出國報告（出國類別：研究）

赴美研習傳染病自動化通報及主動監測與 Digital Disease Detection 相關技術

服務機關：衛生福利部疾病管制署

姓名職稱：許玉芬技正

派赴國家：美國

出國期間：中華民國 102 年 9 月 11 日至 22 日

報告日期：中華民國 102 年 11 月 22 日

摘　要

爲配合衛生福利部推動「臺灣健康雲計畫」，本署規劃執行「防疫雲」子計畫，包括運用醫院電子病歷進行傳染病自動通報及建置「實驗室資料自動通報系統」，期能藉由提供以醫療機構與實驗室等主要使用者服務爲導向之便捷與高效率防疫資訊雲端技術，提升傳染病疫情及其他公衛事件通報時效與偵測，強化感染控制，進而提昇醫療照護品質。爲研習實驗室資料自動通報機制之相關經驗，本次前往美國奧瑞岡州衛生部，研習該州實驗室電子化自動通報（Electronic Laboratory Reporting，ELR）機制之建置與實務運用等相關經驗，作爲本署「實驗室資料自動通報系統」規劃執行之政策參考。之後前往加州舊金山參加第 2 屆「數位疾病偵測國際研討會（2nd International Conference on Digital Disease Detection）」，學習國際間對於傳染病監測之觀點變化與相關策略未來思考方向及研習疫情監測技術新知。會中由世界各國醫學資訊、公共衛生、流行病學、傳染病相關、動物相關、政府及學術機構等領域之學者與專家，共同探討分享數位資訊運用於健康相關議題監測的實務經驗及資訊技術新知，同時參加專題討論會，探討數位疾病偵測相關技術運用於改善類流感（Influenza-Like Illness）的監測效益。

目　次

頁碼

壹、目的

一、研習實驗室資料自動通報機制之相關經驗，協助國內醫療院所建立微生物檢驗資訊（檢驗方式、檢驗報告等）的交換標準格式，以利未來院際間檢驗資訊的交換，並將符合指定傳染病檢驗項目自動通報至本署平台。

二、學習國際間對於傳染病監測之新觀點與相關策略未來方向，研習疫情監測技術新知。

貳、過程

一、出國行程

自 102 年 09 月 11 日起至 9 月 22 日止，含路程時間共計 12 天。行程如下：

日期	地點	行程
09/11	台北→洛杉磯 洛杉磯→波特蘭	路程（去程）
09/12-09/17	波特蘭	抵達美國奧瑞岡州衛生部、參訪研習
09/17-09/18	波特蘭→舊金山	路程
09/18-09/20	舊金山	疫情監測相關技術研習與交流
09/21-09/22	舊金山→台北	路程（返程）

二、美國奧瑞岡州衛生部參訪研習

爲研習實驗室資料自動通報機制相關經驗，此次前往位於美國奧瑞岡州波特蘭，參訪州衛生部 ACDP（Acute and Communicable Disease Program）中的疾病監測與流行病學中心（Centers for Disease Surveillance and Epidemiology），學習實驗室電子化自動通報（Electronic Laboratory Reporting，ELR）運作經驗及於傳染病監測的應用，作爲推動本署防疫雲建置「實驗室資料自動通報系統」參考。同時也了解該州對於流感、症候群、食媒性疾病等監測機制，作爲持續提升國內相關監測系統參考。

（一） 實驗室電子化通報（Electronic Laboratory Reporting，ELR）運作經驗及於傳染病監測的應用

美國奧瑞岡州政府對於實驗室通報訂定相關法律規範，包含：（1）凡是實驗室檢出指定病原體或項目（詳如附錄一），需於規定時效內報告所轄衛生單位，並將檢體送至州立實驗室進行後續確認；（2）自 2010 年 3 月起，每月通報超過 30 件陽性檢體的實驗室，必須透過該州衛生部之 ELR 機制進行通報；（3）針對至 2011 年 3 月仍未成功或尚未申請加入 ELR 之實驗室訂定罰則；（4）參加 ELR 的實驗室需通過該州的資料品質管控計畫（Oregon’s Data Quality Control program），同時需提出經州衛生部核准的資料維運持續計畫，確保當電子交換因突發狀況無法運作時時，另有兩種以上的方式（如電子郵件、傳真等）可持續傳送資料。

該州的實驗室分爲幾種類型：（1）如 Legacy Health，爲醫療集團體系，該體系下的醫院分布於州內各城市，各醫院會將檢體統一送至該體系的專屬實驗室；（2）如 Mercy Medical Center，爲社區型醫院，本身即有實驗室進行檢驗；（3）Reference Lab，沒有實驗室的醫療院所會將檢體送至 Reference Lab 進行檢驗。州衛生部於 2000 年初開始推動建置 ELR，迄今約有 21 家實驗室參與，醫院涵蓋率約 90%，平均每天約 200-300 筆實驗室通報資料。參加 ELR 的實驗室需

依州衛生部公佈的規格建置資料內容，並依規定的 HL-7（版本 2.5.1）格式以 FTP 方式將（1）通報實驗室基本資料；（2）病患基本資料；（3）檢驗資料等三大部分的資料傳送至州衛生部，其中對於「檢驗項目」與「檢驗結果」規定採用 LOINC（Logical Observation Identifiers Names and Codes）及 SNOMED CT（Systematized Nomenclature of Medicine Clinical Terms）國際通用碼做爲資料交換標準。

參與 ELR 的實驗室需先建立應通報項目的 LOINC 碼，並將完整的通報 LOINC 碼送給州衛生部進行後續資料品質管控。實驗室於加入 ELR 初期傳送階段需同時將資料傳真至地方衛生單位，進行至少 30 天的平行測試。通過平行測試後，實驗室資料即正式以 ELR 機制進行通報。奧瑞岡州 ELR 資料上線（onboarding）步驟詳如附錄二。

ELR 團隊會定期與地方衛生單位合作檢視 ELR 資料，其中若發現傳送的 LOINC 碼與經公衛人員進行疫調後確認的疾病不符，會回饋實驗室請其修訂。如果 LOINC 碼錯誤的情形太頻繁或資料內容格式有問題，則會要求實驗室再次進行 30 天的平行測試，通過後才能直接以 ELR 通報。另外，如有新增加需通報的項目，州衛生部會以電子郵件或電話通知參加 ELR 的實驗室，由各實驗室自行更新系統後配合上線。奧瑞岡州 ELR 資料品質管控計畫詳如附錄三。

各個實驗室通報的資料會先經過資料清理（比對檢核重複通報、確認 LOINC 碼爲需通報的項目等）、資料對應（將實驗室傳送之 LOINC 碼與州衛生部的 LOINC 資料庫進行比對出對應的疾病別）等過程後，自動匯入 Orpheus 系統（Oregon Public Health Epidemiologists' User System，爲奧瑞岡州傳染病監測通報系統，用於管理該州傳染病通報個案）。公衛人員可經由系統自動比對，將 ELR 資料整合至先前通報個案，若該個案未由臨床端通報，公衛人員可視情況啓動相關調查。奧瑞岡州 ELR 資料流程詳如附錄四。

奧瑞岡州規定，醫師與實驗室依法對於臨床上疑似的傳染病個案或是實驗室檢出的傳染病個案皆有義務進行通報，故傳染病個案可能會依臨床表徵與病程發

展有幾種通報情況：（1）醫師先通報，實驗室後通報；（2）醫師與實驗室同時通報；（3）實驗室先通報，醫師後通報；（4）僅由實驗室通報。由於有些疾病的臨床表徵不夠典型，容易被醫師忽略而沒通報，以致低估疾病負擔（disease burden），甚或已經發生群聚而公衛單位因未掌握無法及時介入導致疫情擴大，此時則若有實驗室的通報資料做爲互補機制，則可迅速掌握疫情發展，適時採取有效的疾病防治措施。

在奧瑞岡州研習期間，州衛生部正與地方衛生單位合作調查一起由 ELR 通報發現的罕見隱孢子蟲（*Cryptosporidium*，簡稱 Crypto）群聚疫情。隱孢子蟲病（Cryptosporidiosis）爲 Crypto 所造成的寄生蟲性疾病，主要透過飲用水或環境水傳播，臨床主要表徵爲腹瀉，列爲醫師與實驗室依法需通報的項目。但由於 Crypto 所造成的腹瀉於臨床上常被醫師忽略，所以很難透過醫師通報掌握疾病實際發生情形或群聚疫情。該州某小鎮（人口僅約 15,000 人，但地理大小爲台灣的一半）唯一的一間實驗室於某天透過 ELR 通報 1 例 Crypto，隔天通報 3 例，地方衛生單位懷疑發生群聚疫情，當天隨即介入調查，發現鄰近小鎮的實驗室亦有 2 件檢體正在確認，立即通報州衛生部，州衛生部立即對民眾發出注意飲用水安全相關警示，並與有關的地方衛生單位共同合作進行調查。另有一起群聚事件則是結合 ELR 與 EMR（Electronic Medical Records）資料後發現，ELR 接獲通報 2 例 *Campylobacter*，皆位於同一行政區，地方衛生單位結合 EMR 的個人相關資訊（如主訴症狀、旅遊史、暴露史等）後發現爲一對夫妻，懷疑爲家庭群聚事件，啓動疫調後才發現兩夫妻於發病前一週都曾喝過某農場自產的生乳。

除了依法需通報項目外，也針對特定之非法定通報項目訂定獎勵計畫（Incentive Program），鼓勵實驗室透過 ELR 通報獲得補助，Candidemia 監測計畫即是其中一項。該計畫爲美國 CDC 爲評估 *Candida* 之發生率與地區特性、抗黴菌藥物盛行率、長期趨勢監測、了解病患臨床症狀與風險因子以利改善治療方針等目的，與十個州衛生部合作的一項 EIP（Emerging Infections Programs）。奧瑞岡州由最大城市波特蘭人口最多的三大行政區（Multnomah、Clackamas 及

Washington)的實驗室申請加入,實驗室每月透過 ELR 機制通報 CDC 規範的資料,並將分離的菌株寄給 CDC 後方可獲得補助。州衛生部則定期至醫院調閱病歷取得病患相關資訊,進行分析後每月於網站上公佈統計相關資訊,提供擬定疾病防治政策參考。

(二) 傳染病監測機制(流感、症候群、食媒性疾病)

1. 奧瑞岡州的流感監測主要分爲重症、輕症、實驗室、P&I 死亡等機制,與國內體系相類似:

(1) 醫院監測:主要的監測系統,由波特蘭市三大行政區(Multnomah、Clackamas 及 Washington)的 14 家醫院通報經實驗室確診且住院的流感病人。

(2) 門診類流感通報(ILINet):由全州 22 家醫療照護機構,自願於流感季期間每週通報類流感門診病患數及所有病患數;同時採集檢體送至州立實驗室進行檢驗。

(3) OCHIN ILI 監測:由 OCHIN 公司(保險公司)提供該州共 103 名臨床醫生對於就診病患之出院診斷(discharge diagnoses)ICD-9 碼及就醫原因。通報時效會較 ILINet 晚一週。

(4) 實驗室監測:州立實驗室對於以下幾種來源檢體進行檢驗(1)由醫院監測送驗之檢體、(2)由 ILINet 的醫療機構送驗之檢體、(3)由地方衛生單位針對呼吸道疾病群聚事件(於長期照護機構中通報 1 例確診病例或 3 天內出現 3 例 ILI 病例)調查送驗之檢體。

(5) P&I 死亡監測:利用死亡診斷書(death certificate)進行監測。

州衛生部於流感季期間(第 40 週起)每週於網站上公佈流感監測週報。

2. 奧瑞岡州的症候群監測係從 2009 年 H1N1 全球大流行後開始運作,主要是由聯邦對於各州針對生恐事件監測應變的補助計畫。該州的症候群監測系統 ESSENCE 係由州衛生部與美國約翰霍普金斯大學應用物理實驗室(Applied Physics Laboratory)合作建置,推廣有急診室的醫院參

加通報。參加的醫院定期依規定的 HL-7 格式以 FTP 方式通報急診病患的電子病歷資料，州衛生部依主訴症狀分析分類爲各種症候群（類流感、腸胃道等）進行監測。目前有 3 家醫院參與，仍在持續推廣中。

3. 奧瑞岡州對於食媒性疾病的監測，主要是針對 *Campylobacter*、*Cryptosporidium*、*Cyclospora*、*Listeria*、*Salmonella*、Shiga toxin producing *Escherichia coli* (STEC) O157 與 non-O157、*Shigella*、*Vibrio*、*Yersinia* 等病原體進行以全人口爲基準的實驗室主動監測計畫 FoodNet。該計畫於 1995 年開始運作，由美國 CDC、10 個參與 EIP 的州衛生部、美國農業部、美國食品及藥物管理局（US FDA）等機關共同合作。實驗室除了通報所有檢驗陽性個案外，需定期協助收集病患資料，而後由公衛單位進行個案調查，研擬評估相關防治措施，分析疾病趨勢，並用以估計急性腹瀉性疾病的疾病負擔（disease burden）與常見感染源（exposure）。州衛生部也會定期訪談通報實驗室與臨床醫師，了解實驗室使用的檢驗方法以及常規細菌檢測項目所包含的病原體，以及臨床醫師針對懷疑的疾病是否會有特定的檢驗項目，同時藉此訪談與實驗室及臨床醫師保持良好的合作關係。

三、第 2 屆「數位疾病偵測國際研討會」

第 2 屆「數位疾病偵測國際研討會」(2nd International Conference on Digital Disease Detection)」於 102 年 9 月 18 日至 20 日於美國舊金山舉行，由全球即時傳染病威脅監測警報地圖（HealthMap）、國際疾病監測學會（International Society for Disease Surveillance, ISDS)、國際野生生物保護學會(Wildlife Conservation Society, WCS)、斯科爾全球威脅基金會(The Skoll Global Threats Fund)、美國 CDC、美國 FDA、ProMED-mail 及美國與加拿大多所學術與醫療機構(如美國哈佛醫學院、加拿大多倫多大學、美國波士頓兒童醫院等)共同舉辦;此研討會以數位疾病監測爲主題,由世界各國公共衛生、流行病學、醫學資訊、傳染病相關、動物學者政府及學術機構與商業團體等領域相關人員與會交流。

在過去的十五年裡,網路技術已經顯著改變公共衛生監測和傳染病流行情報收集的範疇。對於疾病及傳染病疫情相關資訊的揭露，不僅透過政府機構於網路上公布的正式訊息外，也透過如社交網站、部落格、聊天室、網路搜尋、當地新聞媒體和網路群眾平台（crowd sourcing platform）等非正式數據流（informal data stream）進行傳播。該些非正式數據流，即所謂的 DDD（digital disease detection),已證明有效於縮短疫病爆發與疾病確認間的時間差，能讓政府機關對於具公眾健康威脅的事件做出快速的反應。如何快速辨別網路訊息，以因應隨時可能發生之大流行與新興傳染病所帶來的高發病率、高死亡率、甚或經濟衝擊，是全球衛生首要關注重點。

由於 DDD 已逐漸被廣泛應用於傳染病監測,此次研討會主要目的在於連接創新技術和健康相關議題,持續探討此新興領域的發展方向與探索創新的數據流和新技術；同時舉辦專題討論會，討論各種傳染病監測方法的優缺點，檢視現有的監測和診斷工具，提出未來發展與改善建議。本次研討會完整會議議程詳如 HealthMap 網站（http://healthmap.org/ddd/schedule/）。

研討會主題重點摘錄簡介如下：

（一） 網路社群資料探勘於健康相關議題的監測應用

所謂的資料探勘（data mining），即是利用自動或半自動方法，對巨量資料作分析，找出有意義的關係或法則，挖掘出潛在且有用資訊的過程。不同的網路社群，會因社群成立目的、發展規模或使用特性等吸引特定網民（netizen）參與，會中由各國專家學者分享運用資料探勘技術，對於特定目標的網路社群巨量資料進行分析，應用於監測傳染病、慢性疾病、食品安全、藥物上市後監測、疫苗安全等健康相關議題。

新加坡衛生部的 Jeannie Tey 分享利用網路社群新浪微博（Sina Weibo）的資料監測中國大陸 H7N9 禽流感疫情，資料顯示於 2013 年 3 月 31 日中國大陸公布首 3 例 H7N9 禽流感病例之前，最早於 3 月 7 日即已出現一間三口感染不明原因肺炎之家庭群聚的微博留言。分析 4 月中國大陸爆發 H7N9 禽流感疫情期間，微博上的 H7N9 疫情資訊平均較中國大陸衛計委官方公布的資訊提前 0.45 小時，微博上的諸多資訊亦成爲獲得官方公佈以外的 H7N9 病例流病相關或禽類資訊的主要方式，亦是中國大陸官方與民眾進行風險溝通的主要管道。

歐美從 1998 年 2010 年出現大規模的「反疫苗」浪潮，該浪潮仍持續至今；許多家長因擔心疫苗安全或是宗教因素拒絕讓小孩子施打疫苗，使得歐美不時傳出如麻疹等疫苗可預防疾病（vaccine preventable disease）的疫情。加拿大（McGill）麥基爾大學利用 VASSA（Vaccine Attitude Surveillance using Semantic Analysis）技術自動化分析推特（Twitter）留言，嘗試建立對於民眾接種疫苗態度的監測架構，未來可提供衛生單位制定疫苗接種策略參考。

美國 Social Health Insights LLC 公司針對近 30 種疾病或症候群分別訂定關鍵字，自動化分析推特（Twitter）留言後進行分類，同時針對推特留言地點進行地理分析。分析結果即時呈現於網站上（http://mappyhealth.com/），提供傳染病早期監測預警參考。

（二） 運用網路群眾的參與於健康相關議題的監測應用

網路技術的發達與智慧型手機的普及化，提供了另一種不同於傳統主要由臨床醫師進行通報的傳染病監測機制－參與式監測（participatory surveillance）。參與式監測主要是運用網路群眾（crowd sourcing），由民眾自願參加，並藉由智慧型手機或熱線（hotline）針對特定目的定期進行通報。

泰國北部清邁省 saraphi 區的登革出血熱病例很多，該區的 saraphi 醫院藉由與電信業者合作，提供智慧型手機與網路服務，開發手機 APP，醫療人員可隨時於家訪現場輸入民眾個人健康、家族史等相關資料，並結合 google 街景服務，適時提供民眾醫療服務及傳染病監測，民眾並可利用手機 APP 進行健康問題線上諮詢，爲透過社區民眾參與整合基礎醫療服務、社區健康與公共衛生的成功經驗。

爲了更及時監測流感趨勢，歐洲與美加地區分別建置由網路群眾參與通報的類流感監測體系。Influenzanet（https://www.influenzanet.eu/en/）爲歐洲十個國家約 5 萬位民眾參與，Flu Near You（https://flunearyou.org/）則開放美加地區 13 歲以上民眾參與，參與的民眾每週皆透過網路或手機 APP 進行通報，通報的資料經彙整後開放於網站供各界利用，同時也回饋參與者相關資訊。其中 Influenzanet 於 2009 年 6 月首度於英國進行，成功掌握首波 H1N1 新型流感疫情。

參與式監測除了應用於傳染病疫情早期監測外，美國 FDA 亦贊助成立 MedWatcher（https://medwatcher.org/about.php），監測包括藥物、醫療儀器、疫苗等不良反應，同時回饋參與者相關安全警訊。加拿大不列顛哥倫比亞省疾病管制中心（British Columbia Centre for Disease Control）則運用網路資訊，透過分析個人環境暴露相關資訊，嘗試推論不同族群特有的環境暴露因素。

對於傳染病監測而言，參與式監測較傳統式監測機制之優勢在於(1)通報時效快、(2)擴充性高，有彈性、(3)便於與群眾溝通、(4)敏感性高、(5)花費較少，但是於疫情事件的特異性及可信度等面向則相對有待改善，同時該如何提高民眾參與率，以提升其代表性，亦是各國努力的目標。

（三） 探討 DDD 運用於提升類流感監測的效益

專題討論會分成三部分進行，分別討論運用 DDD 於提升對目前流感疫情的掌握、早期監測流感疫情與預測季節性流感或流感大流行的可能性與未來發展方向。

目前各國對於類流感監測仍多透過傳統的醫療照護體系進行，近年透過電話調查、網路填寫問卷，智慧型手機、平板電腦、醫療器材等 DDD 方式進行的監測機制陸續發展中。會中大家共同討論，認為由於目前對於此新興領域的潛質仍未知，各國應先釐清自身目的，評估各種 DDD（例如網路社群 social media、參與式監測 participatory surveillance、電子病歷 electronic health record）的不同處，比較其時效性、敏感度、特異性、陽性預測值（PPV），才能決定該如何運用 DDD 於類流感監測。

先前有回溯性研究，以科學方式比對檢視 DDD 的訊息與真實事件的一致性，發現 DDD 的陽性預測值僅約 30%，顯示 DDD 於反應真實疫情的能力仍有待改進。DDD 的資料雖然快速，但不同的資料流都僅反應出故事的一部分，且容易因媒體效應產失誤差或出現網路謠言，造成民眾恐慌，如何確認其正確性並有效整合，仍是未來需努力的方向。

會中也強調，即使 DDD 能早期監測傳染病疫情，但實驗室診斷資料仍舊很重要，建議各國應發展結合數位資訊與實驗室資訊的相關技術，才能完整反應疫情現況，除了現有運用度最高的 DDD（如網路社群、參與式監測）外，也應持續發展探勘數字、檔案、視頻、聲音等新興 DDD 的技術。

公共衛生領域的發展長期以來都是以政府的需求為導向，以致民眾普遍對於政府的努力與成果無同感，建議各國應朝向以群眾的角度思考民眾的需求，未來可考慮與不同的網路社群密切合作，共同努力提升對於健康相關議題的監測時效與品質。

叁、心得與建議

傳統公共衛生監測主要是根據醫師針對病患的臨床表徵進行診斷通報，但此種以醫師診斷爲導向的監測通報機制常受限於病患個體的差異性、疾病的病程發展與醫師的專業知識，使得傳染病個案無法及時被通報掌握，導致疫情於社區中擴散，危及人民健康，同時也容易對傳染病的認識產生偏頗，無法確實評估疾病發生全貌，訂定有效的疾病防治措施。發展建立高敏感度的監測機制，對傳染病進行早期監測，以利及時掌握疫情發展，已成爲公共衛生預警的首要重點工作。

針對實驗室檢驗結果進行監測，除了能更早期發現病原，早期監測疫情發生以適時採取防治措施外，同時透過多元化的傳染病監視機制，與傳統醫師通報機制互補，確實掌握疾病與病原體於社區中流行情形，了解病原體流行趨勢，作爲疫情指標，提供疾病防治政策擬定參考。

傳統的實驗室通報機制多透過電話、傳真、電子郵件等方式進行，美國 CDC 爲提升通報時效，節省人力時間成本，於 2000 年開始發展推動實驗室電子化自動通報（ELR）技術，透過實驗室資料自動通報，建立全國性的實驗室結果即時通報平台。除了依實驗室規模或屬性擬定的階段性補助計畫（先補助公立實驗室、再補助大型私立實驗室），同時與各州衛生部或地方衛生單位合作，透過各州運用公權力擬定強制性通報規範共同推動，以利各衛生單位能透過 ELR 機制即時取得相關資料，掌握疫情現況，及時採取有效的疾病防治措施。截至 2013 年 7 月底，CDC 已補助了 57 個衛生單位（包含 50 個州衛生部、洛杉磯、紐約市、費城、休士頓、芝加哥、DC、美國屬地波多黎各等地方衛生單位）發展 ELR，其中 54 個衛生單位（除了加州、西維吉尼亞州、美國屬地波多黎各外）已成功運用 ELR 機制從 2,900 間實驗室接收檢驗資料，約佔全美 10,400 間有進行通報實驗室的 28%，而透過 ELR 接收的資料佔全美實驗室總通報資料量的 62%。分析 ELR 的通報資料，主要來自大型私立實驗室（40%）、公立實驗室（30%）及醫院所屬實驗室（14%）。

本署曾於 2002 年嘗試針對 *Streptococcus pyogenes*、VRE、*Salmonella typhi*、*Salmonella* species、*Shigella* species、*Burkholderia pseudomallei*、*Haemophilus influenza*、*Neisseria meningitidis*、*Neisseria gonorrhoeae*、*Bordetella pertussis*、*Legionella pneumophila* 等重要病原菌建立全國性實驗室監測通報系統，鼓勵共 16 間醫學中心或大型區域醫院的實驗室自願參加，礙於當時資訊技術發展限制，由實驗室以電子郵件方式每月通報特定檢體檢出之病原菌統計數。考量醫院需由人工進行統計與通報作業，僅規範其通報檢出陽性數的次級資料。惟在無誘因（自願參加，未補助費用）、無公權力規範（無適用的法規）、增加醫院負擔（人工製作統計報表）、通報時效不彰（每月通報一次）、資料代表性不足（僅通報檢出陽性數，無法與個案串連，亦無法計算檢出陽性率）等因素下，該系統於實施幾年後隨即去任務化。

隨著資訊科技的日異月新，輔以修訂傳染病流行疫情監視及預警系統實施辦法，藉由執行「防疫雲」計畫，運用 ELR 機制建置「實驗室資料自動通報系統」，直接由醫院端的系統依通報邏輯與規範的資料內容，自動將所需通報的內容依規定的格式自動傳送至本署，自動化的通報流程，不僅大幅減輕通報人員的負擔，並可避免人工作業可能產生的人為疏失，提升通報時效與資料品質。藉由補助醫院配合修改醫院端程式所需費用及專業團隊輔導推廣上線等誘因，提高醫院參加意願，並透過專業輔導團隊協助推廣，提高參與通報實驗室的涵蓋率，期望建置的「實驗室資料自動通報系統」能更具代表性、更能反應疫病現況。同時參考國外經驗針對檢驗資料採用 LOINC 碼作為交換標準，並依據參與醫院的通報資料持續增修 LOINC 碼，以期能建立國內本土的 LOINC 碼資料庫，建立國內各實驗室對於檢驗資料的標準性，以利未來院際間針對微生物檢驗資料的交換。惟考量政府財政預算，輔助與獎勵費用有可能逐年刪減，除應訂定推廣「重點目標」（例如優先輔導醫學中心或企業型醫院或大型區域醫院等高檢驗量的醫院或專職檢驗機構）外，考量國內許多醫院的實驗室資訊系統（Laboratory Information System，LIS）係委由專業廠商負責程式撰寫與功能維護，建議應與國內 LIS 廠

商合作，透過 LIS 廠商配合修改所販售的系統，將本署「實驗室資料自動通報系統」架構內化至該產品，可有效提升推廣成效。除了運用各種獎勵方式提升醫院參與率外，建議未來可考量適時修法，規範實驗室的法定通報義務，在誘因輔以公權力雙管齊下，「實驗室資料自動通報系統」才能永續經營。

網際網路的快速發展，搭配智慧型手機與平板電腦等行動裝置於近幾年來呈現爆炸性的成長，Twitter、Facebook、WeiBo 等網路社群平台已成爲民眾分享個人生活點滴的主要方式，現代人堪稱過著數位生活（digital life）。如何運用數位疾病偵測（DDD）技術，對於網路公開資料進行有系統的資料探勘，並藉助網路群眾建立參與式監測機制，成爲傳染病早期監測的發展趨勢。回溯性研究顯示 DDD 資料的陽性預測值（PPV）僅約 30%，顯示各國應持續研發技術以改進 DDD 於反應真實疫情的能力。DDD 的資料雖然快速，但如何確認其正確性與代表性，同時有效整合 DDD 與實驗室診斷資料，仍是各國未來持續努力的方向。建議未來可評估研發針對國內最大的網路社群平台 Facebook 公開資訊之資料探勘相關技術，運用於傳染病早期監測的可行性。

本署於 2012 年底接獲英國公共衛生局（PHE）邀請，參與該局與 WHO 合作有關開發大型活動疾病監測平板 APP 研究計畫。APP 原型已開發完成，並已分別於英國（Glastonbury 音樂節，計登錄 790 餘就診人次；Reading 音樂節，計登錄 1300 餘就診人次）及國內（台北護理大學運動會，計登錄 80 餘就診人次）進行實測。建議未來可評估該疾病監測平板 APP 運用於國內傳染病監測的可行性，並善加應用行動裝置內建的 GPS 系統，提升疫情訊息通報的即時性，以快速追踪疾病爆發的規模及速度，期能更早期監控疾病發展趨勢或公共衛生突發事件，透過預警提醒衛生單位及時採取有效措施，降低疾病發生率和死亡，保障全民健康。

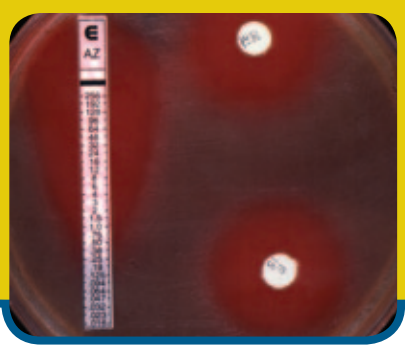
肆、附錄

一、美國奧瑞岡州臨床實驗室依法需通報項目

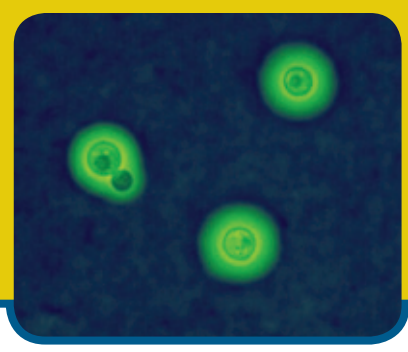
Local health department information

For a list of local health department phone numbers go to: www.healthoregon.org/lhd

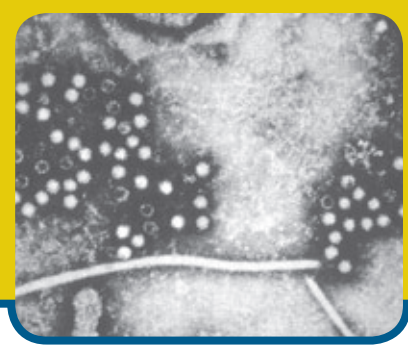
Antimicrobial susceptibility



Cryptococcus gattii (DFA)



Hepatitis E virus (HEV)



OREGON PUBLIC HEALTH DIVISION REPORTING FOR LABORATORIES

By law,[1] Oregon labs must report all human test results "indicative of and specific for" the following diseases, infections, microorganisms, and conditions listed in the accompanying table. These results include microbiological culture, isolation, or identification; assays for specific antibodies; and identification of specific antigens, toxins, or nucleic acid sequences.

In general, reports must be made to the patient's local public health department within one working day of the initial test report.[2] Labs identifying possible agents of bioterrorism should contact their local health department and refer the isolates to the Oregon State Public Health Laboratory immediately, day or night. Reports must include the patient's name, date of birth, county of residence, specimen collection date, lab test and result, and contact information for the ordering clinician and the lab. If possible, patient gender and street address should also be submitted.

The lab that reports to the clinician is responsible for reporting to public health, regardless of which lab actually performs the test. Reports on out-of-state residents should be made directly to that state's health department, or to the Public Health Division of the Oregon Health Authority. Document these reports in a log.

Oregon law requires labs that send an average of >30 records per month to the local public health authority to submit the data electronically in accordance with standards set forth in the Oregon Health Authority's Manual for Mandatory Electronic Laboratory Reporting (ELR).[3]

- Please contact us at 971-673-1111 for ELR initiation, assistance, and approval.
- Qualifying labs that fail to seek or obtain ELR approval may be subject to civil penalties in accordance with Oregon Administrative Rule (OAR) 333-026-0030.[4]
- Labs required to report via ELR shall have a state-approved continuity of operations plan to maintain reporting in emergency situations. At least two alternative methodologies should be incorporated, such as facsimile, mail, or courier service.

- A licensed laboratory required to report data electronically shall participate fully in Oregon's Data Quality Control program, as specified in the Oregon Health Authority's Manual for Mandatory Electronic Laboratory Reporting.[3]
- Electronically submitted reports shall meet relevant reporting timelines.[1]

CIVIL PENALTIES FOR VIOLATIONS OF OREGON REPORTING LAW

- A civil penalty may be imposed against a clinical laboratory for failing to report a reportable disease in accordance with Oregon Administrative Rules.[4]
- Prior to issuing a notice of imposition of civil penalty, the Oregon Health Authority or the local public health authority shall send a written warning letter advising the person or entity that they are not in compliance and that continued noncompliance may result in the issuance of a civil penalty.

Civil penalties shall be imposed as follows:

- 1st violation $100; 2nd violation $200; 3rd or subsequent violation $500;
- Each day out of compliance will be considered a new violation.

☎ Report by phone immediately, any time day or night. New reportables are highlighted.

BACTERIA

Bacillus anthracis [5] ☎
Bordetella pertussis
Borrelia
Brucella
Campylobacter
Chlamydia trachomatis
Chlamydophila psittaci
Clostridium botulinum ☎
Clostridium tetani
Corynebacterium diphtheriae [5] ☎
Coxiella burnetii
Enterobacteriaceae family isolates found to be non-susceptible to any carbapenem antibiotic [5]
Ehrlichia/Anaplasma
Escherichia coli (Shiga-toxigenic) [6]
Francisella tularensis [5] ☎
Haemophilus ducreyi
Haemophilus influenzae [5,7]
Legionella
Leptospira
Listeria monocytogenes [5]
Mycobacterium bovis [5]
Mycobacterium tuberculosis [5]
Neisseria gonorrhoeae
Neisseria meningitidis [5,7]
Rickettsia
Salmonella [5]
Shigella [5]
Treponema pallidum
Vibrio cholerae [5] ☎
Vibrio, non-*cholerae* [5]
Yersinia pestis [5] ☎
Yersinia, non-*pestis* [5]

FUNGI

Cryptococcus [5]

PARASITES

Babesia
Cryptosporidium
Cyclospora
Giardia
Plasmodium
Taenia solium [8]
Trichinella

VIRUSES

Arboviruses [1]
Arenaviruses [10] ☎
Filoviruses [10] ☎
Hantavirus
Hepatitis A [9]
Hepatitis B [9]
Hepatitis C
Hepatitis D (delta)
Hepatitis E
Hemorrhagic fever viruses [10] ☎
HIV infection and AIDS
Influenza, novel strain [11] ☎
Measles (rubeola) ☎
Mumps
Polio ☎
Rabies ☎
Rubella ☎
SARS-coronavirus ☎
Variola major (smallpox) ☎
West Nile
Yellow fever ☎

OTHER IMPORTANT REPORTABLES

Any "uncommon illness of potential public health significance" [1]

Any outbreak of disease [1]

Any other arthropod-borne viruses [1]
- California encephalitis
- Colorado tick fever
- Dengue
- Eastern equine encephalitis
- Kyasanur Forest
- St. Louis encephalitis

All blood lead testing results, but lead poisoning should be reported within one local health department working day [12]

All CD4 counts and HIV viral loads

Creutzfeldt-Jakob disease (CJD) and other prion illnesses

Legionella pneumophila

Oregon Health Authority
PUBLIC HEALTH DIVISION
Office of Disease Prevention and Epidemiology
971-673-1111 (phone)
971-673-1100 (fax)
www.healthoregon.org/acd

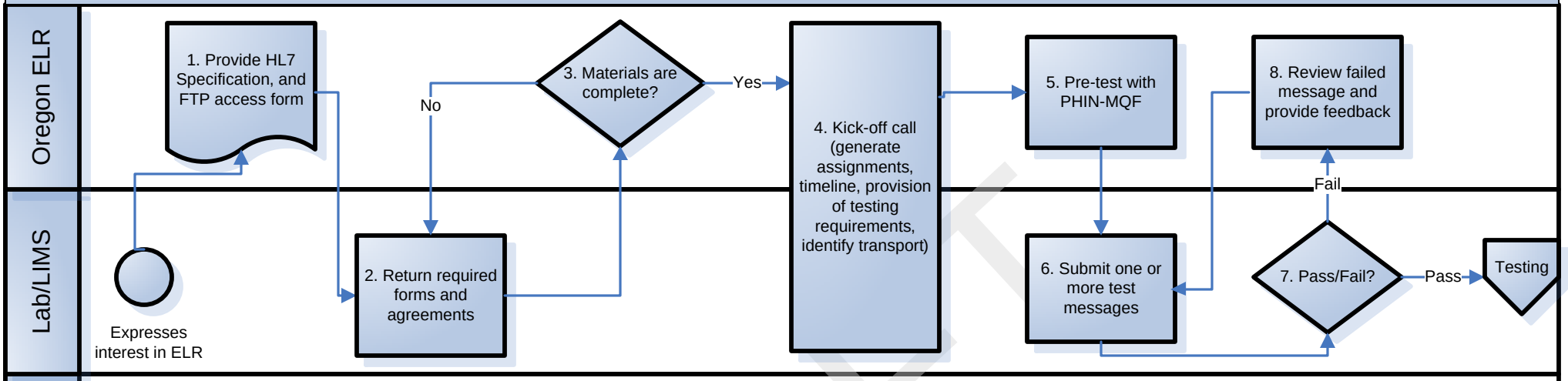
FOOTNOTES

1. Oregon Revised Statute 433.004; Oregon Administrative Rule 333-018 (http://arcweb.sos.state.or/us/pages/rules/oars_300/oar_33/333_018.html)
2. Refer to http://www.healthoregon.org/lhd for a list of local health departments, reporting FAQs, and more details about what to report. When in doubt, report.
3. ORS 433.004 and OAR 333-018-0013 (http://arcweb.sos.state.or/us/pages/rules/oars_300/oar_33/333_018.html); Manual for Mandatory Electronic Laboratory Reporting (http://www.healthoregon.org/elrresources)
4. ORS 431.262; OAR 333-018 (http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_333/333_018.html); OAR 333-026-0030 http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_333/333_026.html)
5. Isolates must be forwarded to the Oregon State Public Health Laboratory (phone, 503-693-4100).
6. All confirmed or suspect isolates of *E. coli* O157, and all non-O157 Shiga-toxin-positive broths, must be forwarded to the Oregon State Public Health Laboratory (phone 503-693-4100).
7. Report only isolates from normally sterile sites (e.g., neither sputum nor throat cultures).
8. Report cysticercosis and all undifferentiated *Taenia* spp. (e.g., eggs in stool O & P).
9. IgM-positive HAV and HBV serum specimens must be forwarded to the Oregon State Public Health Laboratory.
10. Hemorrhagic fever caused by viruses of the filovirus (e.g., Ebola, Marburg) or arenavirus (e.g., Lassa, Machupo) families are reportable.
11. Influenza A virus that cannot be subtyped by commercially distributed assays.
12. "Lead poisoning" means a blood lead level of at least 10 micrograms per deciliter.

OHA 8576 (Rev. 08/2012)

二、奧瑞岡州 ELR 資料上線（onboarding）步驟

Data Exchange with the Oregon ELR Project -- Laboratory Onboarding



Activity Details

(1) Most laboratories are submitting files via secure file transfer protocol (FTP). This document outlines that practice. Laboratories may also submit via the Public Health Information Network-Messaging System (PHIN-MS). Future work may include ability to submit real time via web service or a Health Information Exchange (HIE) portal. Those methods will not be considered at this time.

(2) While meaningful use (MU) requires labs to submit HL7 v2.5.1, non-MU labs may request to send earlier versions of HL7. Those requests will be evaluated on a case by case basis. Oregon ELR recommends data submissions via FTP. If a lab wants to send via PHIN-MS they will need to provide their connection information (e.g., connection point, etc.) to Oregon ELR. For more information about PHIN-MS, please refer to http://www.cdc.gov/phin/tools/PHINms/faqs.html

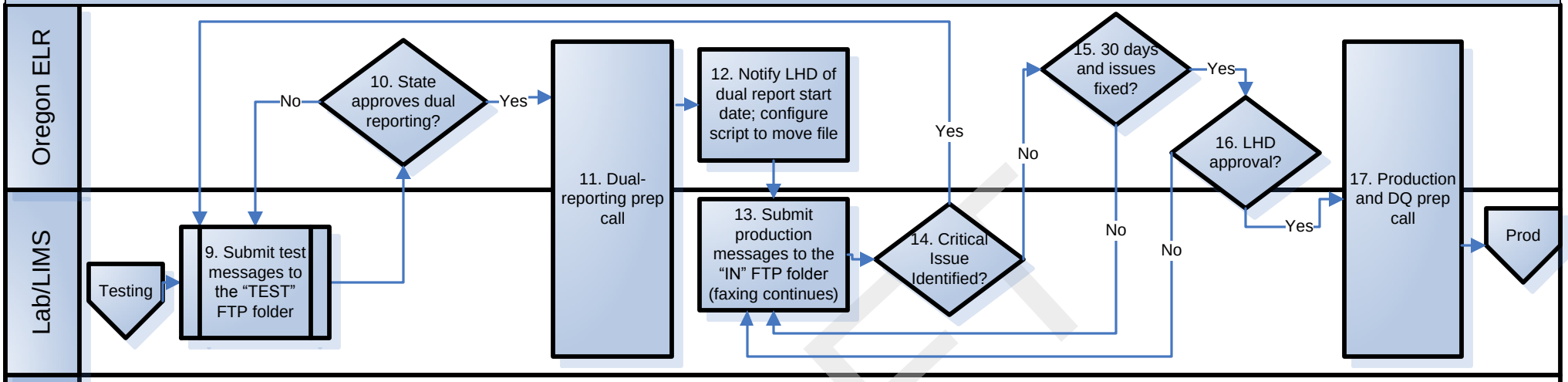
(3) Materials are reviewed by the Interoperability Director (ID). FTP account is created by Oregon's Office of Information Services (OIS); the ID generates usernames and passwords are assigned by OIS. Labs are granted non-expiring passwords for scripted connectivity.

(4) The kick off call should include the Interoperability Director and ELR Research Analyst, laboratory managers responsible for reporting, and technical staff responsible for message creation and submission. This meeting may also include a project manager, meaningful use coordinator, and data quality personnel.

During this call, timelines for project phases should be established, points of contact clarified, and impacts to workflow at the laboratory discussed. Regular meetings should be scheduled with key project staff to ensure that the project stays on target and critical issues are addressed in a timely fashion.

(5-8) Submitters are encouraged to create and send multiple messages to CDC's PHIN-Message Quality Framework testing site (https://phinmqf.cdc.gov/) prior to submitting tests to Oregon ELR to ensure that basic message construction is sound. This does not involve any engagement from the Oregon ELR Project and results are immediately accessible to the message developer. If a message successfully passes the PHIN-MQF or the developer has questions about interpreting those results the Oregon ELR Project should be notified (971-673-1111 or via email at ELR.Project@state.or.us). Oregon ELR will assist in interpreting the PHIN-MQF results.

Data Exchange with the Oregon ELR Project -- Testing



Activity Details

(9) Test messages containing deidentified data should be submitted to the test FTP folder (see Oregon ELR Dataflow diagram for details). These messages are picked up by a WinSCP script running on the Rhapsody server every two hours between 6:30 a.m. and 4:30 p.m. and delivered to a Rhapsody In_ELR_Test folder (CommPoint) as well as being archived in Test folder within the laboratory's directory structure on the same server. [Oregon ELR is working with OIS to procure a separate server configuration for testing/ production/archiving which we expect to implement by 2014.]

The structure of the message needs to comply with the Oregon ELR 2.5.1 Implementation Guide (unless approved for v.2.3.1 at the discretion of the Interoperability Director).

(10) Review of submitted files is done by the Interoperability Director or ELR Research Analyst. Message structure/data quality issues are reported back via email or regularly scheduled project meetings.

(11) After test messages have been constructed and are consistently sent, the project team convenes to determine** a date to begin dual reporting (i.e., production ELR and simultaneous faxing of reportable conditions). During this call a dual-reporting start date is selected and the process for determining how issues will be dealt with and how often the team will meet is outlined.

**Criteria for approval to begin dual reporting are documented in the Data Quality Assurance Protocol and include submission of properly constructed HL7 messages, population of required data elements, use of standardized code-sets, and consistent transmission.

(12) The Orpheus Tech Team will notify Local Health Department users that the lab will begin their minimum 30-day dual reporting period.

The Interoperability Director or ELR Research Analyst will modify the FTP script to route production ELR messages to the appropriate folders.

(13) Dual reporting begins

(14) As issues are identified, the lab will be notified. Non-critical issues (e.g., formatting, code set updates, etc.) may be fixed and not affect the timeframe. Critical issues that are identified will result in a halt to dual reporting and a return to the test environment until resolved. A plan for resolving issues must be agreed upon within one work week.

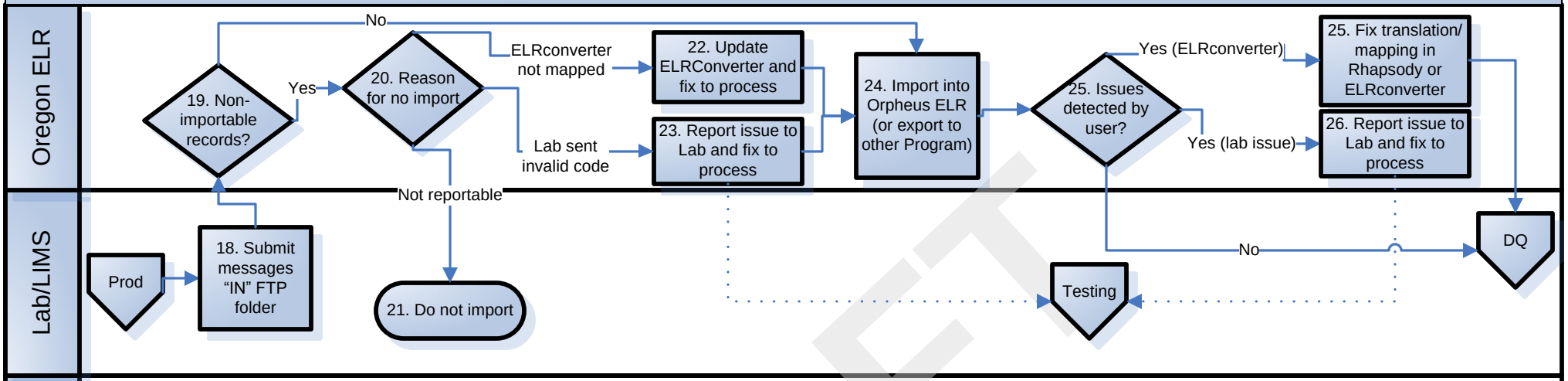
If the lab has to return to the test environment, the 30-day clock starts over.

(15) If the lab has corrected all minor issues and has engaged in a minimum of 30 days dual reporting, the lab will have preliminary approval to go live.

(16) Final approval by the Local Health Department Orpheus User Group (LHD-OUG) is required. Since the LHD is part of the dual reporting process, most issues should have been identified prior to this point. The laboratory remains in the dual reporting cycle until the LHD-OUD grants approval (this group meets monthly).

(17) While there should be regularly scheduled calls or check-points during the dual reporting period, this process will be lab-specific. However, all labs must have a production/ DQ preparation call following final approval from the LHDs, where the official go-live date will be set and the processes for ongoing data quality reviewed.

Data Exchange with the Oregon ELR Project – Production/Maintenance



Activity Details

(18) As long as there are no issues with a lab in production ELR they will remain there indefinitely

If a lab wants to upgrade to a new laboratory information management system, a new electronic health record system, or start using a newer version of HL7, an abbreviated test to production cycle will be considered.

Note: If at any time a critical failure is identified (the OPHD Rhapsody or FileMaker servers are unavailable or the LIMS or EHR server is unavailable, the lab will be asked to resume faxing immediately. When the issue is resolved and the reason for failure has been identified, the lab may resume ELR transmissions.

(19-20) Labs should be sending LOINC and SNOMED codes for tests and results. If something comes across that does not map, it is the DQ Team's responsibility to determine why: failure to map was appropriate (e.g., a non-reportable test or result was submitted); failure to map was caused by a lab code improperly assigned to an Orpheus disease within the ELRconverter (i.e., ELRconverter issue); or if the lab sent an improperly coded value (i.e., lab issue).

(21-23) *Regardless* of the reason the record fails to import, the DQ Team can either set the ELRconverter file to import or not as appropriate.

(21) If the lab sent a non-reportable, the message gets flagged not to process and the lab is notified that they do not need to send that test and result. No further action is required.

(22) If the code was not mapped but should be, the DQ Team updates the LOINC or SNOMED table with the correct disease code and flags the record to process.

(23) If the lab sent a mis-coded value, the DQ Team can properly route the message and the ID inform the lab of the error so that it can be corrected. Note that these messages are processed, and the lab is asked to correct the issue, but this does not prevent them from continuing to submit production level data while they implement the fix.

If the mapping issue results in a major rework on the LIMS side, the lab and ID may decide to also engage in testing while the issue is being fixed. While issues are being addressed Oregon ELR may request the lab to engage in an abbreviated dual-reporting process during this time.

(24) Again, regardless of whether issues are identified, if the data make it into the ELRcoverter they are eligible for import into Orpheus (or routing to another program, like Lead). The ELRconverter file pushes data into Orpheus ELR every two hours between 7:30 a.m. and 5:30 p.m. daily. Records that must be manually reviewed (in steps 20 and 21) will be processed automatically the next time the script runs.

(25-26) Data quality and transmission issues may be detected by Orpheus users or other data recipients while a lab is submitting production level data (e.g., the Oregon Lead Program). These issues should be reported to the Orpheus Tech Team. If the Tech Team cannot identify or resolve the anomaly, it is reported to the Interoperability Director or ELR Research Analyst who investigates whether the anomaly existed in the raw data or was produced during translation and parsing of the ELR from raw HL7 to the ELRconverter.

If the issue originated at the lab, the lab is notified and asked to correct the message. If the anomaly resulted from translation or parsing after arriving at OPHD, the Interoperability Director or ELR RA will correct the Rhapsody route, mapper definition, or ELRconverter script.

Like steps 22-23, if the issue results in a major rework on the LIMS side, the lab and ID may decide to also engage in testing while the issue is being fixed. While issues are being addressed Oregon ELR may request the lab to engage in an abbreviated dual-reporting process during this time.

If no anomalies are identified, the lab is considered in maintenance mode. Labs in maintenance will still be requested to update LOINC and SNOMED codes annually as well as generate an audit review file once each year to be analyzed by the DQ Team. (See ELR Data Quality Assurance SOP.)

三、奧瑞岡州 ELR 資料品質管控計畫

ELR Quality Control:

Electronic Data Quality Control Plan

Stage I	DEVELOPMENT	Develop and test HL7 message format
		Agree upon transmission method, set up procedures
To Pass	Message format and coding must be supported by ELR system, transmission method must be secure and supported by ELR	
Fail	Remain in Stage I until either successful or decision made by either party to discontinue.	

Stage II	TESTING	Lab transmits test data, state checks		
	Check	Record counts		
		Required fields populated		
		Minimum fields		
			Message:	send facility, send date, ID
			Patient:	name, DOB, address (zip), gender, telephone
			Provider:	name, address, telephone
			Facility:	name, address, telephone
			Order:	name, code
			Result:	test code, test name, date, result code, result text or number
		Preferred and special fields: Determined by programs and counties		
	Test	Transmission method		
	Determine	Frequency and time of regular transmission		
To Pass	Message must check out at 100% success or ELR must be confident that any problems have been solved; transmission tests must reach complete success; transmission frequency must be mutually agreed upon.			
Fail	Remain in Stage II until successful or decision made by either partner to return to Stage I or to discontinue.			

Stage III	REVIEW	Lab begins regular transmission of real data, in parallel with traditional reporting method (fax, disk, etc.). Reports are checked by Reviewers.	
	Assign Reviewers		
		County Reps	All counties that receive data during this period will be asked to confirm electronic reporting is equal to traditional reporting. Counties may either check data or 'opt out' by choosing not to review data.
		State Programs	All programs that receive data from the lab must review electronic data to confirm it is equal to traditional reports, or 'opt out' as above.
To Pass	ALL reviewers must rate this satisfactory (or choose to 'opt out'), at which point lab will stop the traditional reporting method and report only electronically.		
Fail	Remain in Stage III until successful or decision made by either party to discontinue.		

Stage IV	MAINTENANCE	Monitor ongoing lab data quality and quantity	
	Annually	A	ELR partners will be polled regarding their satisfaction with labs in maintenance phase; issues will be addressed as appropriate
		B	Lab rep annually verifies list of OR reportable diseases are correctly coded and transmitted
		C	As always, any exceptions are sent to state ELR for investigation.
Fail	--If problems: If requested or if deemed necessary, a conference call will be scheduled between appropriate groups Decision made by reviewers to continue or to drop back to Stage II or III.		
To Pass	Next year →	--If OK, then continue Follow steps A-B above, at once/year intervals. Step C is an ongoing item.	

ELR Quality Control:

Laboratory Code List for Reportable Conditions

Oregon state law (ORS 433.004; OAR 333-018-0015) requires that labs must report all test results *indicative of and specific for* the following diseases, infections, microorganisms, and conditions. Please complete the contact information for your laboratory (including information specific to the person completing this form). On the following pages, place a checkmark (✓) next to each condition tested at your lab, and then list the appropriate test code and name for those conditions. Be sure to date and initial each page so we can be certain that you reviewed each of the listed conditions. *Note: Some labs may be able to substitute their code tables for this form - please contact J.A. Magnuson 971.673.1111 for further information on possible substitution.*

LABORATORY NAME:			
ADDRESS:			
CITY:		*ZIP:*	
PHONE:		*FAX:*	
REPRESENTATIVE COMPLETING THIS FORM			
NAME/TITLE:			
PHONE:		*EMAIL:*	

Please send this completed checklist and any questions or comments to:

Oregon ELR
Oregon Department of Human Services
800 NE Oregon St., Suite 772
Portland, Oregon 97232

Fax: 971-673-1100
E-mail: ELR.PROJECT@state.or.us

If you require assistance, please call J.A. Magnuson at 971-673-1111 or email J.A.Magnuson@state.or.us

DHS oregon department of human services

ELR Quality Control:

Laboratory Code List for Reportable Conditions

Place a checkmark (✓) next to each condition tested at your lab, and then list the appropriate test code and name for those conditions.

	BACTERIA	TEST CODE AND NAME (PLEASE LIST ALL CODES AND NAMES USED TO IDENTIFY A PARTICULAR CONDITION.)
	EXAMPLE:	*LOINC 23423-7, Salmonella enteriditis Ab.IgG, Egg yolk, Enzyme immunoassay*
❑	*Bacillus anthracis*	
❑	*Bordetella pertussis*	
❑	*Borrelia*	
❑	*Brucella*	
❑	*Campylobacter*	
❑	*Chlamydia psittaci*	
❑	*Chlamydia trachomatis*	
❑	*Clostridium botulinum*	
❑	*Clostridium tetani*	
❑	*Corynebacterium diphtheriae*	
❑	*Coxiella burnetii*	
❑	*Ehrlichia*	
❑	*Escherichia coli (*Shiga-toxigenic)	
❑	*Francisella tularensis*	
❑	*Haemophilus influenzae*	
❑	*Haemophilus ducreyi*	
❑	*Legionella*	
❑	*Leptospira*	
❑	*Listeria monocytogenes*	
❑	*Mycobacterium tuberculosis*	
❑	*Mycobacterium bovis*	
❑	*Neisseria gonorrhaeae*	
❑	*Neisseria meningitidis*	
❑	*Rickettsia*	
❑	*Salmonella*	
❑	*Shigella*	
❑	*Treponema pallidum*	
❑	*Vibrio*	
❑	*Yersinia*	

Date:___/___/____ **Initials:_____**

DHS oregon department of human services

ELR Quality Control:

Laboratory Code List for Reportable Conditions

Place a checkmark (✓) next to each condition tested at your lab, and then list the appropriate test code and name for those conditions.

	PARASITES	TEST CODE AND NAME (PLEASE LIST ALL CODES AND NAMES USED TO IDENTIFY A PARTICULAR CONDITION.)
❑	*Cryptosporidium*	
❑	*Cyclospora*	
❑	*Giardia*	
❑	*Plasmodium*	
❑	*Taenia solium*	
❑	*Trichinella*	

	VIRUSES	TEST CODE AND NAME (PLEASE LIST ALL CODES AND NAMES USED TO IDENTIFY A PARTICULAR CONDITION.)
❑	Hantavirus	
❑	Hepatitis A	
❑	Hepatitis B	
❑	Hepatitis C (new infections only)	
❑	Hepatitis D (delta)	
❑	HIV infection and AIDS	
❑	Measles (rubeola)	
❑	Polio	
❑	Rabies	
❑	Rubella	
❑	Yellow fever	

	OTHER IMPORTANT THINGS	TEST CODE AND NAME (PLEASE LIST ALL CODES AND NAMES USED TO IDENTIFY A PARTICULAR CONDITION.)
❑	Any *uncommon illness of potential public health significance*	
❑	Any outbreak of disease	
❑	Any other typically arthropod vector-borne infection	
❑	All blood lead testing results	
❑	Low CD4 cell counts (<200/µl or <14% of total)	
❑	Other:	
❑	Other:	

Date:___/___/____ **Initials:_____**

四、奧瑞岡州 ELR 資料流程

New ELR Dataflow