procedures for reporting exposures and illness.

Activities

- Establish an exposure reporting process that includes various methods for identifying exposed personnel (e.g., self-reporting by employees, logs of personnel entering SARS patient rooms).

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Include a mechanism for sharing information with the health department on exposed patients who are being discharged and also on exposed healthcare workers.

- Establish procedures for managing unprotected high-risk exposures. These occur when a healthcare worker is in a room with a SARS patient during a high-risk aerosol-generating procedure or event and the recommended infection control precautions are either absent or breached. If a healthcare worker has an unprotected high-risk exposure but has no symptoms of SARS-CoV disease, the worker:
  - Should be excluded from duty (e.g., administrative leave) for 10 days after the date of the last high-risk exposure.
  - Should be actively monitored for the development of symptoms for 10 days after the date of the last high-risk exposure. Because a healthcare worker with an unprotected high-risk exposure has been exposed to a known SARS patient, the worker should be monitored not only for fever or lower respiratory symptoms but also for the presence of the other early symptoms of SARS-CoV disease (subjective fever, chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea).

  Decisions regarding activity restrictions (e.g., quarantine, home/work restrictions) outside the facility should be discussed with the health department, in accordance with the recommendations in Supplement D.

- Establish procedures for managing **unprotected exposures that are not high risk**. These occur when a healthcare worker is in a room or patient-care area with a SARS patient (not during a high-risk procedure) and the recommended infection control precautions are either absent or breached. If a healthcare worker has an unprotected, non-high-risk exposure and has **no symptoms of SARS**, the healthcare worker:
  - Need not be excluded from duty.
  - Should be actively monitored for the development of fever or respiratory symptoms for 10 days after the date of the last exposure. Because a healthcare worker with an unprotected, non-high-risk exposure has been exposed to a known SARS patient, the worker should be monitored not only for fever or lower respiratory symptoms but also for the presence of the other early symptoms of SARS-CoV disease (subjective fever, chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea).

  Decisions regarding activity restrictions (e.g., quarantine, home/work restrictions) outside the facility should be discussed with the health department in accordance with the recommendations in Supplement D.

- Healthcare workers who develop symptoms during the follow-up period should:
  - Contact infection control, occupational health, or a designee in each facility where they work and
  - Be evaluated in accordance with the SARS clinical algorithm (www.cdc.gov/ncidod/sars/clinicalguidance.htm).

G. Staffing Needs and Personnel Policies

A SARS outbreak challenges a healthcare facility ability to meet staffing, organizational, and resource needs. During an outbreak of any size, existing staffing shortages may be amplified by illness among staff members, fear and concern about SARS, and isolation and quarantine of exposed staff or ill/exposed family members. Staffing shortages are also likely to escalate as an outbreak progresses.

Supplement C: Preparedness and Response in Healthcare Facilities
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During the preparedness period, it is important to plan for how staffing services might be provided, as some strategies might require changes in policy or even in legislation. To address staffing shortages, healthcare workers may need to be relocated to different settings or modify the type of services they usually provide. The strain involved in the prolonged use of PPE may intensify staffing challenges. Healthcare personnel will need special training in the details of SARS preparedness planning, infection control, crisis management, exposure management, and skills required for a mass-casualty response. Non-healthcare workers, retired healthcare workers, and volunteers may be potential resources. However, use of alternative staffing resources will require training and support.

Experience from other countries has shown that healthcare workers are likely to experience significant physical and emotional stress both during and after an outbreak of SARS. These issues must also be addressed.

Objective 1: Develop strategies to meet the range of staffing needs that might be required to manage a SARS outbreak.

Activities

- Determine the minimum number and categories of personnel needed to care for a single patient or small group of patients on a given day. Given the high burden of wearing SARS PPE (especially prolonged respirator wear), staffing may need to be increased to allow PPE-free time.
- Determine whether a small group of staff, including ancillary staff (perhaps divided into multiple teams), could be assigned responsibility for providing initial care for SARS patients. These staff members would be well trained in infection control practices, would be respirator fit-tested in advance (preferably to multiple manufacturers□models), and would serve as a resource to other staff when additional patients are admitted. Examples of such teams include:
  - Initial care team of medical, nursing, housekeeping, and ancillary staff
  - Emergency response team to provide resuscitation, intubation, and emergency care to possible or known SARS patients using appropriate PPE (see Supplement I for PPE recommendations for respiratory procedures)
  - Respiratory procedures team (e.g., bronchoscopy, sputum induction) using appropriate PPE (see Supplement I for PPE recommendations for respiratory procedures)
- For teaching hospitals, determine what role, if any, students and other trainees (e.g., residents, fellows) will play in the care of SARS patients.
- Determine how staffing needs will be met as the number of SARS patients increases and/or staff become ill or are quarantined.

Objective 2: Ensure that infection control staffing is adequate.

Activities

- Ensure the availability of a sufficient number of infection control practitioners (ICPs) to allow for daily monitoring and assessment of all SARS patient-care areas. ICPs should continue not only to implement appropriate infection control measures but also to stop practices that are ineffective. Designees who can help ICPs during outbreaks should be identified.
- When patients are isolated, designate staff members to formally monitor and reinforce compliance with PPE measures.

Objective 3: Develop personnel policies for exposure management, work restrictions, and compliance.

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Activities

- Inform healthcare workers that they are expected to comply with all infection control and public health recommendations. Alert them that recommendations may change as an outbreak progresses.
- Develop criteria for work restrictions for healthcare workers.
- Develop systems for follow-up of healthcare workers after unprotected exposures to SARS patients.
- Instruct healthcare workers to notify each facility at which they work if any of those facilities is providing care to SARS patients.
- If quarantine is used as an exposure-management tool, some healthcare workers may be placed on orking quarantine? to ensure sufficient staffing levels. Healthcare workers on working quarantine should travel only between home and the healthcare facility for the duration of the restriction. Limitations on alternative employment will be needed.

Objective 4: Provide needed assistance and resources to help healthcare workers cope with the stresses of responding to a SARS outbreak.

Activities

- Arrange to provide assistance to healthcare workers on work quarantine with activities of daily life, including obtaining food, running errands, and providing child care.
- Arrange to provide healthcare workers with access to mental health professionals as needed to cope with the stresses of an outbreak.

H. Access Controls

When SARS-CoV is present in the community surrounding a healthcare facility, preventing unrecognized SARS patients from entering the facility will be essential. Appropriate surveillance and screening measures are detailed in the surveillance section of this document and in Supplement B. Restricting access to the facility will increase the efficacy of surveillance and screening measures.

Objective: Develop criteria and plans for limiting access to the healthcare facility.

Activities

- Establish criteria and protocols for limiting admissions, transfers, and discharges in accordance with local/state recommendations and regulations in the event that nosocomial transmission of SARS-CoV occurs in the healthcare facility.
- Establish criteria and protocols for closing the facility to new admissions and transfers if necessary.
- Establish criteria and protocols for limiting visitors.
- Determine when and how to involve security services to enforce access controls.
- Consider meeting with local law enforcement officials in advance to determine what assistance they might be able to provide.

I. Supplies and Equipment

SARS patient care requires both consumable (e.g., PPE) and durable (e.g., ventilators) supplies. Experience in other countries indicates that a SARS outbreak not only can strain a facility's supply of these resources but also can affect the ability to order replacement supplies.

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Objective 1: Determine the current availability of and anticipated need for supplies and equipment that would be used in a SARS outbreak.

Basic Activity

- Assess anticipated needs for consumable and durable resources that will be required to provide care for various numbers of SARS patients, and determine at what point extra resources will be ordered.

  Consumable resources include:
  - Hand hygiene supplies (antimicrobial soap and alcohol-based waterless hand hygiene products)
  - Disposable particulate respirators (N-95 or higher level)
  - Personal air-purifying respirator (PAPR) hoods and power packs (if applicable)
  - Goggles and face shields (disposable or reusable)
  - Gowns
  - Gloves
  - Surgical masks

  Durable resources include:
  - Ventilators
  - Portable HEPA filtration units
  - Portable x-ray units

Enhanced activity

- Establish back-up plans in the event of limited supplies.

J. Communication and Reporting

A SARS outbreak will generate a need for rapid analysis of the status of patients and transmission in the healthcare facility and reporting of this information to public health officials and to the public, press, and political leaders. These needs can overwhelm resources that are essential to other response activities.

Objective 1: Communicate regularly with the health department about SARS-related activities.

Activities

- Establish a mechanism for regular contact with the local health department to report SARS activity in the facility and receive information on SARS activity in the community.
- Establish a reporting process to review discharge planning of SARS patients and information on exposed patients and healthcare workers with health department officials to ensure appropriate follow-up and case management in the community.
- Discuss jurisdictional and procedural issues for the investigation of nosocomial SARS outbreaks.

Objective 2: Communicate with facility staff and the public.

Activities

- Determine how to provide daily updates to the infection control staff and the hospital administration regarding SARS activity in the facility and the community.

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- Determine the preferred flow and release of information related to SARS patient care or transmission in the facility. Public relations/media staff should work with the SARS coordinator or designee to ensure clarity and accuracy. Prepare plans for: 1) internal notification and communication with patients and healthcare workers, 2) external communication with the media and the public, coordinated with local public health officials, and 3) development of templates for frequently asked questions, notifications, press releases, and other communication tools.
- Determine whether and how the facility will establish a SARS hotline for public inquiries, if needed.

V. Community Healthcare Delivery Issues

A SARS outbreak may generate issues that exceed the scope of a particular healthcare facility and must be addressed at the community level, with representation from healthcare systems, public health, and industry. Some of these issues include:

Facilities
- Designation of certain hospitals to be the primary providers of SARS patient care
- Designation, development, and staffing of community SARS evaluation centers
- Construction and certification of new AIIRs
- Criteria/procedures for and impact of closure of facilities
- Establishment of alternative "overflow" facilities

Personnel
- Protection and training of first responders
- Personnel surge capacity for heavily affected hospitals
- Coordination of volunteer efforts
- Assistance to healthcare workers in quarantine or on home/work restrictions
- Communication with and coordination of contract staff and independent physician groups

Supplies
- Implications (e.g., fit-testing) of an emergency change in respirator type during an outbreak
- Adequacy of supplies of PPE and other equipment and materials
- Coordination of donated items

Finance
- Requisition and distribution of emergency funds to assist with construction and modifications of facilities to care for SARS patients, overtime payment for healthcare and other personnel, costs of healthcare worker furloughs, lost revenues, and other expenses

Legal/regulatory
- Regulations to ensure that no facility can refuse to care for patients with SARS
- Certification of new AIIRs
- Liability issues related to healthcare workers in jobs for which they are not specifically trained

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Appendix C1
Matrices for SARS Response in Healthcare Facilities

Framework for Contingency Planning

SARS-CoV transmission risks in healthcare facilities depend not only on the extent of SARS activity in the community and world but also on the level of SARS activity in the facility. Recommended strategies for SARS response are therefore based on the following framework, which provides options for escalating or otherwise modifying control measures based on facility-specific categories of SARS activity and transmission risks.

Categories of SARS Activity and Transmission Risk in a Healthcare Facility

No cases of SARS in the facility ? Healthcare facilities in this category are those in which:
- No potential or known SARS patients are being cared for as inpatients or outpatients, AND
- No known transmission of SARS-CoV to patients, visitors, or healthcare workers has occurred.

A few cases in the facility, but all cases are imported (NO nosocomial transmission) ? Facilities in this category are those that are providing care to a limited number of potential or known SARS cases as inpatients or outpatients (e.g., in the emergency department) but in which no recognized SARS-CoV transmission to other patients, visitors, or healthcare workers has occurred.

A larger number of SARS cases in the facility OR nosocomial transmission with all cases linked to a clearly identified source □Facilities in this category include those with an elevated risk of transmission due to:
- A large number of SARS patients,
- A significant number of unprotected exposures among patients, visitors, or healthcare workers, OR
- Transmission to other patients or to healthcare workers under circumstances in which the exposures are clearly understood and control measures are in place to prevent further spread.

Cases attributed to nosocomial transmission with NO clearly identified source ? Facilities in this category include those with nosocomial transmission of SARS-CoV in which the presence of unlinked cases (i.e., cases in which the exposure risk cannot be clearly identified) makes it difficult to determine which patients and visitors may have been exposed; therefore, all new-onset febrile illnesses in patients and staff may represent SARS-CoV disease.

Matrices for SARS Response in Healthcare Facilities

The matrices on the following pages summarize suggested SARS control measures in healthcare facilities.

- For the **inpatient and emergency department settings** (Matrix 1), control measures depend on both the level of SARS activity in the facility and in the community. If SARS patients are seen in the facility's emergency department but no SARS patients are admitted to the facility, the **emergency department** may require more extensive control measures than the inpatient areas.
- In the **outpatient and long-term care settings** (Matrix 2 and Matrix 3), control measures depend on the level of SARS activity in the community.

These matrices are intended to provide guidance on potential control measures. Facilities will need flexibility in implementing control measures because requirements will likely change as an outbreak progresses and more information becomes available.

Supplement C: Preparedness and Response in Healthcare Facilities
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Matrix 1: Recommendations for Inpatient Facilities and Emergency Departments

Level of SARS activity	Suggested actions
No cases of SARS in the facility	1) Triage activities/facility access controls • Notify the SARS coordinator or designee of any transfers from facilities that have SARS cases. • In accordance with recommendations for respiratory hygiene/cough etiquette, instruct all patients with respiratory illnesses to perform hand hygiene and cover the nose/mouth when coughing or sneezing. Manage these patients with Droplet Precautions until determined that they are not needed. • **In the presence of person-to person SARS-CoV transmission in the world but no known transmission in the area around the facility**: o Place signs at all entry points detailing symptoms of and current epidemiologic risk factors for SARS and directing persons meeting these criteria to an appropriate area for evaluation. o Initiate screening of patients on entry to the emergency department for symptoms and epidemiologic links suggesting SARS. Patients with fever or lower respiratory symptoms ***and*** SARS risk factors should perform hand hygiene, wear a surgical mask (if possible), and be isolated in accordance with the recommendations in Supplement I. If airborne isolation is not possible, consider cohorting, with all patients wearing surgical masks. Evaluate patients according to the algorithm (Figure 2) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). o If a patient risk of exposure to SARS-CoV is high (e.g., close contact with a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include other early symptoms of SARS-CoV disease. • **In the presence of SARS-CoV transmission in the area around the facility**: o All persons should perform hand hygiene on entry. o Actively screen all persons entering the facility for fever and lower respiratory symptoms. All patients presenting with fever or lower respiratory symptoms should perform hand hygiene, wear a surgical mask (if possible), and be isolated for SARS in accordance with the recommendations in Supplement I. If airborne isolation is not possible, consider cohorting, with all patients wearing surgical masks. Evaluate patients according to the algorithm (Figure 2) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). o If a patient risk of exposure to SARS-CoV is high (e.g., close contact with a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include other early symptoms of SARS-CoV disease. o Intake/triage staff should follow SARS infection control and PPE guidance, as specified in Supplement I. o Limit visitors (e.g., one per patient per day). o Screen all visitors for SARS risk factors and symptoms. o Limit elective admissions and procedures. o Consider designating an area as a ARS evaluation center? and sending all patients presenting with fever or respiratory symptoms to the center for evaluation.

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(continued from previous page)

Matrix 1: Recommendations for Inpatient Facilities and Emergency Departments (continued)

Level of SARS activity	Suggested actions
No cases of SARS in the facility (continued)	2) Patient placement • **In the presence of person-to-person SARS-CoV transmission in the world but NO known transmission in the area around the facility:** o Patients presenting with fever or lower respiratory symptoms ***and*** epidemiologic risk factors for SARS should perform hand hygiene, wear a surgical mask (if possible), and be isolated for SARS in accordance with the recommendations in Supplement I. If airborne precautions are not possible, consider cohorting, with all patients wearing surgical masks. Evaluate patients according to the algorithm (Figure 2) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). o If a patient risk of exposure is high (e.g., close contact with a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or lower respiratory symptoms, the other early symptoms of SARS-CoV disease. • **In the presence of person-to-person SARS-CoV transmission in the world but NO known transmission in the area around the facility:** o Patients presenting with fever or lower respiratory symptoms should perform hand hygiene, wear a surgical mask (if possible), and be isolated in accordance with the recommendations in Supplement I. If airborne isolation is not possible, consider cohorting, with all patients wearing surgical masks. Evaluate patients according to the algorithm (Figure 2) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). o If a patient risk of exposure is high (e.g., close contact with a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or lower respiratory symptoms, the other early symptoms of SARS-CoV disease. 3) Designated personnel • Assign only selected, trained, and fit-tested emergency department staff to evaluate possible SARS cases. Staff should follow SARS infection control and PPE guidance, as specified in Supplement I. 4) Surveillance • Depending on directives from local/state health departments, consider reporting of patients requiring hospitalization for unexplained pneumonia who have risk factors for SARS, as specified in Supplement B. 5) Healthcare worker restrictions • Healthcare workers should notify the SARS coordinator at each facility where they work and have at least daily symptom checks if: o They are caring for a SARS patient in another facility. o They are also working in another facility that has reported nosocomial SARS-CoV transmission. o They have close contact with SARS patients outside the hospital.

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Matrix 1: Recommendations for Inpatient Facilities and Emergency Departments (continued)

Level of SARS activity	Suggested actions
A few cases in the facility, but all cases are imported (NO nosocomial transmission)	1) Triage activities/facility access controls • Same as for o cases of SARS in the facility.☐ Add: • No visitors to SARS patients unless necessary (e.g., parents, translators); visitors must receive infection control training. • Designate specific SARS patient-flow routes (e.g., emergency department to designated elevator to AIIR; AIIR to radiology). • Clean rooms housing SARS patients in accordance with current recommendations (see Supplement I). 2) Patient placement • Same as for o cases of SARS in the facility.☐ Add: • Place admitted known or potential SARS patients in AIIRs if available. • Consider cohorting admitted patients in private rooms on designated SARS units, depending on personnel and availability of AIIRs. Modify designated floors/rooms as possible. 3) Designated personnel • Same as for o cases of SARS in the facility.☐ Add: • Assign only selected, trained, and fit-tested staff to SARS patient care (includes designated ancillary personnel). • Assign a selected, trained, and fit-tested team with access to appropriate respiratory protection (see Supplement I) for emergency resuscitation or respiratory procedures in known or potential SARS patients. 4) Surveillance • Conduct active surveillance targeted to healthcare workers providing care to SARS patients (e.g., symptom monitoring). 5) Healthcare worker restrictions • Same as for o cases of SARS in the facility.☐ Add: • No eating or drinking in SARS patient-care areas. • Furlough healthcare workers with unprotected exposures to SARS patients during high-risk procedures, and institute checks to evaluate possible symptoms. • Healthcare workers with other (non-high-risk) unprotected exposures to a SARS patient should undergo checks for possible symptoms. Furlough of these workers could be considered.

Supplement C: Preparedness and Response in Healthcare Facilities
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Matrix 1: Recommendations for Inpatient Facilities and Emergency Departments (continued)

Level of SARS activity	Suggested actions
A larger number of SARS cases in the facility OR nosocomial transmission with all cases linked to a clearly identified source	1) Triage activities/access controls • Same as for few cases in the facility but all cases are imported." Add: • Regardless of the level of SARS activity in the community around the facility: o Limit visitors (e.g., one per patient per day). o Maintain a log of all visitors to SARS patients to aid in contact tracing. o Limit elective admissions/procedures. o All healthcare workers and visitors should have a fever check and perform hand hygiene on entry. 2) Patient placement • Same as for "A few cases in the facility but all cases are imported." Add: 3) Designated personnel • Same as for few cases in the facility but all cases are imported.☐ 4) Surveillance • Implement active healthcare worker surveillance (symptom monitoring) throughout the facility. • Monitor all healthcare worker absenteeism and illnesses (e.g., through the occupational medicine clinic); evaluate for links to known SARS cases. • Monitor for and evaluate all new fevers and lower respiratory illnesses among patients. Place any patient with unexplained fever or lower respiratory symptoms on SARS precautions, and evaluate in accordance with the algorithm (Figure 2) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). • If a patient risk of exposure is high (e.g., close contact with a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or lower respiratory symptoms, the other early symptoms of SARS-CoV disease. 5) Healthcare worker restrictions • Same as for few cases in the facility but all cases are imported.☐

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Matrix 1: Recommendations for Inpatient Facilities and Emergency Departments (continued)

Level of SARS activity	Suggested actions
Cases attributed to nosocomial transmission with NO clearly identified source	1) Triage activities/access controls • Same as for larger number of cases or linked transmission.☐Add: • No visitors allowed in hospital unless necessary (e.g., parents, translators); visitors must receive infection control training. • Close emergency department and facility to admissions and transfers. 2) Patient placement • Same as for larger number of cases or linked transmission.☐Add: • Consider cohorting patients and staff to care for patients in the following categories: o Afebrile patients with no close SARS contact -- discharge as soon as medically indicated o Afebrile patients with close SARS contact -- discharge as soon as medically indicated, with contact restrictions and health department follow-up per recommendations in Supplement D o Febrile or symptomatic patients not meeting case definition o Patients meeting case definition 3) Designated personnel • Same as for larger number of cases or linked transmission.☐ Add: • All persons in the facility should wear a surgical mask when not providing patient care (this is not meant to serve as SARS PPE but to limit potential SARS-CoV transmission from someone who develops SARS). When in contact with SARS patients, all persons should continue to follow SARS infection control guidance and PPE as specified in Supplement I. 4) Surveillance • Same as for larger number of cases or linked transmission.☐ Add: • Place any patient with new fever or lower respiratory illness (not just unexplained) on SARS precautions and evaluate in accordance with the SARS clinical algorithm. • If a patient risk of exposure is high (e.g., close contact with a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or lower respiratory symptoms, the other early symptoms of SARS-CoV disease. 5) Healthcare worker restrictions • Same as for larger number of cases or linked transmission.☐ Add: • Depending on staffing issues, either: o Implement home/work restrictions for all healthcare workers in the facility, or o Restrict movement to work and home for all healthcare workers who worked in an area of the facility where nosocomial transmission may have occurred.

Supplement C: Preparedness and Response in Healthcare Facilities
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Matrix 2: Recommendations for Outpatient Facilities/Areas

Level of SARS activity	Suggested actions
No person-to-person SARS transmission reported anywhere in the world	1) Patient screening and precautions • In accordance with recommendations for respiratory hygiene/cough etiquette, instruct all patients with symptoms of a respiratory infection to perform hand hygiene and cover the nose/mouth. Manage these patients with Droplet Precautions until it is determined that they are not needed. If there are likely to be delays in moving patients out of the waiting area, consider dividing the area so that patients with respiratory illnesses do not sit near others. 2) Healthcare worker precautions • Healthcare workers seeing patients with respiratory illness should use Droplet Precautions. • During respiratory illness season, intake/triage staff should practice frequent hand hygiene and could be given the option of wearing surgical masks. 3) Infrastructure issues • The facility will need a supply of waterless hand-hygiene products, surgical masks, and other applicable PPE and will need to consider the logistics of implementing a respiratory hygiene/cough etiquette strategy.

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Matrix 2: Recommendations for Outpatient Facilities/Areas (continued)

Level of SARS activity	Suggested actions
Presence of person-to-person SARS transmission worldwide but no known transmission in the area around the facility	1) Patient screening and precautions • Same as for o person-to-person SARS transmission in the world.☐ Add: • Screen all patients and visitors with fever or lower respiratory symptoms for SARS epidemiologic links (e.g., travel to endemic areas or contact with known cases). • Instruct anyone with fever or lower respiratory symptoms ***and*** epidemiologic risks for SARS to wear a surgical mask (if tolerated) and to perform hand hygiene. Place these patients immediately in a private room. Transfer these patients as soon as possible to a facility where they can be isolated appropriately during the evaluation. Notify receiving facilities that the patient is being sent for evaluation of SARS. • If a patient risk of exposure is high (e.g., close contact with a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or lower respiratory symptoms, the other early symptoms of SARS-CoV disease. • Manage outpatients in accordance with *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). 2) Healthcare worker precautions • Same as for o person-to-person SARS transmission in the world.☐ Add: • Healthcare workers who are in direct contact with patients who might have SARS should wear full SARS PPE (see Supplement I). 3) Infrastructure issues • Same as for o person-to-person SARS transmission in the world.☐ Add: • The facility will need a supply of PPE (e.g., gowns, gloves, eye protection, respirators [N-95 or higher level]).
Known transmission in the area around the facility	1) Patient screening and precautions • Screen all patients and visitors for fever and lower respiratory symptoms both when appointments are made and when they arrive at the clinic. Refer persons with these symptoms to a facility where they can be isolated appropriately during evaluation. Warn receiving facilities that the patient is being sent for evaluation of SARS. • If a patient risk of exposure is high (e.g., close contact with a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or respiratory symptoms, the other early symptoms of SARS-CoV disease. 2) Healthcare worker precautions • Same as for "Person-to-person SARS transmission worldwide but no known transmission in the area around the facility.☐ 3) Infrastructure issues • Same as for erson-to-person SARS transmission worldwide but no known transmission in the area around the facility.☐

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Matrix 3: Recommendations for Long-Term Care Facilities

Level of SARS activity	*Suggested actions*
No person-to-person SARS transmission reported anywhere in the world	1) Patient precautions • In accordance with recommendations for respiratory hygiene/cough etiquette, patients who develop symptoms of a respiratory infection should be placed on Droplet Precautions until determined that they are not needed. 2) Healthcare worker precautions • Healthcare workers seeing patients with respiratory illness should use Droplet Precautions and practice frequent hand hygiene. 3) Infrastructure issues • The facility will need supplies for Droplet Precautions (masks, gloves and gowns) and hand hygiene.
Presence of person-to-person SARS transmission worldwide, but no known transmission in the area around the facility	1) Patient precautions • Same as for "No person-to-person SARS transmission reported anywhere in the world." Add: • Screen all potential admissions for symptoms and epidemiologic links to SARS. 2) Healthcare worker precautions • Same as for o person-to-person SARS transmission reported anywhere in the world.☐ 3) Infrastructure issues • Same as for o person-to-person SARS transmission reported anywhere in the world.☐ 4) Access controls • Visitors should be screened for symptoms and epidemiologic links to SARS cases. Visitors with symptoms and epidemiologic links should not be allowed into the facility.
Known transmission in the area around the facility	1) Patient precautions • Same as for o person-to-person SARS transmission reported anywhere in the world.☐ • All new admissions should be evaluated at an acute-care facility (no direct admissions). Patients with fever or lower respiratory symptoms should be evaluated according to the algorithm (Figure 2) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm) before being admitted. Patients who are asymptomatic but had exposures should be observed for 10 days for the development of symptoms before they are admitted. • If there is significant transmission in the community around the facility, initiate surveillance for nosocomial lower respiratory illness, and transfer all patients who develop such illness to an acute-care facility for evaluation. Acute-care facilities should be notified that the patients are being transferred for evaluation of SARS. 2) Healthcare worker precautions • Same as for o person-to-person SARS transmission reported anywhere in the world.☐ • Healthcare workers should undergo symptom monitoring. Symptomatic healthcare workers should be furloughed and evaluated according to the algorithm (Figure 2) in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). 3) Infrastructure issues • Same as for o person-to-person SARS transmission reported anywhere in the world.☐

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	4) Access controls • Visitors should be actively screened for symptoms. • Visitors with symptoms should not be allowed into the facility.

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Appendix C2
Checklist for SARS Preparedness in Healthcare Facilities

The most common source of transmission of SARS-CoV has been healthcare facilities. Consequently, control of spread in healthcare facilities is critical to controlling SARS. The keys to quickly controlling SARS are rapid and appropriate decision making and rapid and effective implementation of response activities. The need for rapid and effective responses requires that planning and preparedness activities precede SARS-CoV activity.

The following checklist is a planning tool for healthcare providers. The checklist format is not intended to set forth mandatory requirements or establish national standards for healthcare preparedness. Rather, each healthcare facility should determine for itself whether it is adequately prepared for disease outbreaks in accordance with its own procedures.

Structure for planning and decision making
- ❑ Designate a planning and response committee that includes representatives from a variety of departments (e.g., administration, infection control, hospital epidemiology, etc.)
- ❑ Identify the local or state health department contact who will serve as liaison for SARS preparedness planning and response.
- ❑ Identify a SARS coordinator to serve as the facility point of contact for communication of information internally and externally.

Written SARS preparedness and response plan
- ❑ Develop written policies and work practices for SARS patients that minimize the risk of transmission to other patients, healthcare workers, and visitors.
- ❑ Define a system to review and update the plan as new information and strategies develop.

Function and capacity of the facility to respond to SARS
- ❑ Test the facility's SARS response capabilities of the facility by using "table top□or other exercises.
- ❑ Identify criteria and methods for measuring compliance with the implementation of response activities.
- ❑ Develop strategies to quickly correct deficiencies in implementation of response activities.

Surveillance, screening, triage, and evaluation in healthcare facilities
- ❑ Ensure that clinicians can promptly detect, report, and manage potential SARS patients.
- ❑ Identify a local or state health department contact to coordinate surveillance for cases of SARS.
- ❑ Develop measures for symptom monitoring and reporting of healthcare workers and patients potentially exposed to SARS-CoV, in accordance with public health recommendations.
- ❑ Educate clinical healthcare providers about signs and symptoms of and risk factors for SARS-CoV disease.
- ❑ Be prepared to recognize and report unusual clusters of pneumonia.
- ❑ Know where and how to promptly report a potential SARS case to hospital and public health officials.
- ❑ Develop procedures for rapidly implementing appropriate isolation and infection practices for potential SARS patients.
- ❑ Develop procedures to perform an appropriate and safe evaluation of patients with SARS-like illnesses that accounts for level of SARS-CoV transmission.

Infection control, isolation, and cohorting measures, and environmental controls
- ❑ Develop comprehensive isolation and infection control guidelines and strategies for patient-related activities in the hospital and optimal overall safety of staff, patients, and visitors.
- ❑ Develop a patient placement and transport plan that ensures appropriate isolation and infection control strategies to minimize the risk of transmission to staff, patients, and visitors.

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- ❑ Develop a plan to formally monitor and reinforce compliance with PPE measures and to update those measures as needed as a SARS outbreak progresses.
- ❑ Develop optimal patient placement strategies that account for the availability of AIIRs.
- ❑ Review and ensure that air-handling capacity of rooms is adequate for isolation and infection control needs of SARS patients.

Exposure reporting and evaluation of risk
Educate staff regarding:
- ❑ Modes of SARS-CoV transmission
- ❑ Risks associated with different patient-care procedures
- ❑ Risks to healthcare workers, patients, and visitors
- ❑ Importance of reporting exposures and illness
- ❑ How and to whom to report SARS-CoV exposures and illness

Administrative and organizational activities
- ❑ Determine the minimum number and categories of personnel needed to care for a single patient or small group of patients on a given day.
- ❑ Determine whether a small group of staff, including ancillary staff, could be assigned responsibility for providing initial care for SARS patients.
- ❑ For teaching hospitals, determine what role, if any, students and other trainees (e.g., residents, fellows) will play in the care of SARS patients.
- ❑ Develop a strategy to meet the staffing needs as the number of SARS patients increases and/or personnel become ill or are quarantined.
- ❑ Develop a strategy to ensure the availability of a sufficient number of infection control practitioners (ICPs) to allow for daily monitoring and assessment of all patient-care areas.
- ❑ Develop a plan for healthcare workers that includes criteria for furloughs and work restrictions, appropriate measures to help healthcare workers comply with restrictions (including access to mental health professionals), follow-up after unprotected exposures to SARS patients, and notification of multiple facilities at which they work.
- ❑ Establish criteria and protocols for controlling access to hospitals, including admissions, transfers, discharges, and visitors.
- ❑ Develop a plan that determines when and how to involve security services to enforce access limitations.
- ❑ Establish criteria and protocols to determine when to close the facility to new admissions and transfers.
- ❑ Assess anticipated needs for consumable and durable resources required to provide care for various numbers of SARS patients, and develop a plan to meet the extra need.
- ❑ Develop a back-up plan to deal with the possibility of limited supplies.

Communication and reporting
- ❑ Establish a mechanism and contacts for regular communications with the state and local health departments.
- ❑ Develop a plan to communicate with and report to health departments information on SARS activity in the healthcare facility and information on exposed visitors.
- ❑ Develop a plan for discharge of SARS patients and appropriate follow-up and case management in the community.
- ❑ Address jurisdictional and procedural issues for the investigation of nosocomial SARS outbreaks.
- ❑ Develop a plan to provide daily updates to the infection control staff and the hospital administration regarding SARS activity in the facility and the community.

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- ❑ Develop a plan for the flow and release of information related to SARS patient care or SARS-CoV transmission in the facility.
- ❑ Develop criteria to determine whether and how the facility will establish a SARS hotline for public inquiries.

Community healthcare delivery
Determine how the healthcare facility will participate in and be affected by community-level healthcare-related issues such as:

- ❑ Community management of SARS patients
- ❑ Expansion of AIIR facilities
- ❑ Training of first responders to safely manage SARS patients
- ❑ Development of community-wide strategies to meet healthcare worker shortages
- ❑ PPE supplies
- ❑ Funding needs
- ❑ Legal regulations
- ❑ Liability issues related to healthcare personnel

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

Summary of Changes in Version 2

This version of Supplement D includes editorial changes throughout the text that are intended to clarify the rationale for and explanations of the recommendations.

Several new components have been added:

- The text box raded Implementation of Community Containment Measures□ provides a rationale for selection among the various community containment interventions.
- Section V provides guidance for de-escalation of interventions.
- Appendix D1 defines and describes the applications, benefits, challenges, and required resources for various containment interventions.
- Appendix D2 answers frequently asked questions about the use of community containment measures.

Appendices related to considerations for persons in isolation at home and in non-hospital facilities have been revised and condensed. More detailed information on these topics is provided in Supplement I.

The Community Containment Matrices included in the previous draft were deleted in favor of more complete coverage of the information in the text.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
SAFER·HEALTHIER·PEOPLE™

Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine
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Community Containment Measures,
Including Non-Hospital Isolation and Quarantine

Goal

- Prevent transmission of SARS-CoV through use of a range of community containment strategies chosen to provide maximum efficacy based on the characteristics of the outbreak while minimizing the adverse impact on personal liberties.

Key concepts

- Prevention and control of SARS-CoV transmission in the community rely on prompt identification and management of both SARS patients and their contacts.
- Isolation is a standard public health practice applied to persons who have a communicable disease. Isolation of SARS patients prevents transmission of SARS-CoV by separating ill persons from those who have not yet been exposed.
- Rapid identification, evaluation, and management of contacts of SARS patients (i.e., the persons most at risk for development of SARS) is resource intensive yet critical to controlling transmission.
- Contacts can be managed by use of a range of strategies, all of which facilitate close monitoring (active or passive) for symptoms and rapid initiation of isolation if symptoms develop.
- Quarantine is a contact management strategy that consists of active monitoring plus activity restrictions; quarantine may be voluntary or mandatory.
- As an outbreak evolves, measures to increase social distance (e.g., cancellation of public events; implementation of community now days? may become necessary; extensive transmission may call for activity restrictions applied to large groups.
- Isolation, quarantine, and other activity restrictions raise legal, social, financial, and logistical challenges that should be anticipated and addressed.
- Implementation of quarantine must ensure delivery of medical care and support to affected persons and protection of individual personal liberties.
- Implementation of quarantine requires understanding of the roles and legal authorities of local, state, and federal public health officials and collaboration with traditional and non-traditional community partners.
- Implementation of all community containment measures relies on public trust. Community officials can generate public trust by communicating clear messages about the rationale for and the role and duration of community containment measures and ways in which affected persons will be supported.

Priority activities

- Identify, evaluate, and monitor contacts of SARS patients, and consider quarantine of contacts if needed.
- Continually monitor the course and extent of the outbreak, and evaluate the need for community containment measures.
- Establish the infrastructure to deliver essential goods and services to persons in quarantine and isolation.
- Develop tools and mechanisms to prevent stigmatization and provide mental health resources for those in isolation and quarantine.
- Work with community partners to ensure that implementation and communication plans address the cultural and linguistic needs of affected persons.

Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

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I. Rationale and Goals

Community containment strategies, including isolation and quarantine, are fundamental public health measures used to control the spread of communicable diseases. All such strategies have in common the primary goal of preventing person-to-person spread of disease by separating those with disease or at increased risk for developing disease from those at lower risk. Although the terms solation? and uarantine? have often been used interchangeably, they actually represent distinct concepts (see Box).

Isolation is a commonly used practice in modern public health. Isolation refers to the separation of ill persons with a communicable disease (e.g., *SARS patients*) from those who are healthy. A prototypical example is the isolation of persons with potentially infectious tuberculosis. Isolation not only prevents transmission of infection to others but also allows for the focused delivery of specialized health care to ill persons. SARS patients can be isolated in a hospital, at home, or in a designated community-based facility.

Quarantine is the separation or restriction of activities of persons who are not ill but who are believed to have been exposed to a communicable disease and are therefore at highest risk of becoming infected (e.g., *close contacts of SARS patients*[1]). Although rarely used in the modern era -- due in part to the advent of antibiotics and antiviral agents and to the negative connotations associated with past use -- quarantine and other community containment strategies were valuable for the control of the 2003 global SARS outbreaks.

Contacts of SARS patients can be managed through a range of strategies, all of which are designed to facilitate early recognition of illness in persons at high risk and thereby to prevent transmission to others. Key to each of these strategies is the ability to closely monitor contacts of SARS patients for the onset of symptoms. Monitoring may be *passive*, in which contact themselves report the appearance of symptoms, or *active*, in which healthcare officials periodically assess contacts for symptoms.

In this document, uarantine? refers to interventions -- either voluntary or compulsory -- in which active monitoring is accompanied by a restriction on the activities of persons exposed to SARS-CoV to prevent transmission if they develop SARS-CoV disease. Quarantine may also have a specific legal definition that may differ among jurisdictions based on applicable laws. Although quarantine, by definition, restricts some personal liberties, it is a collective action implemented for the common good. Modern quarantine is predicated on the need to aid persons who are infected with or exposed to infectious agents while protecting others from the dangers of inadvertent exposure. As such, it differs substantially from the quarantine of the past.

In addition to separating exposed persons from unexposed persons, quarantine can have other potential benefits. For diseases, such as measles, that can be transmitted from asymptomatic persons (i.e., persons who appear healthy and have not yet developed symptoms), quarantine can reduce the risk of further spread. Although transmission from asymptomatic persons is considered unlikely for SARS-CoV disease, symptom onset may be insidious and quarantine can reduce the risk of transmission from those in whom symptoms are yet to be recognized and acknowledged. In addition, restricting the activities of exposed but asymptomatic persons should facilitate careful monitoring of these persons for development of symptoms and thereby reduce delays in their recognition. In this way, closer follow-up can expedite

[1] Close contact: A person who has cared for or lived with a person with SARS-CoV disease or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS-CoV disease. Examples of close contact include kissing or hugging, sharing eating or drinking utensils, talking within 3 feet, and direct touching. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

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the implementation of appropriate precautions, thereby preventing additional transmission. The utility of quarantine in this context is to:

- Identify through contact tracing those at greatest risk for the onset of SARS symptoms,
- Separate them from others by restricting their movements,
- Actively monitor them, and
- Rapidly institute appropriate isolation procedures as soon as symptoms are detected.

In this way, quarantine reduces both the period during which transmission might occur and the number of persons who might be exposed during this period.

Whereas isolation and contact management strategies such as active monitoring are directed to individuals, broader *community containment measures* may be applied to groups of persons or to communities during outbreaks characterized by extensive transmission. These interventions range from *measures to increase social distance* among community members (e.g., cancellation of public gatherings, use of masks, implementation of community-wide now days? to *community-wide quarantine*.

Although all of these interventions are designed to prevent transmission by limiting social interactions and preventing inadvertent exposures, the less stringent actions may be easier to implement on a large scale. For example, in the now day? approach, community members are asked to stay home as they would during a major snowstorm. Schools are closed, work sites are closed or restricted, large public gatherings are cancelled, and public transportation is halted or scaled back. Implementation requires fewer resources than are needed to activate and maintain community-level quarantine. In addition, as snow days are a familiar concept in most communities, implementation can occur quickly. Implementation of quarantine, on the other hand, can be resource intensive, requiring mechanisms for enforcement and provision of necessities. Snow days and other measures to increase social distance are therefore the preferred community-level responses, with quarantine reserved for situations in which less drastic measures have not been successful in containing an outbreak.

Appendix D1 provides detailed descriptions of the interventions for community containment, including definitions, applications, benefits, challenges, and required resources. Answers to frequently asked questions about community containment measures, including quarantine, are provided in Appendix D2.

Although isolation, quarantine, and other containment measures are optimally performed voluntarily, many levels of government (local, state, federal) have the legal authority to compel mandatory isolation and quarantine of persons and communities to protect the public health. (See Supplement A and Section VI: Enforcement of Community Containment Measures.)

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II. Lessons Learned

During the 2003 epidemic, the community containment strategy for the United States consisted mainly of coordinating SARS response activities through CDC Emergency Operations Center and providing information and education to the public, healthcare workers, and others. Activities included issuing guidelines and fact sheets, holding press conferences, and meeting with groups and communities to address their concerns about stigmatization. CDC also recommended isolation of SARS patients until they were believed to be no longer infectious. This practice allowed patients to receive appropriate care and helped contain the spread of infection. Severely ill persons were cared for in hospitals; those with mild illnesses were cared for at home. Sick persons in home isolation were asked to avoid contact with others and to remain at home until 10 days after the resolution of fever, provided respiratory symptoms were absent or improving. In the United States, where there was little or no transmission of SARS-CoV, neither individual nor population-based quarantine of contacts was recommended. CDC advised persons who were exposed but not symptomatic to monitor themselves for symptoms and advised home isolation and medical evaluation if symptoms appeared.

Large-scale quarantine was used for the first time in decades in several countries that were severely affected by the 2003 SARS outbreak. Strategies included quarantine of close contacts in healthcare and household settings, work and school contacts, travelers arriving from other SARS-affected areas, and, in some cases, of entire apartment complexes or areas of a city. Other strategies used to control and prevent SARS-CoV transmission in these countries included 1) requiring fever screening before entry to schools, work sites, and other public buildings, 2) requiring use of face masks in certain settings, such as public transportation systems, 3) implementing population-wide temperature monitoring and SARS fever hotlines and referral services, and 4) implementing community-level disinfection strategies.

The impact and effectiveness of individual isolation and quarantine measures and community- and population-level interventions undertaken to contain the SARS epidemic globally are not yet fully understood, but some important generalizations can be made. Overall, strategies associated with timely and successful control of local outbreaks were characterized by rapid and aggressive use of case and contact identification and community containment strategies. Other lessons learned from this modern experience with community containment include the following:

- Most, but not all, SARS patients have a clear history of exposure to another SARS patient or to a specific setting with recognized SARS-CoV transmission.
- Strict infection control measures are needed for isolation of SARS patients; these may be difficult to implement in home and community settings.
- Tracing and monitoring of contacts of SARS patients are resource intensive but critical to the containment and early recognition of illness in persons at greatest risk for development of disease.
- Community control measures such as cancellation of public events and other now day" measures may reduce the risk of exposure to SARS-CoV at the population level by limiting social interactions.
- Although quarantine of individual contacts was an integral part of SARS control in most settings, quarantine of large groups was used only in selected settings where transmission was extensive.
- To be effective, quarantine does not have to be mandatory and compliance does not have to be 100%; voluntary compliance with quarantine requests was >90% in most settings.
- A variety of quarantine strategies (e.g., home quarantine, working quarantine) may be used, depending on specific needs.
- Isolation and quarantine raise legal, social, financial, and logistical challenges (e.g., financial support, provision of services, prevention of stigma) that should be anticipated and addressed. Meeting the social, financial, and psychological needs of persons with SARS and their contacts is key to the successful application of containment measures.

Supplement D: Community Containment Measures, Including Non-Hospital Isolation and Quarantine

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- Effective implementation of quarantine requires a clear understanding of the roles and legal authorities of local, state, and federal public health officials.
- Effective implementation of quarantine requires identification of appropriate traditional and non-traditional partners (e.g., law enforcement) and their engagement in coordinated planning and response.
- The financial, social, and psychological impact of quarantine measures is substantial; preparedness planning should include measures to reduce this impact.
- Obtaining and maintaining public trust are key to successful implementation of these measures; clear messages about the criteria and justification for and the role and duration of quarantine and ways in which persons will be supported during the quarantine period will help generate public trust.

Isolation and Quarantine

Isolation is the separation and restriction and movement or activities of ill infected persons who have a contagious disease, for the purpose of preventing transmission to others.

- Isolation allows for the focused delivery of specialized health care to persons who are ill, and it protects healthy persons from becoming ill.
- Ill persons are usually isolated in a hospital, but they may also be isolated at home or in a designated community-based facility, depending on their medical needs.
- solation" is typically used to refer to actions performed at the level of the individual patient.

Quarantine is the separation and restriction of movement or activities of persons who are not ill but who are believed to have been exposed to infection, for the purpose of preventing transmission of diseases.

- Persons are usually quarantined in their homes, but they may also be quarantined in community-based facilities.
- Quarantine can be applied to an individual or to a group of persons who are exposed at a large public gathering or to persons believed exposed on a conveyance during international travel.
- Quarantine can also be applied on a wider population- or geographic-level basis. Examples of this application include the closing of local or community borders or erection of a barrier around a geographic area (*cordon sanitaire*) with strict enforcement to prohibit movement into and out of the area.

Isolation and quarantine are optimally performed on a voluntary basis, in accordance with instructions of healthcare providers and health officials. However, many levels of government (local, state, federal) have the basic legal authority to compel mandatory isolation and quarantine of individuals and communities when necessary to protect the public health.

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III. Management of SARS Patients in Isolation

Preventing transmission from SARS patients is critical to controlling SARS. This requires limiting the public interactions of possible or known SARS patients (e.g., at work, school, out-of-home child care) and preventing transmission wherever the patients are housed during the period of infectivity (10 days after the resolution of fever, provided respiratory symptoms are absent or improving).

SARS patients should be isolated in a hospital only if medically necessary. Local and state authorities should also be prepared to isolate patients at home or in alternative facilities designated for this purpose. SARS preparedness planning must address home isolation of SARS patients, the availability and use of existing or temporary structures as alternative facilities for isolation, the management of patients housed at home or in alternative facilities, and resources for supplies and services.

Objective: Separate and confine patients who meet the case definition for probable or confirmed SARS-CoV disease or SARS report under investigation (RUI) during the period of communicability (See MMWR 52(49):1202-1206 [www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm]).

Activities aimed at separating persons with known or possible SARS-CoV disease should be modulated as needed based on the status of the outbreak. Basic activities should be initiated with the identification of the first confirmed or probable case or SARS RUI. Enhanced activities may become necessary as an outbreak evolves and the number of persons requiring isolation increases.

Basic Activities

- SARS patients should be admitted to a healthcare facility for isolation only if clinically indicated or if isolation at home or in a community facility cannot be achieved safely and effectively. **Isolation of SARS patients in hospitals is described in detail in Supplement C.**

- Before a SARS patient is placed in a residence or community facility for isolation, arrangements should be made to ensure that the residence has the features necessary for provision of appropriate care to the patient and to determine if sufficient infection control measures can be established to prevent/limit exposures to household members, other primary caregivers, and the community. Guidelines on evaluation of residences for isolation are provided in Appendix D3 and in Supplement I.

- During the period of home isolation, household members not providing care should be relocated if possible so that only the primary caregiver and the patient remain in the residence. If household members cannot be relocated, they should minimize their contact with the SARS patient. Persons at risk for serious SARS complications (e.g., persons with underlying heart or lung disease, persons with diabetes mellitus, elderly persons) should not have contact with the patient.

- The SARS patient in home isolation and all persons in contact with the patient should follow the infection control recommendations described in Supplement I.

- Close contacts of SARS patients[2] should be vigilant for fever (i.e., measure temperature twice daily), respiratory symptoms, and other symptoms of early SARS-CoV disease, such as chills,

[2] Close contact: A person who has cared for or lived with a person with SARS-CoV disease or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS-CoV disease. Examples of close

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rigors, myalgia, headache, or diarrhea. If symptoms develop, the designated health department should be contacted to arrange for immediate medical evaluation and follow-up.

Enhanced Activities

If a surge in patients overwhelms healthcare capacity or if home isolation is not feasible, health departments may need to use alternative facilities for isolation of SARS patients. Additional information on community isolation of SARS patients is provided in Appendix D3 and in Supplement I.

IV. Management of Contacts of SARS Cases

Objective 1: Monitor and evaluate contacts of SARS patients (probable and confirmed cases of SARS-CoV disease; SARS RUIs) to ensure early identification of illness and rapid institution of infection control precautions to prevent further spread (See MMWR 52(49):1202-1206 [www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm]).

Basic Activities: Passive or Active Monitoring

- In a limited SARS outbreak, contacts of SARS patients may be managed by using passive or active monitoring. Monitoring consists of direct contact □by phone or in person ? with the health department or a designee at least once a day to assess the affected person for symptoms and address any needs. Frequent monitoring (e.g., twice a day) can reduce the interval between the onset of symptoms and the institution of precautions. *Passive monitoring* relies on the affected person to contact health authorities if symptoms develop. *Active monitoring* involves direct assessment of each contact at least once a day by a designee of the health department.

  Persons with high-risk exposures (e.g., healthcare workers involved in aerosol-generating procedures on a SARS patient) may require activity restrictions in addition to monitoring (see *Enhanced Activities* below).

- Regardless of the type of monitoring recommended, all contacts of SARS cases should be advised to:

  - Be vigilant for fever (i.e., measure temperature twice a day), respiratory symptoms, and other symptoms of early SARS-CoV illness for 10 days after exposure (See MMWR 52(49):1202-1206 [www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm]).
  - If symptoms develop, contact a designated health department staff member so that clinical evaluation can be performed without delay.
  - Before visiting a healthcare facility for evaluation, inform the healthcare provider in advance about the possible exposure to SARS-CoV.

Enhanced Activities: Quarantine of Contacts

During a large outbreak or in situations of high-risk exposures (e.g., if transmission from a particular case has been demonstrated by emergence of secondary cases among one or more

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contact include kissing or hugging, sharing eating or drinking utensils, talking within 3 feet, and direct touching. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

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contacts), consideration should be given to managing contacts with activity restrictions in addition to active monitoring. This combined approach is referred to as *quarantine*. The purpose of quarantine is to reduce transmission by 1) separating contacts of SARS patients from others, 2) monitoring contacts for symptoms, and 3) instituting appropriate infection control precautions as soon as symptoms are detected.

Implementation of quarantine for contacts can be complicated and resource intensive, and the activity restrictions can be difficult for affected persons to endure. In deciding when to use quarantine and which persons should be included in a quarantine order, public health officials must strike a balance based on the epidemiologic situation and available resources. Limiting quarantine to only high-risk contacts may be more labor intensive at the outset but will be easier to maintain since fewer resources will be needed for provision of services and enforcement of restrictions. Applying quarantine too narrowly in the midst of an extensive outbreak can, however, blunt the efficacy of the policy if missed cases result in additional generations of transmission. If the resources required for investigation and risk stratification of contacts are not available, broader application of quarantine may be more practical. Whenever quarantine is implemented, close clinical monitoring and provision of essential services and needs must be ensured.

- Based on the situation, select among the three main options for quarantine of contacts: home quarantine, quarantine in designated facilities, and working quarantine.

  Home quarantine -- Home quarantine is most suitable for contacts with a home environment that can meet their basic needs and in which unexposed household members can be protected from exposure.

  - Persons in home quarantine must be able to monitor their own symptoms (or have them monitored by a caregiver).

  - As is the case for isolation, a home should be evaluated for suitability before being used for quarantine. Because the infection control requirements for healthy contacts in quarantine are less stringent than those for ill persons in isolation, this evaluation may be performed by use of a questionnaire administered to the quarantined person or the caregiver. Additional guidance on use of a residence for quarantine is provided in Appendix D3 and Supplement I.

  - Household members require no specific precautions as long as the quarantined person remains asymptomatic. However, because the onset of symptoms can be insidious, it may be prudent for the quarantined contact to minimize interactions with other household members to prevent exposure during the interval between the development and the recognition of symptoms. Precautions might include 1) sleeping and eating in a separate room, 2) using a separate bathroom, and 3) wearing a surgical mask when in a room with others.

  - Persons in quarantine may be assessed for symptoms by either active or passive monitoring. Delayed recognition of symptoms and a resulting delay in the institution of isolation contributed to extensive chains of transmission in several areas during the 2003 SARS outbreaks, even when the areas were under heightened surveillance. Active monitoring of contacts in quarantine might overcome any delays resulting from the insidious onset of symptoms or denial among those in quarantine.

  - Persons who develop symptoms should immediately notify the designated health department to arrange for medical evaluation. The health department should provide

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explicit instructions for isolation and other infection control precautions to be observed in the home while the ill person is awaiting evaluation. At minimum, persons with symptoms should be separated from others in the household.

- Household members may go to school, work, etc., without restrictions unless the quarantined person develops symptoms. If the quarantined person develops symptoms, household members should remain at home in a room separate from the symptomatic person and await additional instructions from health authorities.

- Household members can provide valuable support to quarantined persons by helping them feel less isolated and ensuring that essential needs are met.

Quarantine in designated facilities -- Contacts who do not have an appropriate home environment for quarantine or who choose not to be quarantined at home may be quarantined in facilities designated for this purpose. Facilities designated for quarantine of persons who cannot or choose not to be quarantined at home should meet the same criteria listed for home quarantine. Evaluation of potential sites for facility-based quarantine is an important part of preparedness planning. Additional guidance on use of a residence for quarantine is provided in Appendix D3 and Supplement I.

Working quarantine -- This restriction applies to healthcare workers or other essential personnel who have been exposed to SARS patients and may need to continue working (with appropriate infection control precautions) but who are quarantined either at home or in a designated facility during off-duty hours (See Supplement C). When off duty, contacts on working quarantine should be managed in the same way as persons in quarantine at home or in a designated facility. Local officials will also need to develop:

- Systems for monitoring persons in working quarantine for symptoms during work shifts
- Mechanisms for immediate medical evaluation of anyone who develops symptoms
- Provisions for transportation to and from work, if needed

- The recommended duration of quarantine for SARS is generally 10 days from the time of exposure. During that period, contacts should be monitored at least daily for fever and respiratory symptoms. In addition, health officials should provide the necessary support to enable contacts to comply with quarantine appropriately. Recommendations for monitoring of contacts include the following:

  - Monitor daily, or more frequently if feasible, for fever, respiratory symptoms, and other symptoms of early SARS-CoV disease.
  - Monitor compliance with quarantine through daily visits or telephone calls.
  - Provide a hotline number for quarantined persons to call if they develop symptoms or have other immediate needs.
  - If a quarantined person develops symptoms suggestive of SARS, arrangements should be in place for immediate medical evaluation of the patient. The health department should provide explicit instructions on the isolation and infection control precautions to be observed while the ill person is awaiting evaluation. At a minimum, symptomatic persons should be isolated from others in a separate room.
  - Provide persons in quarantine with all needed support services, including 1) psychological support, 2) food, 3) household and medical supplies, and 4) care for family members. Financial issues, such as medical leave, may also need to be considered.

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- At the end of the designated quarantine period, contacts should have a final assessment for fever and respiratory symptoms. Persons without fever or respiratory symptoms may return to normal activities.

Objective 2: Compile and analyze the information on contacts needed to evaluate and monitor the effectiveness of contact management strategies and containment interventions.

Contact tracing and monitoring require substantial data management resources. The information technology needs for timely surveillance, monitoring, and management of contacts of SARS cases are currently under discussion among CDC and partners in state and local health departments, and development of a contact tracing and monitoring database is under way.

Basic Activities

- Public health officials responsible for contact tracing and management should compile and analyze information collected from contacts during the investigation and in the course of monitoring to evaluate the effectiveness of control measures. These data will inform decision making about the need for more stringent measures such as quarantine. Information should be collected for contacts of all SARS cases to determine the following:

  - Number of contacts identified per case
  - Number of days between onset of symptoms and reporting to health officials and between reporting and isolation
  - Number of cases occurring with unknown exposure

Enhanced Activities

If quarantine is implemented, information gathered during the investigation and monitoring of contacts should be analyzed on an ongoing basis to evaluate the effectiveness of the intervention. This information will be critical in determining the need for broader application of quarantine and the timing of withdrawal of containment measures. In addition to the parameters listed above, which should be determined for contacts of all SARS cases, the proportion of contacts in quarantine (by risk group) who develop SARS-CoV disease should be determined.

V. Community-Based Control Measures

Whereas decisions on use of containment measures in individual situations depend primarily on the characteristics of the exposure and the affected contact, the decision to institute broader use of community measures is more complex. The different options □e.g., active monitoring with voluntary activity restrictions, legally mandated quarantine, institution of snow days ? will vary in their effectiveness in controlling the outbreak and their impact on personal liberties. Other measures that might prevent inadvertent SARS-CoV exposures (e.g., temperature monitoring in public places; use of masks) should also be considered. Decisions should be based primarily on the epidemiologic characteristics of the outbreak. Other considerations will include the healthcare and public health resources available and the level of community cooperation (see Appendix D4).
Local officials will face enormous logistic, economic, ethical, and psychological challenges in implementing community-level containment measures. Preparedness planning should include development of essential partnerships to address: 1) provision of essential services and support (e.g., food, household and medical supplies, medical attention, caretaking, continuation of work/school via telecommuting or home-based

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curricula, financial support), 2) mental health (e.g., stigma management and prevention, psychological support), and 3) enforcement (e.g., controlling entry into and exit from narrowly defined geographic areas; border surveillance/monitoring; travel permits and credentials).

Even with the most comprehensive planning, however, officials must be prepared to make decisions on the basis of incomplete or inadequate information and to modify strategies as the situation unfolds. Although control measures should never be used indiscriminately or in a manner out of proportion to the situation, undue caution should not inhibit the bold and swift implementation of the interventions upon which effective control depends.

Objective 1: Reduce the risk of transmission of SARS-CoV at the community level by implementing large-scale measures that limit social interactions and prevent inadvertent exposures.

Activities

- Implement community containment measures based on the epidemiologic characteristics of the outbreak, according to the graded response outlined in the Box below.
- In the absence of SARS-CoV transmission in the world, activities should focus on *preparedness, planning and surveillance* for the first case(s). Public health and healthcare officials should provide community members with information about SARS and promote hand hygiene and respiratory hygiene/cough etiquette (See Supplement C).

Graded Implementation of Community Containment Measures

Level of SARS activity	***Response***
No SARS-CoV transmission globally	Preparedness planning
SARS-CoV transmission in the world, but all cases Locally either are imported or have an identifiable epidemiologic link to other cases at the time of initial evaluation	Passive or active surveillance/monitoring of contacts
SARS activity in the area, with either a small number of cases in persons without an identifiable epidemiologic link at the time of initial evaluation or increased occurrence of SARS among known contacts	Quarantine of close contacts
SARS activity in the area, with a large number of cases in persons without an identifiable epidemiologic link at the time of initial evaluation; control measures are believed to be effective	Focused measures to increase social distance; consider community-level measures to increase social distance
SARS activity in the area, with a large number of cases in persons without an identifiable epidemiologic link at the time of initial evaluation; control measures are believed to be ineffective	Community-level measures to increase social distance; consider community-wide quarantine.
Decreases in the number of new cases, unlinked (or nexpected? cases, and generations of transmission	Quarantine of contacts
Transmission has been controlled/eliminated; no new cases reported	Active monitoring in high-risk populations; Continue for 2-3 incubation periods after control or elimination of transmission.

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- If SARS-CoV transmission is occurring in the world but the United States is reporting only a few imported cases and no or limited local transmission from those cases, then officials in areas with SARS cases should consider passive (at minimum) or active *monitoring of close contacts*. Although active monitoring promotes early identification of non-specific or insidious symptoms and reliable assessment of fever and symptoms, it also requires substantial resources. Local conditions therefore may dictate at least initial use of passive monitoring, particularly in the management of contacts with lower-risk exposures. For persons with high-risk exposures (e.g., healthcare workers with unprotected exposure to a SARS case, especially during a high-risk procedure), home quarantine with either passive or active monitoring may be considered.

- Jurisdictions should consider *more restrictive measures* for any of the following situations:

  - Identification of cases without known epidemiologic links (i.e., cases occurring in persons who, at the time of diagnosis, are not known to have had contact with a known SARS case or exposure to a known transmission setting)
  - Increasing number of cases among contacts of SARS patients
  - Significant interval between the onset of symptoms and the isolation of cases
  - Inadequate resources for continued isolation of cases and tracing and monitoring of contacts

  Measures to be considered include *quarantine of close contacts*, such as family members or healthcare workers who provided care to SARS patients. This approach has the advantage of limiting the use of quarantine to those at greatest risk, but implementation requires time, effort, and availability of skilled interviewers.

  Whenever possible, contacts should be *quarantined at home*. Home quarantine requires the fewest additional resources, although arrangements must still be made for monitoring patients, reporting symptoms, transporting patients for medical evaluation, and providing essential supplies and services.

  In some cases, affected persons may not have access to an appropriate home environment for quarantine. Examples include travelers; persons living in dormitories, homeless shelters, or other group facilities; and persons whose homes do not meet the minimum requirements for quarantine. In other instances, contacts may have an appropriate home environment but may not wish to put family members at risk. In these situations, health officials should identify a *facility with the appropriate characteristics for quarantine of contacts*. Monitoring may be either passive or active, although active monitoring may be more appropriate in a facility setting.

- Jurisdictions with large numbers of cases without known epidemiologic linkages should consider instituting *measures to increase social distance*. Identification of an unlinked case can mean either that transmission is occurring from undetected cases or that contact tracing efforts are not identifying all potential contacts. Increasing social distance can reduce the likelihood that unexposed community members will be exposed to SARS-CoV and that persons who have already been exposed will unknowingly transmit to others if they become symptomatic. Interventions to increase social distance are usually applied to groups of persons in settings where there might have been exposure to SARS-CoV (e.g., a school in which several cases of SARS have been diagnosed). In a community with ongoing transmission, these measures may be applied to settings without known exposure (e.g., cancellation of concerts or sporting events; restricted use of public transportation).

  The now day? approach may be an effective way to increase social distance and reduce transmission because it is a concept with which most Americans are familiar. This intervention would likely be instituted for an initial 10-day period, with final decisions on duration based on

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assessment of current epidemiologic information. Other community-level measures, such as community-wide temperature monitoring, temperature screening before entering public buildings, or recommended or mandatory mask use, may also be considered. Although the effectiveness of these interventions has not been quantified, they might enhance public awareness and facilitate early detection of cases.

- In extreme circumstances, when control measures do not appear to be effective or resources are overwhelmed, more restrictive measures such as *widespread or community-wide quarantine* may be considered.

Objective 2: Scale back community containment measures as soon as appropriate.

Communities may scale back community containment measures as the outbreak comes under control. For example, with significant declines in the number of new cases, unlinked cases, and generations of transmission, the community measures can be halted and efforts can be refocused on quarantine of known contacts.

The process by which community containment measures are lifted requires as much thought and planning as their implementation. When applied to individuals, movement restrictions such as quarantine can be removed as soon as the exposed contact has remained without signs or symptoms of disease for a complete incubation period for SARS-CoV disease (i.e., 10 days).

A decision to discontinue the broader use of community-level measures is more complex. A decision on the optimal time to remove these measures must balance the need to restore personal liberties against community safety. Premature removal of containment strategies can increase the risk of additional transmission and recurrent outbreaks. Decisions should be based on evidence of improving local/regional control, such as 1) consistent decrease in the number of confirmed cases, 2) reduction in the number of probable and known cases, and 3) confirmation that all cases either were imported or have a known source or well-defined epidemiologic link.

Activities

- When there is reasonable evidence of improved control of the outbreak, discontinue quarantine of contacts of persons meeting the criteria for SARS RUI (see MMWR 52(49):1202-1206 [www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm]). Continue quarantine of contacts of persons with probable or confirmed SARS-CoV disease, particularly those with known exposures or well-defined epidemiologic links.
- When three incubation periods have elapsed since the last reported confirmed case of SARS-CoV disease, discontinue quarantine of contacts. Also discontinue maintenance of designated facilities for quarantine.
- As soon as appropriate, discontinue use of community-level containment measures. Withdraw the most stringent measures (e.g., geographic or population-based movement restrictions, mass transit interruptions, travel restrictions) first. Begin scaling back community-level measures when three incubation periods have elapsed after identification of the last unlinked or probable case of SARS-CoV disease (i.e., all cases are imported or have known exposures or well-defined epidemiologic links).

VI. Enforcement of Community Containment Measures

Data from modeling studies suggest that community containment measures such as quarantine are effective for controlling an outbreak even if compliance is less than perfect. Optimally, quarantine applied

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on a voluntary basis will afford sufficient compliance to attain the necessary effect. Nevertheless, protocols must be established for enforcement of both individual and community measures when higher levels of compliance are required.

Objective 1: Enforce individual quarantine restrictions as necessary.

Activities

- Develop protocols for follow-up of persons who cannot be reached by telephone. Protocols might include a threshold period for non-responsiveness that should trigger a home visit or other means to locate the person. Partnerships with law enforcement and other community-based resources will be helpful in tracing the whereabouts of persons who have violated restrictions.
- Consider and plan for the use of alternative arrangements for persons who cannot or will not comply with voluntary home quarantine. These might include:
  - Issuing official, legally binding quarantine orders
  - Posting a guard outside the home
  - Using electronic forms of monitoring
  - Using guarded facilities

Objective 2: Enforce community-level containment measures as necessary.

Activities

Enforcement of community-wide containment measures is necessarily more complex given the larger number of persons involved. Although some measures, such as cancellation of public events or scaling back of mass transit services, are self-enforcing, others (e.g., restrictions on travel between areas) may require use of physical measures such as checkpoints. Implementation will require close partnerships and cooperation with law enforcement at the local and state levels. Federal law enforcement resources may also be available in some situations.

VII. Roles and Responsibilities

Historical precedents, both legal and practical, suggest that states have primary authority to invoke and enforce quarantine in their own jurisdictions. This authority derives from the states□□police power," i.e., the inherent authority of a government to enact laws and promote regulations to safeguard the health and welfare of its citizens. As a result of this authority, the individual states are responsible for intrastate isolation and quarantine practices and conduct their activities in accordance with their respective statutes. Of note, quarantine is not the only public health action that can be compelled by state health authorities. Other frequently enforced actions include school immunization and tuberculosis treatment laws.

Current quarantine laws, regulations, and enforcement procedures vary widely from state to state, as do states?lists of notifiable and quarantinable diseases. Many of these laws date back to the nineteenth century. In response to a request from CDC, the Center for Law and the Public Health at Georgetown and Johns Hopkins Universities has developed a odel State Emergency Health Powers Act□ (www.publichealthlaw.net/MSEHPA/MSEHPA2.pdf) to assist state governments in reviewing emergency public health powers to ensure they are adequate to respond to modern disease and bioterrorism concerns.

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At the federal level, the HHS Secretary has statutory responsibility for preventing the introduction, transmission, and spread of communicable diseases from foreign countries into the United States (e.g., at international ports of arrival and from one state or possession to another). The communicable diseases for which federal isolation and quarantine are authorized are set forth by executive order of the President. An executive order adding SARS to the list of detainable communicable diseases was issued in April 2003. By statute, the HHS Secretary may accept state and local assistance in the enforcement of federal quarantine regulations and may also assist state and local officials in the control of communicable diseases. For more information on legal authorities and a checklist on legal considerations for SARS preparedness, see Supplement A.

VIII. Preparedness Planning

A checklist for preparedness planning for community containment measures is provided in Appendix D5.

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Appendix D1
Interventions for Community Containment

Contacts of SARS patients can be managed by use of a range of interventions, all of which are designed to facilitate early recognition of illness in persons at greatest risk of becoming infected and thereby to prevent transmission to others. Whereas many of these interventions are applied individually to persons identified as contacts of a person with possible or known SARS-CoV disease, others are applied to larger groups of persons, or communities, who share a similar risk of exposure. The interventions include the following:

Passive Monitoring

Definition	The contact is asked to perform self-assessment at least twice daily and to contact authorities immediately if respiratory symptoms or fever occur
Application	Situations in which 1) the risk of exposure and subsequent development of disease is low, and 2) the risk to others if recognition of disease is delayed is also low.
Benefits	Requires minimal resources Places few constraints on individual freedoms
Challenge	Relies on self-reporting Affected persons may not perform an adequate self-assessment
Resources Required	Supplies (thermometer; symptom log; written instructions) Hotline to notify authorities about symptoms or needs Staff to receive telephone reports and provide in-person evaluation and care
Partners	Household members
Forms/Templates	Symptom logs Instructions for patients and healthcare workers

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Active Monitoring without Explicit Activity Restrictions

Definition	A healthcare or public health worker evaluates the contact on a regular (at least daily) basis by phone and/or in person for signs and symptoms suggestive of SARS-CoV disease
Application	Situations in which 1) the risk of exposure to and subsequent development of disease is moderate to high, 2) resources permit close observation of individuals, and 3) the risk of delayed recognition of symptoms is low to moderate
Benefits	Places few constraints on individual liberties
Challenges	Requires adequate staffing Requires a system to track information and to verify monitoring and appropriate actions based on findings
Resources Required	Trained staff to provide in-person and/or telephone evaluations Contingency plans for managing noncompliant persons Contingency plans for rapid isolation of persons who develop symptoms Hotline to notify authorities about symptoms or needs
Partners	Professional and lay healthcare workers to perform evaluations on behalf of the health department Possible need for law enforcement to assist with management of noncompliant persons
Forms/Template	Checklist for assessment of active monitoring Template for recording results of clinical evaluation

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Active Monitoring with Activity Restrictions (Quarantine)

Definition	The contact remains separated from others for a specified period (generally 10 days after potential exposure), during which s/he is assessed on a regular basis (in person at least once daily) for signs and symptoms of SARS-CoV disease. Persons with fever, respiratory, or other early SARS-CoV symptoms (See MMWR 52(49):1202-1206 [www.cdc.gov/mmwr/preview/mmwrhtml/mm5249a2.htm]) require immediate evaluation by a trained healthcare provider. Restrictions may be voluntary or legally mandated; confinement may be at home or in an appropriate facility. No specific precautions are required for those sharing the household with a person in quarantine as long as the person remains asymptomatic. However, because onset of symptoms may be insidious, it may be prudent to minimize interactions with household members during the period of quarantine.
Application	Situations in which the risk of exposure and subsequent development of disease is high and the risk of delayed recognition of symptoms is moderate
Benefits	Reduces risk of spread from persons with subacute or subclinical presentations or from delayed recognition of symptoms
Challenges	Infringes on personal freedom of movement May lead to a feeling of isolation from family and friends May lead to loss of income or employment Requires plans/protocols for provision of essential services Requires plan for provision of mental health support Risk of noncompliance, particularly as duration increases May require enforcement for noncompliance
Resources Required	Staff for monitoring and evaluation Appropriate facility if home setting is unavailable or inadequate Staff, funding, goods for provision of essential services Hotline for notification of symptoms or personal needs Mechanisms to communicate with family members outside the household or facility Mental health and social support services Delivery systems for food and other essential supplies
Partners	Professional and lay healthcare workers to perform assessments on behalf of the health department Community volunteers/workers to assist with provision of essential services Potential need for law enforcement to assist with noncompliant persons
Forms/Templates	Checklist for active monitoring Template for recording results of clinical evaluation Checklist and guidelines for evaluation of homes for quarantine Checklist and guidelines for evaluation of community-based sites for quarantine

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	Guidelines for monitoring compliance with home quarantine Guidelines for monitoring compliance with quarantine in community-based facilities Forms for recording compliance with quarantine
Examples	Home quarantine (voluntary or mandatory) Facility quarantine (voluntary or mandatory)

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Working Quarantine

Definition	Persons are permitted to work but must observe activity restrictions while off duty. Monitoring for fever and other symptoms before reporting for work is usually required. Use of appropriate PPE while at work is required.
Application	Persons for whom activity restrictions (home or facility quarantine) are indicated but who provide essential services (e.g., healthcare workers)
Benefits	Reduces risk of community spread from high-risk contacts while minimizing adverse impact of activity restrictions on provision of essential services Clinical monitoring at work reduces the staff required for active monitoring at the quarantine site
Challenges	Need for close and consistent pre-shift monitoring at the work site to prevent inadvertent exposures May require means of transporting persons to and from work site to minimize interactions; persons in working quarantine should wear appropriate PPE during transport. Must maintain close cooperation and communication between work-site and local health authorities
Resources Required	Appropriate facility for off-duty quarantine if home is unavailable or inadequate Staff, funding, goods for provision of essential services Hotline for notification of symptoms and personal needs System to track results of work-site monitoring and location(s) of off-duty quarantine Mental health and psychosocial support services, especially if work includes care of SARS patients
Partners	Work-site administrators and infection control personnel Community volunteers/workers Staff/volunteers to assist with transportation to and from work Potential need for law enforcement to assist with noncompliant persons
Forms/Templates	Guidelines and instructions for persons in working quarantine Instructions for supervisors of persons in working quarantine Checklist to evaluate homes for quarantine Guidelines for monitoring compliance Checklist for active monitoring at work site Template for recording results of clinical evaluation Forms for recording compliance

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Focused Measures to Increase Social Distance

Definition	Intervention applied to specific groups, designed to reduce interactions and thereby transmission risk within the group. When focused, the intervention is applied to groups or persons identified in specific sites or buildings, most but not necessarily all of whom are at risk of exposure to SARS-CoV
Application	Groups or settings where transmission is believed to have occurred, where the linkages between cases is unclear at the time of evaluation, and where restrictions placed only on persons known to have been exposed is considered insufficient to prevent further transmission
Benefits	Applied broadly, reduces the requirement for urgent evaluation of large numbers of potential contacts to determine indications for activity restrictions. May enable reductions in transmission among groups of persons without explicit activity restrictions (quarantine)
Challenges	May be difficult to solicit cooperation, particularly if popular buildings are closed or popular events are cancelled Requires excellent communication mechanisms to notify affected persons of details and rationale May need to provide replacement for affected activities (e.g., school, essential services) Generally relies on passive monitoring
Resources Required	Systems to communicate relevant messages May require enforcement, particularly if closure of popular buildings or gathering places is necessary Requires resources for passive monitoring Hotlines to report symptoms and obtain follow-up instructions Transportation for medical evaluation, with appropriate infection control precautions
Partners	News media and communication outlets Law enforcement Community groups
Forms/Templates	Messages for affected persons Messages for employers of affected persons Messages for persons supplying essential services
Examples	Closure of schools or office buildings Suspension of public markets

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Community-Wide Measures to Increase Social Distance

Definition	Intervention applied to an entire community or region, designed to reduce personal interactions and thereby transmission risk. The prototypical example is implementation of a now day,? in which offices, schools, transportation systems are cancelled as for a major snowstorm.
Application	All members of a community in which 1) extensive transmission of SARS-CoV is occurring, 2) a significant number of cases lack clearly identifiable epidemiologic links at the time of evaluation, and 3) restrictions on persons known to have been exposed are considered insufficient to prevent further spread
Benefits	Reduces need for urgent evaluation of large numbers of potential contacts to determine indications for activity restrictions May enable reductions in transmission among groups without explicit activity restrictions (quarantine) "Snow days□are familiar concepts and thus easy to implement on short notice
Challenges	May be difficult to solicit cooperation Requires excellent communication mechanisms to notify persons of details and rationale May need to provide replacement for affected activities (e.g., school, essential services) May need to address mental health and financial support issues When an entire community is involved, requires cooperation with neighboring jurisdictions that may not be using a similar intervention, particularly in situations where persons live in one city and work in another and only one locale is affected by the intervention. Generally relies on passive monitoring
Resources Required	Communication outlets Enforcement Resources for passive monitoring Hotlines and other communication systems to report symptoms and obtain follow-up instructions Transportation for persons requiring medical evaluation, with appropriate infection control precautions
Partners	News media and other communication outlets Law enforcement Transportation officials to enforce restrictions (e.g., closure of bridges, roads, or mass transit systems), plan detours, and maintain critical infrastructure supplies
Forms/Templates	Messages for affected persons Messages for employers of affected persons Messages for persons supplying essential services
Examples	Community-wide now day"

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Scaling back of mass transportation
Closure of bridges and tunnels
Closure of schools and work sites

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***Widespread Community Quarantine, Including* Cordon Sanitaire**

Definition	Legally enforceable order that restricts movement into or out of the area of quarantine of a large group of people or community; designed to reduce the likelihood of transmission of SARS-CoV among persons in and to persons outside the affected the area. When applied to all inhabitants of an area (typically a community or neighborhood), the intervention is referred to as *cordon sanitaire* (sanitary barrier).
Application	All members of a group in which 1) extensive transmission is occurring, 2) a significant number of cases lack identifiable epidemiologic links at the time of evaluation, and 3) restrictions placed on person known to have been exposed are considered insufficient to prevent further spread. Widespread quarantine is unlikely to be necessary because other less restrictive measures (e.g., snow days) may be equally effective.
Benefits	Reduces need for urgent evaluation of large numbers of potential contacts to determine indications for activity restrictions
Challenges	Most extreme of the potential containment measures May be controversial because of infringement on personal liberties May be difficult to solicit cooperation for extended periods, particularly if the rationale is not readily apparent or was not clearly explained Requires excellent communication mechanisms to inform affected persons and to maintain public confidence in the appropriateness of the chosen course of action May need to provide replacements for affected activities (e.g., school, essential service providers) Must address mental health and financial support for affected population When an entire community is involved, requires cooperation with neighboring jurisdictions that may not be using a similar intervention, particular in situations where persons live in one city and work in another and only one locality is affected by the intervention Generally relies on passive monitoring Need to provide mechanisms for isolating symptomatic persons with minimal delay
Resources Required	Systems to communicate relevant messages Will likely require enforcement to maintain security at borders Resources for passive monitoring Transportation for persons requiring medical evaluation, with appropriate infection control precautions Staff and supplies to maintain access to and availability of essential services and goods, including food, water, medicine, medical care, utilities Plan to divert flow of critical infrastructure supplies and materials that normally transit through quarantined area
Partners	News media and other mass communication outlets Public and private groups, industries, and officials to coordinate supply and provision of essential services to affected area

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	Law enforcement to maintain security at borders and to enforce movement restrictions Transportation industry
Forms/Templates	Messages for affected persons Messages for employers of affected persons Messages for persons supplying essential services
Examples	Quarantine (*cordon sanitaire)* of a city or town Quarantine of occupants of a housing complex or office building

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Appendix D2
Frequently Asked Questions about Use of Community Containment Measures

If SARS-CoV reappears in the United States, will quarantine definitely be required and used?
No. Quarantine is only one of a spectrum of actions that may be considered during a future SARS outbreak in the United States. Although rapid control is likely to require bold and swift action, measures that are less drastic than legally enforced quarantine may suffice, depending on the epidemiologic characteristics of the outbreak. For example, active monitoring without activity restrictions may be adequate when most cases are either imported or have clear epidemiologic linkages at the time of initial evaluation. When the epidemiology of the outbreak indicates a need for stronger measures, jurisdictions can adopt a voluntary quarantine approach and reserve legal measures only for those who fail to comply. When an outbreak progresses to include large numbers of cases for which no epidemiologic linkages can be identified, community-level interventions may become necessary. Even at this stage, however, measures designed to increase social distance, such as snow-days, may be preferred alternatives. Wider use of quarantine is generally reserved for situations in which all other control measures are believed to be ineffective.

The choice of containment measures requires frequent and ongoing assessment of an outbreak and evaluation of the effectiveness of existing control measures. Officials must be prepared to make decisions based on limited information and then modify those decisions as additional information becomes available.

Does the effectiveness of containment measures require 100% compliance?
No. Containment measures, including quarantine, are effective even if compliance is less than 100%. Even partial or eaky□quarantine can reduce transmission. Therefore, strict legal enforcement is not necessarily always needed; in most cases, jurisdictions can rely on voluntary cooperation. Modeling studies of the relative contributions of quarantine and vaccination in control of smallpox outbreaks suggest a benefit from quarantine even when compliance is as low as 50%. The incremental benefit of quarantine approaches a maximum at a compliance rate of approximately 90%, with little additional benefit from higher rates of compliance. Therefore, containment measures can be important components of the response to a communicable disease outbreak even when compliance is not high.

Does uarantine□always mean using a legal order to restrict someone activity?
No. The term uarantine? is often defined narrowly to refer to the legally mandated separation of well persons who have been exposed to a communicable disease from those who have not been exposed. Although the precise legal definition of quarantine may differ from jurisdiction to jurisdiction, when used clinically or programmatically, quarantine may be defined more broadly to include all interventions, both mandatory and voluntary, that restrict the activities of persons exposed to a communicable disease. Therefore, whenever an exposed person is placed under a regimen of monitoring that includes an activity restriction, even when those restrictions are adhered to voluntarily, the person is said to be under quarantine.

Must quarantine be mandatory to be effective?
No. Although the federal government and nearly all states have the legal authority to place persons exposed to certain communicable diseases under quarantine and enforce the required restrictions on activity, use of this authority may not always be necessary or practical. Previous experiences with the use of quarantine, including those during the 2003 SARS outbreaks, suggest that the majority of persons comply voluntarily with requests from health authorities to remain in quarantine and observe the recommended activity restrictions.

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During the 2003 outbreaks, at least one jurisdiction outside the U.S. used an incremental approach to institution of quarantine. A request for voluntary quarantine resulted in compliance by more than 90% of affected persons. Those who did not adhere to the request were served with a legally enforceable order. This approach has the advantage of being perceived by the public as being less severe, since compliance with the initial request is voluntary. In addition, in jurisdictions where prevailing statutory quarantine authorities require separate orders for each person placed under activity restrictions, this approach reduces the legal workload to a more practical level.

Does being placed in quarantine increase a person risk for acquiring disease?
Historically, placement in quarantine has been associated with increased disease transmission. One reason may be that separation between ill and well persons was not maintained. One of the fundamental principles of modern quarantine is that persons in quarantine are to be closely monitored so that those who become ill are efficiently separated from those who are well. A second principle is that persons in quarantine should be among the very first to receive any available disease-prevention interventions. Adherence to these two principles of modern quarantine should prevent an increase in risk for acquiring disease while in quarantine.

Is quarantine really necessary if everyone who develops symptoms is rapidly placed in isolation?
Although theoretically true, it would be unrealistic to believe that even the most efficient system for initiation of isolation will minimize delays to the extent required to prevent transmission. Among the factors contributing to delays in recognition of symptoms are the insidious nature of disease onset and denial that symptoms have developed. Early in the 2003 outbreak in Singapore, the average delay from onset of symptoms to initiation of isolation was 7 days. Officials were able to reduce this delay only to 3 days, even with an aggressive public awareness campaign on the importance of symptom recognition and isolation.

Quarantine helps to reduce transmission associated with delays in isolation in two ways. First, quarantine enables health officials to quickly locate symptomatic persons who should be placed in isolation. Second, although quarantine locations may not be as efficient as isolation facilities in preventing transmission, quarantine reduces the number of persons who might be exposed while awaiting transfer to an isolation facility. If quarantine was not used, symptomatic and infectious persons could move about freely in public places, potentially exposing large numbers of additional persons and thereby fueling the outbreak.

Is quarantine useful only for diseases in which transmission is possible before the onset of symptoms?
No. Although quarantine clearly has benefits for prevention of diseases in which the period of communicability precedes onset of symptoms, a second, often overlooked, benefit is relevant to diseases such as SARS, in which infectiousness is likely to coincide with the onset of symptoms. Quarantine facilitates both close monitoring and prompt follow-up of persons who are at high risk for developing disease. Both these factors are likely to reduce the delay in initiation of isolation following onset of symptoms. Quarantine also limits the number of additional persons exposed if the quarantined person develops disease. Thus, quarantine can be a useful strategy even with diseases that are infectious only after symptoms develop.

Is quarantine useful only for diseases that are spread by the airborne route?
No. Quarantine simply refers to the separation and restriction of activity of persons exposed to a communicable disease who are not ill. It is designed to minimize interactions between those exposed to a disease and those not yet exposed. As such, quarantine can be used for any disease that is spread from

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person to person. In practice, however, because the activity restrictions associated with quarantine infringe on personal liberties, the intervention is generally reserved for diseases that are easily and rapidly spread from person to person. The indication for quarantine for diseases purely transmitted by the airborne route is clear. However, this tool can also be useful where transmission can occur through close personal contact with secretions or objects contaminated by an ill person. Smallpox is an excellent example of a disease where quarantine can be effective in controlling spread although transmission may occur by means other than the airborne route.

Will the public accept the use of quarantine?
Yes. The negative connotations associated with quarantine likely stem from its misuse or abuse in the past. Although inappropriate use of quarantine, either voluntary or mandatory, would not and should not be accepted by the public, efforts should be made to gain public acceptance when use of this measure is indicated. Experiences with the use of quarantine during the SARS outbreaks of 2003 suggest that public acceptance of quarantine may be greater than previously thought. In Canada, almost all persons asked to observe quarantine restrictions did so willingly, with only a small number requiring a legal order to gain cooperation. In all cases, cooperation and acceptance was achieved through clear and comprehensive communication with the public about the rationale for use of quarantine.

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Appendix D3
Guidelines for Evaluating Homes and Facilities for Isolation and Quarantine

I. Isolation Facilities

A. Home isolation

Ideally, persons who meet the criteria for a confirmed or probable case of SARS-CoV disease or a SARS RUI and who do not require hospitalization for medical reasons should be isolated in their homes. The home environment is less disruptive to the patient's routine than isolation in a hospital or other community setting.

Any home being considered as an isolation setting should be evaluated by the patient's physician, health department official, or other appropriate person to verify its suitability. The assessment should center on the following minimum standards for home isolation of a SARS patient:

Infrastructure
- Functioning telephone
- Electricity
- Heat source
- Potable water
- Bathroom with commode and sink
- Waste and sewage disposal (septic tank, community sewage line)

Accommodations
- Ability to provide a separate bedroom for the SARS patient
- Accessible bathroom in the residence; if multiple bathrooms are available, one bathroom designated for use by the SARS patient

Resources for patient care and support
- Primary caregiver who will remain in the residence and who is not at high risk for complications from SARS-CoV disease
- Meal preparation
- Laundry
- Banking
- Essential shopping
- Social diversion (e.g., television, radio, internet access, reading materials)
- Masks, tissues, hand hygiene products

B. Isolation in a community-based facility

When persons requiring isolation cannot be accommodated either at home or in a healthcare facility, a community-based facility for isolation will be required. The availability of a community-based facility will be particularly important during a large outbreak.

Much of the work in identifying and evaluating potential sites for isolation should be conducted in advance of an outbreak as part of preparedness planning. Each jurisdiction should assemble a team to identify appropriate locations and resources for community SARS isolation facilities,

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establish procedures for activating them, and coordinate activities related to patient management. The team should consider the use of both existing and temporary structures. Options for existing structures include community health centers, nursing homes, apartments, schools, dormitories, and hotels. Options for temporary structures include trailers, barracks, tents, and ubble systems.☐ Considerations include the following:

Basic infrastructure requirements
- Meets all local code requirements for a public facility
- Functioning telephone system
- Electricity
- Heating, ventilating, and air conditioning (HVAC)
- Potable water
- Bathroom with commode and sink
- Waste and sewage disposal (septic tank, community sewage line)
- Multiple rooms for housing ill patients

Ventilation capacity
- Preferably, rooms with individual ventilation systems (e.g., room or window fan coil units that do not recirculate to other parts of the building)
- Alternatively, facility with a non-recirculating ventilation system that permits redirection of the air flow from corridors and staff areas into patient rooms.

Access considerations
- Proximity to hospital
- Parking space
- Ease of access for delivery of food and medical and other supplies
- Handicap accessibility

Space requirements
- Administrative offices
- Offices/areas for clinical staff
- Holding area for contaminated waste and laundry
- Laundry facilities (on- or off-site)
- Meal preparation (on- or off-site)

Social support resources
- Television and radio
- Reading materials

To determine priorities among available facilities, consider these features:

- Separate rooms for patients or areas amenable to isolation of patients with minimal construction
- Single pass (non-recirculatiing) ventilation for each room or isolation area
- Feasibility of modifying existing infrastructure as needed to meet AIIR standards (see Supplement I)
- Feasibility of controlling access to the facility and to each room
- Availability of potable water, bathroom, and shower facilities
- Facilities for patient evaluation, treatment, and monitoring
- Capacity for providing basic needs to patients

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- Rooms and corridors that are amenable to disinfection
- Facilities for accommodating staff
- Facilities for collecting, disinfecting, and disposing of infectious waste
- Facilities for collecting and laundering infectious linens and clothing
- Ease of access for delivery of patients and supplies
- Legal/property considerations

Additional considerations include:

- Staffing and administrative support
- Training
- Ventilation and other engineering controls
- Ability to support appropriate infection control measures
- Availability of food services and supplies
- Ability to provide an environment that supports the social and psychological well-being of patients
- Security and access control
- Ability to support appropriate medical care, including emergency procedures
- Access to communication systems that allow for dependable communication within and outside the facility
- Ability to adequately monitor the health status of facility staff

II. Quarantine Facilities

A. Home quarantine

A person residence is generally the preferred setting for quarantine. As with isolation, home quarantine is often least disruptive to a person routine. Because persons who have been exposed to SARS-CoV may need to stay in quarantine for as long as 10 days, it is important to ensure that the home environment meets the ongoing physical, mental, and medical needs of the individual. An evaluation of the home for its suitability for quarantine should be performed, ideally before the person is placed in quarantine. This evaluation may be performed on site by a health official or designee. However, from a practical standpoint, it may be more convenient to evaluate the residence through the administration of a questionnaire to the individual and/or the caregiver. Points to be considered in the evaluation include:

- Availability of/access to educational materials about SARS and quarantine
- Basic utilities (water, electricity, garbage collection, and heating or air-conditioning as appropriate)
- Basic supplies (clothing, food, hand-hygiene supplies, laundry services)
- Mechanism for addressing special needs (e.g., filling prescriptions)
- Mechanism for communication, including telephone (for monitoring by health staff, reporting of symptoms, gaining access to support services, and communicating with family)
- Accessibility to healthcare workers or ambulance personnel
- Access to food and food preparation
- Access to supplies such as thermometers, fever logs, phone numbers for reporting symptoms or accessing services, and emergency numbers (these can be supplied by health authorities if necessary)
- Access to mental health and other psychological support services

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B. Quarantine in a community-based facility

Although the home is generally the preferred setting for quarantine, alternative sites for quarantine may be necessary in certain situations. For example, persons who do not have a home situation suitable for this purpose or those who require quarantine away from home (e.g., during travel) will need to be housed in an alternative location. Because persons who have been exposed to SARS-CoV may require quarantine for as long as 10 days, it is important to ensure that the environment is conducive to meeting the ongoing physical, mental, and medical needs of the individual. Ideally, one or more community-based facilities that could be used for quarantine should be identified and evaluated as part of SARS preparedness planning. The evaluation should be performed on site by a public health official or designee. Additional considerations, beyond those listed above for home quarantine, include:

- Separate rooms and bathrooms for each contact
- Delivery systems for food and other needs
- Staff to monitor contacts at least daily for fever and respiratory symptoms
- Transportation for medical evaluation for person who develop symptoms
- Mechanisms for communication, including telephone (for monitoring by health staff, reporting of symptoms, gaining access to support services, and communicating with family)
- Services for removal of waste. (Note: No special precautions for removal of waste are required as long as persons remain asymptomatic)

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Appendix D4
Threshold Determinants for the Use of Community Containment Measures

Parameter	Variable
Epidemiologic parameters of the outbreak	Absolute number of cases
	Rate of incident cases
	Number of hospitalized cases
	Number and percent of cases with no identified epidemiologic link
	Morbidity (including disease severity) and mortality
	Number of contacts under surveillance and/or quarantine
Healthcare resources	Hospital/facility bed capacity
	Isolation/negative pressure room capacity
	Staff resources
	Patient/staff ratio
	Number of isolated or quarantined staff
	Availability of specifically trained specialists and ancillary staff
Equipment and supplies	Availability of ventilators
	Availability of other respiratory equipment
	Availability of personal protective equipment and other measures
	Availability of therapeutic medications (SARS and non-SARS specific)
Public health resources	Investigator to case and contact ratios
	Number of contacts under active surveillance
	Number of contacts under quarantine
	Ability to rapidly trace contacts (number of untraced/interviewed contacts)
	Ability to implement and monitor quarantine (staff to contact ratio)
	Ability to provide essential services (food, water, etc.)
Community cooperation, mobility and compliance	Degree of compliance with voluntary individual isolation
	Degree of compliance with active surveillance and voluntary individual quarantine
	Degree of movement out of the community
	Degree of compliance with community-containment measures

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Appendix D5
Preparedness Checklist for Community Containment Measures

General

- ❑ Establish an incident command structure that can be used for SARS response.
- ❑ Establish a legal preparedness plan
- ❑ Establish relationships with partners, such as law enforcement, first responders, healthcare facilities, and the legal community.
- ❑ Plan to monitor and assess factors that will determine the types and levels of response, including the epidemiologic profile of the outbreak, available local resources, and level of public acceptance and participation.
- ❑ Develop communication strategies for the public, government decision makers, healthcare and emergency response providers, and the law enforcement community.

Management of cases and contacts (including quarantine)

- ❑ Develop protocols, tools, and databases for:
  - Case surveillance
  - Clinical evaluation and management
  - Contact tracing, monitoring, and management
  - Reporting criteria
- ❑ Develop standards and tools for home and non-hospital isolation and quarantine
- ❑ Establish supplies for non-hospital management of cases and contacts
- ❑ Establish a telecommunications plan for otlines? or other services for:
  - Case and contact monitoring and response
  - Fever triage
  - Public information
  - Provider information
- ❑ Plan to ensure provision of essential services and supplies to persons in isolation and quarantine, including:
  - Food and water
  - Shelter
  - Medicines and medical consultations
  - Mental health and psychological support services
  - Other supportive services (e.g., day care).
  - Transportation to medical treatment, if required
- ❑ Plan to address issues of financial support, job security, and prevention of stigmatization

Non-hospital-based isolation of cases

- ❑ Identify appropriate community-based facilities for isolation of patients who have no substantial healthcare requirements.
- ❑ Develop policies related to use of these facilities.
- ❑ Identify facilities for persons for whom home isolation is indicated but who do not have access to an appropriate home setting, such as travelers and homeless populations.
- ❑ Ensure that required procedures for assessment of potential isolation or quarantine sites are available and up to date.

Community containment measures

- ❑ Ensure that legal authorities and procedures are in place to implement the various levels of movement restrictions as necessary.

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- ❑ Identify key partners and personnel for the implementation of movement restrictions, including quarantine, and the provision of essential services and supplies:
  - Law enforcement
  - First responders
  - Other government service workers
  - Utilities
  - Transportation industry
  - Local businesses
  - Schools and school boards
- ❑ Develop training programs and drills
- ❑ Ensure fit-testing and training in PPE for responders and providers as necessary
- ❑ Develop plans for the mobilization and deployment of public health and other community service personnel

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Supplement E: Managing International Travel-Related Transmission Risk

Summary of Changes in Version 2

This Supplement has undergone minor revisions in wording for consistency with the revised case definition for SARS-CoV disease.

Contents

Managing International Travel-Related Transmission Risk

Goals

- Prevent the introduction of SARS-CoV (and spread from an introduction) into the United States from SARS-affected areas.
- Prevent exportation of SARS-CoV from the United States if domestic transmission presents an increased risk of exportation.
- Reduce the risk of SARS-CoV disease among outbound travelers to SARS-affected areas.
- Prevent the transmission of SARS-CoV to passengers on a conveyance with a SARS patient, and evaluate and monitor other passengers to detect SARS-like illness and prevent further spread.

Key concepts

- SARS-CoV can spread rapidly on a global scale through international travel if control measures are not implemented.
- SARS-CoV transmission usually involves close contact and is often limited to healthcare settings or households; the risk of SARS to travelers visiting an affected area is low unless travelers are exposed to these settings.
- Travelers visiting SARS-affected areas can reduce their risk by following recommended guidelines and can help prevent transmission by monitoring their health during and for 10 days after travel.
- SARS patients can transmit SARS-CoV to other passengers on conveyances and should postpone travel until they are no longer infectious.
- Active follow-up of passengers on conveyances with SARS cases can help prevent further spread by informing passengers of their exposure and providing instructions for monitoring health and seeking medical evaluation if symptoms develop.
- Transmission of SARS-CoV on conveyances can occur only if an undetected case boards. Therefore, the primary preventive strategy is to prevent symptomatic persons from traveling.

Priority activities

- Screen incoming travelers from SARS-affected areas for SARS, and provide guidance about monitoring their health and reporting illness.
- Provide guidance to outbound travelers about active SARS-affected areas and measures to reduce the risk of acquiring SARS-CoV disease during travel.
- If SARS-CoV transmission in the United States presents an increased risk of exporting SARS-CoV to other countries, then screen outbound travelers to prevent such exportation.
- Ensure the appropriate evaluation and management of SARS cases and potentially exposed passengers and crew members on conveyances.

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I. Rationale and Goals

The rapid global spread of SARS-CoV in 2003 was facilitated by international travel, as illustrated by the initial dissemination of the SARS outbreak from Hong Kong. Although travelers visiting SARS-affected areas are potentially at risk of contracting SARS-CoV disease, SARS-CoV transmission is generally localized and often limited to specific settings (e.g., hospitals) or households of SARS-CoV patients, even in settings with large outbreaks. Consequently, the overall of risk of SARS-CoV disease for outbound travelers who are not exposed to these settings is low. Nevertheless, nearly all U.S. laboratory-confirmed SARS cases were in travelers to SARS-affected areas. Screening and evaluating travelers for SARS-like symptoms, educating them about SARS, and reporting illness should therefore decrease the risk of travel-associated SARS. Because SARS-CoV can sometimes be transmitted on conveyances (e.g., airplanes), it is also important to prevent spread from an ill passenger with a SARS-like illness and to identify and monitor contacts on the conveyance for SARS-like illness.

Because of the significant impact of travel on the spread of communicable diseases such as SARS-CoV disease, legal authority exists at local, state, federal, and international levels to control the movement of persons with certain communicable diseases within and between jurisdictions. The types of measures that might be used to modify the risk of travel-related SARS-CoV disease range from distribution of health alert notices and arrival screening to quarantine of new arrivals and restrictions or prohibitions on nonessential travel. Although the states have authority for movement restrictions within states, federal laws govern movement between states and across international borders. Thus, airports and other ports of entry are sites of multiple overlapping jurisdictions where the interplay between various authorities must be clearly understood (See Section VII: Roles and Responsibilities, below).

The overall goals for the management of international travel-related SARS-CoV transmission risk are to:

- Prevent the introduction of SARS-CoV (and spread from an introduction) into the United States from SARS-affected areas.
- Prevent exportation of SARS-CoV from the United States if domestic transmission presents an increased risk of exportation.
- Reduce the risk of SARS among outbound travelers to SARS-affected areas.
- Prevent the spread of SARS-CoV to passengers on a conveyance with a SARS patient, and evaluate or monitor other passengers to detect SARS-like illness and prevent further spread.

II. Lessons Learned

During the 2003 global response, the control strategy for the United States included issuing travel alerts and advisories (see Box), distributing health alert notices to travelers arriving from areas with SARS, and conducting visual inspections of arriving travelers to facilitate early identification of imported cases and response to reports of ill passengers. CDC staff met more than 11,000 direct and indirect flights from SARS-affected areas and distributed more than 2.7 million health alert notices to arriving passengers as well as to persons arriving at 13 U.S. land border crossings near Toronto and departing passengers bound for the United States from the Toronto airport. Health alert notices informed returning travelers of potential exposure to SARS-CoV. They alerted travelers to the symptoms of SARS-CoV disease and advised them to promptly seek medical attention if symptoms develop. The notices also provided information and instructions for physicians.

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Travel Alerts and Travel Advisories

- Travel alerts and advisories are notifications of an outbreak of disease occurring in a geographic area. A ***travel alert***, a lower-level notice, provides information about the disease outbreak and informs travelers how to reduce their risk of acquiring the infection. An alert does not include a recommendation against nonessential travel to the area.
- When the health risk for travelers is thought to be high, a ***travel advisory*** recommending against nonessential travel to the area is issued. Travel advisories are intended to reduce the number of travelers to high-risk areas and the risk for spreading disease to other areas.
- CDC issues travel alerts and advisories based on evidence of transmission, spread of disease, and effectiveness of local prevention efforts. The quality of local disease surveillance and the accessibility of medical care are additional considerations.

During the outbreak response, CDC quarantine staff met planes reporting an ill passenger to facilitate 1) evaluation of the passenger for possible SARS-CoV disease, 2) collection of locating information on the other passengers, and 3) coordination with federal and local authorities. If the ill passenger was determined to be a possible SARS case, then the locating information was forwarded to state and local health departments for contact tracing.

Border and travel-related activities implemented in countries more seriously affected by SARS included pre-departure temperature and symptom screening, arrival screening (asking passengers about travel history and possible exposure to SARS-CoV), top lists? (maintaining lists of persons who were possible SARS cases or contacts to prevent them from traveling), and quarantine of travelers returning from other SARS-affected areas.

Lessons learned from this response support the recommendations included in this Supplement. These lessons included the following:

- SARS-CoV can spread rapidly on a global scale through international travel if control measures are not implemented.
- SARS-CoV transmission is usually localized and often limited to healthcare settings and households; the risk of SARS-CoV disease to travelers visiting an affected area is low unless travelers are exposed in these settings.
- Patients with SARS-CoV disease can transmit infection to other passengers on conveyances and should postpone travel until they are no longer infectious.
- SARS-CoV transmission can occur within the close confines of conveyances. Resulting infections usually represent a failure to recognize symptomatic index cases and their high-risk contacts, who should have been prevented from traveling.
- Active follow-up of passengers on conveyances with SARS cases can help prevent further spread by informing passengers of their exposure and providing instructions for monitoring their health and seeking medical evaluation if they become ill.

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III. Activities Directed to Inbound Travelers

The nature and scope of activities related to travelers entering or in the United States will differ depending on the extent of SARS-CoV transmission in the United States and in the country or countries from which the passenger has traveled (Appendix E1). When SARS-CoV transmission is absent or limited in the United States, then efforts will focus on promptly identifying cases imported from SARS-affected areas and preventing further spread from such cases. Guidelines have been developed for various groups who might be arriving from areas affected by SARS-CoV (www.cdc.gov/ncidod/sars/hostingarrivals.htm; www.cdc.gov/ncidod/sars/business_guidelines.htm). If active transmission of SARS-CoV is occurring in a U.S. city or area, then it will be important to prevent spread to other areas in the United States, possibly by limiting or restricting non-essential travel into or from the affected area.

Objective: Prevent spread from SARS-CoV-infected travelers entering the United States.

Basic Activities

- Inform incoming travelers about SARS, and provide guidance on monitoring their health and reporting illness to the appropriate authorities. This may be accomplished by use of:
  - Videos or public announcements on the conveyance just before arrival
  - Distribution of health alert notices before or upon arrival (www.cdc.gov/ncidod/sars/travel_alert.htm)
  - Posters or public announcements in airports
- Evaluate travelers who report SARS-like symptoms (e.g., fever or respiratory symptoms) during travel, and collect locating information for the other passengers and crew (See Section V: Activities Related to SARS on Conveyances).
- Respond to reports of ill passengers on airplanes or other conveyances arriving from areas with SARS-CoV disease.

Enhanced Activities

- If the level of transmission in another country is high, incoming passengers from that country might require enhanced screening and evaluation through:
  - Visual inspection of all travelers as they disembark
  - Screening of travelers for symptoms of SARS-CoV disease and recent high-risk exposures to SARS-CoV (e.g., SARS-CoV patients or high-risk settings) through a self-administered questionnaire
  - Temperature screening
- Quarantine inspectors at CDC quarantine stations and public health workers in locations near other ports of entry may be required to meet all airplanes or other conveyances arriving from areas with SARS to question crew members about any ill passengers and to visually inspect passengers upon disembarkation.
- If the level of SARS-CoV transmission in a U.S. area is sufficiently high to present a substantial risk to travelers, then non-essential travel to this area may be limited, cancelled, or subjected to increased surveillance measures.
- Other activities that may be considered but whose effectiveness is unclear (especially given the resources required for implementation) include:
  - Ten-day quarantine of all passengers arriving from SARS-affected areas
  - Collection of locating information on all arriving passengers

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IV. Activities Directed to Outbound Travelers

Activities related to outbound travelers will vary based on the extent of SARS-CoV transmission in the United States and at the destination (Appendix E1). If there is little SARS-CoV transmission in the United States, the goal is to inform travelers about the risk of SARS and appropriate measures to reduce the risk of acquiring SARS-CoV infection during travel (www.cdc.gov/ncidod/sars/travel_advice.htm). If there is extensive SARS-CoV transmission in the United States, then preventing the exportation of SARS-CoV will be an added objective.

Objective: Minimize outbound travelers?risk for exposure to SARS-CoV during travel or the risk of spreading SARS-CoV to other localities.

Basic Activities

- Issue travel alerts and advisories (see Box in Section II. Lessons Learned).
- Provide educational materials to travelers on measures to reduce the risk of SARS-CoV disease.

Enhanced Activities

- If there are locations with extensive SARS-CoV transmission where control measures do not appear to be effective, further travel restrictions (e.g., cancellation of flights) to those locations may be considered (see Section VII: Roles and Responsibilities).

- If the level of SARS-CoV transmission in the United States presents an increased risk for exportation, then some or all of the following might be implemented:
  - Pre-departure screening (e.g., temperature screening, visual screening) of outbound travelers
  - Health certifications, i.e., requiring travelers to have a medical examination before departure, with a doctor statement that they are free of SARS-CoV symptoms and have not had close contact to a SARS-CoV patient in the past 10 days
  - Stop lists, i.e., maintaining lists of SARS cases and close contacts at ports of departure against which travelers?names can be checked to prevent them from traveling

V. Activities Related to SARS on Conveyances

A SARS patient on a conveyance presents a risk of transmission to other passengers and crew and to non-passengers on arrival and a risk of further spread from passengers who become infected. Many of the activities listed below are performed by CDC staff at the eight current quarantine stations and by public health workers in locations near other ports of entry with assistance by CDC quarantine station staff from that region.

Objective: Protect co-passengers and crew members from SARS-CoV-infected passengers and from transmission associated with passengers exposed to the index case.

Activities

Management of a potential SARS patient on a conveyance

- Separate the potential SARS patient as completely as possible from other passengers and the crew. The ill passenger should wear a surgical mask.

- Ensure that persons caring for the ill passenger follow infection control measures recommended for cases of SARS (See Supplement I and www.cdc.gov/ncidod/sars/flight_crew_guidelines.htm).
- If possible, designate a separate toilet for the exclusive use of the ill passenger.
- Notify the airport or land port authorities at the destination so that health authorities are informed and prepared to meet the conveyance upon arrival, to manage the ill passenger, and to evaluate other passengers.

Management on arrival

- Separate the ill passenger from exposed, well co-passengers at the soonest moment both in transit and after arrival.
- Place the ill passenger in an isolation facility (if available), and assess.
- Assess other passengers for illness, types of exposures to the ill passenger, and other potential SARS-CoV exposures. EMS personnel and local emergency department staff can perform these evaluations using appropriate precautions (See Supplement I and www.cdc.gov/ncidod/sars/airpersonnel.htm).
- Transfer the ill passenger to a local healthcare facility for further evaluation if needed. Protocols and memoranda of agreement with ambulance services and hospitals with appropriate infection control measures in place should be established in advance (see Section VIII: Preparedness Planning.)

Management of passengers and crew on the same conveyance

- Collect locating information for all passengers and crew. This information should be obtained directly from passengers, if possible. If a potential SARS case on a conveyance is not detected until after arrival, this information can be obtained from passenger manifests, staff lists, and/or customs forms.
- Inform all passengers on board about SARS, and advise them to seek immediate medical attention if fever or respiratory symptoms develop within 10 days of the flight. Pay particular attention to close contacts of the case.
- Consider temporary detention of the plane and arrangements for monitoring and quarantine of all passengers and crew in some circumstances (e.g., if the ill passenger had contact with a laboratory-confirmed SARS case and had significant respiratory symptoms during a prolonged flight). Home quarantine may be used for persons who live in or near the port of arrival; a designated facility should be arranged for the others (See Supplement D).

VI. De-escalation of Control Measures

Objective 1: Downgrade or remove travel alerts and advisories as appropriate.

Activities

- CDC will downgrade a travel advisory to a travel alert when there is:
  - Adequate and regularly updated reporting of surveillance data from the area
  - No evidence of ongoing unlinked transmission for 20 days (two incubation periods) after the onset of symptoms for the last confirmed case without an epidemiologic link, as reported by public health authorities.
- CDC will remove a travel alert when there is:
  - Adequate surveillance data from the area

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- No evidence of new cases for 30 days (three incubation periods) after the date of onset of symptoms for the last case, as reported by public health authorities.
- Limited or no recent instances of exported cases from the area. An *exported case* is an ill person who meets the definition for a probable or confirmed case of SARS-CoV disease and who acquired SARS-CoV infection in the area in question and then traveled outside the affected area to another region and was diagnosed there (i.e., the person was not identified as a part of contact tracing activities, and travel was not restricted).

Objective 2: Reduce measures used for inbound travelers as appropriate.

Activities

For all passengers arriving from areas with SARS-CoV transmission:

- Continue general education for passengers from a particular area until the travel alert has been lifted (30 days after the onset of symptoms for the last case in that area). Because travel patterns may make it difficult to determine passengers' points of origin, it may be more practical to continue general education until travel alerts have been lifted for all areas.
- Continue evaluating travelers who report symptoms of SARS during travel until the travel alert for that area has been lifted (30 days after the onset of symptoms for the last case from that area).

For passengers arriving from areas under a travel advisory:

- Continue the use of screening questionnaires until the area of origin is downgraded from a travel advisory to a travel alert.
- Continue meeting conveyances from SARS-affected areas and visually inspecting passengers until the area of origin is downgraded from a travel advisory to a travel alert.

Objective 3: Reduce other measures used for outbound travelers as appropriate.

Activities

- Continue pre-departure fever and symptom screening for passengers departing from areas with ongoing unlinked transmission, but consider discontinuing these activities 20 days after the onset of symptoms for the last unlinked case.
- Continue stop lists until there are no longer any cases under isolation or contacts under quarantine.

Objective 4: Reduce measures for management of passengers with SARS-CoV disease on conveyances as appropriate.

Activities

- Continue meeting any flight with an ill passenger on board who has SARS-like symptoms. If the passenger is seriously ill, evaluate and follow-up according to established protocols.
- Continue to collect locating information as long as the passenger has symptoms compatible with SARS-CoV disease and has traveled from an area with ongoing unlinked transmission (under a travel advisory). For areas that have been downgraded to a travel alert, locating information

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may not be needed unless the ill passenger meets the epidemiologic criteria for likely exposure to SARS-CoV (See Supplement B, Appendix B1).
- The need for monitoring and quarantine of contacts of a passenger from an area on travel alert should be determined after the ill passenger has been fully evaluated.

VII. Roles and Responsibilities

Because jurisdictions and authorities at airports and other ports of entry overlap, it is important that local, state, and federal staff establish protocols and outline roles and responsibilities in advance of a public health emergency.

Currently, eight of the international airports have permanent federal quarantine staff (www.cdc.gov/ncidod/dq/quarantine_stations.htm). These federal quarantine staff have primary responsibility for handling the quarantine-related travel activities described above. State and local public health staff may provide assistance. At other airports and ports, local and state public health staff or other deployed persons will have primary responsibility, under the coordination of regional quarantine personnel. The local health jurisdiction will have primary responsibility for follow-up and management of passengers who may have been exposed to a SARS case on a conveyance.

Most local and state jurisdictions have adequate quarantine authority to require a person with a possible communicable disease, such as SARS-CoV disease, or their contacts to be detained for evaluation. Federal authority can be used if necessary. Public health officials should work closely with local, state, and federal law enforcement officials to enforce quarantine authority for persons who do not cooperate voluntarily.

VIII. Preparedness Planning

A. Legal authority for restricting movement

In advance of the possible reappearance of SARS-CoV, public health officials should:

- Work closely with their legal counterparts to ensure that the legal authority for movement restrictions at the local, state, and federal levels is known and understood and to establish boundaries of authority and processes to address multi-jurisdictional issues (See Supplement A).
- Develop plans for making decisions on movement restrictions, such as: 1) requirements for pre-departure screening, 2) requirements for arrival screening and/or quarantine, 3) travel prohibitions on cases and contacts, 4) restrictions related to use of mass transit systems, and 5) cancellation of non-essential travel.
- Work closely with local, state, and federal law enforcement to develop plans for enforcement of these restrictions.

B. Engagement of key partners

In advance of the possible reappearance of SARS-CoV, public health officials should:

- Begin preparedness planning by identifying key partners representing: 1) law enforcement (local, state, federal), 2) legal community, 3) emergency medical services (for evaluation of ill arriving passengers and transportation to the hospital), 4) hospital personnel, 5) transportation industry personnel, and 6) other emergency management personnel. The partners should be involved in the planning process.

Supplement E: Managing International Travel-Related Transmission Risk

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- Develop plans for the training, mobilization, and deployment of pertinent public health and other staff.
- Conduct training programs and drills.
- Provide respirator fit-testing and training in use of PPE for persons at risk for exposure to possible SARS cases.
- Plan for the diversion of conveyances carrying supplies for maintenance of critical infrastructure around key transportation hubs that may be affected by SARS-CoV.

C. Protocols for management of ill arriving passengers

Public health officials and CDC quarantine staff, in collaboration with legal and law enforcement authorities, should develop protocols for the management of ill arriving passengers at ports of entry, including provisions for:

- Meeting flights with a reported ill passenger
- Establishing notification procedures and communications links
- Separating the ill passenger during assessment
- Assessing the ill passenger and referring for evaluation and care
- Transporting the ill passenger to a designated healthcare facility (see Supplement D.)
- Collecting locating information on other passengers and crew
- Collecting the flight manifest, customs declarations, and other information for contact tracing
- Identifying any other ill passengers and separating them from well passengers
- Quarantining contacts if necessary, including transportation to a quarantine facility
- Providing enforcement for uncooperative ill passengers or contacts

See Supplement A.

D. Memoranda of agreement (MOA) with healthcare facilities, transport services, emergency medical systems, and physicians

- State and local public health officials should work with federal quarantine staff to develop MOAs with hospitals near ports of entry; these facilities must be equipped to isolate, evaluate, and manage possible SARS patients (see Supplement C).
- Agreements should include arrangements with a designated emergency medical service for on-site assessment of ill passengers and transportation to a hospital for evaluation.

See Supplement A.

E. Designation of quarantine facility

State and local public health officials should identify a facility for travelers who are designated as contacts and who require quarantine but cannot be quarantined at home.

F. Roles and responsibilities

Roles and responsibilities should be outlined for the various partners and the various levels of jurisdiction (local, state, and federal) for each component of the response.

For additional information and material on prevention of SARS travel-related risks, see www.cdc.gov/ncidod/sars/travel.htm.

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Appendix E1
Travel-Related SARS Response Matrices

Matrix 1: Suggested Activities for Inbound Travelers

Level of SARS-CoV transmission activity in the United States	Suggested actions, by situation in originating location

No known SARS-CoV transmission worldwide **or** known SARS-CoV activity but only imported cases	***Imported cases; limited transmission in location of origin***
	• Distribute health alert notices to all arrivals.
	• Implement passive monitoring of all arriving passengers for development of fever or respiratory symptoms.
	• Advise persons who develop symptoms to self-report before presentation to healthcare provider.
	• Follow quarantine officer protocol for arriving ill passengers
	  o Follow procedures for ill contacts
	  o Collect 30-day contact information for passengers on conveyances with ill passenger
	• Consider enhanced surveillance for ill passengers.
	Extensive transmission/effective control measures
	• Implement active surveillance for ill passengers.
	• Implement symptom screening for all arriving passengers.
	• Medically evaluate all passengers with symptoms.
	• Consider 10-day quarantine for asymptomatic arrivals.
	• Collect contact information on all arriving passengers.
	Extensive transmission/ineffective control measures
	• Prohibit all non-essential arrivals.
	• Conduct medical screening upon arrival.
	• Implement mandatory 10-day quarantine for all asymptomatic arrivals.
	• Collect contact information on all arriving passengers.

Extensive SARS-CoV transmission in United States and community, with effective control measures	***Imported cases; limited transmission in location of origin*** • Minimize non-essential travel. • Consider restricting travel within jurisdictions. • Advise arrivals to follow procedures based on situation in location of origin. ***Extensive transmission/effective control measures*** • Minimize non-essential travel. • Consider restricting travel within jurisdictions. • Advise arrivals to follow procedures based on situation in location of origin. ***Extensive transmission/ineffective control measures*** • Prohibit all non-essential arrivals. • Conduct medical screening upon arrival. • Implement mandatory 10-day quarantine for all asymptomatic arrivals. • Collect contact information on all arriving passengers.

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Extensive SARS-CoV transmission in United States and community, with ineffective control measures	***Imported cases; limited transmission in location of origin*** • Prohibit all non-essential arrivals. • Advise arrivals to follow procedures based on situation in location of origin. ***Extensive transmission/effective control measures*** • Prohibit all non-essential arrivals. • Advise arrivals to follow procedures based on situation in location of origin. ***Extensive transmission/ineffective control measures*** • Prohibit all non-essential arrivals. • Conduct medical screening upon arrival. • Implement mandatory 10-day quarantine for all asymptomatic persons. • Collect contact information on all arriving passengers.

Supplement E: Managing International Travel-Related Transmission Risk
(continued from previous page)

Matrix 2: Suggested Activities for Outbound Travelers

Level of SARS-CoV transmission	Suggested actions
No known SARS-CoV transmission worldwide	• No special activities
SARS activity in United States and community, but only imported cases	• Issue travel alerts for countries with limited transmission. • Issue travel advisories for countries with extensive transmission. • Prohibit non-essential travel to countries where control measures are inadequate. • Consider: o Medical screening at all exit points o Travel prohibition for all persons meeting case definition with epidemiologic link to transmission setting o Medical assessment for all with signs/symptoms without epidemiologic link • Prohibit travel for persons under quarantine.
Extensive SARS-CoV transmission in United States and community, with effective control measures	• Issue international travel alerts/advisories/prohibitions as above. • Issue alerts/advisories/prohibitions for domestic destinations based on setting and transmission pattern. • Initiate medical screening of departing passengers at all exit points. • Prohibit travel for all persons meeting case definition. • Prohibit travel for all persons under quarantine. • Require health certificate for exit.
Extensive SARS-CoV transmission in United States and community, with ineffective control measures	• Issue international travel alerts/advisories/prohibitions as above. • Issue domestic alerts/advisories/prohibitions as above. • Prohibit nonessential outbound travel. • Require health certificate for essential travel. • Implement medical screening at all exit points. • Prohibit travel for all persons meeting case definition. • Prohibit travel for all persons under quarantine.

For more information, visit www.cdc.gov/ncidod/sars or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Supplement F: Laboratory Guidance

Summary of Changes in Version 2

This version of Supplement F includes additional guidance on the types of specimens to collect for SARS-CoV testing and the optimal timing for collection. Three new appendices have been included:

- Appendix F3: Guidelines for Clinicians: The Consent Process for SARS-CoV RT-PCR and EIA Testing at CDC and Public Health Laboratories
- Appendix F6: Guidelines for Medical Surveillance of Laboratory Personnel Working with SARS-CoV
- Appendix F8: Guidelines for Laboratory Diagnosis of SARS-CoV Infection

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Laboratory Guidance

Goals

- Provide the public health community with ready access to high-quality SARS-CoV diagnostics.
- Ensure that SARS-CoV laboratory diagnostics are used safely and appropriately and that results are interpreted appropriately.

Key concepts

- Efficient SARS-CoV diagnostic assays have been developed, but they frequently do not provide a definitive diagnosis early in illness.
- Although the sensitivity of current assays probably cannot be improved significantly, changes in the type, quality, and processing of specimens may improve the ability to detect SARS-CoV infection in patients.
- The majority of SARS-like illnesses will be caused by other respiratory pathogens; rapid and accurate diagnosis of these infections will make it easier to manage community anxiety about SARS-like illnesses.
- The possibility of false-positive and false-negative results with both PCR and serologic assays should always be considered when interpreting results; clear strategies to minimize such possibilities and to confirm test results are essential.

Priority activities

- Improve the ability to detect SARS-CoV infection by optimizing the selection and timing of specimen collection and processing.
- Provide SARS-CoV assays for RT-PCR testing to Laboratory Response Network (LRN) laboratories and for serologic testing to state public health laboratories.
- Distribute proficiency panels and questionnaires to participating laboratories to determine the ability of laboratories to provide valid SARS-CoV diagnostics.
- Provide guidance on laboratory safety for SARS-CoV and other respiratory diagnostic testing and for possible SARS-CoV-containing specimens submitted for other tests.
- Provide guidance for interpreting test results, taking into account the potential for false-positive and false-negative results and the availability of applicable clinical and epidemiologic information.
- Identify surge capacity for laboratory testing in the event of a large SARS outbreak.

Supplement F: Laboratory Guidance
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I. Rationale and Goals

Laboratory diagnostics are essential for detecting and documenting a reappearance of SARS-CoV, responding to and managing outbreaks, and managing concerns about SARS in patients with other respiratory illnesses. The identification of SARS-CoV led to the rapid development of enzyme immunoassays (EIA) and immunofluorescence assays (IFA) for serologic diagnosis and reverse-transcription PCR (RT-PCR) assays for detection of SARS-CoV RNA in clinical samples. These assays can be very sensitive and specific for detecting antibody and RNA, respectively, in the later stages of SARS-CoV infection. However, both are less sensitive for detecting infection early in illness.

As part of SARS preparedness, CDC is working to improve diagnostics by developing new tools that should make definitive diagnosis early in illness possible. In the interim, CDC is applying new knowledge about the natural history of SARS-CoV disease to improving diagnostic yield by optimizing the type, timing, and quantity of specimens collected. CDC's laboratory diagnostics plan is designed to achieve two primary goals:

- Provide ready access to high-quality SARS-CoV laboratory diagnostics for the public health community
- Ensure that SARS-CoV laboratory diagnostics are used safely and appropriately and that results are interpreted appropriately

II. Lessons Learned

The following lessons learned from the global and U.S. experience with SARS-CoV laboratory diagnostics have been considered in developing this Supplement:

- High-quality SARS-CoV diagnostic assays have been developed, but they frequently do not provide a definitive diagnosis early in illness and need to be used and interpreted carefully.
- Although the sensitivity of SARS-CoV PCR and antibody assays probably cannot be significantly improved, changes in the type, quality, and quantity of specimens and in procedures for processing specimens may improve the detection of SARS-CoV.
- The majority of SARS-like illnesses will be caused by other respiratory pathogens. Diagnosis of these infections will often make it easier to manage community anxiety about SARS-CoV.
- The possibility of false-positive and false-negative results with both PCR and serologic assays should always be considered when interpreting results. Clear strategies to minimize such possibilities and to confirm test results are essential.

III. Diagnostic Assays

Among the several types of assays used to detect SARS-CoV, RT-PCR and antibody assays are the most commonly used.

A. Real-Time RT-PCR Assays

Many laboratories have developed SARS-CoV real-time RT-PCR assays (www.cdc.gov/ncidod/sars/lab/rtpcr/), which have several advantages over traditional RT-PCR assays. Because real-time RT-PCR assays use internal probes as well as amplification primers, they can be designed to be very specific for SARS-CoV RNA (or cDNA). They can also be very sensitive, with consistent detection limits of between 1 and 10 SARS-CoV RNA copies per reaction. Real-time PCR assays can be performed faster than traditional RT-PCR assays and, because they operate as closed systems,

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with reduced risk of contamination in the laboratory. Finally, real-time RT-PCR assays can give an accurate estimate of the quantity of virus present in a sample.

As with all PCR assays, interpretation of RT-PCR tests must account for the possibility of false-negative and false-positive results. False-negative results can arise from poor sample collection or degradation of the viral RNA during shipping or storage. Application of appropriate assay controls that identify poor-quality samples can help avoid most false-negative results. A more difficult problem is the apparently low titer of SARS-CoV shed in specimens collected early in illness, which may make it difficult to confirm a diagnosis.

The most common cause of false-positive results is contamination with previously amplified DNA. The use of real-time RT-PCR helps mitigate this problem by operating as a contained system. A more difficult problem is the cross-contamination that can occur between specimens during collection, shipping, and aliquoting in the laboratory. Liberal use of negative control samples in each assay and a well-designed plan for confirmatory testing can help ensure that laboratory contamination is detected and that specimens are not inappropriately labeled as SARS-CoV positive.

In the absence of SARS-CoV transmission worldwide, the probability that a positive test result will be a "false positive" is high. To decrease the possibility of a false-positive result, testing should be limited to patients with a high index of suspicion for having SARS-CoV disease. For information on the indications for SARS-CoV testing, see *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* www.cdc.gov/ncidod/sars/clinicalguidance.htm.

In addition, any positive specimen should be retested in a reference laboratory to confirm that the specimen is positive. To be confident that a positive PCR specimen indicates that the patient is infected with SARS-CoV, a second specimen should also be confirmed positive. Finally, all laboratory results should be interpreted in the context of the clinical and epidemiologic information available for the patient.

B. Antibody Assays

The most commonly used serologic assays (www.cdc.gov/ncidod/sars/lab/eia/) are based on cultured SARS-CoV antigen as either inactivated whole virus lysate for EIA or inactivated virus in cells fixed for IFA. These assays have proven to be highly specific, with no cross-reactivity with paired serum specimens from patients infected with the other known human coronaviruses (229E and OC43) or from healthy blood donors and other persons without clinical or epidemiologic evidence of SARS-CoV disease.

Antibody assays have been the most reliable indicators of SARS-CoV infection when applied to convalescent-phase serum specimens collected >28 days after onset of illness. Since previous SARS-CoV infection is still rare in most populations, demonstration of SARS-CoV-specific antibodies in a single serum specimen is sufficient for diagnosis. However, demonstration of a four-fold or greater increase in antibody titer or conversion from a negative to a positive result between acute- and convalescent-phase serum specimens provides additional confidence that SARS-CoV is linked to any corresponding illness. In some patients, antibody becomes detectable within 8 to 10 days, and most have detectable antibody by 2 weeks. However, some persons do not develop detectable antibodies until 28 days after onset of illness. Although false-positive SARS-CoV serology results are much less likely than false-positive PCR results, guidelines for confirmatory testing similar to those outlined for RT-PCR still apply. Neutralization antibody assays can also be used to detect infection. IgM assays and assays using the S or N proteins as antigens have been developed and are under evaluation.

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C. Other Assays

Among the other methods used to detect SARS-CoV are: isolation in cell culture, electron microscopy for CoV-like particles, and immunohistologic or in situ probe hybridization studies on tissue specimens. These methods are less likely to detect SARS-CoV infection than are RT-PCR or antibody assays. Although isolation of SARS-CoV in cell culture represents a definitive diagnosis, it is not recommended for routine detection as it lacks sensitivity compared to RT-PCR and also requires more restrictive Biosafety Level (BSL) 3 conditions.

Diagnostic assays for other respiratory pathogens may be helpful in differentiating SARS-CoV disease from other illnesses, but SARS patients can sometimes be infected with SARS-CoV and another respiratory pathogen simultaneously

IV. CDC Laboratory Diagnostics Plan

CDC is planning and embarking on a range of laboratory diagnostics activities that will enhance the capacity to detect a reappearance of SARS-CoV and respond to and manage outbreaks. Objectives and descriptions of these activities are as follows.

Objective 1: Expand public health access to high-quality SARS-CoV diagnostics.

Activities

- Assay deployment -- CDC has deployed the SARS-CoV RT-PCR diagnostic assay under an Investigational Device Exemption (IDE) from the Food and Drug Administration (FDA). Protocols for both the RT-PCR and the serologic assay have been approved by CDC's Institutional Review Board (IRB). RT-PCR assays were deployed through the Laboratory Response Network (LRN) to selected laboratories in nearly all states; serologic assays have been deployed to nearly all state public health laboratories.

- Proficiency testing -- To assess the availability and quality of SARS-CoV diagnostics in laboratories that received CDC's RT-PCR and antibody assays, CDC will distribute a panel of positive and negative specimens for testing (proficiency panels). The receiving laboratories will test these specimens and send their results to CDC for analysis of findings and responses to a questionnaire. These data will provide information on the laboratory's readiness to perform SARS-CoV diagnostics (see Appendix F1).

- Assessment of SARS-CoV diagnostics in non-public health laboratories -- Determining the availability and quality of SARS-CoV testing in non-public health laboratories will provide an assessment of overall laboratory diagnostic preparedness. Several clinical pathology professional organizations conduct laboratory surveys and distribute proficiency panels. CDC will assist with SARS surveys and provide proficiency panels so that the professional organizations can assess the status of SARS-CoV diagnostics in their members' laboratories.

- Confirmatory testing -- Positive RT-PCR test results should be confirmed in a reference laboratory. Confirmatory testing is particularly important in areas with a low prevalence of SARS-CoV disease, where the positive predictive value of the assay is likely to be quite low. CDC will conduct confirmatory testing during the early phases of an outbreak. Other laboratories that are proficient in SARS-CoV diagnostics will participate in confirmatory testing as outbreaks escalate. Early in an outbreak, positive serologic tests should also be confirmed; later tests conducted in a proficient laboratory do not required confirmation.

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A key factor in the value of confirmatory RT-PCR testing is specimen handling. To interpret confirmatory test results, the aliquot of the specimen submitted for testing should not have been at risk for template contamination or degradation. The approach for and interpretation of confirmatory testing must consider all potential sources and types of template contamination (e.g., whole viral genome; genome portions; PCR products). Guidelines for confirmatory testing are provided in Appendix F2.

Objective 2: Improve the ability to detect SARS-CoV by optimizing the selection and timing of specimen collection and processing.

Most patients in the early stages of SARS-CoV disease have a low titer of virus in respiratory and other secretions and require time to mount an antibody response. In one study (in patients treated with high-dose steroids and ribavirin), nasopharyngeal (NP) aspirates were found to be PCR positive in <40% of patients during the first week of illness and in >50% of patients during the second week of illness (Peiris 2003). During the second week of illness, stool specimens were found to be PCR positive in a higher percentage of patients than were NP aspirates. Limited data suggest that serum may be the best specimen for SARS-CoV PCR diagnostics during the first few days of illness.

Activities

- Specimen collection -- CDC has developed guidance for health departments and laboratorians to maximize the efficiency and accuracy of diagnostic procedures. Clinicians and laboratorians are asked to:
  - Obtain informed consent -- A signed consent form is recommended for RT-PCR and EIA testing because neither assay has been licensed by the FDA and the RT-PCR test is being used under an FDA-approved IDE. In addition, a signed consent form is required to store specimen remainders for future investigations (see Appendix F3).
  - Collect multiple specimens -- The type and timing of specimen collection is important to maximize the probability of detecting evidence of SARS-CoV infection. Since it is not yet clear which specimen type is best for detecting viral RNA, it is important to collect different types of specimens and at multiple times during the illness. Appendix F4 provides guidance on the type and timing of specimens for SARS-CoV diagnostics.
  - Handle specimens correctly -- CDC has developed guidance for specimen collection, handling, and shipping (Appendix F4). State and local health departments can use these guidelines to educate clinicians on appropriate methods of specimen management.
- Assay sensitivity -- CDC will evaluate ways to improve assay sensitivity, such as extracting RNA from a larger volume of the specimen and including a larger amount of template RNA in the RT-PCR reaction. CDC is developing IgG and IgM assays using expressed proteins as the antigens. Preliminary data suggest that antibody assays using the SARS-CoV S protein might detect an antibody response earlier in illness.

Objective 3: Ensure that SARS-CoV specimens are handled safely and that SARS-CoV diagnostic tests are used and interpreted appropriately.

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Activities

- Biosafety guidance -- The laboratory-acquired SARS-CoV infection in Singapore (Singapore Ministry of Health 2003) and presumed laboratory-acquired SARS-CoV infection in Taiwan (Department of Health, Taiwan 2003) underscore the need to handle SARS-CoV specimens and SARS-CoV-infected tissue culture material safely. CDC has developed guidelines for handling these types of specimens and materials (Appendix F5) and for implementing a surveillance program in the event of a laboratory exposure (Appendix F6). State and local health departments can use these guidelines to educate personnel in viral diagnostic, research, and clinical laboratories about safe specimen handling and appropriate responses to a laboratory exposure.

- Test interpretation -- Clinicians should interpret SARS-CoV test results in consultation with state or local health department officials and with consideration of data on the clinical and epidemiologic features of the illness and the type and timing of specimen collection. CDC has developed guidelines to guide state and local health department staff in their consultations with clinicians about test interpretation (Appendix F7). CDC, in cooperation with CSTE, has also developed criteria for laboratory diagnosis of SARS-CoV infection (Appendix F8).

- Data reporting and integration -- State and local health departments will collect clinical and epidemiologic data on potential cases of SARS-CoV disease and report cases to CDC through a web-based reporting system. CDC will send laboratory data back to state and local health departments daily. The clinical and epidemiologic information reported to CDC and downloaded back to the states can provide a source of patient information that can help laboratorians consider appropriate testing strategies and interpret test results. With guidance from state and local health departments, CDC will facilitate access to data as requested. In addition, results of laboratory testing on any specimens submitted to CDC will be integrated into the data provided to state and local health departments, allowing timely dissemination of this information.

- Training and education – Diagnostic assays have an important role in detecting an introduction of SARS-CoV, managing a SARS outbreak, and addressing concerns about SARS. The healthcare and public health communities should be aware of the value, limitations, and appropriate use and interpretation of SARS-CoV diagnostics. CDC will provide training and educational materials that state and local health departments can use to educate clinicians and public health workers about SARS-CoV diagnostics.

- Coordination -- Coordinated information sharing among clinicians, laboratorians, and epidemiologists is central to efficient investigation of potential cases of SARS-CoV disease. CDC will assist public health laboratories and epidemiologists in developing rapid and coordinated strategies for: 1) collecting, tracking, and testing specimens, 2) interpreting test results, 3) reporting information to clinicians, and 4) communicating results to CDC, other public health officials, and the public.

Objective 4: Ensure the availability of SARS-CoV diagnostic test kits and protocols for testing other respiratory pathogens.

Activities

- Diagnostic supplies -- The supply of SARS-CoV RT-PCR and serologic test kits is limited. To ensure the availability of a sufficient number of kits to meet routine public health needs and the anticipated high demand associated with simultaneous outbreaks, CDC is monitoring both the

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deployment and number of kits. After patterns of use have been determined, CDC will plan the production of new kits to ensure that the supply can meet both projected baseline needs and the accelerated use associated with a SARS outbreak.

- Tests for alternative respiratory agents -- CDC will complete the development and initial evaluation of real-time PCR assays for the most important common respiratory pathogens in the United States and make primer and probe sequences and protocols available to the LRN and other public health laboratories.

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Appendix F1
Proficiency Testing for Public Health Laboratories Providing SARS-CoV EIA and RT-PCR Diagnostics

CDC has developed and validated diagnostic assays for SARS-CoV, including an enzyme immunoassay (EIA) (www.cdc.gov/ncidod/sars/lab/eia/) for detection of serum antibodies to SARS-CoV and a reverse transcription-polymerase chain reaction (RT-PCR) assay (www.cdc.gov/ncidod/sars/lab/rtpcr/) for detection of SARS-CoV RNA. Both the EIA and the RT-PCR tests are sensitive and highly specific for diagnosis of SARS-CoV infection. Testing with these assays is now available through state public health laboratories and CDC's Laboratory Response Network (LRN).

CDC is implementing a quality assurance study to evaluate each laboratory's testing proficiency. To demonstrate competence in performing these tests, public health and LRN laboratories must successfully identify positive and negative specimens provided in the proficiency panels.

Process for Proficiency Panel Testing

1. EIA proficiency panels will be shipped to designated public health laboratories, and RT-PCR proficiency panels will be distributed through the LRN.
2. Each laboratory should complete testing promptly and return results by the designated date.
3. Proficiency panel test results must be returned by electronic mail using a designated format.
4. Each laboratory will receive a complete summary of its own results as well as an aggregate summary of performance from all laboratories completing the proficiency testing.
5. CDC will provide a certificate of participation to the participating laboratory to help fulfill quality assurance requirements.

Results obtained from a laboratory's proficiency testing will initially be considered "educational," and laboratories will not be required to undergo additional training as remediation. However, successful completion of the proficiency test will be required for approval of a public health or LRN laboratory as a confirmatory testing site.

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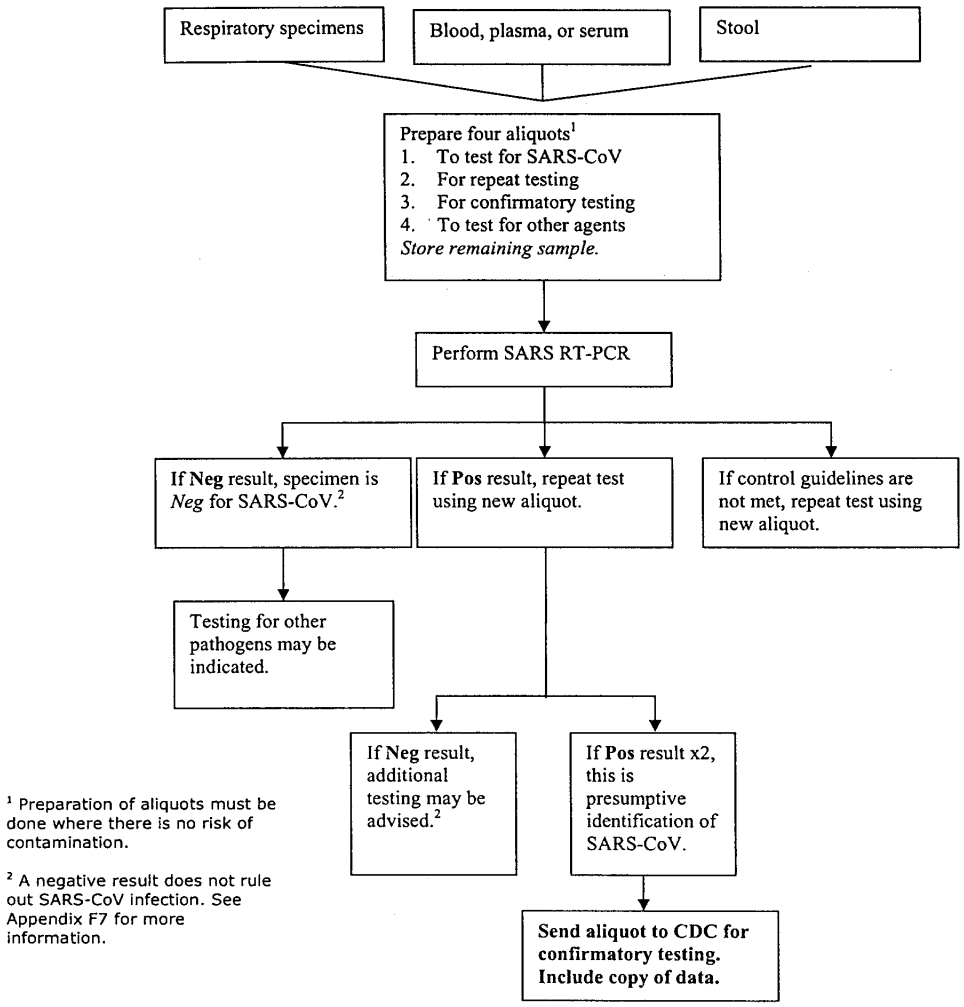
Appendix F2

SARS-CoV Specimen Testing Guidelines: RT-PCR Testing



[1] Preparation of aliquots must be done where there is no risk of contamination.

[2] A negative result does not rule out SARS-CoV infection. See Appendix F7 for more information.

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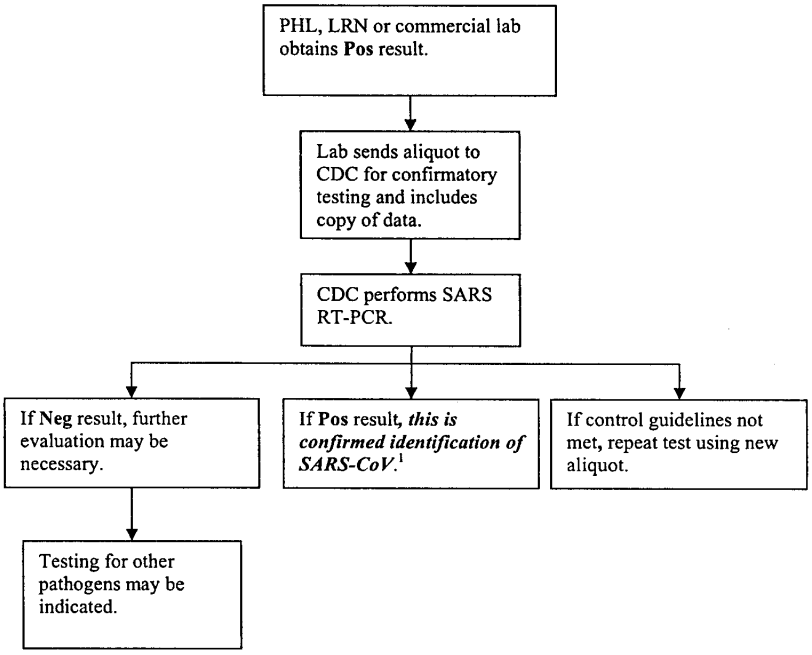
RT-PCR Confirmatory Testing



[1] Confirmed identification of SARS-CoV in a single clinical specimen is not equivalent to laboratory confirmation of SARS-CoV infection in a patient. To be confident that a PCR-positive specimen indicates infection in the patient, a second specimen should be confirmed positive. For more information on the criteria for diagnosing SARS-CoV infection, see Appendix F8.

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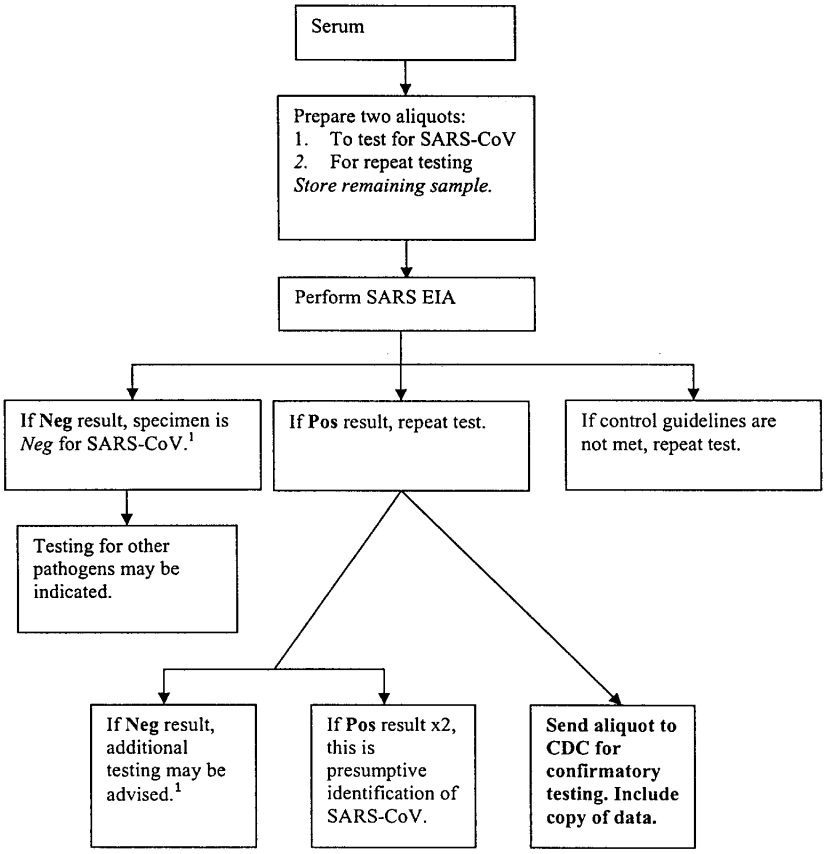
SARS-CoV Specimen Testing Guidelines: Serologic Testing



[1] A negative result does not rule out SARS-CoV infection. See Appendix F7 for more information.

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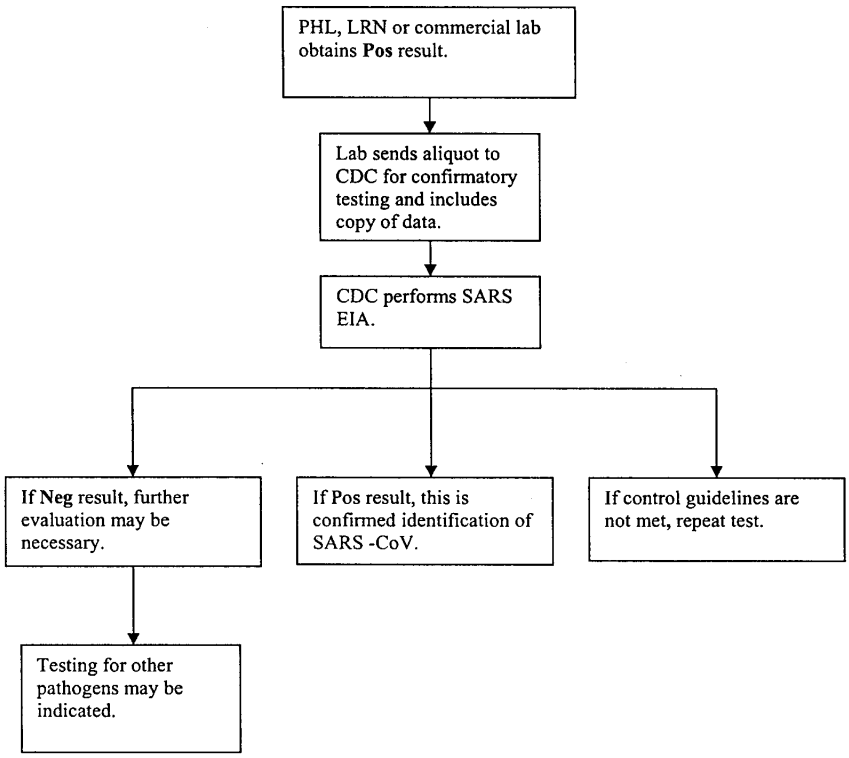
Serologic Confirmatory Testing



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Appendix F3
Guidelines for Clinicians: The Consent Process for SARS-CoV RT-PCR and EIA Testing at CDC and Public Health Laboratories

Key Messages

- A consent form is recommended when submitting specimens for SARS-CoV reverse-transcription polymerase chain reaction (RT-PCR) or enzyme immunoassay (EIA) testing.
- Due to important public health concerns, if SARS-CoV testing is indicated, specimens will be tested even if a consent form is NOT received.
- A patient information sheet, informing patients about the tests and requesting permission for long-term storage of their specimen remainders, will be sent to the physician with the patient's test results. The physician should provide this document to the patient and return a signed copy to the local or state health department if consent for long-term specimen storage is obtained.

CDC has distributed a SARS-CoV RT-PCR assay (www.cdc.gov/ncidod/sars/lab/rtpcr/) under an FDA investigational device exemption (IDE) and an EIA assay (www.cdc.gov/ncidod/sars/lab/eia/) to state and local public health laboratories to test specimens for SARS-CoV. These tests are used to evaluate persons suspected of having SARS-CoV disease. The RT-PCR assay is used to test for SARS-CoV viral RNA in respiratory samples, stool, plasma, or serum. The EIA test is used to detect SARS-CoV antibodies in blood or serum specimens. A signed consent form for performance of each test is recommended because neither test has been licensed by the FDA and the RT-PCR test is being used under an FDA-approved IDE. A signed consent form is also required for storage of specimen remainders for future investigations.

To submit specimens for SARS-CoV RT-PCR or EIA testing, healthcare providers should follow these steps:

1. **Consult the state or local health department** to determine if SARS-CoV testing is indicated.
2. **Seek informed consent** from the patient for testing.
   The RT-PCR consent form can be found at:
   www.cdc.gov/ncidod/sars/lab/rtpcr/consent.htm.
   The EIA consent form can be found at:
   www.cdc.gov/ncidod/sars/lab/eia/consent.htm
3. **Collect specimens** for testing. Guidelines for specimen collection are provided in Appendix F4.
4. **Submit specimens**, with a signed consent form and completed specimen submission form, to the state or local public health laboratory.

   Specimens will be tested at the reference public health laboratory. Final results will be reported to you through the state or local health department. Information on interpreting these test results is provided in Appendix F7.

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5. **Deliver test results** to the patient. Provide a patient information sheet/consent for long-term specimen storage to the patient along with the test results. Specimen remainders stored long term may be used for future investigations.

   The RT-PCR patient information sheet/consent for long-term specimen storage can be found at: www.cdc.gov/ncidod/sars/lab/rtpcr/participant.htm.
   The EIA patient information sheet/consent for long-term specimen storage can be found at: www.cdc.gov/ncidod/sars/lab/eia/participant.htm.

6. **If a signed patient information sheet/consent for long-term storage is obtained, fax it** to the state or local public health department. Contact information is provided at www.cdc.gov/other.htm#states.

Frequently Asked Questions

Where can I find information on how to report a possible SARS case and submit specimens for SARS-CoV testing?
This information is available through the state or local health department. Contact information is provided at: www.cdc.gov/other.htm#states.

Why is a signed informed consent form recommended for SARS-CoV testing?
A signed consent form is recommended because neither the RT-PCR test nor the EIA test has been licensed by FDA and the RT-PCR test is being used under an FDA-approved investigational device exemption (IDE). In addition, consent is required to store specimen remainders for future investigations.

Why are there two different consent forms, one for RT-PCR and one for EIA?
Two forms are required because of differing IRB review requirements; CDC's IRB reviewed and approved two separate protocols.

What happens if I submit specimens for testing without a signed consent form?
Because of the potentially serious public health impact of SARS-CoV transmission, specimens that are received by a state or local public health laboratory without a signed consent form will still be tested.

What is the patient information sheet, and when do I use it?
The patient information sheet/consent for long-term specimen storage will be sent to the physician along with the patient's test results. The physician should provide this document to the patient. It explains to the patient why SARS-CoV testing was performed on their specimens, explains what the results mean, and asks the patient for permission to store specimen remainders for future investigations.

Why should a signed patient information sheet be returned?
The patient information sheet asks the patient for permission to store specimen remainders for future investigations. If a signed consent form is not received before testing, it is necessary to receive the signed patient information sheet to store any specimen remainders. Specimens without a signed informed consent or signed patient information sheet allowing long-term specimen storage must be destroyed.

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Appendix F4
Guidelines for Collecting Specimens from Potential SARS Patients

This document updates and replaces the guidelines for specimen collection posted previously on CDC's SARS website, to reflect the most recent information on laboratory diagnostics for SARS-CoV. The main changes are as follows:[1]

- Addition of stool, serum, and plasma to the list of specimens for RT-PCR testing
- Addition of information on the optimal timing of specimen collection and testing by specimen type
- Recommendation to collect multiple specimens for RT-PCR testing

[1] Pending IRB approval.

Key Messages

- Consult the state or local health department to determine the appropriateness and details of SARS testing.
- If possible, collect multiple specimens from different body sites and at different times during illness.
- A signed consent form is recommended when collecting specimens for SARS-CoV RT-PCR or antibody testing.

Before collecting and shipping specimens for SARS-CoV testing, consult with the state health department/state epidemiologist to determine whether the patient meets the SARS case definition. Health department contact information is available at: www.cste.org/members/state_and_territorial_epi.asp.

When possible, collect multiple respiratory specimens for testing. For example, collect specimens from two different sites on the same day (e.g., one nasopharyngeal swab and a stool specimen or another respiratory specimen) or from two different times during the illness. The chart on the last page specifies recommended specimen types for SARS-CoV diagnostics by stage of illness, including postmortem specimen collection.

A signed consent form is recommended when collecting specimens for SARS-CoV RT-PCR or antibody testing. Information on the consent process for collection of respiratory specimens, blood or stool for RT-PCR testing is provided at: www.cdc.gov/ncidod/sars/lab/rtpcr/index.htm. Information on the consent process for the collection of blood/serum for antibody testing is provided at: www.cdc.gov/ncidod/sars/lab/eia/index.htm.

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RT-PCR Diagnostics

Although studies to date have not definitively determined the best specimens for SARS RT-PCR diagnostics, it is reasonable to collect:

During the first week of illness:	Nasophyaryngeal (NP) swab plus oropharyngeal (OP) swab and a serum or plasma specimen
After the first week of illness:	NP swab plus OP swab and a stool specimen

Serologic Diagnostics

Serum specimens for SARS-CoV antibody testing should be collected when the diagnosis is first suspected and at later times if indicated. An antibody response is occasionally detected during the first week of illness, likely to be detected by the end of the second week of illness, and sometimes may not be detected until >28 days after onset of symptoms.

I. Collecting Respiratory Specimens

Eight types of respiratory specimens may be collected for viral and/or bacterial diagnostics: 1) nasopharyngeal wash/aspirates, 2) nasopharyngeal swabs, 3) oropharyngeal swabs, 4) broncheoalveolar lavage, 5) tracheal aspirate, 6) pleural fluid tap, 7) sputum; and 8) post-mortem tissue. Nasopharyngeal wash/aspirates are the specimen of choice for detection of most respiratory viruses and are the preferred specimen type for children under age 2 years.

In contrast to most respiratory pathogens for which respiratory specimens are optimally collected within 72 hours after the onset of symptoms, levels of SARS-CoV may be higher later in the course of the illness.

Before collecting specimens, review the infection control precautions in Supplement I.

A. Collecting specimens from the upper respiratory tract

1. Nasopharyngeal wash/aspirate

Have the patient sit with head tilted slightly backward. Instill 1 ml-1.5 ml of nonbacteriostatic saline (pH 7.0) into one nostril. Flush a plastic catheter or tubing with 2 ml-3 ml of saline. Insert the tubing into the nostril parallel to the palate. Aspirate nasopharyngeal secretions. Repeat this procedure for the other nostril. Collect the specimens in sterile vials. Label each specimen container with the patient's ID number and the date collected. If shipping domestically, use cold packs to keep the sample at 4°C. If shipping internationally, pack in dry ice.

2. Nasopharyngeal or oropharyngeal swabs

Use only sterile dacron or rayon swabs with plastic shafts. Do not use calcium alginate swabs or swabs with wooden sticks, as they may contain substances that inactivate some viruses and inhibit PCR testing.

Nasopharyngeal swabs -- Insert a swab into the nostril parallel to the palate. Leave the swab in place for a few seconds to absorb secretions. Swab both nostrils.

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Oropharyngeal swabs -- Swab the posterior pharynx and tonsillar areas, avoiding the tongue.

Place the swabs immediately into sterile vials containing 2 ml of viral transport media. Break the applicator sticks off near the tip to permit tightening of the cap. Label each specimen container with the patient's ID number and the date the sample was collected. If shipping domestically, use cold packs to keep sample at 4°C. If shipping internationally, pack in dry ice.

B. Collecting specimens from the lower respiratory tract

1. Broncheoalveolar lavage, tracheal aspirate, pleural fluid tap

Centrifuge half of the specimen, and fix the cell pellet in formalin. Place the remaining unspun fluid in sterile vials with external caps and internal O-ring seals. If there is no internal O-ring seal, then seal tightly with the available cap and secure with Parafilm®. Label each specimen container with the patient's ID number and the date the sample was collected. If shipping domestically, use cold packs to keep sample at 4°C. If shipping internationally, ship fixed cells at room temperature and unfixed cells frozen.

2. Sputum

Educate the patient about the difference between sputum and oral secretions. Have the patient rinse the mouth with water and then expectorate deep cough sputum directly into a sterile screw-cap sputum collection cup or sterile dry container. If shipping domestically, use cold packs to keep sample at 4°C. If shipping internationally, pack in dry ice.

II. Collecting Blood Components

Serum and blood (plasma) should be collected early in the illness for RT-PCR testing. The reliability of RT-PCR testing performed on blood specimens decreases as the illness progresses.

Both acute and convalescent serum specimens should be collected for antibody testing. To confirm or rule out SARS-CoV infection, it is important to collect convalescent serum specimens >28 days after the onset of illness.

A. Collecting serum for antibody or RT-PCR testing

Collect 5 ml-10 ml of whole blood in a serum separator tube. Allow the blood to clot, centrifuge briefly, and collect all resulting sera in vials with external caps and internal O-ring seals. If there is no internal O-ring seal, then seal tightly with the available cap and secure with Parafilm®. The minimum amount of serum preferred for each test is 200 microliters, which can easily be obtained from 5 mL of whole blood.

A minimum of 1 cc of whole blood is needed for testing of pediatric patients. If possible, collect 1 cc in an EDTA tube and in a clotting tube. If only 1cc can be obtained, use a clotting tube.

Label each specimen container with the patient's ID number and the date the specimen was collected. If unfrozen and transported domestically, ship with cold packs to keep the sample at 4°C. If frozen or transported internationally, ship on dry ice.

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B. Collecting EDTA blood (plasma) for RT-PCR

Collect 5 ml-10 ml of blood in an EDTA (purple-top) tube. Transfer to vials with external caps and internal O-ring seals. If there is no internal O-ring seal, then seal tightly with the available cap and secure with Parafilm®. Label each specimen container with patient's ID number and date of collection. Store and ship blood specimens with cold packs to keep the sample at 4°C.

III. Collecting Stool Specimens for PCR

Begin collecting stool specimens as soon as possible in the course of the illness. Although collecting earlier specimens is ideal, SARS-CoV has been detected in stool as late as one month after the onset of symptoms.

Place each stool specimen -- as large a quantity as can be obtained (at least 10 cc) -- in a leak-proof, clean, dry container, and refrigerate at 4°C. Patients may drape plastic kitchen wrap across the back half of the toilet, under the toilet seat, to facilitate collection of stool specimens.

IMPORTANT: Refrigerate or freeze tubes after specimens are placed in them. If specimens will be examined within 48 hours after collection, they can be refrigerated. If specimens must be held longer than 48 hours, freeze them as soon as possible after collection. Although storage in an ultra-low freezer (-70°C) is preferable, storage in a home-type freezer (if properly set at -20°C) is acceptable for short periods.

Specimens from possible and known SARS cases must be packaged, shipped, and transported according to the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations at (www.iata.org/dangerousgoods/index) and US DOT 49 CFR Parts 171-180 (hazmat.dot.gov/rules.htm). Step-by-step instructions on appropriate packaging and labeling are available at: www.cdc.gov/ncidod/sars/pdf/packingspecimens-sars.pdf.

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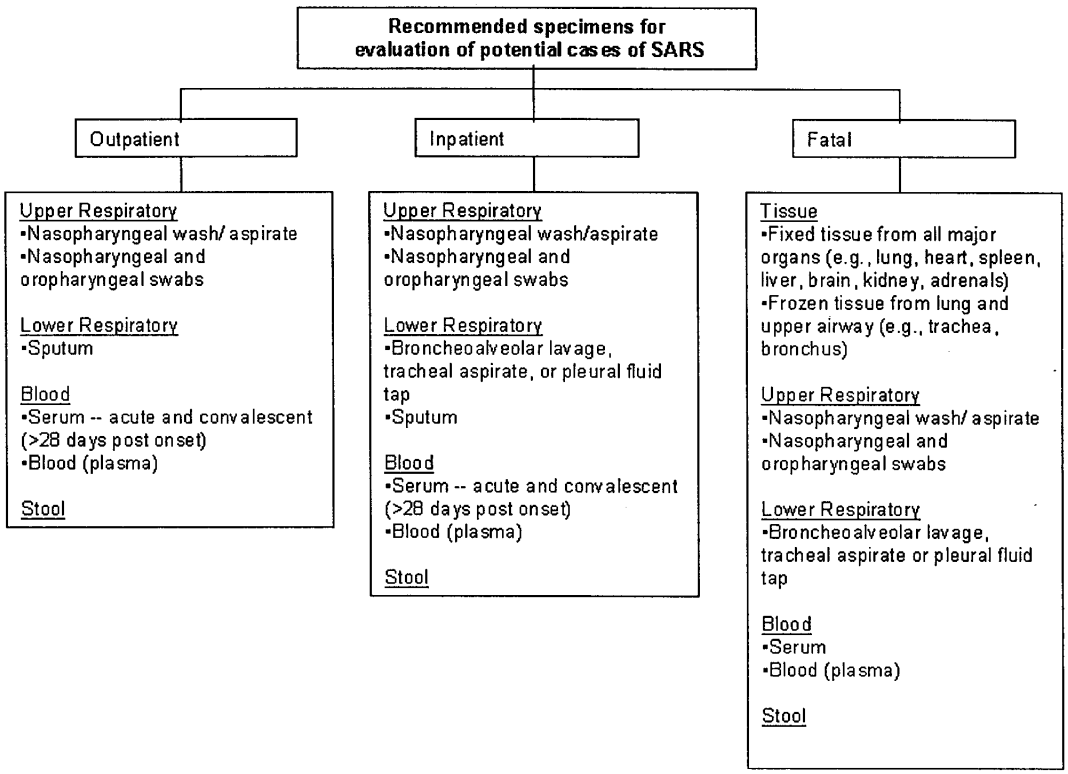

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Specimens for SARS-CoV Testing:
Priority Specimens and Timing for Collection

The likelihood of detecting infection is increased if multiple specimens, e.g., stool, serum, and respiratory tract specimens, are collected during the course of illness.

Specimen, by test type	<1 week after symptom onset	1-3 weeks after symptom onset	>3 weeks after symptom onset
RT-PCR[1] for viral RNA detection			
Sputum[2]	√[3]	√√	√
Bronchoalveolar lavage, tracheal aspirate, or pleural fluid tap[4]	√	√√	√
Nasopharyngeal wash/aspirate	√	√√	√
Nasopharyngeal and oropharyngeal swabs	√	√√	√
Serum (serum separator tube)	√√	√	not recommended
Blood (plasma) (EDTA/purple top tube for plasma)	√√	√	not recommended
Stool (minimum 10 cc specimen)	√	√√	√√
EIA[1] for antibody detection			
Serum[5] (serum separator tube)	√√	√√	√√

[1] Because of the investigational nature of both the SARS RT-PCR (reverse transcription-polymerase chain reaction) and the SARS EIA (enzyme immunoassay), it is recommended that the clinician obtain a signed informed consent form from the patient. The consent form for the RT-PCR test can be found at: www.cdc.gov/ncidod/sars/lab/rtpcr/consent.htm. The consent form for the EIA test can be found at: www.cdc.gov/ncidod/sars/lab/eia/consent.htm.

[2] A sputum specimen is preferred if the patient has a productive cough.

[3] The more checks, the better the results from a particular specimen at a specific point in the illness.

[4] Consider these specimen types if sputum is not available.

[5] Also collect a convalescent specimen >28 days post onset.

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Appendix F5
Laboratory Biosafety Guidelines for Handling and Processing Specimens Associated with SARS-CoV

Key Messages

- Clinical laboratories performing routine hematology, urinalysis, and clinical chemistry studies, and microbiology laboratories performing diagnostic tests on serum, blood, or urine specimens should follow standard laboratory practices, including Universal Precautions, when handling potential SARS-CoV specimens. For additional information, see www.osha.gov/SLTC/bloodbornepathogens/index.html#revised_standard.
- Microbiology and pathology laboratories performing diagnostic tests on stool or respiratory specimens should handle potential SARS-CoV specimens using standard Biosafety Level (BSL)-2 work practices in a Class II biological safety cabinet.
- A detailed description of recommended facilities, practices, and protective equipment for the various laboratory biosafety levels can be found in the CDC/NIH Biosafety in Microbiological and Biomedical Laboratories (BMBL) manual at www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4s3.htm.

Although routine clinical laboratories around the world have processed an estimated several thousand diagnostic specimens from patients with SARS, no cases of SARS-CoV disease among laboratory workers performing diagnostic assays have been reported to date. However, there have been two reported cases of SARS-CoV disease in workers in research laboratories where SARS-CoV was being propagated. Until more information about the transmission of SARS-CoV in the laboratory setting is known, precautions should be taken in handling specimens (e.g., respiratory and stool specimens, unfixed lung tissue, viral cultures) that might contain large quantities of SARS-CoV.

Effective and timely communication between clinical and laboratory staff is essential to minimize the risk incurred in handling specimens from patients with possible SARS-CoV disease. Such specimens should be labeled accordingly, and the laboratory should be alerted to ensure proper specimen handling. Biosafety guidelines for handling SARS-CoV specimens, by specimen type, are provided below. Guidelines on implementing a medical surveillance system for laboratory workers are provided in Appendix F6.

A. Blood (blood, serum and plasma) and urine specimens

- Handle these specimens using Universal Precautions, which includes use of gloves, gown, mask, and eye protection. For more information on Universal Precautions, see www.osha.gov/SLTC/bloodbornepathogens/index.html#revised_standard.
- Any procedure with the potential to generate fine-particulate aerosols (e.g., vortexing or sonication of specimens in an open tube) should be performed in a biological safety cabinet (BSC). Use sealed centrifuge rotors or sample cups, if available, for centrifugation. Ideally, rotors and cups should be loaded and unloaded in a BSC. Perform any procedures outside a BSC in a manner that minimizes the risk of exposure to an inadvertent sample release.

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- After specimens are processed, decontaminate work surfaces and equipment. Use any EPA-registered hospital disinfectant. Follow manufacturer's recommendations for use-dilution (i.e., concentration), contact time, and care in handling.

B. Other specimens (e.g., respiratory secretions, stool, or tissue for procedures performed in microbiology or pathology laboratories)

- The following activities may be performed in BSL-2 facilities with standard BSL-2 work practices:

  - Pathologic examination and processing of formalin-fixed or otherwise inactivated tissues
  - Molecular analysis of extracted nucleic acid preparations
  - Electron microscopic studies with glutaraldehyde-fixed grids
  - Routine examination of bacterial and mycotic cultures
  - Routine staining and microscopic analysis of fixed smears
  - Final packaging of specimens for transport to diagnostic laboratories for additional testing. Specimens should already be in a sealed, decontaminated primary container.

- The following activities involving manipulation of untreated specimens should be performed in BSL-2 facilities and in a Class II BSC:

  - Aliquoting and/or diluting specimens
  - Inoculating bacterial or mycological culture media
  - Performing diagnostic tests that do not involve propagation of viral agents in vitro or in vivo
  - Nucleic acid extraction procedures involving untreated specimens
  - Preparation and chemical- or heat-fixing of smears for microscopic analysis

  Work surfaces should be decontaminated on completion of work with appropriate disinfectants. All disposable waste should be autoclaved.

  Laboratory workers should wear personal protective equipment (PPE), including disposable gloves and laboratory coats.

  Any procedure or process that cannot be conducted in a BSC should be performed while wearing gloves, gown, eye protection, and respiratory protection, (see Supplement I, Section III.D.5).

  Acceptable methods of respiratory protection include: a properly fit-tested, NIOSH-approved filter respirator (N-95 or higher level) or a powered air-purifying respirator (PAPR) equipped with high-efficiency particulate air (HEPA) filters. Accurate fit-testing is a key component of effective respirator use.[1] Personnel who cannot wear fitted respirators because of facial hair or other fit limitations should wear loose-fitting hooded or helmeted PAPRs.

  Appropriate physical containment devices (e.g., centrifuge safety cups; sealed rotors) should also be used. Ideally, rotors and cups should be loaded and unloaded in a BSC.

[1] Respirators should be used in the context of a complete respiratory protection program, as required by the Occupational Safety and Health Administration (OSHA). This includes training, fit-testing, and fit-checking to ensure appropriate respiratory selection and use. To be effective, respirators must provide a proper sealing surface on the wearer's face. Detailed information on a respiratory protection program can be found at: www.osha.gov/SLTC/etools/respiratory/.

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- The following activities must be performed in a BSL-3 facility using BSL-3 work practices:

  - SARS-CoV propagation in cell culture
  - Initial characterization of viral agents recovered in cultures of SARS specimens

  Any procedure or process that cannot be conducted in a BSC should be performed while wearing gloves, gown, eye protection, and respiratory protection (see Supplement I, Section III.D.5).

  Acceptable methods of respiratory protection include: a properly fit-tested, NIOSH-approved filter respirator (N-95 or higher level) or PAPR equipped with HEPA filters. Accurate fit-testing is a key component of effective respirator use.[1] Personnel who cannot wear fitted respirators because of facial hair or other fit limitations should wear loose-fitting hooded or helmeted PAPRs.

  Centrifugation should be carried out using sealed centrifuge cups or rotors that are unloaded in a BSC.

- The following activities must be performed in Animal BSL-3 facilities using Animal BSL-3 work practices:

  - Inoculation of animals for potential recovery of SARS-CoV from SARS samples
  - Protocols involving animal inoculation for characterization of putative SARS agents

Consideration may also be given to referral of specimens to a suitably equipped reference laboratory.

Note: Packaging, shipping, and transport of specimens from possible and known cases of SARS-CoV disease must follow the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations at (www.iata.org/dangerousgoods/index) and US DOT 49 CFR Parts 171-180 (hazmat.dot.gov/rules.htm). Step-by-step instructions on appropriate packaging and labeling are provided at: www.cdc.gov/ncidod/sars/pdf/packingspecimens-sars.pdf

[1] Respirators should be used in the context of a complete respiratory protection program, as required by the Occupational Safety and Health Administration (OSHA). This includes training, fit-testing, and fit-checking to ensure appropriate respiratory selection and use. To be effective, respirators must provide a proper sealing surface on the wearer's face. Detailed information on a respiratory protection program can be found at: www.osha.gov/SLTC/etools/respiratory/.

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Appendix F6
Guidelines for Medical Surveillance of Laboratory Personnel Working with SARS-CoV

Key Messages

- Laboratory workers should receive training on the appropriate biosafety level for the type of work being performed.
- Before working with either live SARS-CoV or clinical specimens known to contain SARS-CoV, laboratory workers should have a baseline serum sample obtained and stored for future reference.
- Laboratory workers in laboratories that contain live SARS-CoV should report any fever or lower respiratory symptoms to their supervisor. They should be evaluated for possible exposures, and the clinical features and course of their illness should be closely monitored.
- Laboratory workers who are believed to have had a laboratory exposure to SARS-CoV should be evaluated, counseled about the risk of SARS-CoV transmission to others, and monitored for fever or lower respiratory symptoms as well as for any of the following: sore throat, rhinorrhea, chills, rigors, myalgia, headache, diarrhea.
- Local and/or state public health departments should be promptly notified of laboratory exposures and illness in exposed laboratory workers.

Medical surveillance of laboratory personnel can help to ensure that workers who are at risk of occupational exposure to SARS-CoV and who develop symptoms of illness receive appropriate medical evaluation and treatment, both for the benefit of their health and to prevent further transmission.

- Laboratory workers should be provided training on the appropriate biosafety level and specific safety practices for the type of work being performed. Biosafety guidelines for laboratory work with SARS-CoV are available at: www.cdc.gov/ncidod/sars/sarslabguide.htm.
- Before working with either live SARS-CoV or clinical specimens known to contain SARS-CoV, laboratory workers should have a baseline serum sample obtained and stored for future reference.
- Laboratory workers should immediately contact their supervisor in the event of a recognized exposure or development of lower respiratory symptoms and/or fever. In addition, exposed laboratory workers should be monitored for the presence of any of the following: sore throat, rhinorrhea, chills, rigors, myalgia, headache, diarrhea. The supervisor should immediately contact appropriate healthcare personnel and facility contacts (e.g., occupational health, infection control, or a designee); the local and/or state public health departments should be promptly notified as well.

I. Management of a Break in Laboratory Procedure

In the event of an identifiable break in laboratory procedure (e.g., tear in a glove; spill of live virus), the laboratory worker should immediately implement applicable laboratory procedures for emergency

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exposure management and/or environmental decontamination and notify the supervisor for further instructions. The worker and the supervisor, in consultation with occupational health or infection control personnel, should evaluate the break in procedure to determine if an exposure occurred. If the break in procedure resulted in an exposure, the worker should be managed as described below.

II. Management of Exposed Laboratory Workers

A. Management of exposed laboratory workers who are asymptomatic

1. Exposed workers should be instructed to be vigilant for the development of fever (i.e., measure and record body temperature twice daily for 10 days after the date of the last unprotected exposure), lower respiratory symptoms, or any of the following: sore throat, rhinorrhea, chills, rigors, myalgia, headache, diarrhea. Exposed workers should immediately notify the supervisor if symptoms develop.

2. Exposed workers should be actively monitored for symptoms prior to reporting for duty.

3. Decisions regarding activity restrictions (e.g., work) should be discussed with the health department, in accordance with the recommendations in Supplement D. Asmptomatic exposed workers generally do not need to be excluded from duty. However, a worker who has had a high-risk exposure may need to be furloughed.

B. Management of exposed laboratory workers who develop symptoms within 10 days of exposure

1. The exposed laboratory worker who develops fever, lower respiratory symptoms, sore throat, rhinorrhea, chills, rigors, myalgia, headache, or diarrhea should:

   - Immediately put on a surgical mask if at work, *and*
   - Immediately notify the appropriate facility contact (e.g., infection control, occupational health, or a designee in each facility where s/he works), *and*
   - Report to the designated location for clinical evaluation.

2. Symptomatic laboratory workers should be managed in accordance with the recommendations in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* www.cdc.gov/ncidod/sars/clinicalguidance.htm.

3. Decisions on return to work should be guided by policies or regulations defined by the facility or health department.

III. Management of Symptomatic Laboratory Workers with No Recognized Exposures

Laboratory workers who develop a fever or lower respiratory symptoms and who have no recognized exposure should immediately contact the supervisor. The supervisor should immediately contact the appropriate healthcare personnel and facility contacts (e.g., occupational health, infection control, or a designee), who should review the worker's illness and potential laboratory exposures to determine if any SARS precautions or additional consultations are necessary. If clinical or exposure information suggests SARS-CoV infection, local or state public health officials should be immediately be contacted and consulted about managing the ill laboratory worker and contacts.

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Appendix F7
Fact Sheet for Clinicians: Interpreting SARS-CoV Test Results from CDC and Other Public Health Laboratories

Key Messages

- A positive RT-PCR test result for SARS-CoV should be considered presumptive until confirmatory testing by a second reference laboratory is performed.
- A negative test result for SARS-CoV may not rule out SARS-CoV disease and should not affect patient management or infection control decisions.

Definitions

SARS	Severe acute respiratory syndrome
SARS-CoV	SARS-associated coronavirus; a newly described coronavirus that is genetically and antigenically distinct from other human coronaviruses
Laboratory-confirmed SARS-CoV infection	• Detection of any of the following by a validated test, with confirmation in a reference laboratory: o Serum antibodies to SARS-CoV in a single serum specimen, *or* o A four-fold or greater increase in SARS-CoV antibody titer between acute- and convalescent-phase serum specimens tested in parallel, *or* o Negative SARS-CoV antibody test result on acute-phase serum and positive SARS-CoV antibody test result on convalescent-phase serum tested in parallel; **or** • Isolation in cell culture of SARS-CoV from a clinical specimen, with confirmation using a test validated by CDC; **or** • Detection of SARS-CoV RNA by RT-PCR validated by CDC, with confirmation in a reference laboratory, from: o Two clinical specimens from different sources, *or* o Two clinical specimens collected from the same source on two different days
Confirmed case of SARS-CoV disease	A person with clinically compatible illness and laboratory-confirmed SARS-CoV infection

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The Centers for Disease Control and Prevention (CDC) and other institutions have been working to develop strategies to detect and control the spread of severe acute respiratory syndrome (SARS). The cause of SARS has been determined to be infection with a previously unrecognized human coronavirus, SARS-associated coronavirus (SARS-CoV). Information on SARS and SARS-CoV is provided on CDC's SARS website: www.cdc.gov/sars/. All information and guidelines, including those on SARS-CoV laboratory testing, may change as we continue to learn more about this disease. Please check CDC's SARS website regularly for the most current information.

Previous experience with SARS-CoV disease demonstrates that the best guide to diagnosis is exposure to a person with SARS-CoV disease, a setting where SARS-CoV transmission is occurring, or persons who are part of a cluster of pneumonia without a known cause. Information in diagnosing SARS-CoV disease is provided in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). Persons without a potential risk of exposure should usually not be tested for SARS-CoV. Clinicians should seek guidance from the state or local health department regarding current guidelines for SARS-CoV testing.

Clinicians providing care for patients with possible SARS-CoV disease may find the following information useful when interpreting SARS-CoV test results.

What tests for SARS-CoV are available?
CDC has developed and validated an enzyme immunoassay (EIA) for detection of serum antibody (www.cdc.gov/ncidod/sars/lab/eia/) to SARS-CoV and a reverse transcription-polymerase chain reaction (RT-PCR) assay (www.cdc.gov/ncidod/sars/lab/rtpcr/) for detection of SARS-CoV RNA. The EIA has been distributed to most state public health laboratories, and the RT-PCR has been distributed to most laboratories in the Laboratory Response Network (LRN). Both the EIA and the RT-PCR tests are sensitive and highly specific for SARS-CoV. The ability to diagnose SARS-CoV infection in a patient is often limited, however, by either the low concentration of virus in most clinical specimens (RT-PCR assays) or the time it takes a person to mount a measurable antibody response to SARS-CoV (serologic assays). The likelihood of detecting infection is increased if multiple specimens (e.g., stool, serum, respiratory tract specimens) are collected at several times during the course of illness.

CDC considers detection of SARS-CoV antibody to be the most reliable indicator of infection. Since previous infection is still rare in most populations, seroconversion is not needed to diagnose infection. Therefore, the presence of SARS-CoV antibody in someone without a previous history of SARS is indicative of recent infection. A negative serologic test can rule out SARS-CoV infection if the serum specimen is collected >28 days after onset of illness. Some persons do not mount an antibody response (test positive) until more than 28 days after onset of illness. Patients with a negative antibody test result whose specimens were obtained 28 days before illness onset or before should have another serum specimen collected >28 days after onset of symptoms.

RT-PCR for SARS-CoV RNA is a very sensitive and specific assay when performed appropriately. This test can detect SARS-CoV RNA in serum, stool, upper and lower respiratory specimens, various tissues, and occasionally urine specimens. Testing of multiple specimen types at several times during the course of illness should increase the likelihood of detecting infection.

Other tests for detection of SARS-CoV include immunofluorescence assay (IFA) for SARS-CoV antibody, SARS-CoV isolation studies, electron microscopic studies, and immunohistologic or in situ hybridization studies on tissue specimens. The IFA for SARS-CoV antibody gives results essentially identical to those

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for the EIA for SARS antibody. Cell culture, electron microscopy, and histologic studies are less frequently used and less sensitive than RT-PCR. Cell culture for SARS-CoV should be done only in a BSL-3 laboratory using BSL-3 procedures (see Appendix F5).

What does it mean if a specimen tests positive for SARS-CoV?
Laboratory test results should always be considered with clinical observations and epidemiologic data in making a final diagnosis. A positive RT-PCR result should be confirmed by testing a second specimen and confirming the result at a qualified second laboratory to ensure that the result is not an artifact of laboratory contamination. A positive serologic result is less likely to result from a laboratory artifact but should also be subjected to confirmatory testing. If the results are confirmed, then a positive RT-PCR or serologic test result indicates that the patient has been recently infected with SARS-CoV (unless the patient has a previous history of SARS-CoV disease). Guidelines for managing patients with SARS-CoV disease are provided in Supplement C and Supplement I.

How is a SARS-CoV test confirmed?
Positive antibody and RT-PCR test results should be confirmed by repeat testing of the original specimen AND by testing of the same specimen in an independent laboratory using a validated assay.

What is difference between a laboratory-confirmed clinical specimen and laboratory-confirmed SARS-CoV disease?
This distinction is made for PCR test results because of concerns about false-positive results. For serology, virus isolation, and histopathologic studies, if a specimen is confirmed positive, the patient is also considered to be confirmed positive. For PCR, a second specimen is required to be confirmed positive to decrease the chance of misclassifying a patient due to a false-positive result. In all instances, laboratory results must be considered in the context of clinical and epidemiologic information on the patient.

What does it mean if a patient with an illness suggestive of SARS has a negative SARS-CoV test result?
A negative antibody result on a serum specimen collected >28 days after onset of illness is sufficient to eliminate SARS-CoV as the cause of illness. A negative antibody result on serum specimens collected ≤28 days after onset of illness or a negative RT-PCR test does not rule out SARS-CoV infection. Clinical specimens do not always have sufficient virus to be detected by RT-PCR. An antibody response may not be detected in some patients until >28 days after onset of illness.

What does it mean if test results are positive for other respiratory diseases?
A positive test result for another respiratory pathogen does not rule out SARS-CoV disease. SARS patients can be co-infected with SARS-CoV and other respiratory pathogens. Thus, detection of another respiratory pathogen does not eliminate the possibility of SARS-CoV disease. In some circumstances (e.g., another pathogen is detected in multiple patients in a cluster of cases and can fully explain the severity of illness), detection of another respiratory pathogen may make SARS-CoV disease less likely. Factors that may be considered in assigning alternate diagnoses include the strength of the epidemiologic exposure criteria for SARS-CoV disease, the specificity of the diagnostic test, and the compatibility of the clinical presentation and course of illness with the alternative diagnosis.

Does a negative SARS-CoV test result affect patient management?
As noted above, the interpretation of negative SARS-CoV test results varies depending on the type of specimen, the timing of specimen collection, and the test that was performed. With the exception of a >28-day negative serologic test result, a negative SARS-CoV test result should not affect patient isolation or management decisions. The clinical features of the illness and the type and risk of exposure are the keys to making decisions on patient management and isolation.

Supplement F: Laboratory Guidance

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Has the identification of SARS-CoV as the etiologic agent changed the recommendations for medical treatment of patients with SARS?

No. The discovery that SARS-CoV is the cause of SARS has not changed treatment recommendations. Research on antiviral treatment for SARS-CoV disease is currently under way.

Should a person who may have been exposed to a location with transmission of SARS-CoV or who had contact with a SARS patient be tested even if not ill?

Persons who have potentially been exposed to SARS patients and are well should be tested only as part of research studies. The exposed person may contact their state health department or CDC about participating in studies of persons exposed to SARS-CoV.

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Appendix F8
Guidelines for Laboratory Diagnosis of SARS-CoV Infection

Laboratory confirmation of SARS-CoV infection is based on:

- Detection of any of the following by a validated test, with confirmation in a reference laboratory:
  - Serum antibodies to SARS-CoV in a single serum specimen, *or*
  - A four-fold or greater increase in SARS-CoV antibody titer between acute- and convalescent-phase serum specimens tested in parallel, *or*
  - Negative SARS-CoV antibody test result on acute-phase serum and positive SARS-CoV antibody test result on convalescent-phase serum tested in parallel; **or**

- Isolation in cell culture of SARS-CoV from a clinical specimen, with confirmation using a test validated by CDC; **or**

- Detection of SARS-CoV RNA by RT-PCR validated by CDC, with confirmation in a reference laboratory, from:
  - Two clinical specimens from different sources, *or*
  - Two clinical specimens collected from the same source on two different days

Guidelines for the collection of specimens from potential cases of SARS are provided in Appendix F4.

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Supplement G: Communication and Education

Summary of Changes in Version 2

The title of Supplement G has been changed from ommunication□to ommunication and Education□to reflect the addition of information on newly developed educational tools focusing on SARS preparedness and infection control.

Contents

Communication and Education

Goals

- Instill and maintain public confidence in the nation's public health system and its ability to respond to and manage the reappearance of SARS-CoV.
- Contribute to the maintenance of order, minimization of public panic and fear, and facilitation of public protection through the provision of accurate, rapid, and complete information before, during, and after a SARS outbreak.
- Provide accurate, consistent, and comprehensive information about SARS-CoV disease.
- Address rumors, inaccuracies, and misperceptions as quickly as possible, and prevent stigmatization of affected groups.

Key concepts

- Timely dissemination of accurate and science-based information on what is known and not known about SARS-CoV disease and the progress of the response effort builds public trust and confidence.
- Coordination of messages and release of information among federal, state, and local health officials and affected institutions are critical to avoiding contradictions and confusion that can undermine public trust and impede containment measures.
- Information should be technically correct and sufficiently complete to support policies and actions without being patronizing.
- Guidance to community members on actions needed to protect themselves and their family members and colleagues is essential for crisis management.
- Information presented during an outbreak should be limited to specific data and results; messages should omit speculation, over-interpretation of data, overly confident assessments of investigations and control measures, and comments related to other jurisdictions.
- Rumors, misinformation, misperceptions, and stigmatization of specific groups must be addressed promptly and definitively.
- Education and training of healthcare workers and public health staff on appropriate strategies to recognize SARS-CoV disease and implement control measures is key to containing a SARS outbreak.

Priority activities

- Identify key messages about SARS-CoV disease for specific audiences and the most effective methods to deliver these messages.
- Issue local public health announcements and updated information on the outbreak and response.
- Provide a location for state, local, and federal communication and emergency response personnel to meet and work side-by-side in developing key messages and handling media inquiries.
- Respond to frequently occurring media questions by preparing fact sheets, talking points (key messages), and question-and-answer documents.
- Coordinate requests for spokespersons and subject matter experts.

Supplement G: Communication and Education
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I. Rationale and Goals

During the 2003 SARS response, health communications figured prominently among the tools used to contain the outbreak. The response to outbreaks and the threat of outbreaks necessitated extensive communications activities. Experience showed that, although a media/communications plan cannot alleviate the threat of SARS-CoV or solve associated public health problems, good communication can guide the public, the media, and healthcare providers in responding appropriately and complying with exposure-control measures as required.

This document describes the communication plans and activities that are suggested to prepare for a possible reappearance of SARS-CoV and activities that would be needed to respond to a SARS outbreak. This plan identifies information necessary for major planning, preparedness, and communication response activities of state and local health departments and provides guidance for coordinating efforts with CDC and other entities. The goals of this Supplement are to provide local and state communications specialists with suggestions and guidance to:

- Instill and maintain public confidence in the nation's public health system and its ability to respond to and manage a SARS outbreak
- Contribute to the maintenance of order, minimization of public panic and fear, and facilitation of public protection through the provision of accurate, rapid, and complete information
- Provide accurate, consistent, and comprehensive information about SARS-CoV disease
- Address rumors, inaccuracies, and misperceptions as quickly as possible, and prevent stigmatization of affected groups

II. Lessons Learned

After the SARS response of 2003, federal, state, and local public health colleagues conducted internal debriefings to prepare for a future SARS occurrence. At CDC, communications officers, in consultation with state and local partners, identified the following as essons learned? for the next SARS response:

- Timely dissemination of accurate and science-based information on what is known and not known about SARS-CoV disease and the progress of the response effort builds public trust and confidence.
- Coordination of messages and release of information among federal, state, and local health officials and affected institutions are critical to avoiding contradictions and confusion that can undermine public trust and impede containment measures.
- Information should be technically correct and sufficiently complete to support policies and actions without being patronizing.
- Guidance to community members on actions needed to protect themselves and their family members and colleagues is essential for crisis management.
- Information presented during an outbreak should be limited to specific data and results; messages should omit speculation, over-interpretation of data, overly confident assessments of investigations and control measures, and comments related to other jurisdictions.
- Rumors, misinformation, misperceptions, and stigmatization of affected groups must be addressed promptly and definitively.
- Education and training of healthcare workers and public health staff on appropriate strategies to recognize SARS-CoV disease and implement control measures is key to containing a SARS outbreak.

III. Key Messages

Lessons learned from the 2003 experience will help local, state, and national communications specialists refine their communications planning to facilitate appropriate and decisive actions in response to a re-emergence. The foundation for effective communication is a set of key messages that can be used consistently to highlight and reinforce the lessons learned and generate an appropriate response to SARS that minimizes risk while ensuring a strong and rapid response. These messages should be developed with the input of all decision-makers in the SARS response, and all communication messages should emanate from these central points. The following are examples for consideration:

- We have learned a great deal about SARS-CoV disease that is helping us prepare for the possibility that it will return.
- A SARS diagnosis is guided by a history of exposure to SARS-CoV or to a setting in which transmission is occurring.
- Most exposures to SARS-CoV occur in healthcare facilities and households. Community exposures outside of these settings have been reported, but these occurred rarely, under special circumstances, and, with few exceptions, after close contact with ill persons. Persons at risk in healthcare facilities include healthcare workers, patients, and visitors. In households, the greatest risk is to family members of SARS patients.
- In most instances, SARS outbreaks were localized to specific communities and often to specific locations or facilities in a community. For example, in Canada, most SARS cases occurred in Toronto, and in Toronto, most cases occurred in hospitals.
- SARS can be controlled by rapid, appropriate public health action that includes surveillance, identification and isolation of SARS cases, infection control, intense contact tracing, and quarantine of persons who may have been exposed to SARS-CoV. These measures can be a temporary inconvenience to those involved but are essential for containing SARS outbreaks.
- The United States is preparing for a possible reappearance of SARS-CoV by: 1) educating healthcare workers about SARS-CoV disease diagnosis, 2) developing SARS surveillance systems to determine if and where SARS-CoV has re-emerged, 3) developing guidelines for preventing transmission in different settings, 4) improving laboratory tests for SARS-CoV, and 5) developing better guidance for treating SARS patients.
- At this time, there is no evidence of ongoing transmission of SARS-CoV anywhere in the world. In the absence of SARS-CoV transmission, there is no need for concern about travel or other activities. Up-to-date information on SARS is available on CDC's SARS website (www.cdc.gov/SARS).

IV. Preparing for a Communications Response

In the absence of SARS activity worldwide, states and localities need to prepare and disseminate messages to encourage vigilance for the possible reappearance of SARS-CoV and to specify activities to prevent its spread. Communications personnel need to assess communication needs and capacity, develop criteria and procedures for requesting CDC communications assistance, and develop mechanisms for coordinating the activities of on-site CDC communications experts with local/state communication resources. If SARS-CoV transmission is confirmed, the community will look to state and local health departments as an information resource. Public information officers and communications specialists should be prepared for the surge of requests and inquiries generated by reports of SARS activity. The following suggestions should be considered for optimal preparedness.

Supplement G: Communication and Education
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Objective 1: Assess the readiness of the jurisdiction to meet communication needs during a SARS outbreak.

Activities

- Assess the information needs of healthcare providers. Most healthcare providers lack experience with SARS and will need information on how to diagnose, report, and manage possible cases. Communications specialists should have an understanding of healthcare provider knowledge about surveillance and reporting, diagnostics, transmission, exposure management, and issues such as concern for self-protection and possible use of quarantine and isolation.
- Assess the information needs of the general public. Public perceptions about SARS-CoV may reflect misunderstandings and inaccuracies that can exacerbate fears and may impede containment efforts. Assessment of public knowledge and beliefs should guide the preparation of risk communication messages and strategies. Information strategies may include surveys, focus groups, and consultation with professional and civic groups.
- Consider logistical considerations that can influence the effectiveness of health communications. Consideration may include:
  - Adequacy of printing/graphic design contracts and resources to meet emergency needs
  - Availability of tools (cell phones, email equipment, laptops) needed by communications staff at the time of deployment. A o-Kit? to enable staff to set up operations wherever necessary is optimal.
  - Capacity of hotlines and web servers to accommodate increased usage
  - Availability of emergency personnel to staff hotlines and communication centers for extended hours and days
  - Adequacy of training in risk communication, media relations, and SARS-CoV epidemiology, clinical features, diagnostics, and surveillance.

Objective 2: In the absence of SARS-CoV transmission worldwide, make preparations for a rapid and appropriate communications response to a global recurrence or introduction into the United States.

Activities

- Prepare to manage media demands. The first jurisdiction(s) with possible or confirmed cases of SARS-CoV disease can expect a deluge of media attention. Local communications personnel will need to determine capacity and develop procedures for addressing demands. This may include requesting CDC communications assistance and coordinating the activities of on-site CDC and local/state communication resources.
- Increase the range and type of educational materials that will be available during an outbreak. As possible, coordinate efforts with other agencies and organizations to avoid duplication.
  - Develop a portfolio of communication, information, and education sources and materials on topics including: clinical and laboratory diagnostics, infection control, isolation and quarantine, stigmatization management, travel control authority, legal issues, and agencies?roles and responsibilities.
  - Develop and present formal educational curricula and materials in multiple formats for professional audiences.
  - Coordinate with partner agencies to prepare and establish appropriate public, healthcare provider, policy maker, and media responses to a case or outbreak of SARS-CoV disease, including an understanding of how the public health system will respond, roles and

responsibilities of the different sectors involved, and reasonable expectations regarding the scope and effect of public health actions.
  - o Establish protocols to communicate the data that will need to be reported daily after confirmation of SARS activity (e.g., morbidity and mortality figures; geographic location of cases; number of persons affected; number of persons hospitalized).
- Establish a mechanism in advance for reviewing and clearing SARS-related messages and materials.
- Identify a spokesperson and subject matter experts who will be available during an outbreak. The spokesperson will require training in media relations and risk communication.
- Develop websites to help manage information requests. Materials may be developed in advance and stored on a server. Health departments may choose to use or adapt materials posted on CDC SARS website (www.cdc.gov/sars).
- Consider establishing a toll-free public information hotline. Although a CDC information hotline will be available during an outbreak, state and local health departments may also wish to provide this service for local residents. Hotline staff should be trained in advance and will need access to an evolving database of frequently asked questions.
- In coordination with other emergency response personnel, identify an algorithm or specific events that will activate emergency operations activities.
- Consider use of available federal assistance. If requested, CDC communication experts can be dispatched immediately to a community that has a confirmed case of SARS-CoV disease. These persons can help coordinate communication and media relations?activities in the field and assist in the coordination of communication with public and private healthcare providers and other agencies responsible for the outbreak response.
- Be aware of local resources. The local chapters of the American Lung Association and other organizations are helpful in disseminating educational messages to the community.

Objective 3: Increase knowledge about and awareness of SARS-CoV disease, and enhance understanding of preparations for the reappearance of SARS-CoV and the appropriate response to a global recurrence or introduction into the United States.

Activities

- Initiate the preparation and some dissemination of messages and materials to increase the knowledge of the public, healthcare professionals, policymakers, media, and others about SARS, travelers?advisories and alerts, infection control measures, patient management strategies, community containment measures including quarantine, and laboratory diagnostics. Public understanding of measures such as isolation and quarantine will facilitate acceptance of these approaches if needed.
- Use of a variety of approaches (e.g., increasing information available through websites and the media; collaboration with professional and civic organizations) to increase the level of knowledge about SARS-CoV disease. Target information to healthcare providers, public health officials, policy makers, media, and other local partners.
- Be prepared to immediately address questions related to the initial case(s) and to provide guidance to the public regarding disease susceptibility, diagnosis, and management. Case counts will need to be continually placed in context.
- Be prepared to address more complex questions. As is the case with most newly emerging microbial agents, most healthcare providers have never seen a case of SARS and will be relying on state/local health departments to provide needed information rapidly.
- Ensure the availability of communications products in multiple languages, based on the demographics of the jurisdiction. Health departments may choose to use or adapt translated materials on CDC website.

V. Communications Activities in the Presence of SARS

Objective 1: Coordinate local/state and national communications efforts related to SARS.

Activities

- Make every effort to work in close consultation with CDC communications colleagues to ensure a consistent and accurate communications response.
- In the event of a widespread SARS outbreak in the United States, it may be necessary to establish a Joint Information Center (JIC) in field locations where outbreak(s) are occurring. Most state and local jurisdictions currently have plans in place to facilitate such an installation if necessary. The JIC will become operational at the beginning of an HHS-wide federal response to the outbreak and will consist of representatives from all local, state, and federal agencies involved in the outbreak response. States and localities will coordinate all communication activities through the JIC or through an emergency communications center if the JIC has not been activated. The CDC Director Emergency Operations Center (DEOC) will coordinate CDC's interface with the JIC. Additional information on the JIC is provided in Appendix G1.
- Interact, as appropriate, with CDC Emergency Communication System (ECS). Once SARS activity is confirmed, CDC will activate the ECS to serve as a resource to state and local communications personnel and coordinate the federal public health communication response. ECS will direct all CDC SARS-related communication activities, including communication strategy development, key message development, CDC website management, materials development and dissemination, national media relations, media monitoring, and all other national communication components. Some ECS staff will be designated to focus on national level issues, whereas others will coordinate field personnel. The ECS will fully support JIC activities.
- Interact, as appropriate, with federal communication liaisons. To better understand and to encourage a reciprocal relationship between state and local communication officials, it is important to understand the roles of the federal communication liaisons in relation to the communications portion of the SARS response plan. Additional information can be found in Appendix G2.
- Harmonize messages used at the national and local levels (see Key Messages above).

Objective 2: Keep communications staff informed and ready with accurate, up-to-date information that is relevant to the situation in the jurisdiction.

Activities

- Establish a procedure for release of daily case counts at a specified time and location (e.g., website).
- Develop a ibrary? of SARS-related material for reference. Local and state health departments should develop a listing of SARS resources and references that can be readily available to communications and public information officers. Although information on SARS is available from multiple sources, CDC website offers the most up-to-date official information. Local and state health departments should visit the CDC website at www.cdc.gov/ncidod/sars/ for updated guidance, protocols, press releases, travel advisories, and educational materials in other languages.
- Equip all communications staff with a resource booklet identifying websites relating to SARS. Have the information technology department bookmark these links on staff members workstations.

- Maintain a library of relevant articles and publications in hard copy for use during field operations.
- Know the community. Ensure that communication materials address the language needs and cultural aspects of the affected community.
- Know your hotlines. Hotlines can provide ongoing guidance on new messages and materials that need to be developed to respond to public inquiries and concerns.
- Coordinate and maintain communication with local partners, such as:
  - Public affairs directors and information officers from local and state health departments
  - City and state government public affairs offices
  - Local congressional delegation and offices
  - Local police and fire departments and emergency management officials
  - Regional HHS health officers and regional Office of Emergency Preparedness
  - Local hospital public relations/affairs departments
  - State and local Emergency Operations Center coordinators
  - Federal Emergency Operations Centers

Objective 3: Communicate key messages, and provide up-to-date information on global and domestic SARS activity.

Activities

- Participate in and make available federal agency telebriefings and satellite broadcasts on SARS.
- Use websites as a central component in managing information requests from the public. Strategically designed websites can be used to organize and quickly provide information, updates, fact sheets, responses to frequently asked questions, healthcare provider resources, and media materials to a range of audiences.
- Provide information for travelers. SARS activity anywhere in the world will prompt immediate attention to travelers?movements to and from affected areas and will likely result in travelers□ alert messages and surveillance at relevant ports of entry.

VI. SARS Educational Tools and Resources

SARS educational tools and resources focus on understanding what is known about SARS-CoV disease and reinforcing infection control practices as the key to the prevention and control.

- **Archived satellite broadcasts and webcasts** -- Archived satellite broadcasts and webcasts provide a comprehensive review of infection control practices, clinical diagnosis and management, quarantine and community containment, legal challenges, laboratory diagnostics, and surveillance activities. Archived webcasts include the following:

  - Public Health Community Preparedness for Severe Acute Respiratory Syndrome (SARS) www.cdc.gov/ncidod/sars/webcast/broadcast052003.htm
  - Preparing for the Return of SARS: Are We Ready? www.phppo.cdc.gov/PHTN/webcast/sars-return/
  - SARS: When a Global Outbreak Hits Home www.publichealthgrandrounds.unc.edu/sars/index.htm

- **PowerPoint slides** – CDC has developed several Powerpoint presentations based on the material in *Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS)* (www.cdc.gov/ncidod/sars/sarsplanslides.htm). Topics include: surveillance, laboratory diagnostics, preparedness and response in healthcare facilities, community response and containment, and communication and education.

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- **Educational tools** -- Educational materials (currently under development) focus on SARS preparedness and infection control practices. These downloadable resources include reviews of personal protective equipment (PPE) and training activities for healthcare settings. Tools currently under development include:

  - Informational PPE slide set
  - Accompanying PPE poster in English and Spanish
  - Training scenarios for healthcare settings
  - Warning signage for patients at risk of exposure to SARS-CoV (suitable for entrances to healthcare facilities).

  Announcements regarding the availability of these materials will be posted on CDC SARS website: www.cdc.gov/sars/.

Appendix G1
Fact Sheet: Joint Information Center

What does it mean to a communications specialist when a JIC is operational?

Once a Joint Information Center (JIC) is operational, all media contacts and information should be handled through this center to ensure the distribution of consistent and accurate information. The JIC will:

- Issue local public health announcements and updated information on the outbreak and the response
- Disseminate information about SARS, its management, and the possible need for travel restrictions and isolation and quarantine
- Establish a ews desk operation? to coordinate and manage media relations activities
- Provide a location for state, local, and federal communication and emergency response personnel to meet and work side-by-side in developing key messages, handling media inquiries, writing media advisories and briefing documents
- Respond to frequently occurring questions by developing fact sheets, talking points (key messages), and question-and-answer documents
- Coordinate requests for spokespersons and subject matter experts
- Issue media credentials
- Address other local/regional information requests related to the outbreak that require distribution to the media and the general public
- Develop, coordinate, and manage local websites, as required

What activities should be carried out once a decision to activate a JIC has been made?

- Once widespread SARS-CoV transmission has been verified, activate full-scale communication activities according to the state or local risk communications plan. This may include deployment of field team(s) and assessment of staffing needs for extended hours/days at the command center. Designated staff will immediately report to the communications command center.
- Ensure that the communications command center has sufficient telephone lines to permit immediate access by field deployment teams.
- Activate or enhance a toll-free hotline, if available, and add sufficient personnel to answer incoming calls. Provide telephone response staff with resources (e.g., state or CDC website address), and direct them to provide feedback on needs for development, enhancement, or revision of current materials to meet emerging information demand. To reduce the burden on local resources, callers may be directed to the CDC information hotline if necessary. Also consider implementing a dedicated line for healthcare providers.
- Create and disseminate a media advisory that provides information on the situation, major actions taken, information about SARS, public guidance, and local resources. It will be imperative to issue information updates immediately and, as possible, to correct errors and misperceptions.
- If developed, activate the local emergency SARS website, provide links to other state government web servers, and disseminate this information widely through the media. If a website has not been developed, a link can be made available to CDC SARS website (www.cdc.gov/sars/). All media and public materials should be posted to the website, and all SARS-related information should provide a website address. The website should be used for media updates.

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- Provide local and external partners (e.g., medical professional associations, community leaders, community groups) with information/materials that will enable them to respond to public or healthcare provider inquiries, as necessary. Arrange to hold periodic briefings with these partners.

Appendix G2
Media Relations

One person cannot handle all aspects of media relations in the event of a widespread SARS outbreak. A Joint Information Center (JIC) is the best way to coordinate and manage media relations activities. Public information officers from a range of federal, state, and local agencies will need to work side-by-side handling media inquires, writing releases, and providing information on their agencies and other duties as appropriate. If a JIC is not activated, the various participants of a JIC and the ECS should establish a daily briefing among participants for coordination and communication on media briefings and media materials.

The role of the state and local health department should be made clear in all contacts with the media and in other public communications (e.g., press briefings, interviews, teleconferences). Cooperation and understanding among all the involved agencies will greatly enhance the success of the media operation. It will be important that federal health personnel (i.e., CDC), local and state health departments, and transportation agencies work together closely. Together, these groups will create and manage the flow of information to the media. It will also be important to work closely with mayoral, governor, and congressional media and communication staff. Key messages should be used consistently to convey the priorities of state and local health departments and their actions. Public information officers at state and local health departments can offer valuable insights into important issues in the state and local community, as well as guidance in dealing with local media. In addition, they can provide information about media contacts, outlets, directories, and telephone and fax numbers to facilitate distribution of information to the media. State and local personnel may be able to locate facilities and infrastructure for briefings. Media offices at local hospital should not be overlooked; they generally have good relationships with the media, as does the local fire department public information officer. In most communities, fire departments deal on a daily basis with the local media and can be valuable resources.

Public health spokespersons should answer questions concerning SARS and the actions being taken to control and respond to the outbreak. Personnel dealing with the media should be trained on the type of questions they should answer and those that should be directed elsewhere. They should also be trained in strategies for emphasizing key message in all responses. Adhering to key messages will allow communication to be consistent over time. Key messages must be science-based, reflect current knowledge, and based on good public health practice.

Communication personnel should identify and create new messages and materials that address emerging questions and concerns of the media, public, healthcare providers, policy makers, and others. As appropriate and feasible, field team communication staff should tailor SARS education and communication materials to community needs, with a special emphasis on subgroups who are most directly affected by SARS and who may be subject to stigmatization.

The ECS or Joint Information Center should implement daily routines for informing, and responding to inquiries from the media, healthcare providers, and the public:

- Establish daily or twice-daily press briefings. Once routine briefings are established, they will be invaluable in terms of relaying rapidly changing messages. As necessary and possible, without compromising the work commitments of subject matter experts, daily activities can be extended,
- n-person□press briefings are best for major public health announcements.
- Ideally, the same experts will conduct the media briefings to ensure continuity of messages. Experts should be reassuring about the ability of the public health authorities to respond to a crisis but should not minimize the severity of the situation in a way that could invalidate public concern.
- Limit media briefings to 30 to 45 minutes.

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- The state or local public information officer representing the public health should moderate, begin, and end the briefing. The moderator should: 1) set ground rules, 2) announce times of future briefings, 3) make administrative announcements, and 3) briefly introduce each panel member
- Each panel member should speak for 3 to 5 minutes on issues related to his/her area of expertise. Questions should be held until all panel members have spoken. Questions should be directed to the moderator, who will either answer the question or refer it to the appropriate panel member.
- All spokespersons should leave at the end of the briefing and avoid participating in individual media interviews.
- The state or local public information officer (or lead communication staff person) and the CDC field liaison should be notified immediately of any potential issues (e.g., inaccurate information, reports of rumors in the community, unanswered questions) that were identified during the briefing and need to be addressed.

Appendix G3
Community Relations/Outreach

Outreach to persons who may have special needs or issues that distinguish them from the general public during an outbreak of SARS will be especially important. First responders and their families, healthcare workers and medical/hospital support personnel, and transportation officials will all have special needs for information ? either to be able to perform their jobs or to ensure that their own concerns about exposure and protection are being addressed.

Local communications staff will need to establish a daily routine for coordinating and communicating with partner organizations regarding community education and outreach activities and needs, with briefings arranged as needed. Cooperation and understanding among all the involved agencies will greatly enhance the success of the community outreach/community relations operation. It will be important to work closely with local health departments□education and community outreach staff members, who can offer valuable insights into issues that are relevant to the community.

Communication staff should make use of the resources of the ECS and JIC to facilitate coordination and management of community relations activities. Community outreach staff, health education, and public health information officers from a wide range of federal, state, and local agencies will need to work side-by-side to appropriately handle community information needs. Suggested community relations activities include the following:

- Develop and maintain a contact list of key community partners, and establish regular briefings, ideally on a daily basis. Include members of healthcare organizations and transportation officials involved in the response.
- Work with healthcare providers and other affected workers (e.g., transportation personnel) to identify and address relevant issues. Staff members are much more likely to feel confident in carrying out their duties if they feel that their risks, and the risks to their families, are being addressed and minimized.
- Establish a community telephone line to respond to the questions and concerns of state and local healthcare providers, pharmacists, transportation personnel, persons under isolation or quarantine, and other special populations as appropriate. Work with partners to implement a resource and referral list for phone line staff.
- Work with local partners and response personnel to coordinate communication and health education activities by identifying needs and reporting on activities that have been planned and executed. Activities may include: 1) information campaigns for affected groups, 2) education campaigns and activities for healthcare providers, including first responders; 3) education and communication with state and community personnel involved in meeting community needs or community actions designed to prevent the spread of the disease, and 4) activities to ensure that persons under isolation or quarantine have access to needed supplies or services.
- Tailor communication and education services and messages to affected communities. This may include meeting with community partners to identify specific community resources that can be utilized and secured.
- Develop a list of healthcare facilities in the community that can be used for information dissemination and health education activities. Coordinate with CDC staff in initiating contact with healthcare workers. Cross-train key partners to assist in education and outreach efforts.
- In coordination with epidemiologic and medical personnel, obtain and track information daily on the numbers and location of new cases, new quarantined persons, and hospitals with SARS cases. Use these reports to determine priorities among community outreach and education efforts

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- Provide feedback to and coordinate with the JIC for distribution of information and identification of information needs.

Appendix G4
CDC Field Communications Liaisons

The CDC response to a major SARS outbreak will take place through CDC centralized Emergency Communications System (ECS) and through the deployment of field communication personnel. The responsibilities of CDC field personnel are to: 1) inform and advise federal efforts about the local situation and developments, 2) coordinate federal activities in such a manner that they do not contradict or otherwise impede local efforts, and 3) support state and local communication efforts, as necessary. To facilitate this coordination between state and local health department personnel and CDC communication personnel, CDC has designated two critical positions -- Field Communication Media Liaison and Field Communication Community Liaison (described below). These two roles correspond to the media relations and community relations/outreach response functions described above.

CDC Field Communication Media Liaison (FCML)

Among the activities of the CDC Field Communication Media Liaison are to:

- Work with state and local officials to facilitate the effective management of local communication efforts and the on-site communications center
- Support state/local officials in facilitating the provision and management of accurate, timely, and relevant information to the public and media (and timely and appropriate responses to errors and misinformation)
- Help enhance state and local communication efforts (e.g., obtain or verify information, prepare and debrief subject matter experts)
- Provide information to the federal (CDC and HHS) communication centers regarding local issues and developments, and coordinate federal and state/local communication.
- Serve as the principal CDC media advisor in the field, and assist the CDC ECS Leadership Team by serving as a media spokesperson when appropriate
- Assist state and local officials in preparing statements and materials to inform the public about a possible or known case of SARS-CoV disease in the jurisdiction, explain that health officials are working with CDC to confirm or rule-out the diagnosis (or to prevent further transmission), and inform the public about measures underway to prevent the spread of infection.
- Work with the lead CDC Center for SARS (NCID) to determine the most appropriate messages and timing for the notification of the news media and general public and to ensure proper clearance of messages and materials
- Act as CDC representative for coordination with the JIC for factual and consistent distribution of information and identification of information needs
- As necessary, help locate authorized public health spokespersons, and assist in directing local media to previously identified reliable state and local subject matter experts on SARS (e.g., local health officers and infectious disease physicians)
- Assist state and local officials in preparing for media interviews, developing media materials, and scheduling and managing media interviews. This includes assisting with logistics and working with local, state, and local officials to lease space as needed for briefings and other communications activities.
- Provide regular updates to CDC ECS regarding local developments, concerns, and issues.

CDC Field Communication Community Liaison (FCCL)

CDC communication plans include a Field Communication Community Liaison to serve as a CDC community relations advisor in the field. This person can assist local/state health department officials and

work with the ECS in serving as a contact point to local hospitals and infectious disease specialists. The liaison can play an important role in assisting with communication tasks relevant to the implementation of control measures (e.g., use of personal protective equipment, isolation and quarantine). The liaison will attend all CDC response team meetings and provide updates to the team leader and media liaison regarding community outreach and education activities.

As most community relations activities are state and local responsibilities, the liaison should coordinate with state and local officials to assess the need for assistance. Among the activities of the CDC Field Communication Community Liaison are to:

- Assist in identifying key community partners, developing and maintaining a contact list of these partners, and scheduling and participate in daily briefings
- Assist in the management of the [local] Joint Information Center
- Assist in the management of community outreach staff
- Assist in coordination and management of training and education outreach activities for healthcare professionals
- Assist with communication and educational activities for quarantined persons
- Participate in daily staff meetings held by the CDC field team leader.
- Send a daily community outreach activity report to the CDC DEOC and, if identified, the CDC SARS response team
- Request the DEOC to send new materials as updated and to provide information on new and emerging questions and issues identified from hotlines and other sources
- In coordination with local authorities, maintain a daily log of community information activities to facilitate the subsequent evaluation of the outbreak response
- In coordination with local authorities, write, edit, approve, and initiate clearance procedures for customized community outreach materials. To avoid confusing or contradictory messages, materials should be cleared by the JIC, program or content expert, state/local health departments.
- Assist HHS, CDC, and state and local officials in working with state and community groups.

For more information, visit www.cdc.gov/ncidod/sars or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)

Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS) Version 2

Supplement I: Infection Control in Healthcare, Home, and Community Settings

This new Supplement outlines the infection control recommendations for prevention of SARS-CoV transmission in healthcare, household, and community settings. During the 2003 global epidemic, SARS-CoV caused unprecedented levels of morbidity and mortality among healthcare personnel and disrupted healthcare delivery systems, leading in some instances to closure of hospitals. Rapid implementation and adherence to infection control measures proved essential for controlling transmission in healthcare settings. To assist healthcare facilities in controlling SARS-CoV transmission, CDC issued several infection control guidance documents that evolved with improved understanding of the virus and its modes of transmission. This Supplement consolidates, updates, and replaces the previous guidelines and provides new information to guide infection control practices for prevention of SARS-CoV transmission.

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Supplement I: Infection Control in Healthcare, Home, and Community Settings
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B. Management of Exposures and Other Contacts with SARS Patients

Appendix I1: Recommendations for Application of Standard Precautions for the Care of All Patients in All Healthcare Settings
Appendix I2: Summary of Recommendations for Expanded Precautions

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Infection Control in Healthcare, Home, and Community Settings

Goals

- Ensure early recognition of patients at risk for SARS-CoV disease.
- Prevent transmission of SARS-CoV by implementing appropriate infection control precautions.

Key concepts

- SARS-CoV can be efficiently transmitted in healthcare settings if patients with SARS-CoV disease are not immediately recognized and if infection control precautions are not applied.
- Basic infection control measures are effective in preventing SARS-CoV transmission.
- Administrative measures designed to facilitate early recognition of patients with SARS-CoV disease are a critical component of SARS prevention strategies.

Priority activities

- Reinforce basic infection control practices among healthcare workers.
- Take steps to reduce transmission of respiratory viruses from symptomatic persons at the time of initial encounter with the healthcare setting.
- Develop triage strategies that ensure early recognition of patients at risk for SARS-CoV disease.
- Develop plans for appropriate SARS infection control precautions in inpatient and outpatient healthcare facilities, homes, and community isolation facilities.
- Ensure appropriate management and follow-up monitoring of healthcare workers who have had exposures to and other contacts with SARS patients.

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I. Rationale and Goals

Transmission of SARS-CoV appears to occur predominantly through close interactions with infected persons. Infectious respiratory secretions are the most likely source of infection, although fecal/oral transmission may have occurred in some settings. Contact with contaminated body substances, either directly (e.g., shaking hands) or indirectly (e.g., touching objects contaminated with respiratory secretions or stool), can lead to exposure. SARS-CoV may also be transmitted through close contact with respiratory droplets expelled when a patient coughs or sneezes. In some instances, however, true airborne transmission (i.e., via droplet nuclei) cannot be excluded as a possible mode of SARS-CoV transmission.

SARS-CoV has been transmitted in healthcare settings (e.g., inpatient settings, emergency departments, nursing homes) to and from patients, healthcare workers, and visitors. Transmission to healthcare workers has occurred primarily after close contact with symptomatic persons before implementation of infection control precautions. During the 2003 outbreaks, multiple hospitals reported cases of SARS-CoV disease among healthcare workers who were present during aerosol-generating procedures performed on patients with SARS-CoV disease, suggesting that aerosol-generating procedures may pose an increased risk of SARS-CoV transmission. Special precautions during these procedures are recommended.

Infection control guidance to prevent SARS-CoV transmission is necessary to help ensure the protection of healthcare workers and healthcare facilities. In addition, as hospitalization of patients with SARS-CoV disease is recommended only if medically indicated, patients with less severe disease will likely be isolated in personal residences and designated community facilities. Therefore, appropriate infection control measures will be required to prevent transmission of SARS-CoV in these facilities. The goals for all settings are to:

- Ensure early recognition of patients at risk for SARS-CoV disease.
- Prevent transmission of SARS-CoV by implementing appropriate infection control precautions.

II. Lessons Learned

The following lessons learned from the global experience with SARS-CoV have been considered in developing this Supplement:

- Transmission of SARS-CoV appears to occur predominantly through close interactions with infected persons.
- Persons with unrecognized SARS-CoV disease can contribute to the initiation or expansion of an outbreak, especially in healthcare settings.
- Transmission of SARS-CoV in a single healthcare facility can have far-reaching public health effects.
- Transmission to healthcare workers has occurred primarily after close, unprotected contact with symptomatic persons before implementation of infection control precautions.
- Certain high-risk procedures and events can increase the risk of SARS-CoV transmission.
- Infection control is a primary public health intervention for containing the spread of SARS-CoV.
- Patients with SARS-CoV disease need to be isolated to minimize the risk of transmission to others.
- Patients with mild SARS-CoV disease can be safely isolated in locations other than acute-care facilities, such as at home or in community facilities designated for isolation of SARS patients.

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III. Infection Control in Healthcare Facilities

A. Preparedness Planning

SARS preparedness planning for healthcare facilities is addressed in Supplement C. One component with particular relevance to this Supplement is the education and training of healthcare workers on infection control measures. Observations of healthcare workers caring for SARS patients during the 2003 epidemic identified numerous breaches in infection control, especially in the use of personal protective equipment (PPE). These can be corrected through complete and comprehensive training, provision of properly selected PPE, and monitoring of PPE use. Most important, all healthcare settings need to re-emphasize the importance of basic infection control measures, including hand hygiene, for the control of SARS-CoV and other respiratory pathogens.

Objective: Reinforce basic infection control practices in healthcare facilities and among healthcare personnel.

Activities

- Educate staff about the importance of strict adherence to and proper use of standard infection control measures, especially hand hygiene (i.e., hand washing or use of an alcohol-based hand rub). For complete recommendations on hand hygiene, refer to: www.cdc.gov/handhygiene/.
- Reinforce education on the recommended procedures for Standard, Contact, and Airborne Infection Isolation (AII) Precautions (see www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm).
- Ensure that personnel have access to appropriate PPE, instructions and training in PPE use, and respirator fit-testing.

B. Early Recognition and Prevention of Transmission in Outpatient Settings

Objective: Ensure early recognition and prevention of transmission of SARS-CoV and other respiratory viruses at the initial encounter with a healthcare setting.

The 2003 outbreaks identified weaknesses in the way infection control precautions are implemented at the time symptomatic patients first visit a healthcare facility for evaluation. To address this deficiency, CDC is *incorporating measures to prevent the transmission of all respiratory infections*, beginning at the first point of contact with a potentially infected person, as one component of Standard Precautions in healthcare settings (see Appendix I1 and www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm).

These simple preventive measures apply in the absence and presence of SARS-CoV transmission in the world. Once SARS-CoV transmission is detected, efforts to enhance the early detection of patients with SARS-CoV disease (described in Section III.C below) should be added to these new Standard Precautions measures.

Activities

Visual alerts

- Post visual alerts (in appropriate languages) at the entrance to outpatient facilities (e.g., emergency departments, physicians?offices, outpatient clinics) instructing patient and the persons who accompany them to: 1) inform healthcare personnel of symptoms of a respiratory

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infection when they first register for care, and 2) practice respiratory hygiene/cough etiquette (www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm). Sample visual alerts will be posted on CDC SARS website: www.cdc.gov/ncidod/sars/.

Respiratory hygiene/cough etiquette

To contain respiratory secretions, all persons with signs and symptoms of a respiratory infection, regardless of presumed cause, should be instructed to:

- Cover the nose/mouth when coughing or sneezing.
- Use tissues to contain respiratory secretions.
- Dispose of tissues in the nearest waste receptacle after use.
- Perform hand hygiene after contact with respiratory secretions and contaminated objects/materials.

Healthcare facilities should ensure the availability of materials for adhering to respiratory hygiene/cough etiquette in waiting areas for patients and visitors:

- Provide tissues and no-touch receptacles (i.e., waste container with pedal-operated lid or uncovered waste container) for used tissue disposal.
- Provide conveniently located dispensers of alcohol-based hand rub.
- Provide soap and disposable towels for hand washing where sinks are available.

Masking and separation of persons with symptoms of respiratory infection

- During periods of increased respiratory infection in the community, offer masks to persons who are coughing. Either procedure masks (i.e., with ear loops) or surgical masks (i.e., with ties) may be used to contain respiratory secretions; respirators are not necessary. Encourage coughing persons to sit at least 3 feet away from others in common waiting areas. Some facilities may wish to institute this recommendation year-round.

Droplet Precautions

- Healthcare workers should practice Droplet Precautions (i.e., wear a surgical or procedure mask for close contact), in addition to Standard Precautions, when examining a patient with symptoms of a respiratory infection. Droplet Precautions should be maintained until it is determined that they are no longer needed (see www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm).

C. Early Detection and Isolation of Patients Potentially at Risk for SARS-CoV Disease

Early detection and isolation of patients who may be infected with SARS-CoV are the most important interventions to prevent the introduction of SARS-CoV into a healthcare setting. However, because measures to control SARS-CoV can impose a considerable burden, especially if multiple patients with respiratory illnesses are being seen in an outpatient setting or admitted to a hospital for treatment of pneumonia, the intensity of early detection and control measures should be based on the level of SARS-CoV transmission in the world. See CDC SARS website (www.cdc.gov/sars/) for current information on SARS-CoV transmission worldwide.

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Objective 1: ***In the absence of SARS-CoV transmission in the world***, implement screening to detect the re-emergence of SARS-CoV, and ensure appropriate triage and management of patients with possible SARS-CoV disease.

In the absence of person-to-person SARS-CoV transmission, the likelihood that a patient being evaluated for fever or lower respiratory illness, with or without pneumonia, has SARS-CoV disease will be exceedingly low unless there are both typical clinical findings and some accompanying epidemiologic evidence that raises the suspicion of exposure to SARS-CoV. Therefore, patients with respiratory infections should not be considered as possible cases of SARS-CoV disease unless they have severe pneumonia (or acute respiratory distress syndrome) of unknown etiology that requires hospitalization *and* an epidemiologic history that raises the suspicion of SARS-CoV exposure.

Activities

Screening and triage

- Only patients requiring hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology should be screened for SARS epidemiologic risk factors. The suspicion for SARS-CoV disease is raised if, within 10 days of symptom onset, the patient:
  - Has a history of travel to mainland China, Hong Kong, or Taiwan,[1] or close contact[2] with an ill person with a history of recent travel to one of these areas, *OR*
  - Is employed in an occupation associated with a risk for SARS-CoV exposure (e.g., healthcare worker with direct patient contact; worker in a laboratory that contains live SARS-CoV), or
  - Is part of a cluster of cases of atypical pneumonia without an alternative diagnosis

  Evaluate persons with such a clinical and exposure history according to Figure 1 in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidanceframe1.htm).

Outpatient infection control

- Follow the infection control recommendations for respiratory hygiene/cough etiquette and Droplet Precautions outlined in Section III.B above.

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[1] The 2003 SARS-CoV outbreak likely originated in mainland China, and neighboring areas such as Taiwan and Hong Kong are thought to be at higher risk due to the large volume of travelers from mainland China. Although less likely, SARS-CoV may also reappear from other previously affected areas. Therefore, clinicians should obtain a complete travel history. If clinicians have concerns about the possibility of SARS-CoV disease in a patient with a history of travel to other previously affected areas (e.g., while traveling abroad, had close contact with another person with pneumonia of unknown etiology or spent time in a hospital in which patients with acute respiratory disease were treated), they should contact the local or state health department.

[2] Close contact: A person who has cared for or lived with a person with SARS-CoV disease or had a high likelihood of direct contact with respiratory secretions and/or body fluids of a person with SARS-CoV disease. Examples of close contact include kissing or hugging, sharing eating or drinking utensils, talking within 3 feet, and direct touching. Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

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Disposition

- No special infection control measures are recommended following discharge from an outpatient setting.

Hospitalization

- Patients who require hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology and who have one of the potential SARS risk factors should be placed on Droplet Precautions until it is determined that the cause of the pneumonia is not contagious. If the health department and clinicians *strongly* suspect SARS-CoV disease, then the patient should be placed on Contact and Airborne Infection Isolation Precautions, in addition to Standard Precautions (See Section C below and *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness*,www.cdc.gov/ncidod/sars/clinicalguidance.htm).

Objective 2: ***In the presence of person-to-person transmission of SARS-CoV in the world,*** ensure the prompt identification and appropriate management of patients with possible and known SARS-CoV disease.

Activities

Screening and triage

Once person-to-person SARS-CoV transmission has been documented anywhere in the world, the probability that a patient presenting with early clinical symptoms of SARS actually has SARS-CoV disease increases if the patient has an epidemiologic link to a geographic location in which SARS-CoV transmission has been documented.

- Screen all patients with fever or lower respiratory symptoms, with or without pneumonia, to determine if, within 10 days of the onset of symptoms, they had:
  - Close contact with a person suspected of having SARS-CoV disease, *or*
  - A history of foreign travel (or close contact with an ill person with a history of travel) to a location with documented or suspected SARS-CoV transmission, *or*
  - Exposure to a domestic or occupational location with documented or suspected SARS-CoV (including a laboratory that contains live SARS-CoV), or close contact with an ill person with such an exposure history

- For persons with a high risk of exposure to SARS-CoV (e.g., persons previously identified through contact tracing or self-identified as close contacts of a laboratory-confirmed case of SARS-CoV disease; persons who are epidemiologically linked to a laboratory-confirmed case of SARS-CoV disease), the clinical criteria should be expanded to include, in addition to fever or respiratory symptoms, the presence of any other early symptoms of SARS-CoV disease (subjective fever, chills, rigors, myalgia, headache, diarrhea, sore throat, rhinorrhea). The more common early symptoms include chills, rigors, myalgia, and headache. In some patients, myalgia and headache may precede the onset of fever by 12-24 hours. However, diarrhea, sore throat, and rhinorrhea may also be early symptoms of SARS-CoV disease.

  Evaluate persons with an exposure history suggesting possible SARS-CoV disease according to Figure 2 in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease*

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among Persons Presenting with Community-Acquired Illness
(www.cdc.gov/ncidod/sars/clinicalguidanceframe2.htm).

- Patients who require hospitalization for pneumonia and who do not have a known epidemiologic link to a setting in which SARS-CoV has been documented should be screened for additional risk factors using the questions that apply when no SARS-CoV is documented in the world (i.e., employment in an occupation at particular risk for SARS-CoV exposure; part of a cluster of atypical pneumonias without an alternative diagnosis).

- Healthcare workers who are the first points of contact (e.g., triage and reception) should be trained to perform SARS-CoV screening. If screening personnel are not available, healthcare providers should screen symptomatic patients for SARS-CoV disease risk factors before initiating history-taking and physical examination. If SARS symptoms and risk factors are present, follow the clinical algorithm for patient management (www.cdc.gov/ncidod/sars/clinicalguidanceframe2.htm).

Outpatient infection control

- Patients with fever or lower respiratory symptoms, with or without pneumonia, who have been exposed to SARS-CoV or who have SARS risk factors should be suspected of having SARS-CoV disease and isolated as soon as possible. Such patients should be given a mask (surgical or procedure) to wear and immediately placed in a private examination room or cubicle. If available, an AII room (AIIR) should be used.
- Where limited space and examination room capacity preclude these measures, the patient should sit as far away as possible from other patients in the waiting area.
- Family members or friends who accompany the patient should be considered at risk for SARS-CoV disease and screened for fever and lower respiratory symptoms. If either is present, infection control measures to prevent SARS-CoV transmission should be applied.
- Healthcare workers should wear gown, gloves, respiratory protection, and eye protection (if needed) as described in Section III.D.5 below.

Disposition

- Hospital admission or discharge of a possible SARS patient should generally be based on the patient's clinical condition and healthcare needs. If diagnostic, therapeutic, or supportive regimens do not necessitate hospitalization, patients with possible SARS-CoV disease should not be hospitalized.
- Exceptions include persons for whom no other alternative for providing safe infection control is available. Such persons include travelers, homeless persons, and persons who would be returned to an environment where infection control measures are not feasible or practical (e.g., crowded dormitories, prisons and jails, detention centers, homeless shelters, other multi-person single-room dwellings). These persons should be hospitalized and isolated as recommended in Section D below. As soon as appropriate arrangements can be made for out-of-hospital care, the patient can be discharged. Alternatively, the patient may be admitted to a designated residential facility for isolation of convalescing SARS-CoV disease cases, if one exists.
- During transport between locations, patients should wear a mask. Public transportation (e.g., bus, train) should be avoided. Recommendations for emergency medical transport are provided in Section IV below.

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Hospitalization

- Follow recommended precautions for hospitalization of a patient with known or possible SARS-CoV disease as described in Section D below.

D. Infection Control Precautions for Hospitalized SARS Patients

The following recommendations apply to patients who have laboratory evidence of SARS-CoV disease or for whom the attending clinicians and health department strongly suspect SARS-CoV disease. The level of precautions described will rarely be needed in the absence of SARS-CoV transmission in the world but will be used increasingly once SARS-CoV transmission is detected.

Contact and AII Precautions, in addition to Standard Precautions, should be applied when caring for patients with known or possible SARS-CoV disease. (Droplet Precautions also are required but are subsumed within AII Precautions.) These precautions should be maintained for the duration of potential infectivity (see (www.cdc.gov/ncidod/sars/clinicalguidance.htm) or until a diagnosis of SARS-CoV disease has been ruled out. See Appendix I2.

The objective of all of the following activities is to prevent the transmission and acquisition of SARS-CoV in the hospital.

1. Patient placement

- Admit patients with SARS-CoV disease to an AIIR. An AIIR is a single-patient room in which environmental conditions are controlled to minimize the possibility of airborne transmission of infectious agents. These rooms have specific requirements for controlled ventilation, including: 1) a specified number of required air exchanges per hour (ACH) (i.e., 6 for old buildings; 12 for new construction or renovation), 2) monitored negative pressure relative to hallways, and 3) air exhausted directly to the outside preferably or passed through a high-efficiency purifying air (HEPA) filter if recirculated. These requirements are detailed in the *Guideline for Environmental Infection Control in Healthcare Facilities, 2003* (www.cdc.gov/ncidod/hip/enviro/guide.htm).

- If there is a lack of AIIRs and/or a need to concentrate infection control efforts and resources, patients may be cohorted on a floor or nursing unit designated for the care of SARS patients only, rather than placed in AIIRs throughout the hospital. This strategy physically isolates SARS patients and also makes it possible to dedicate resources and appropriately trained staff to their care. Experience in some settings in Taiwan and Toronto demonstrated that cohorting SARS patients, without use of AIIRs, effectively interrupted transmission. Thus, although single AIIRs are recommended for SARS isolation, other strategies may provide effective overall infection control, particularly if air-handling systems in existing rooms/units/floors can be modified to allow these areas to operate under negative pressure relative to surrounding areas.

- Even if a facility has chosen to cohort SARS patients, properly designed and operated AIIRs are preferred for 1) patients who are known to have transmitted SARS-CoV to other persons and 2) patients in whom the risk of SARS is being assessed.

- Designate 点lean? and 飞irty? areas for isolation materials. Maintain a stock of clean patient care and PPE supplies outside the patient段 room. Decide where contaminated linen and waste will be placed. Locate receptacles close to the point of use and separate from the clean supplies. Also designate the location where reusable PPE (e.g., goggles, face shields) will be placed for cleaning and disinfection before reuse.

- Limit the amount of patient-care equipment brought into the room to that which is medically necessary. Provide each patient with patient-dedicated equipment (e.g., thermometer, blood pressure cuff, stethoscope).

- Limit staff to the number sufficient to meet patient-care needs. Using staff who have been specially trained to care for patients with SARS may reduce opportunities for exposure, increase adherence to recommended infection control practices, and promote continuity of care.

2. Patient transport

- Limit patient movement and transport outside the AIIR to medically necessary purposes. Whenever possible, use portable equipment to perform x-rays and other procedures in the patient段 room.
- If transport or movement is necessary, ensure that the patient wears a surgical mask, puts on a clean patient gown, and performs hand hygiene before leaving the room. If a mask cannot be tolerated (e.g., due to the patient段 age or deteriorating respiratory status), apply the most practical measures to contain respiratory secretions.
- Limit contact between SARS patients and others by using less traveled hallways and elevators when possible.

3. Visitors

- Limit visits to patients with known or possible SARS-CoV disease to persons who are necessary for the patient's emotional well-being and care.
- Visitors who have been in contact with the patient before and during hospitalization are a possible source of SARS-CoV. Therefore, schedule and control visits to allow for appropriate screening for SARS-CoV disease before entering the hospital and appropriate instruction on use of PPE and other precautions (e.g., hand hygiene, limiting surfaces touched) while in the patient段 room.

4. Hand hygiene

Hand hygiene (i.e., hand washing or use of an alcohol-based hand rub) should be performed after contact with a patient on precautions for SARS-CoV disease or their environment of care. Current guidelines for hand hygiene are provided at: www.cdc.gov/handhygiene/.

5. Personal protective equipment (PPE)

Gloves, gown, respiratory protection, and eye protection (as needed) should be donned before entering a SARS patient段 room or designated SARS patient-care area. This level of protection is required for the majority of patient contacts. Additional guidance for performing an aerosol-generating procedure on patients with SARS Co-V disease is provided in Section III.D.11 below. Instructions on how to safely don, use, and remove PPE are being developed and will be provided at www.cdc.gov/ncidod/sars/ when available. Removal of PPE in a manner that prevents contamination of clothing and skin is a priority.

- Gown and gloves ? Wear a standard isolation gown and pair of nonsterile patient-care gloves for all patient contacts. The gown should fully cover the front torso and arms and should tie in the back. Gloves should cover the cuffs of the gown.

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- Respiratory protection ? Wear a NIOSH-certified N-95 filtering facepiece respirator for entering an AIIR or designated SARS patient-care area.[3] If N-95 or higher level of respiratory protection is not available, then wear a snug-fitting surgical mask to prevent nose and mouth contact with large respiratory droplets. Discard respirators upon leaving the patient room or area.

- Eye and face protection -- It is not yet known whether routine eye protection is needed to prevent SARS-CoV transmission. Routinely wear eye protection when within 3 feet of a patient with SARS-CoV. If splash or spray of respiratory secretions or other body fluids is likely, protect the eyes with goggles or a face shield, as recommended for Standard Precautions. The face shield should fully cover the front and wrap around the side of the face. Corrective eyeglasses or contact lenses alone are not considered eye protection.

- Use safe work practices when wearing PPE:
  - Avoid touching the face with contaminated gloves
  - Avoid unnecessary touching of surfaces and objects with contaminated gloves

6. Medical waste

Medical waste has not been implicated in the transmission of SARS-CoV. Therefore, no special handling procedures are recommended for SARS-CoV-contaminated medical waste.

- Contain and dispose of SARS-CoV-contaminated medical waste in accordance with facility-specific procedures and/or local or state regulations for handling and disposal of medical waste, including used needles and other sharps.
- Discard as routine waste used patient-care supplies that are not likely to be contaminated (e.g., paper wrappers).
- Wear disposable gloves when handling waste. Perform hand hygiene after removal of gloves.

7. Textiles (linen and laundry)

Contact with textiles has not been implicated in the transmission of SARS-CoV. Therefore, no special handling procedures are recommended for linen and laundry that may be contaminated with SARS-CoV.

- Store clean linen outside patient rooms, taking into the room only linen needed for use during the shift.
- Place soiled linen directly into a laundry bag in the patient's room. Contain linen in a manner that prevents the linen bag from opening or bursting during transport and while in the soiled linen holding area.
- Wear gloves and gown when directly handling soiled linen and laundry (e.g., bedding, towels, personal clothing) as per Standard and Contact Precautions. Do not shake or otherwise handle soiled linen and laundry in a manner that might aerosolize infectious particles.
- Wear gloves for transporting bagged linen and laundry.
- Perform hand hygiene after removing gloves that have been in contact with soiled linen and laundry.

[3] Respirators should be used in the context of a complete respiratory protection program as required by the Occupational Safety and Health Administration (OSHA). This includes training, fit-testing, and fit-checking to ensure appropriate respirator selection and use. To be effective, respirators must provide a proper sealing surface on the wearer段face. Detailed information on a respiratory protection program is provided at www.osha.gov/SLTC/etools/respiratory/.

- Wash and dry linen according to routine standards and procedures (www.cdc.gov/ncidod/hip/enviro/guide.htm).

8. Dishes and eating utensils

Dishes and eating utensils have not been implicated in SARS-CoV transmission. Therefore, no special precautions, beyond those for Standard Precautions, are recommended for dishes and eating utensils used by a patient with known or possible SARS-CoV disease.

- Wash reusable dishes and utensils in a dishwasher with recommended water temperature (www.cdc.gov/ncidod/hip/enviro/guide.htm).
- Wear gloves when handling patient trays, dishes, and utensils.

9. Patient-care equipment

- Follow standard practices for handling and reprocessing used patient-care equipment, including medical devices. Wear gloves when handling and transporting used patient-care equipment. Wipe heavily soiled equipment with an EPA-approved hospital disinfectant before removing it from the patient段 room. Follow current recommendations for cleaning and disinfection or sterilization of reusable patient-care equipment.
- Wipe external surfaces of portable equipment for performing x-rays and other procedures in the patient段 room with an EPA-approved hospital disinfectant upon removal from the patient段 room.

10. Environmental cleaning and disinfection

Cleaning and disinfection of environmental surfaces are important components of routine infection control in healthcare facilities. Although little is known about the extent of environmental contamination in SARS patients' rooms, epidemiologic and laboratory evidence suggests that the environment could play a role in transmission. Therefore, cleaning and disinfection are critical to the control of SARS-CoV transmission. Environmental cleaning and disinfection for SARS-CoV follows the same principles generally used in healthcare settings.

Cleaning and disinfection of occupied patient rooms

- Consider designating specific, well-trained environmental services personnel for cleaning and disinfecting of SARS patient rooms/units. Fully define the scope of cleaning that will be done each day; identify who will be responsible for cleaning and disinfecting the surfaces of patient-care equipment (e.g., IV pumps, ventilators). Consider using a checklist to promote accountability for cleaning responsibilities.

- Environmental services personnel should wear PPE as described in Section III.D.5 above. These staff should be trained in proper procedures for PPE use, including removal of PPE, and the importance of hand hygiene.

- Keep cleaning supplies outside the patient room (e.g., in an anteroom or storage area).

- Keep areas around the patient free of unnecessary supplies and equipment to facilitate daily cleaning.

- Use any EPA-registered hospital detergent-disinfectant. Follow manufacturer段 recommendations for use-dilution (i.e., concentration), contact time, and care in handling.

- Clean and disinfect SARS patients□rooms at least daily and more often when visible soiling/contamination occurs. Give special attention to frequently touched surfaces (e.g., bedrails, bedside and over-bed tables, TV control, call button, telephone, lavatory surfaces including safety/pull-up bars, doorknobs, commodes, ventilator surfaces) in addition to floors and other horizontal surfaces.

- Because so little is known about environmental transmission of SARS-CoV, placement of patients in rooms that do not have carpeting is preferred because non-carpeted floors are easier to clean and disinfect. If use of carpeted rooms cannot be avoided, vacuuming should be done daily, and personnel should wear the recommended PPE. Follow current CDC environmental guidelines for vacuuming and shampooing carpeted floors in patient rooms (www.cdc.gov/ncidod/hip/enviro/guide.htm).

- After an aerosol-generating procedure (e.g., intubation), clean and disinfect horizontal surfaces around the patient. Clean and disinfect as soon as possible after the procedure.

- Clean and disinfect spills of blood and body fluids in accordance with current recommendations for Standard Precautions (www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm).

Cleaning and disinfection after patient discharge or transfer

Follow standard facility procedures for terminal cleaning of an isolation room.

- Clean and disinfect all surfaces that were in contact with the patient or may have become contaminated during patient care.
- Wipe down mattresses and headboards with an EPA-approved hospital disinfectant.
- Privacy curtains should be removed, placed in a bag in the room and then transported to be laundered.
- No special treatment is necessary for window curtains, ceilings, and walls unless there is evidence of visible soil.
- Do not spray (i.e., fog) occupied or unoccupied rooms with disinfectant. This is a potentially dangerous practice that has no proven disease control benefit.

11. Aerosol-generating procedures

Because aerosol-generating procedures may pose a greater risk of SARS-CoV transmission, additional precautions are recommended for healthcare workers who perform or assist with these procedures. Procedures that stimulate coughing and promote the generation of aerosols include aerosolized or nebulized medication administration, diagnostic sputum induction, bronchoscopy, airway suctioning, endotracheal intubation, positive pressure ventilation via face mask (e.g., BiPAP, CPAP), and high-frequency oscillatory ventilation.

Healthcare facilities should review their strategies to protect healthcare workers during these procedures, including the use of PPE and safe work practices. Healthcare workers who perform these procedures should be alerted to the fact that there may be an increased risk for SARS-CoV transmission when these procedures are performed.

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Infection control measures

- Limit performance of aerosol-generating procedures on SARS patients to those that are considered medically necessary. Clinically appropriate sedation during intubation and bronchoscopy may minimize resistance and coughing during the procedure.
- Limit the number of healthcare workers in the room during an aerosol-generating procedure to those essential for patient care and support.
- Perform aerosol-generating procedures in an AIIR. If an AIIR is not available, perform the procedure in a private room, away from other patients. If possible, increase air exchanges, create a negative pressure relative to the hallway, and avoid recirculation of the room air. If recirculation of air from such rooms is unavoidable, pass the air through a HEPA filter before recirculation, as recommended for *Mycobacterium tuberculosis* (www.cdc.gov/mmwr/preview/mmwrhtml/00035909.htm).
- Air-cleaning devices, such as portable HEPA filtration units, may be used to further reduce the concentration of contaminants in the air. Keep doors closed except when entering or leaving the room, and minimize entry and exit during the procedure.
- Submicron filters on exhalation valves of mechanical ventilators may prevent contaminated aerosols from entering the environment. Although the effectiveness of this measure in reducing the risk of SARS-CoV transmission is unknown, the use of such filters is prudent during high-frequency oscillatory ventilation of patients with SARS-CoV disease.

PPE for aerosol-generating procedures

The optimal combination of PPE for preventing SARS-CoV transmission during aerosol-generating procedures has not been determined. Wearing PPE during these procedures protects the respiratory tract from inhalation of droplet nuclei and the mucous membranes, skin, and clothing from contact with infectious respiratory secretions. PPE should cover the torso, arms, and hands as well as the eyes, nose, and mouth. PPE must be compatible with the needs of healthcare worker protection and patient care. The following PPE is recommended:

- Disposable isolation gown, preferably with fluid-resistant properties, to protect the body and exposed areas of the arms. A disposable full-body isolation suit is an option and may provide greater protection of the skin, especially around the neck. Surgical hoods, which fully cover the head, neck, and face, (with the addition of an N-95 or higher-level disposable particulate respirator), have been used in some settings. It is unknown whether covering exposed areas of skin or hair on the head will further reduce the risk of transmission.

- Pair of disposable gloves that fit snuggly over the gown cuff.

- Eye protection (i.e., goggles) to protect the eyes from respiratory splash or spray. Goggles should fit snuggly (but comfortably) around the eyes. A face shield may be worn over goggles to protect exposed areas of the face but should not be worn as a primary form of eye protection for these procedures.

- Respiratory protection -- During aerosol-generating procedures, there must be minimal respirator face-seal leakage to fully protect the worker from exposure to aerosolized infectious droplets. The following respiratory protection options should be considered:

    - Disposable particulate respirators (e.g., N-95, N-99, or N-100) are sufficient for routine respiratory protection for Airborne Infection Isolation and are the minimum level of respiratory protection required for healthcare workers who are performing aerosol-generating procedures. To ensure adequate protection, healthcare workers must be fit-

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tested to the respirator model that they will wear (www.cdc.gov/niosh/99-143.html) and also know how to check the face-piece seal. A fit-check should be performed each time a respirator is put on, before entering the patient room. Workers who cannot wear a disposable particulate respirator because of facial hair or other fit limitations should wear a loose-fitting (i.e., helmeted or hooded) PAPR.

- Healthcare facilities in some SARS-affected areas routinely used higher levels of respiratory protection for performing aerosol-generating procedures on patients with SARS-CoV disease. It is unknown whether these higher levels of protection will further reduce transmission. Factors that should be considered in choosing respirators in this setting include availability, impact on mobility, impact on patient care, potential for exposure to higher levels of aerosolized respiratory secretions, and potential for reusable respirators to serve as fomites for transmission. Higher levels of respiratory protection include:
  - PAPR with loose-fitting face piece that forms a partial seal with the face
  - PAPR with hood that completely covers the head and neck and may also cover portions of the shoulder and torso
  - PAPR with tight-fitting face piece (half and full face-piece)
  - Full face-piece elsastomeric negative-pressure (non-powered) respirators with N, R, or P-100 filters.

IV. Infection Control for Prehospital Emergency Medical Services (EMS)

Effective communication among clinicians requesting emergency transport of a patient with possible or known SARS-CoV disease, EMS personnel, and receiving facilities is necessary to ensure the appropriate protection of healthcare workers. Prehospital care personnel should follow the updated Standard Precautions recommendations to prevent the spread of respiratory infections described in III.B above. These include promoting respiratory hygiene/cough etiquette (www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm) and using Droplet Precautions (www.cdc.gov/ncidod/hip/ISOLAT/Isolat.htm), in addition to Standard Precautions, for all patients with symptoms of a respiratory infection. When SARS is suspected in a patient needing emergency transport, ***prehospital care providers and healthcare facilities should be notified in advance that they may be transporting or receiving a patient who may have SARS-CoV disease.***

A. Patient Transport

Objective: Safely transport patients with known or possible SARS-CoV disease.

Activities

Patients who may have SARS-CoV disease may be safely transported in any emergency vehicle with the proper precautions.

- Involve the fewest EMS personnel required to minimize possible exposures.
- Family members and other contacts of SARS patients should not ride in the ambulance if possible. If necessary, they should be evaluated for fever and lower respiratory symptoms and, if either is present, asked to wear a surgical or procedure mask when riding in the vehicle.
- When possible, use vehicles that have separate driver and patient compartments that can provide separate ventilation to each area. Close the door/window between these compartments before bringing the patient on board. Set the vehicle段 ventilation system to the non-recirculating mode to maximize the volume of outside air brought into the vehicle. If the

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vehicle has a rear exhaust fan, use it to draw air away from the cab, toward the patient-care area, and out the back end of the vehicle. Some vehicles are equipped with a supplemental recirculating ventilation unit that passes air through HEPA filters before returning it to the vehicle. Such a unit can be used to increase the number of ACH (NIOSH HETA report 95-0031-2601 [www.cdc.gov/niosh/hhe/reports/pdfs/1995-0031-2601.pdf]).

- If a vehicle without separate compartments and ventilation must be used, open the outside air vents in the driver area and turn on the rear exhaust ventilation fans to the highest setting. This will create a negative pressure gradient in the patient area.

- If possible, place a surgical mask on the patient to contain droplets expelled during coughing. If this is not possible (i.e., would further compromise respiratory status, difficult for the patient to wear), have the patient cover the mouth/nose with tissue when coughing.

- Oxygen delivery with a non-rebreather face mask may be used to provide oxygen support during transport. If needed, positive-pressure ventilation should be performed using a resuscitation bag-valve mask, preferably one equipped to provide HEPA or equivalent filtration of expired air.

- If a patient has been mechanically ventilated before transport, HEPA or equivalent filtration of airflow exhaust should be available. (EMS organizations should consult their ventilator equipment manufacturer to confirm appropriate filtration capability and the effect of filtration on positive-pressure ventilation.)

- Cough-generating procedures (e.g., mechanical ventilation, nebulizer treatment) should be avoided during prehospital care.

B. Personal Protective Equipment

Objective: Ensure the safety of prehospital care providers who transport patients with known or possible SARS-CoV disease.

Activities

- Prehospital care providers who directly handle a patient with SARS-CoV disease or who are in the compartment with the patient should wear PPE as recommended for Standard, Contact, and AII Precautions (www.cdc.gov/ncidod/hip/ISOLAT/isopart2.htm). These include the following:
  - Disposable isolation gown, pair of disposable patient examination gloves, eye protection (i.e., goggles or face shield).
  - Respiratory protection (i.e., N-95 or higher-level respirator)

- Personnel in the driver□ compartment who will have no direct patient contact should wear an N-95 or higher-level respirator during transport. Drivers who also provide direct patient care (e.g., moving patients on stretchers) should wear the recommended PPE for patient contact. This PPE, with the exception of the respirator, should be removed and hand hygiene performed after completing patient care and before entering driver□ compartment to avoid contaminating the compartment. Instructions on how to safely don, use, and remove PPE is being developed and will be provided when available on CDC□ SARS website: www.cdc.gov/ncidod/sars/.

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C. Safe Work Practices

Objective: Ensure safe work practices among EMS personnel to prevent transmission of SARS-CoV.

Activities

- Avoid touching one段 face with contaminated gloves.
- Avoid unnecessary touching of surfaces in the ambulance vehicle.
- Arrange for the receiving facility staff to meet the patient at the ambulance door to limit the need for EMS personnel to enter the emergency department in contaminated PPE. (It may not be practical to change PPE before patient transfer into the facility.) Remove and discard PPE after transferring the patient at the receiving facility and perform hand hygiene. Treat used disposable PPE as medical waste.

D. Clinical Specimens

Objective: Safely collect clinical specimens from SARS patients during transport.

Activities

- Handle clinical specimens that must be collected during transport (e.g., blood gas) in accordance with standard operating procedures.

E. Post-Transport Management of the Contaminated Vehicle

Objective: Safely clean vehicles used for transport of SARS patients to prevent SARS-CoV transmission.

Activities

- Follow standard operating procedures for the containment and disposal of regulated medical waste.
- Follow standard operating procedures for containing and reprocessing used linen. Wear appropriate PPE when removing soiled linen from the vehicle. Avoid shaking the linen.
- Clean and disinfect the vehicle in accordance with standard operating procedures. Personnel performing the cleaning should wear a disposable gown and gloves (a respirator should not be needed) during the clean-up process; the PPE should be discarded after use. All surfaces that may have come in contact with the patient or materials contaminated during patient care (e.g., stretcher, rails, control panels, floors, walls, work surfaces) should be thoroughly cleaned and disinfected using an EPA-registered hospital disinfectant in accordance with manufacturer段 recommendations.
- Clean and disinfect reusable patient-care equipment according to manufacturer段 instructions.

F. Follow-up of EMS Personnel

Objective: Ensure appropriate follow-up and care of EMS personnel who transport SARS patients.

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Activities

- Manage EMS personnel who transport SARS patients as recommended for hospital personnel (see Section IX).

V. Infection Control for Care of SARS Patients at Home

Patients with SARS-CoV disease who do not require hospitalization for medical indications may be isolated at home.

A. Assessment of the Residence

Objective: Ensure that the residential setting is suitable and appropriate for isolation of a SARS patient.

Activities

- Before a SARS patient occupies a residence for home isolation, there should be an assessment (by phone or direct observation) to ensure that the residence has the features necessary for provision of appropriate care and infection control precautions. Because of the variability of household settings, professional judgment is needed in determining whether a home is an appropriate location for a patient with SARS-CoV disease.
- There should be a bathroom in the home for use by the patient and household members only. If there are multiple bathrooms, one should be designated solely for the patient's use, especially if the patient has diarrhea.
- The patient should have a bed and preferably a private room for sleeping.
- If the home is a multiple family dwelling (e.g., apartment building), the area in which the patient will be housed should have a separate air-handling system (if one is present).
- Basic amenities, such as heat, electricity, potable and hot water, sewer, and telephone access, should be available.
- There should be a primary caregiver to assist the patient with basic needs in the home and social service support for obtaining groceries, prescriptions, and other personal needs.

B. Infection Control Precautions for SARS Patients Isolated at Home

Objective: Ensure the use of proper infection control precautions in the home setting to minimize the potential for SARS-CoV transmission.

Infection control principles used in healthcare settings also apply in the home care setting. However, due to practical limitations, there are some differences between what can be done in the home and the healthcare setting. For example, AII Precautions cannot be practiced completely outside of fully controlled settings such as healthcare facilities. Since SARS-CoV is most likely transmitted through contact and droplet spread, the use of modified precautions that focus on preventing droplet and contact spread are recommended for isolation in the household setting.

Activities

Duration of infection control measures

- Continue the infection control precautions outlined below until 10 days following resolution of fever (given respiratory symptoms are absent or resolving) or until the health department has

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determined that home isolation precautions can be safely discontinued (e.g., diagnosis of SARS-CoV disease is ruled out).

Home isolation precautions

- Patients should not leave the home for the duration of the isolation period, except as necessary for follow-up medical care. When movement outside the home is necessary, the patient should wear a mask, if tolerated, and should not use public transportation.
- Separate the patient from other persons in the household to the extent possible. Use a separate room and bathroom if available.
- Limit the number of persons in the household to those who are essential for patient support. Other household members should either be relocated or minimize contact with the patient in the home. This is particularly important for persons at risk of serious SARS-CoV disease complications (e.g., persons with underlying heart or lung disease, diabetes mellitus, older age).
- Unexposed persons who do not have an essential need to be in the home should not visit.

Infection control measures in the home

- Hand hygiene -- All persons in the household should carefully follow recommendations for hand hygiene (i.e., hand washing with soap and water or use of an alcohol-based hand rub) after touching body fluids (e.g., respiratory secretions, stool, urine, vomitus) and potentially contaminated surfaces and materials (e.g., linen). Hand hygiene supplies (soap/water, alcohol-based hand rub, disposable towels) should be available and replenished as needed. (See www.cdc.gov/handhygiene/.)

- Source control -- Patients should cover the nose/mouth when coughing and dispose of tissues in a lined waste container. If possible, the patient should wear a surgical mask when others are present. If the patient cannot wear a mask, persons in close contact with the patient should wear a mask. Masks should fit snugly around the face and should not be touched or handled during use. If masks will be reused by persons in the home, procedures for identifying each person段 mask and containing it between uses should be in place. A supply of masks should be available based on the volume needed each day.

- Gloves and other protective attire -- Use of disposable gloves should be considered for any direct contact with the body fluids of a patient with possible or known SARS-CoV disease. ***However, gloves are not intended to replace proper hand hygiene.*** Immediately after gloves are removed, they should be discarded and hand hygiene should be performed. Gloves must never be washed or reused.

- Laundry (e.g., bedding, towels and clothing) -- Towels and bedding should not be shared. Laundry may be washed in a standard washing machine with warm water and detergent; bleach may be added but is not necessary. Gloves should be worn when handling soiled laundry, and care should be used when handling soiled laundry to avoid direct contact of skin and/or clothing with contaminated material. Soiled laundry should not be shaken or otherwise handled in a manner that may aerosolize infectious particles.

- Dishes and other eating utensils -- Objects used for eating should not be shared, but separation of eating utensils for use by the SARS patient is not necessary. Soiled dishes and eating utensils should be washed either in a dishwasher or by hand with warm water and soap.

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- Household waste -- Gloves, tissues, and other waste generated in the care of a SARS patient should be bagged and placed in another container for disposal with other household waste.

- Cleaning and disinfection of environmental surfaces -- Environmental surfaces that are frequently touched by the patient or are soiled with body fluids should be cleaned and disinfected with a household disinfectant. The bathroom used by the patient should be cleaned daily, if possible. Household utility gloves should be worn during the cleaning process.

C. Follow-up of Contacts

Objective: Ensure appropriate follow-up and care of exposed close contacts of SARS patients in home isolation.

Activities

- Household members and other close contacts of SARS patients should be vigilant for fever (i.e., measure temperature at least daily) and/or respiratory symptoms.
- If household contacts develop fever or respiratory symptoms, arrangements should be made immediately for a medical evaluation. ***In advance of the evaluation, healthcare providers should be informed that the person (and those who may accompany him or her) is a close contact of a SARS patient so arrangements can be made, to prevent transmission to others in the healthcare setting.***
- Symptomatic household or other close contacts should follow the same precautions recommended for the SARS patient.
- In the absence of fever or respiratory symptoms, household contacts need not limit their activities outside the home, unless otherwise required by quarantine regulations.

VI. Infection Control for Care of SARS Patients in Community Isolation Facilities

If a surge in patients overwhelms existing healthcare capacity or if home isolation is not feasible for individual patients, jurisdictions might need to use alternative facilities in the community for the isolation of SARS patient. In most situations, community isolation facilities will house and care for patients with milder cases of SARS-CoV disease These patients can be expected to care for themselves and are not expected to have significant healthcare needs. The specific precautions that will be required will depend in part of the type of facility designated for community isolation (e.g., motel, hotel, hospital). The same infection control principles that apply to home isolation apply to community isolation facilities. However, in community settings, personnel who are in the facility should be trained and fit-tested for an N-95 respirator.

- Community isolation facilities should have rooms with private bathrooms.
- Personnel who enter the room should wear an N-95 respirator. If there will be direct contact with the patient or the patient段 environment, a disposable isolation gown and gloves should be worn.
- Receptacles for soiled linen/laundry and contaminated waste should be placed in designated locations. Follow home care guidelines above for handling these materials.

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VII. Infection Control for Public Health and Outreach Workers

Objective: Ensure the safety of public health and outreach workers who meet with SARS patients or their contacts in the home or a community isolation facility.

Activities

- Public health workers and other personnel who work in the field and may be visiting patients in home or community isolation facilities should wear PPE that is commensurate with the degree of patient contact. These personnel should be trained and fit-tested in N-95 respirator use. Personnel who enter the home or room of a SARS patient should wear an N-95 respirator.
- If there will be direct contact with the patient or the patient's environment, a disposable isolation gown and gloves should be worn.
- PPE should be removed outside the home or facility and bagged for disposal; hand hygiene should be performed.

VIII. Infection Control for Laboratory and Pathology Procedures

Despite the processing of several thousand diagnostic specimens from patients with SARS-CoV disease in routine clinical laboratories around the world, to date there have been no reported clusters of SARS-CoV disease among laboratory workers. To date, the only confirmed episode of SARS-CoV transmission to a laboratory worker occurred in a research laboratory. The risk of transmission to laboratory personnel is most likely during specimen processing and handling of virus cultures.

A. Specimen Collection and Handling

Objective: Safely collect and handle specimens from SARS patients to prevent transmission of SARS-CoV.

Activities

- Healthcare workers who collect specimens from SARS patients should wear PPE as appropriate for Standard, Contact, and AII Precautions.
- Standard facility procedures for specimen collection and transport to the clinical laboratory should be followed.
- All specimens should be appropriately contained (bagged if necessary) and have a completed laboratory requisition slip attached. Information on the requisition slip should indicate that the patient is or could be infected with SARS-CoV. Laboratory personnel should be alerted to the possibility of SARS-CoV to ensure safe handling procedures.

B. Laboratory Procedures

Objective: Safely process SARS-CoV specimens to prevent transmission.

Activities

- Biosafety levels 2 and 3, according to specimen type, are recommended for processing SARS-CoV specimens. The specifics of these recommendations are provided in Supplement F.

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C. Postmortem Handling of Human Remains

Objective: Safely handle human remains during autopsy procedures to prevent transmission of SARS-CoV.

Activities

In general, safety procedures for human remains infected with SARS-CoV should be consistent with those used for any autopsy procedure. However, additional respiratory protection is needed during an autopsy procedure that generates aerosols (e.g., use of oscillating saws).

Personal protective equipment (PPE)

- Wear standard autopsy PPE, including a scrub suit worn under an impervious gown or apron, eye protection (i.e., goggle, face shield), double surgical gloves with an interposed layer of cut-proof synthetic mesh gloves, surgical mask or respirator, and shoe covers.
- Add respiratory protection if aerosols might be generated. This includes N-95 or N-100 disposable particulate respirators or PAPR. Autopsy personnel who cannot wear a disposable particulate respirator because of facial hair or other fit limitations should wear a loose-fitting (i.e., helmeted or hooded) PAPR.
- Remove PPE before leaving the autopsy suite and disposed in accordance with facility policies and procedures.

Engineering controls

- Whenever possible, perform autopsies on human remains infected with SARS-CoV in autopsy settings that have adequate air-handling system. This includes a minimum of 6 (old construction) to 12 (new construction) ACH, negative pressure relative to adjacent areas as per recommendations for AIIRs, and direct exhaust of air to the outside or passed through a HEPA filter if air is recirculated. Exhaust systems around the autopsy table should direct air (and aerosols) away from healthcare workers performing the procedure (e.g., exhaust downward).

- Use containment devices whenever possible. Use biosafety cabinets for the handling and examination of smaller specimens. When available, use vacuum shrouds for oscillating saws to contain aerosols and reduce the volume released into the ambient air environment.

Prevention of percutaneous injuries

- Follow standard safety procedures for preventing percutaneous injuries during autopsy.

IX. Occupational Health Issues

A. Surveillance and Monitoring of Healthcare Workers

Objective: Establish/adapt a healthcare personnel surveillance system to ensure that workers who may have had exposure to SARS-CoV are identified and monitored and that those who develop illness receive appropriate care.

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Activities

- Establish a process to identify personnel who enter the rooms or units where SARS patients are provided cared. Possible mechanisms include self-reports, sign-in sheets, or logs.
- Instruct personnel who have unprotected contact with patients with SARS-CoV disease or who have early symptoms of SARS-CoV disease to immediately notify occupational health, infection control, or a designee.
- Develop a system to identify healthcare personnel who provided care to a patient who was later identified as having SARS-CoV disease.
- See Supplement F, Appendix F6 for guidance on medical surveillance of exposed laboratory workers.

B. Management of Exposures and Other Contacts with SARS Patients

Objective: Ensure appropriate management and follow-up monitoring of healthcare workers who have had exposures and other contacts with SARS patients.

Activities

Clinical judgment should be used in deciding when a worker has been exposed and needs follow-up monitoring.

Management of asymptomatic healthcare workers with unprotected high-risk exposures

An unprotected high-risk exposure occurs when a healthcare worker is in a room with a SARS patient during an aerosol-generating procedure or event *and* the recommended infection control precautions are either absent or breached. If a healthcare worker has an unprotected high-risk exposure but has no symptoms of SARS-CoV disease, the worker:

- Should be excluded from duty (e.g., administrative leave) for 10 days after the date of the last high-risk exposure.
- Should be vigilant for the development of fever and/or respiratory symptoms.
- Should be actively monitored for the development of fever and/or respiratory symptoms for 10 days after the date of the last high-risk exposure.

Decisions regarding activity restrictions, (e.g., quarantine home/work restrictions) outside the facility should be discussed with the health department, in accordance with the recommendations in Supplement D.

The combination of close monitoring for symptoms and exclusion from duty protects the hospital and community without imposing unnecessary restrictions on a healthcare worker.

Management of asymptomatic healthcare workers with unprotected exposures that are not high risk

Unprotected exposures that are not high risk occur when a healthcare worker is in a room or patient-care area with a SARS patient (not during a high-risk procedure) and the recommended infection control precautions are either absent or breached. If a healthcare worker has an unprotected, non-high-risk exposure and has no symptoms of SARS-CoV disease, the healthcare worker:

- Need not be excluded from duty.

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- Should be vigilant for the development of fever and/or respiratory symptoms (i.e., measure and record body temperature twice daily for 10 days following the date of last unprotected exposure, and immediately notify the healthcare facility if symptoms develop.)
- Should be actively monitored for the development of fever and lower respiratory symptoms before reporting to duty.

Decisions regarding activity restrictions, (e.g., quarantine home/work restrictions) outside the facility should be discussed with the health department, in accordance with the recommendations in Supplement D.

Surveillance of asymptomatic healthcare workers who have cared for SARS patient(s) but have no known unprotected exposures

- Instruct workers to be vigilant for the development of fever and/or respiratory symptoms, measure and record body temperature twice daily throughout the 10-day period following the date of last protected contact with a SARS patient, and immediately notify the healthcare facility if symptoms develop.
- Implement active follow-up surveillance of these workers for 10 days following the last protected exposure.
- Decisions regarding activity restrictions, (e.g., quarantine home/work restrictions) outside the facility should be discussed with the health department, in accordance with the recommendations in Supplement D.

Management of symptomatic healthcare workers

- Any healthcare worker who has cared for or been exposed to a SARS patient and who develops fever and/or respiratory symptom(s) within 10 days after exposure or patient care should:
  - Immediately contact infection control, occupational health or designee in each facility where s/he works; and
  - Report to the predetermined location for clinical evaluation. (During periods of increased SARS activity in the healthcare facility and/or community, this recommendation extends to all symptomatic personnel working in the facility, regardless of whether they have had contact with a SARS patient.)
- Any healthcare worker who develops symptoms or fever while at work should immediately put on a surgical mask and notify the appropriate facility contact (e.g., occupational health, infection control, or other designee) and then report to the designated location for clinical evaluation.
- Symptomatic healthcare personnel should be managed in accordance with the recommendations in *Clinical Guidance on the Identification and Evaluation of Possible SARS-CoV Disease among Persons Presenting with Community-Acquired Illness* (www.cdc.gov/ncidod/sars/clinicalguidance.htm). Decisions on return to work should be guided by policies or regulation defined by the facility or health department.

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Appendix I1
Recommendations for Application of Standard Precautions for the Care of All Patients in All Healthcare Settings

Component	**Recommendations**
Hand hygiene	After touching blood, body fluids, secretions, excretions, contaminated items; immediately after removing gloves; between patient contacts
Personal protective equipment (PPE)	
Gloves	For touching blood, body fluids, secretions, excretions, contaminated items; for touching mucous membranes and nonintact skin
Mask, eye protection, face shield	During procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, secretions
Gown	During procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated
Soiled patient-care equipment	Handle in a manner that prevents transfer of microorganisms to others and to the environment; wear gloves if visibly contaminated; perform hand hygiene
Environmental control	Develop procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas
Textiles (linen and laundry)	Handle in a manner that prevents transfer of microorganisms to others and to the environment
Needles and other sharps	Do not recap, bend, break, or hand-manipulate used needles; use safety features when available; place used sharps in puncture-resistant container
Patient resuscitation	Use mouthpiece, resuscitation bag, other ventilation devices to prevent mouth contact
Patient placement	Prioritize for single patient room if patient is at increased risk of transmission, is likely to contaminate the environment or does not maintain appropriate hygiene, or is at increased risk of acquiring infection or developing adverse outcome following infection
Respiratory hygiene/cough etiquette (source containment of infectious respiratory secretions in symptomatic patients, beginning at initial point of encounter)	Instruct symptomatic persons to cover mouth/nose when sneezing/coughing; use tissues and dispose in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation, > 3 feet if possible

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Appendix I2
Summary of Recommendations for Expanded Precautions

Category	Elements
Contact Precautions	• Single patient room (preferred) • Gloves for all contact with patient and environment of care • Isolation gown for all patient contact
Droplet Precautions	• Single patient room (preferred) • Surgical mask within 3 feet of patient • Eye protection within 3 feet of patient with SARS □ CoV
Airborne Infection Isolation	• Private room with monitored negative air pressure relative to surrounding areas and 6-12 air exchanges per hour • Appropriate discharge of the air to the outdoors or monitored high-efficiency filtration of room air before recirculation • Doors closed except as needed for entry and exit • NIOSH-approved respiratory protection (e.g., N-95 respirator) for entry to rooms of patients with infectious pulmonary or laryngeal *M. tuberculosis*, draining skin lesions with *M. tuberculosis,* SARS-CoV disease, smallpox, and viral hemorrhagic fevers

For more detailed information about infection control precautions, please see www.cdc.gov/ncidod/hip/isolat/isolat.htm.