行政院所屬各機關因公人員出國報告書
（出國類別：會議）

參加FAO/OIE主辦之控制及撲滅家禽流行性感冒區域會議報告書

出國人員 （服務機關、職稱及姓名）
國立中興大學獸醫學院　院長　張天傑
農業委員會動植物防疫檢疫局動物防疫組　科長　廖永剛

出國地點：泰國曼谷市
出國期間：　九十三年二月二十五日至二月二十九日
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行政院及所屬各機關出國報告提要

出國報告名稱：參加 FAO/OIE 主辦之控制及撲滅家禽流行性感冒區域會議

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出國計畫主辦機關/聯絡人/電話

農委會動植物防疫檢疫局/周佳蓉/02-3343-2052

出國人員姓名/服務機關/單位/職稱/電話

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出國類別： □1 考察□2 進修□3 研究□4 實習■5 其他

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關鍵詞：家禽流行性感冒、世界糧農組織（FAO）、世界動物衛生組織（OIE）、診斷鑑定技術、

內容摘要：（二百至三百字）

本次會議由世界糧農組織（FAO）及世界動物衛生組織（OIE）合辦，張院長受邀以專家身份報告台灣發生低病原性家禽流行性感冒之診斷與防疫措施，說明我國為防範高病原性家禽流行性感冒之入侵，由監測結果中檢出有低病原性家禽流行性感冒病毒感染，為防範低病原性家禽流行性感冒轉變為高病原性家禽流行性感冒，乃採行高保護水準，採取撲殺清場的措施。同時因為對農民有補償，因而農民願意通報病例，所以我們可以早期檢測出有感染的雞群，防範病毒散佈。由於我國將疫情透明化的說明，及應用 RT-PCR 技術進行家禽流行性感冒病毒血清亞型的鑑定技術，受到與會國家代表之認同。

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壹、 緣起

因應亞洲地區包括南韓、日本、越南、泰國、柬埔寨、印尼、巴基斯坦、寮國、中國大陸及香港陸續發生高病原性 H5N1 家禽流行性感冒疫情，並於泰國及越南地區造成有人因接觸病禽而染病死亡的疫情，顯示亞洲地區發生之高病原性家禽流行性感冒疫情，已造成發生國家極大的經濟損失與民眾恐慌。因此在國際交通頻繁的今日，如何防範疾病蔓延及控制疾病不再發生，亟需國際間共同合作一起清除這類人畜共通傳染病。

一般家禽流行性感冒並不會直接傳染給人類，其傳染的途徑可經由接觸含有病原之糞便、分泌物或吸入漂浮在空氣中的病毒。一九九七年係首次於香港發生人感染家禽流行性感冒病毒，依據世界衛生組織報告顯示，這波亞洲人感染高病原性家禽流行性感冒疫情，多半是直接與已感染的活家禽密切接觸造成，尚無跡象證實會從人感染人，但目前比較擔心的是，高病原性家禽流行性感冒與人的流行性感冒發生基因重組才會大規模感染人類。

本次會議由世界糧農組織（FAO）及世界動物衛生組織（OIE）合辦，於本（九十三）年二月二十六日至二十八日間在泰國曼谷市舉行。由於我國並不是世界糧農組織的會員國，故在會前該組織並未邀請我國參加，但因我國為世界動物衛生組織會員，在亞洲地區及我鄰國陸續發生高病原性家禽流行性感冒疫情的同時，我國僅檢出低病原性家禽流行性感冒病毒，並將疫情很透明的公布，故世界動物衛生組織執行長 Dr. Bernard Vallat

及亞洲區 OIE 代表 Dr Teruhide Fugita 分別來信邀請我國世界動物衛生組織代表-中興大學獸醫學院院長張天傑教授以專家身份出席該次會議，請張院長報告控制家禽流行性感冒的經驗（信中特別說明是以專家份與會，不代表國家或組織，請參閱附錄一內之亞洲區 OIE 代表 Dr Teruhide Fugita 致張院長之電子信函），該組織並負擔張院長出席是項會議之機票及生活費。

張院長數度向 OIE 爭取我國可增派一員參加該次會議，惟 OIE 答以因我國尚未為 FAO 會員，為免另生枝節，僅邀請張院長一人以專家身份與會。為協助收集國外相關疫情與防疫資料，本局指派動物防疫組廖科長永剛陪同前往，俾協助張院長及時將相關訊息回報國內，以掌握會議討論之進展。

張院長之報告係以專家身份報告台灣發生低病原性家禽流行性感冒之診斷與防疫措施，說明我國為防範高病原性家禽流行性感冒之入侵，已長期對家禽進行流行性感冒進行病毒分離及血清學之監測工作。自從 1997 年香港發生 H5N1 高病原性家禽流行性感冒疫情後，我國即擴大家禽流行性感冒之監測範圍，每年自候鳥棲息地包括臺北、宜蘭、臺南、嘉義、金門等監測點收集候鳥之糞材樣品，進行病毒分離。由監測結果中所檢出之家禽流行性感冒病毒株，均以 OIE 所定標準診斷方法進行確診，證實所檢出之病毒皆屬低病原性。

惟自九十一年六月以後，陸續在例行性採樣監測中，於養禽場檢驗出

H5N2、H7N7 的家禽流行性感冒病毒弱毒株，為避免弱毒株長期存在家禽場中易發生變異而形成強毒株，必須及早清除病毒，已採取撲殺清場措施。另於九十二年十二月間在金門海域查獲由大陸漁船棄置海上漂流之走私紅面鴨，分離出 H5N1 高病原性家禽流行性感冒病毒，該批鴨隻已依規定於金門銷燬處理，並未流入市面或混入國內養禽場。故台灣地區只檢出有低病原性家禽流行性感冒病毒株，與亞洲國家發生之高病原性家禽流行性感冒病毒株是不同。

張院長報告內容中也說明，我國檢驗出低病原性家禽流行性感冒病毒之診斷過程與處理經過，我國因為一直有進行候鳥排遺(fecal sample) 家禽流行性感冒病毒分離及雞、鴨、鵝家禽流行性感冒病毒血清抗體之監測工作。2003 年檢測候鳥樣本 2,145 件，養禽場 1,419 場，血清抗體 40,350 件。迄今未檢測出任何高病原性家禽流行性感冒之抗體和病毒。OIE 僅指定高病原性家禽流行性感冒為應通報動物疾病，各國對於其國內所發生的低病原性家禽流行性感冒則得依各國擬採取之保護水準，訂定必要的防疫措施。我國為防範低病原性家禽流行性感冒轉變為高病原性家禽流行性感冒，乃採行高保護水準，即採取撲殺清場的措施。

台灣地區在 2004 年 1-2 月間，因為氣溫較往年低溫，因而在一些雞場陸續發生呼吸道疾病疫情，經檢測出有新城病、雞傳染性支氣管炎等病毒伴隨細菌性如大腸桿菌、葡萄球菌之感染，造成嚴重之呼吸道疾病。又因

鄰近國家如：中國大陸、香港、韓國、日本相繼傳出有高病原性家禽流行性感冒病毒之疫情，故執行檢驗之家畜衛生試驗所也進行家禽流行性感冒病毒與抗體之檢測。結果分離出家禽流行性感冒病毒，以OIE「診斷試驗與疫苗標準手冊」所指定之病毒分離、核酸序列分析、雛禽血管內接種致死指數(intravenous pathogenicity index ; IVPI)等方式，判定所分離之家禽流行性感冒病毒為H5N2低病原性家禽流行性感冒病毒。並分析病毒性狀為不會感染人體之禽類家禽流行性感冒病毒，同時該病毒感染雞隻也為顯出有病原性（IVPI＝0.0）。

張院長之報告後有歐盟代表詢問我們是否有對家禽進行主動監測，張院長回答：我國是在鴨隻批發市場有進行家禽流行性感冒病毒及抗體檢測，若有陽性反應即追蹤來源場，並將有感染病毒之鴨隻撲殺清場(stamping out)。對於周圍場再進行追蹤檢驗，若是有檢驗出陽性場也是採撲殺清場措施。這次我們檢驗出家禽流行性感冒病毒，是因為在受到我們鄰國如韓國、大陸、越南發生高病原性家禽流行性感冒疫情，又在金門的走私鴨檢體中驗出高病原性家禽流行性感冒病毒，因而在有呼吸道疾病的雞隻病例主動監測檢驗出，雖然檢驗出是低病原性高病原性家禽流行性感冒病毒，但為防範病毒的散佈與發生突變而採最高級的防疫政策，進行撲殺清場工作，同時因為對農民有補償，因而農民願意通報病例，所以我們可以早期檢測出有感染的雞群，防範病毒散佈。

在中場休息時，我們特別前去向發問之歐盟發問代表致意，了解她是歐盟健康及消費安全部(Health and Consumer Protection Directorate-General, European Commission)之獸醫官員(Veterinary Administrator) Maria Pittman 小姐，她對張院長的報告非常有興趣，因為我們國家執行家禽流行性感冒病毒撲滅工作的透明度，讓她們更了解台灣是低病原性的家禽流行性感冒病毒，和亞洲其他國家的高病原性家禽流行性感冒是不同。同時她也批評有些國家疫情不透明，造成許多疾病蔓延也是相當不滿。所以，經由此次能在這國際會議中明確說明台灣的疫情，不要讓外國以為台灣是和中國大陸、香港一般，也是發生高病原性家禽流行性感冒的疫情，實有很大的宣傳效果。

張院長報告中，引用 RT-PCR 技術進行家禽流行性感冒病毒血清亞型的鑑定技術，受到與會國家診斷人員之認同。同時對於我國曾在金門的走私鴨檢體中分離出高病原性家禽流行性感冒病毒，也都相信不是台灣地區的病毒。故由這次報告能誠實的說明，正符合國際組織間強調要透明化的說明，是給予很大的肯定。也發現各國試驗研究單位也參考我們的 RT-PCR 技術，進行家禽流行性感冒病毒血清亞型的鑑定，會後有泰國、印度、澳洲、韓國及歐盟代表都對由謝快樂教授領導的研究團隊給予很高的評價。

台灣地區雖然今（九十三）年一至二月間陸續於彰化、嘉義、台南縣養雞場雞隻分離出 H5N2 低病原性家禽流行性感冒病毒，而採取高標準的防

疫措施（撲殺清場措施），是顧及台灣之家禽飼養密度高，及防範低病原性家禽流行性感冒病毒持續存在家禽場中，恐有突變轉為高病原性家禽流行性感冒病毒而採取之措施，來保護我們的家禽產業。希望在這次報告能讓其他國家知道，台灣的真實情形，以免讓世界衛生組織(WHO)或世界糧農組織(FAO)總把台灣歸為中國大陸的一省，而將台灣也列為疫區中（報告內容請參閱附錄一之張院長英文報告及簡報資料）。

貳、行程及紀要

日 期	地點	行　　程	備　　註
二月二十五日（星期三）	台北至泰國曼谷	啟程搭長榮航空 BR201 下午 13：55 起飛 於泰國時間當日下午 16：45 抵達曼谷市	駐泰國台北經濟文化辦事處翁副組長瑛敏小姐與張秘書象錡先生接機後下榻於 Sofitel 飯店
二月二十六日（星期四）	曼谷	上午 10 時拜會駐泰國台北經濟文化辦事處 中午 12 時返抵 Sofitel 飯店辦理會議報到 下午 13：45 會議開始及與會國家報告	鄭代表博久先生接見 翁副組與張秘書陪同辦理
二月二十七日（星期五）	曼谷	上午 8：30 開始由與會國家報告及專家報告至下午 18：30 結束	
二月二十八日（星期六）	曼谷	上午 8：30 開始與會國家分組討論及報告，下午為綜合討論及結論至下午 17：30 結束	
二月二十九日（星期日）	曼谷至台北	啟程搭長榮航空 BR212 下午 12：55 起飛 於台北時間當日下午 17：10 抵達中正機場後返家	張秘書象錡先生送機

一、拜會駐泰國台北經濟文化辦事處

上午十時張院長與廖科長由辦事處張秘書象錡先生陪同前往辦事處，由鄭代表博久先生及秘書組楊組長巨中先生與翁副組長瑛敏小姐等接見，討論現在許多國際組織的會議場合，往往因中共打壓而無法以正式代表身分與會，但為能讓我國的聲音傳達出去，我們還是應該保握機會，利用可

能的方法積極參與。本次雖然張院長是以專家身分受邀與會報告，這就是將我們的研究成果與積極處理的態度向與會國家說明，相信是有機會讓其他國家更了解我們。但是在這種國際場合，我們還是要小心，避免我國被不當的手段矮化。

會後由翁副組長瑛敏小姐與張秘書象錡先生陪同我們前往會場報到，並於會場協助張院長報到後，介紹中央通訊社曼谷辦事處郭芳贊先生，並由張院長接受訪問，簡要的說明台灣檢出與其他亞洲國家發生嚴重的高病原性家禽流行性感冒病毒之疫情不同點，是因為在一般的病例中檢驗出有低病原性的家禽流行性感冒病毒，為防範低病原性家禽流行性感冒病毒持續存在家禽場中，恐怕有突變轉為高病原性家禽流行性感冒病毒，而台灣地區因為家禽飼養密度高，故採取高標準的防疫措施，對檢出低病原性家禽流行性感冒病毒的家禽場進行撲殺清場，以保護我們的家禽產業。這與亞洲國家發生高病原性家禽流行性感冒的疫情而執行的防疫措施是不同。

這次來參加會議是受世界動物衛生組織(OIE)邀請，是以專家身分出席會議，並不能說是代表台灣，但我們仍希望藉此次會議報告能讓其他國家知道，台灣的真實情形，以免讓世界衛生組織(WHO)或世界糧農組織(FAO)總把台灣歸為中國大陸的一省，而將台灣也列為疫區中。

二、參加會議記要

會議於下午一時四十五分開始，先分別由世界衛生組織、國際糧農組織、世界動物衛生組織代表致詞，一致認為世界各國對將有危害健康衛生的傳染病要一起合作清除，避免傳染病蔓延。再由泰國農業部副部長說明家禽流行性感冒已在世界上引起很大的經濟與衛生問題，也在泰國造成很大的經濟損失，希望這次會議能讓與會國家與代表提出共同的防治策略，共同防止家禽流行性感冒病毒散播。更說明泰國為建立早期預警系統(early warning system)而設立畜牧生產研發處(Department of Livestock Development)，執行牧場經常性的隨機採樣檢驗，目的就是要做好監測工作，及防範疾病散佈。

會議議程的安排為：第一部分是參加國家之疫情狀況報告，首先是有發生疫情的 9 個亞洲國家加上請張院長說明台灣經驗的報告，每個國家報告後接受與會人員之發問與回答。再來為其餘目前未有疫情傳出之 14 國家報告。(詳見附錄二之會議議程)

第二部份是特定議題演講，分別由 OIE 及 FAO 的專家報告有關獸醫服務體系、動物疾病監測、疾病通報、公共衛生與撲殺屍體處理之動物福利等議題。第三部分為因應發生高病原性家禽流行性感冒之措施及分組討論。最後為大會結論與建議。(請見會議內容摘要報告及附錄二之與會國家報告與專家報告資料)

經由與會國家疫情報告與討論，本次會議提出的結論與建議事項有以

下幾點：(詳細內容請參閱附錄三資料)

一、對於發生國家建議要收集其流行病學資料，追蹤病毒來源與分析毒株之分子性狀，提供世界動物衛生組織 (OIE)。同時各國需加強其防疫與公共衛生監測系統。

二、各國間要加強的措施有下述幾點：

1. 可由相關國際組織成立區域合作計畫，共享資源及作為控制疫情時之決策參考。
2. 各國成立獸醫任務編組準備緊急防疫計畫，並配合公共衛生部門執行相關措施。
3. 各國也應評估發展獸醫組織，包括人員、實驗室、器材之準備，以防範疾病發生。
4. 盡量能將疾病控制於小範圍內，故需相關國家間之實驗室合作與檢驗試劑之分享。
5. 要建立共通之生物安全與公共衛生教育資料，共同防範區域間之疾病傳播。
6. 經由各國間檢疫、移動管制與監測工作，可依家禽飼養模式來進行疫病控制分類，以儘早清除疾病。家禽飼養模式分為三類：大型企業化養殖 (industrial commercial poultry)、小型企業化養殖 (small commercial poultry)及家戶養殖家禽(subsistence farming and pet

birds)。

7. 各國流行病學資料應提供給FAO/OIE/WHO等國際組織，借由各國或當地的專家可分析流行病學病因及分子性狀分析，以提供共享的資訊，進而可提供發生疫情之國家援助。

8. 對於是否使用疫苗進行疾病控制，經評估唯有遵循OIE規範所製造的疫苗，配合撲殺清場及監測工作才容易成功。如果只要靠疫苗接種進行家禽流行性感冒清除計畫是不容易成功。

9. 動物撲殺工作應先給予鎮靜後再執行，並要即時給予畜主補償，才可防止疾病散播。受污染之物質及裝動物的籠架也要在24小時內清除與消毒才可防範病原傳播。

10. 對於野生動物是要將其與家禽隔離，如避免水禽直接或間接和陸禽接觸。對於家戶養殖家禽更要有監測工作以減少疾病發生。有野鳥傳染病監測計畫也可防範疾病傳播。

三、有關人類受感染之健康問題主要是因為接觸染病之動物，故有需要加強動物及人類的疾病監控工作，同時也需要各國將疫情透明化(transparency)。對於有暴露危險之工作人員應提供防護設備、抗病毒藥物、操作準則或疫苗等防護措施。

參、會議內容摘要報告

一、參加國家之疫情報告

與會國家之報告，首先由亞洲地區發生高病原性家禽流行性感冒疫情之與會國家報告（26 日下午），報告順序依國家名字之英文字母排列，我國未被列為發生國家之報告國家名單中，但將我國和香港列為其他報告項目中。大會主席為 OIE 代表(Dr. Karim BenJebara)，先以國家名稱請各國代表報告，當發生國家共 9 個代表報告後，主席即以 Dr. Chang Tien-Jye 請張院長報告(未稱台灣代表)，張院長上台後即以投影片螢幕先說明台灣並未發生高病原性家禽流行性感冒，但因為防疫需要而採最嚴厲的防疫措施，將有檢驗出病低原性家禽流行性感冒之家禽清除，其目的就是要防範病低原性家禽流行性感冒病毒持續存在家禽場中，恐怕因為突變而成為高病原性家禽流行性感冒，將會造成更大的損失。同時在報告後接受與會人員之發問與回答。茲將各國家代表報告之疫情與處理情形摘錄如下：

柬埔寨(Cambodia)

疫情：2004 年 1 月即發現有雞隻感染似新城病(Newcastle disease)及家禽霍亂(Fowl cholera)病例，原以為是因為到了乾季時間常有的病例。但在 1 月 12 日時有一蛋雞場發現高死亡率的病例，又因鄰國亞洲地區有發生高病原性家禽流行性感冒疫情，所以決定採樣送檢驗是否有高病原性家禽流行性感冒。

診斷：2004 年 1 月 13 日將蛋雞場病例病材送法國巴斯德研究所(Research Center for Influenza; Pasteur Institute, France)檢驗。在 1 月 23 日確診有 H5N1 高病原性家禽流行性感冒病毒感染。

控制：移動管制、撲殺清場、加強消毒。禁止疫區禽鳥類及其產品輸入，並要求上市家禽須有獸醫師健康證明。該國疫情於 1 月 28 日以後就沒有新病例。後續繼續進行監測工作，及與相關組織合作。

中國大陸 (China)

疫情：從 2004 年 1 月 27 日至 2 月 22 日止有 49 個報告病例，48 個病例已確診為高病原性家禽流行性感冒。共有 15 省發生，83%的病例發生在中國南部鄰海省份，發生動物有雞、鴨、鵝、黑天鵝(black swan)、鵪鶉(quail)、鴿子及雉類。

診斷：由哈爾濱獸醫研究所-國家家禽流行性感冒參考實驗室以病毒分離診斷為 H5N1 亞型。血管內接種病原性指數(IVPI)為 3.0。

控制：目前對人也有進行監測工作，但未檢出有人感染病例。以疫苗接種(H5N2 病毒株不活化疫苗)管制區感受性動物，並由四家生物製藥廠(Harbin Weike Bio. LTD 哈爾濱、Quindao Yibang Bio.LTD 青島、Zhongmu LTD, Zhengzhou 河南鄭州、Zhaoqing Dahuanong LTD, Guangzhou 江蘇)負責製造疫苗。目前已使用 180,000,000 劑量，估計未來三個月將需疫苗劑量

約 800,000,000-1,000,000,000 劑量。目前以發生場及周圍半徑 3 公里內之家禽亦撲殺清場、距離發生場周圍 3-8 公里之緩衝區(buffer zone)進行免疫。對家禽糞便、墊料、飼料及水都要加強消毒。在感染區及緩衝區的家禽與家禽產品市場都關閉。

印尼（Indonesia）

疫情：從 2003 年 8 月開始即有類似新城病病例發生，是由西岸省份開始至 11 月時最高峰。雞隻死亡數量由 8 月的 9,000 到 11 月達 2,266,420 隻，然後死亡數量逐漸下降至 2004 年 2 月為 8,729。共有 80 個報告病例，以 爪哇(Java)省最嚴重(爪哇省的家禽數量佔印尼全國的 65%)。檢討該國疫情也懷疑有走私疫苗或生物製劑使用而引起疫情，及因為家禽移動、感染場蛋盒、運輸車輛等器械傳播。

診斷：由該國相關單位進行，以血清學、病原性檢查、電子顯微鏡、RT-PCR 與病毒核酸定序診斷。

控制：採行免疫注射及撲殺政策併行控制疫情，對已發生場採全面撲殺控制，發生場周圍 1 公里範圍內雞場雞隻全面接種疫苗。新發生疫情之區域有新發生場，則將 1 公里範圍內雞場雞隻全面撲殺。所用疫苗是以其國內分離株製造，由當地 3 家製藥廠製造供應不活化疫苗。對 4-7 日齡雞隻接種疫苗，再以監測和追蹤病例方式進行控制家禽流行性感冒。

日本(Japan)

疫情：2004 年 1 月 11 日在山口縣一蛋雞場出現第 1 個病例，撲殺近 3 萬 5 千隻雞。第 2 個病例在大分縣於 2 月 16 日發生，為民眾飼養的小型鬥雞(bantams)及鴨，經診斷皆為 H5N1 型，但這 2 個病例在流行病學分析上無相關性。

診斷：由其國家動物衛生研究所診斷，病毒核酸序列分析結果是鳥源性病毒，與香港、越南會感染人之禽流感病毒序列不同。

控制：病例周圍 30 公里劃定為管制區，不准家禽移動及進行交易。山口縣病例之移動管制執行至 2 月 19 日已解除。有補償措施，分別對感染場的撲殺損失及管制區的禁止移動的損失補償。

南韓(Korea)

疫情：2003 年 12 月 10 日在雞隻發現第一件病例，12 月 14 日在同一省的鴨發現第一件病例，在 12 月 20 日以後陸續在不同省的雞及鴨發現病例，至 2004 年 2 月 6 日止共有 18 件病例(雞 8 場、鴨 9 場及 1 場有雞鴨一起養)分布在四個省。

診斷：National Veterinary Research and Quarantine Service，以血清學及 RT-PCR 反應診斷。病毒核酸分析結果和越南分離株不同。

控制：撲殺清場措施，雞隻感染場周圍 3 公里的雞鴨場皆撲殺，鴨發

生場場則只對該鴨場撲殺，故至 2 月 24 日止共撲殺雞 223 場 3,314,320 隻雞，撲殺鴨 112 場，1,114,467 隻鴨。撲殺動物及蛋品皆掩埋，場內飼料或污染物送焚化。採行移動管制(30 天)、加強監測工作等措施，以清除高病原性家禽流行性感冒為工作目標，故政策亦不使用疫苗控制。

寮國(Lao PDR)

疫情:2004 年 1 月初有雞隻診斷為家禽霍亂的病例以抗生素治療無效，經採集病例樣品送到泰國及越南進行診斷鑑定工作，於 1 月 27 日證實為高病原性家禽流行性感冒。從發生到 2 月，總共有 3 個爆發區域，42 個家禽場發生，共有 45,124 隻家禽(含雞、鴨、鵪鶉)病死，撲殺 91,681 隻家禽。由於該國近 85%的雞隻是由民眾自己飼養，企業化養殖場僅在都市近郊有，故在疫情資料收集並不完全。

診斷：由越南(National Veterinary Diagnostic Laboratory in Vietnam) 及 泰國(Northeast Regional Animal Disease Diagnostic and Research Centre, Khone Kaen, Thailand)診斷鑑定。

控制：採行撲殺、移動管制及監測工作控制疫情。不使用疫苗防治。

巴基斯坦(Pakistan)

疫情：該國曾於 1994 年及 1995 年間發生高病原性家禽流行性感冒，

當時的病毒經參考實驗室診斷為 H7N3 病毒株。1997 至 1998 年間再有 H9N2 低病原性家禽流行性感冒病毒，當時和雞傳染性支氣管炎病例並存於雞群中，也造成蛋雞產蛋率下降達 70%的疫情，和肉雞約 70%的死亡率。2003 年 1 月開始又持續在肉雞及蛋雞發生 20-50%死亡率的疫情，到 11 月間已轉變成在 40-60 周齡的種雞發生 70-80%死亡率的疫情，並且在鴿子也發生近似的疫情，經英國參考實驗室檢測為 H7N3 之高病原性家禽流行性感冒病毒，同時以血清學檢測，也發現雞群中存有 H7 及 H9 血清亞型之抗體。2004 年以後沒有新病例再傳出。

診斷：由英國家禽流行性感冒病毒診斷鑑定參考實驗室（World Reference Laboratory, Weybridge, UK）診斷。

控制：1995 年時，Veterinary Research Institute, Lahore 亦有製造疫苗，前期是直接以福馬林液將病毒不活化後直接使用於雞隻，後期再使用油質佐劑疫苗(oil-adjuvant vaccine)，並可由民間公司製造。目前該國政府對發生疫情區域採自願性撲殺措施，及由地方政府執行移動管制，養雞戶也可以選擇使用疫苗防疫。

泰國(Thailand)

疫情：2004 年 1 月 23 日證實發生高病原性家禽流行性感冒疫情，發生的病毒株經診斷為 H5N1 亞型，共有 161 件病例，且發生在數種家禽中。分

布在 40 個省 71 個行政區，到 2 月 23 日止約撲殺 70 萬隻家禽。分離的病毒經基因分析，結果與 2004 年在越南及 2003 年在香港發生的 H5N1 病毒株相近。

診斷：國家診斷室依 OIE 準則進行診斷鑑定。

控制：經診斷確定病例周圍 5 公里之家禽全部撲殺，50 公里內的家禽場進行監測，再劃定 50-60 公里間的家禽場動物移動管制。同時由畜產發展處在全國設定 65 個管制站，有警方配合執行管制工作。目前不採行疫苗防疫措施。

越南 (Vietnam)

疫情：2003 年 12 月 25 日第一個病例報告，至 2 月 19 日通報 OIE 的報告，共有 1247 個家禽病例，分布在 35 個區域發生，撲殺家禽數目約有 6,621,985。感染人的病例累計有 22 人，其中 15 人死亡。

診斷：越南國內有 2 個實驗室可以診斷高病原性家禽流行性感冒，分別位於北方之 National Center for Veterinary Diagnostic (NCVD)及南方的 Ho Chi Minh Regional Veterinary Center。病毒株經診斷為 H5N1 亞型。

控制：採取撲殺及監測措施，政府因為經費不足，無法對感染場周圍所有家禽貫徹撲殺補償，目前疫情尚未完全控制。該國也未有使用疫苗防

疫的考量。

會議之第二天為澳洲、紐西蘭及亞洲地區未發生高病原性家禽流行性感冒疫情之與會國家報告：報告順序依國家名字之英文字母排列，共有澳洲（Australia）、孟加拉(Bangladesh)、婆羅州(Brunei Durussalam)、布丹（Bhutan)、北韓(D.P.R. Korea)、印度(India)、馬來西亞(Malaysia)、緬甸(Myanmar)、尼伯爾(Nepal)、紐西蘭(New Zealand)、菲律賓(Philippines)、新加坡(Singapore)、斯里蘭卡(Sri Lanka)及帝汶島(Timor Leste)等 14 個國家報告。各國報告都一致強調要加強監測，做好檢疫措施，以及要求農民做好自衛防疫與疾病通報措施才可防範疾病入侵。以下為澳洲等國報告摘錄如下：

澳洲（Australia）之監測結果：該國曾有五次家禽流行性感冒病毒感染的疫情，分別發生於西元 1976 (H7N7)、1985(H7N7)、1992(H7N3)、1994(H7N3)及 1997(H7N4)，當時都在疾病診斷出為家禽流行性感冒病毒感染，即採取撲殺清場方式控制，故沒有疫情蔓延情形。防疫措施：目前設立國家獸醫緊急應變計畫(Australia Veterinary Emergency Plan; AUSVETPLAN)，並將資料公布於網站上，隨時可供查閱或作為防疫控制之參考。主要防疫措施為監測及加強檢疫工作，避免外來病原入侵。不同意使

用疫苗，宣導農民避免水禽與陸禽混養。

孟加拉（Bangladesh）

該國之監測結果並沒有疫情發生。防疫措施是採行強化檢疫功能，對進口家禽執行隔離檢疫長達 2 個月。

婆羅州（Brunei Durussalam）

之監測結果並沒有疫情發生。防疫措施：禁止自疫區進口禽鳥類動物及強化邊境檢疫功能，對家禽場進行血清學監測(non specific ELISA kits)。

印度（India）

監測結果：2001 年，有一批未經許可之私人進口自沙烏地阿拉伯的 80 隻鴿子，在隔離檢疫站驗出其中 63 隻有 H7 亞型血清抗體，故在隔離檢疫站就全部銷毀。之後對進口鴿子有加強檢疫，但都未再發現有家禽流行性感冒病例。2001-2004 年間之監測其國內雞、鴨等動物之樣品都沒有發現家禽流行性感冒病毒。

防疫措施：目前有一座高生物安全動物疾病診斷實驗室，是自 1998 年興建 2001 年啟用，專供惡性傳染病診斷研究用，目前該實驗室可進行各亞

型家禽流行性感冒病毒（含高病原性）診斷分析。

馬來西亞 (Malaysia)

監測結果：未檢測出有高病原性家禽流行性感冒病毒，但曾於 1989 及 2003 年分別在野鳥、鴨與雞中檢出非病原性家禽流行性感冒病毒(A/magpie robin/1989/H4N3, A/bulbul/1989/H4N3, A/duck/1989/H3N8, A/chicken/1989/H9N2, A/duck/1989/H3N8, A/chicken/2003/H9N2)。

防疫措施：加強在邊境檢疫（與泰國相鄰），家禽場如有死亡率超過 3% 之病例皆須檢測是否有家禽流行性感冒病毒。

緬甸(Myanmar)

目前該國獸醫訪視過 14 省的 6340 家禽場未發現有家禽流行性感冒病徵。但該國也承認缺乏診斷家禽流行性感冒病毒之經驗與人才，所以該國正需要國際組織支援診斷試劑供其進行監測工作。

尼伯爾 (Nepal)

監測結果：已主動監測 15 個種雞場（曾於 2003 年 7 月以後有自泰國進口種雞者）結果都正常。另外監測國內家禽場及國家公園內之侯鳥也都未有病例報告。

菲律賓 (Philippines)

防疫措施：將家禽流行性感冒緊急應變措施分級為四級：第一級為國內沒有家禽流行性感冒疫情。第二級為家禽有確診出家禽流行性感冒疫情。第三級為有家禽流行性感冒病毒傳染給人之疫情。第四級為有人傳人家禽流行性感冒病毒之疫情時。

二、特定議題之專家演講

（一）獸醫服務體系(International commitments of veterinary service)

由世界動物衛生組織執行長 Dr. Bernard Vallat 報告，主要說明目前 OIE 有 166 個會員國，各國的獸醫服務體系應依 OIE 的標準進行評估。評估的項目有：1. structure, roles and responsibility of the Veterinary Administration and Veterinary Services, including field services（各國中央與地方獸醫工作組織）。2. disease surveillance and notification systems and networks（疾病監測系統）。3. determination of animal health status（動物疫病診斷）。4. records of import and export（進出口記錄）。5. provision of relevant information on timely manner（即時疫情通報）。

各國的獸醫服務體系應建構在道德及技術支援的基礎，讓各國有正確的決策、執行程序與對外溝通說明系統。OIE 對各國的表現能力，也以下列幾項標準來評估：1. effective surveillance and monitoring of the animal health status（有效的動物健康情形監測系統）。2. accurate notification of findings to the national focal point and to the OIE（明確的通報疫情給 OIE）。3. credibility of certification of animals and animal products（有可信賴的動物檢疫證明文件）。

由以上幾點要求是各國都應公開及應遵守的準則，才可避免災難及防

範動物疫病或人畜共通傳染病的傳播。

（二）動物疾病監測(Surveillance, diagnosis, research and biosecurity)

由 FAO 代表 L. Lubroth 報告疾病監測有主動性(active surveillance)與被動性(passive surveillance)，視不同的疾病而有不同的方法。監測結果不管是陽性或是陰性都很重要，尤其呈現陰性時，更要在流性病學上很重要的數據。配合疾病監測結果，要有明確的診斷方法，這方法應依 OIE 的準則進行操作才可為共通的認證方法，以證實監測結果。

有關研究方面，目前已進步到分子技術來分析判定。應用層面包括診斷、流行病學及疫苗研發。生物安全議題就是防範疾病傳播與防止感染，目前對市場管理及如何避免感染是很重要的議題，尤其對於家禽市場的雞隻、雞籠、雞蛋等可能感染源，要有正確的消毒方法，才可避免感染人。工作人員是主要的因素，應要記得換工作服、鞋子及進出動物舍或實驗室時要有適當的消毒，如鞋子經過有效的消毒槽讓病原不會傳播。避免職業傷害(occupational hazards)就是要注意生物安全事項。

（三）疾病通報(disease notification)

由 OIE 代表 Dr. Karim BenJebra 報告各國疫情要透明化，在目前各國

遵循 WTO/SPS 架構下，各國一定要符合國際標準。目前推動的通報系統已用網路通報，一旦有表 A 或 B 級傳染病發生時一定要通報。大陸代表提出在野鳥或候鳥檢出有家禽流行性感冒病毒，是否要通報？主講人回應通報是以疾病為主，主要就是要各會員國將訊息公開。

（四） 公共衛生議題

由 WHO 專家 F.X.Meslin 說明本次 H5N1 家禽流行性感冒病毒感染人之調查報告，共有 32 個病例，其中死亡病例為 22 個，分別由泰國（共 9 例，7 例死亡）及越南（共 23 例，15 例死亡）收集分析。這些感染者的病歷經證實皆為直接接觸過 H5N1 病毒感染的病死雞。並無人傳人或醫院內感染的證據，發病年齡從 4 歲到 58 歲都有，無分男女性別而有感受性的不同。發病症狀有發燒（>38℃）、呼吸短促及無分泌物的咳嗽等症狀，死亡案例都因為呼吸緊迫不及救治而死。

目前尚未發展出抗 H5N1 病毒的疫苗，所以現階段以加強動物的監測工作及強化環境消毒，牧場工作人員需有適當防護裝備以及準備抗病毒藥物，以減緩病毒的傳播。現階段的措施主要是對病例隔離，公告旅遊危險區、加強檢疫把關等方法。

（五） 撲殺與屍體處理之動物福利

由澳洲Dr. John Galvin報告，建議進行動物撲殺時應將動物進行鎮定、安樂死，不要以殘忍手段強迫致死。故可以將待殺動物先放入（或驅趕）至大型容器內再灌入氣體致死（如二氧化碳、一氧化碳氣體）。另外也可以鎮定藥物注射讓動物昏迷後再撲殺。電擊是最普遍的撲殺動物方式，但因在野外使用時需有特殊裝置才可。並且確認動物在被銷毀前已死亡，這是要符合動物福利(Animal welfare)的作法。

至於消毒及動物銷毀方法，因不同環境及疾病類型有不同的方法，最重要的是要注意生物安全操作，且不至讓病原再傳播。現行最常用的銷毀動物屍體方法為：掩埋、焚燬、化製或用於堆肥。

三、因應發生高病原性家禽流行性感冒之措施及分組討論

會議最後一天是分組討論，張院長和日本、韓國、香港及新加坡代表分為一組，由於彼此的診斷鑑定技術與經濟能力相當，故討論時多偏重在流行病學分析與調查的合作。以台灣目前進行家禽流行性感冒之研究，係依循 OIE 的標準進行各項診斷鑑定工作，並與日本北海道大學獸醫學院喜田 宏教授(Dr. H. Kida) 合作進行血清亞型之鑑定。對於疫情透明化，大家一致認為中國大陸還需更透明化，避免不明病原在大陸傳播，而影響周邊國家。

肆、心得與建議

一、藉由我國對疫情的透明化，經以OIE「診斷試驗與疫苗標準手冊」所指定之病毒分離、核酸序列分析、雛禽血管內接種致死指數(intravenous pathogenicity index ; IVPI)等方式，判定所分離之家禽流行性感冒病毒為H5N2低病原性家禽流行性感冒病毒，與會國家都認同張院長的報告，證實我國的獸醫科技已符合國際標準。

二、現在許多國際組織的會議場合，往往因中共打壓而無法以正式代表身分與會，但為能讓我國的聲音傳達出去，我們還是保握機會，利用可能的方法積極參與。由於我國為OIE之會員國，應可藉參加相關國際組織合作計畫，拓展我國的國際地位。

三、目前各國都很重視各項疾病之緊急防疫計畫，並配合公共衛生部門執行相關措施。我國也由這次處理家禽流行性感冒之防疫工作，在中央成立中央防治重要動物傳染病因應小組，定期召開會議協調各部會之防疫措施。檢討防疫工作所需之人員、實驗室、器材之準備，以積極處理各項防疫工作。

四、對於家禽流行性感冒是否使用疫苗進行疾病控制，經與會討論評估建議，唯有遵循OIE規範所製造的疫苗，配合撲殺清場及監測工作才容易成功。如果只要靠疫苗接種進行家禽流行性感冒清除計畫是不容易成功。

五、參與本次會議瞭解各發生國之處理方式後，檢討我國現行措施是符合國際規範。例如撲殺低病原性家禽流行性感冒病毒感染鳥禽時，我國採取以水化氯醛藥劑先將雞隻鎮定後，再裝入屍袋送往焚化或化製。符合先鎮靜後再執行之要求，並給予畜主補償，才可防止疾病散播。

六、雖然會後張院長向WHO、FAO等組織之代表反應不應該將台灣列為中國大陸之疫情範圍內，致使其他國家誤以為台灣有高病原性家禽流行性感冒疫情，但未受到正面回復，此仍須我們再予努力。

附錄一

1. OIE 邀請張院長之來函
2. 張院長與會之報告及簡報資料

行政院農業委員會動植物防疫檢疫局

動物檢疫組

寄件者: OIE Tokyo Office [oietokyo@tky.3web.ne.jp]
寄件日期: 2004年2月19日星期四 下午 4:59
收件者: Chang Tien-Jye (Dr)
副本: Sermpan Soontornchat (Dr); Gevers Helga (Ms); Boyazoglu Jean (Dr)
主旨: Fw: FAO/OIE Emergency Regional Meeting on Avian Influenza Control in Animals in Asia
重要性: 高

Sorry Dr Fujita's electronic signature was missin from the earlier transmission.

OIE TOKYO
----- Original Message -----
From: OIE Tokyo Office
To: tjchang@dragon.nchu.edu.tw
Cc: Sermpan Soontornchat (Dr) ; Gevers Helga (Ms) ; Boyazoglu Jean (Dr)
Sent: Thursday, February 19, 2004 4:40 PM
Subject: FAO/OIE Emergency Regional Meeting on Avian Influenza Control in Animals in Asia

Ref. No. 04-131/36-1/ka

Dear Prof. Chang

FAO/OIE Emergency Regional Meeting on Avian Influenza Control in Animals in Asia
(in collaboration with WHO, DLD and JLTA)
Bangkok, Thailand, 26-28 February 2004

It is my pleasure to learn your attendance as an expert in your personal capacity (but not representing any institute) for a presentation on "Specific Experiences of Avian Influenza Control" (15 minutes) at the FAO/OIE Emergency Regional Meeting on Avian Influenza Control in Animals in Asia jointly organised by the World Organisation for Animal Health (Office International des Epizooties, OIE) and Food and Agriculture Organization of the United Nations (FAO), in collaboration with the World Health Organization (WHO), the Department of Livestock Development, Thailand (DLD) and the Japan Livestock Technology Association (JLTA).

(
We believe that you have already received an invitation letter from Dr Bernard Vallat, Director General of OIE dated 10 February 2004, stating that you are requested to contact me (OIE Regional Representative for Asia and the Pacific based in Tokyo, Japan) for further information.

The above Meeting will be held at Chaophya Park Hotel and Resorts, 247 Rachadapisek Road, Dindaeng, Bangkok 10320; Tel: +66-2-290 0125, Fax: +66-2-290 0167-8, E-mail; chaopark@chaophyapark.com, from the afternoon of 26 February (Thursday) to 28 February 2004 (Saturday).

The purpose of the Meeting is to support uptake and implementation of the Joint Ministerial Statement on the Current Poultry Disease Situation in Bangkok, Thailand on 28 January 2004 and of the recommendations of the FAO/OIE/WHO Technical Consultation on the Control of Avian Influenza in Rome, Italy on 3-4 February 2004.

Copies of the tentative agenda of the Meeting and the DRAFT Information Sheet are enclosed for your information.

I suggest that you could buy your airticket (lowest cost round economy class) to and from Bangkok, Thailand, as indicated in the e-mail dated 16 February 2004 from Prof. Boyazoglu, OIE, Paris. Please inform OIE HQ of the cost of your ticket as soon as possible so that reimbursement could be made in Bangkok by the OIE HQ, Paris.

Your per diem and terminal expenses will also be paid by the OIE HQ, Paris, during the Meeting in Bangkok.

農委會動植物防疫檢疫局總收文

2004/2/20

(02)3140-4883

Please confirm your stay at Chaophya Park Hotel and Resorts in Bangkok with Dr Sermpan Soonthornchat, Thai focal point, DLD, Bangkok, Thailand (Fax: +66-2-653-4936, E-mail: dg@dld.go.th).

I look forward to seeing you in Bangkok very soon.

Yours sincerely

Teruhide Fujita
Regional Representative
OIE Regional Representation
for Asia and the Pacific
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2004/2/20

Current Status of Avian Influenza in Taiwan

Professor Tien-Jye Chang
National Chung Hsing University
Taichung, Taiwan

Introduction

Influenza occurring in avian species is named avian influenza (AI), which is caused by infection with influenza virus. The disease in avian has two forms, highly pathogenic avian influenza (HPAI) and low pathogenic avian influenza (LPAI). Most of the avian influenza virus isolates are low pathogenic. To date, all virulent strains isolated worldwide were either H5 or H7 subtype, of which most isolates were of low virulence.

The determination of the pathogenicity of AI depends on clinical signs and laboratory diagnostic tests. HPAI is a notifiable disease in Taiwan as well as to the World Organization for Animal Health (OIE). The disease may result in mortality of chickens as high as 100%. Up to now, Taiwan has not identified any case of HPAI.

Epidemiology of avian influenza in Taiwan, 2004

From January to February 2004, the weather was very cold in Taiwan. Cases of respiratory diseases resulting in the death of chickens in several chicken farms were reported. The diseases were diagnosed by the infection of disease was suspected due to the infection of Newcastle disease (ND) virus, Infectious Bronchitis (IB) virus, *E. coli* and *Staphyloccus spp.* The infection of the diseases and the chicken mortality might be due to immune depression caused by low temperature and high humidity. In addition, LPAI virus subtype H5N2 was also detected. The first case was reported in a broiler chicken farm located in Changhua prefecture on January, 2004.

According to the epidemiological studies, some clinical signs appearing on the chicken were similar to those of ND. It was found that after vaccination with live attenuated (Lasoda strain) ND vaccine, although few chickens might succumb to the infection of ND, most chicken would recover from the disease within 5-7 days. To diagnose ND, tests including pathological examination, virus

isolation, serological test and nucleic acid sequence analysis were performed in the Animal Health Research Institute (AHRI), Council of Agriculture (COA).

For the identification and subtyping of isolated AI viruses, the reverse transcription polymerase chain reaction (RT-PCR) of avian influenza viruses was performed in epizootics. Conventional serological method was also adopted. H5N2 isolates of LPAI has been detected from duck farms in Yilan and Tainan in 2002 and 2003, respectively. The low pathogenic virus isolates were identified based on the "Manual of international standard for diagnostic method" published by the OIE. Furthermore, the result of intravenous pathogenicity index test (IVPI) is 0, and identified to be non-pathogenic AIV.

Taiwan has about 5,900 chicken farms and 1,300 duck farms. Since January 2004, H5N2 isolates of LPAI along with respiratory illness were detected in 16 chicken farms in Changhua, Chiayi, Tainan, Taoyuan, Miaoli, and Nantou and 1 duck farm in Yunlin. Stamping-out policy was executed although no clinical sign of AI was observed.

Surveillance of poultry and migratory birds in Taiwan

Since 1986, the COA of this country has conducted studies on AI and surveillance of poultry. The Bureau of Animal and Plant Health Inspection and Quarantine (BAPHIQ) of the COA continued the surveillance of AI on poultry, and migratory birds were also included in the surveillance. Sample collection included fecal samples from migratory birds for virus isolation and serum samples from poultry for antibody detection. In 2003, 2,145 fecal samples from migratory birds and 40,350 serum samples from 1,419 poultry farms were tested. Up to the present, neither HPAI antibodies nor viruses have been detected. Stamping out, movement control, and disinfection of the farm where the flock was detected with LPAI were executed.

Epizootic analysis of LPAI

Poultry industry is one of the important agribusiness in Taiwan. In 2002, consumption of chickens and ducks has reached 377,522,000 and 31,012,000, respectively. High density of poultry farms, cross contamination of transportation vehicles and migratory or domestic birds carrying the AI virus may cause the virus transmission. When an influenza virus is first introduced

into a new host, it may undergoes a period of evolutionary change. Numerous changes of HA gene may due to immunological selection. A typical case was found in Mexico 1994~1995: the LPAI in waterfowls and transmitted to chicken to cause a huge damage in poultry production.

Diagnosis

The major diagnosis methods used include pathological examination, virus isolation, serological test (HI test), and nucleic acid sequence analysis. The serum samples were processed for hemagglutination inhibition (HI) test, and the swab or fecal samples for virus isolation through inoculation of 9-11 days' embryonated SPF fowl eggs. Whenever the virus was harvested, a hemagglutination (HA) test was operated. The positive reactors were further identified by the method of HI and RT-PCR. The AI isolates were further subtyped by serological method and RT-PCR. Finally, the methods of IVPI and sequence analysis were further operated to differentiate the LPAI virus from HPAI virus.

From the results of all the tests, all the isolates of AI in Taiwan identified are LPAI virus with serotype of H5N2.

Future plan for the Control of AIV in Taiwan

No AI vaccine is permitted to be used in poultry in Taiwan. The serological surveillance of AIV in the poultry will be continued with higher frequency of sampling. The fecal samples of migratory birds and isolation of AI virus will also be processed continuously.

Conclusion

A recent detection of avian influenza in Taiwan was due to low pathogenic AI infection and its serotype is H5N2. Although H5N2 avian influenza virus was detected, it was not the primary causative agent of the disease of chicken based on the pathological findings and the laboratory diagnosis.

All of the isolates detected were low pathogenic avian influenza virus (LPAI) and recognized as the same strain. Respiratory diseases are the most common diseases of chickens influenced greatly by cold weather in winter and

early spring in Taiwan. The weather in January and February 2004 was very cold in Taiwan, resultingin the occurrence of respiratory disease in chickens.

Co-infection of other pathogens, included ND and IB virus, the H5N2 LPAI virus was found in many cases. It is presumed that the immunity of chicken was reduced by infection of viruses other than AI virus and thus predispose the chicken with chronic respiratory disease and colibacillosis when the temperature changes. Based on the laboratory results, most of the chickens were mainly killed by the chronic respiratory diseases and colibacillosis.

For the prevention of the spread of LPAI, several farms detected with the H5N2 AI virus were found by active surveillance and all chickens in the positive reactor farms were stamped out.

Current status of Avian Influenza in Taiwan

Professor Tien-Jye Chang
College of Veterinary Medicine
National Chung Hsing University
Taiwan

Taiwan remains HPAI-free status

- OIE designates HPAI as a notifiable disease but not LPAI. For LPAI, each country can adopt its own prevention measures based on the appropriate level of protection set by the country.
- Taiwan set a high level of protection and adopted stamping out policy in order to prevent the existence of LPAI virus.

2

Epidemiology

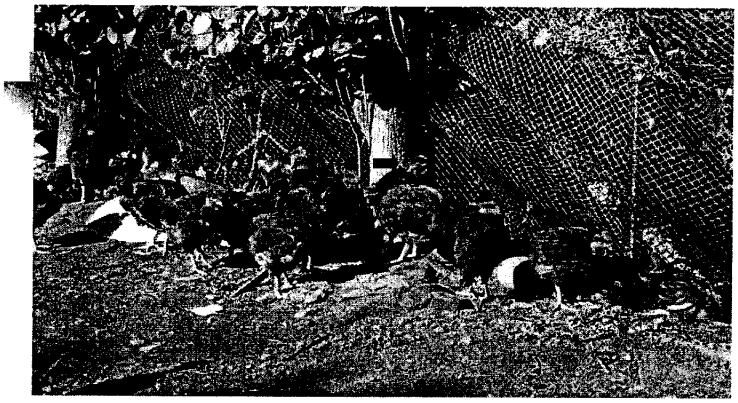
- Early January of 2004
- Low temperature and high humidity
- Chicken: broiler & native chicken
- Clinical syndromes: respiratory disorder
- Vaccination with live attenuated ND vaccine (Lasoda strain)

3

Diagnosis

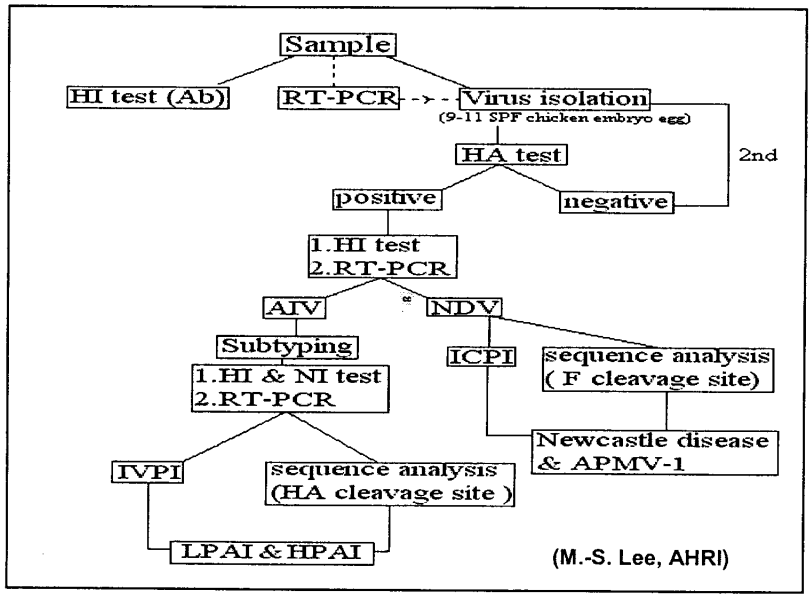
- Pathological Examination
- Virus Isolation
- Serological Test – HI test
- Nucleic Acid Sequence Analysis

4



Depression and gasping were found in the six-week-old native chickens.

5



Identification of avian influenza virus

- Conventional serological method – HI test
- RT-PCR with specific primers for differentiation the subtype of AIV
- Sequence analysis of the PCR product
- Intravenous pathogenicity index (IVPI)

7

Conventional serological method

- Antisera against H1-H15 subtypes obtained either from Dr. R.G. Webster or Dr. H. Kida
  - Animal Health Research Institute, COA
- Hemagglutination inhibition test performed in microtiter plates

8

Subtype differentiation of AIV

- A quick method for AIV subtype differentiation
- Conserved sequences of nucleoprotein gene of AIV
- RT-PCR with specific primers
- M.-S. Lee *et al.* / Journal of Virological Methods 97 (2001) 13-22.

9

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Journal of Virological Methods 97 (2001) 13–22

Journal of Virological Methods

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Identification and subtyping of avian influenza viruses by reverse transcription-PCR

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[b] *National Institute of Animal Health, Council of Agriculture, Taipei, Taiwan*
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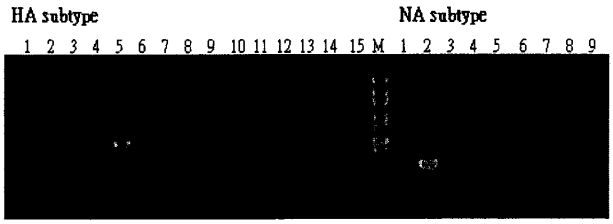
Received 6 November 2000; received in revised form 5 March 2001; accepted 7 March 2001

Abstract

Avian influenza viruses have 15 different hemagglutinin (HA) subtypes (H1–H15). We report a procedure for the identification and HA-subtyping of avian influenza virus by reverse transcription-PCR (RT-PCR). The avian influenza virus is identified by RT-PCR using a set of primers specific to the nucleoprotein (NP) gene of avian influenza virus. The HA-subtypes of avian influenza virus were determined by running simultaneously 15 RT-PCR reactions, each using a set of primers specific to one HA-subtype. For a single virus strain or isolate, only one of the 15 RT-PCR reactions will give a product of expected size, and thus the HA-subtype of the virus is determined. The result of HA-subtyping was then confirmed by sequence analysis of the PCR product. A total of 80 strains or isolates of avian influenza viruses were subtyped by this RT-PCR procedure, and the result of RT-PCR gave an excellent (100%) correlation with the result of the conventional serological method. The RT-PCR procedure we developed is rapid and sensitive, and could be used for the identification and HA-subtyping of avian influenza virus in organ homogenates.

Keywords: Avian influenza virus; Hemagglutinin; Subtype; Reverse transcription-polymerase chain reaction (RT-PCR)

Avian influenza (Chicken isolate, RT-PCR results)



(M.-S. Lee, AHRI)

11

Epizootics of LPAI in Taiwan

- Seasonal change
- Newcastle disease
- Infectious bronchitis
- Chronic respiratory disease
- Bacterial infection

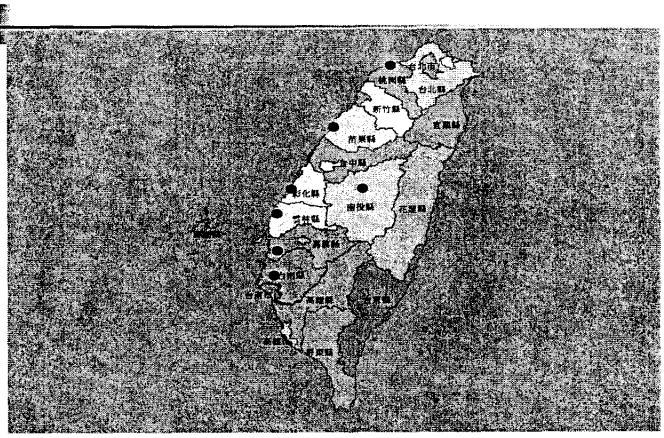
12

Poultry detected

- Chicken: broiler, layer, native
- Duck
- Pheasant

13

Prefectures detected



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Phylogenetic analysis

- Sequence analysis of the RT-PCR products
- Correlation between sequences of isolates and their amino acids in NP gene products

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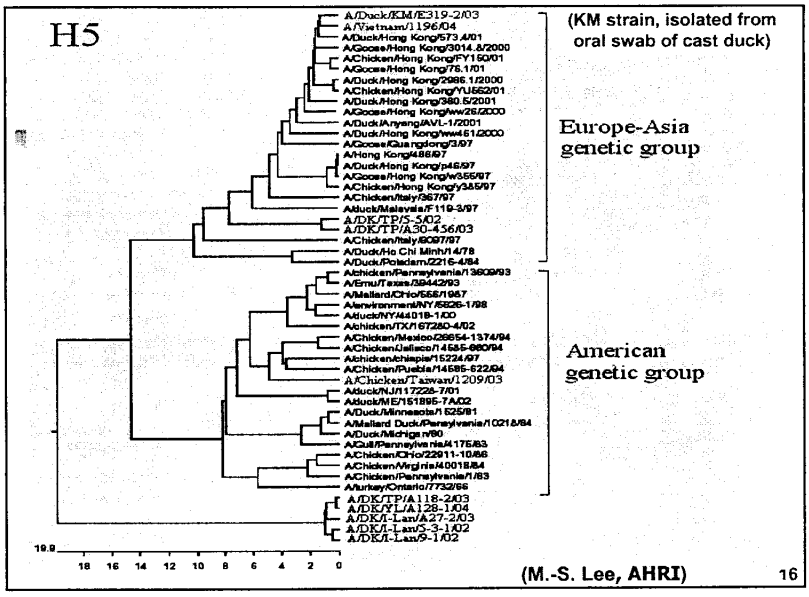

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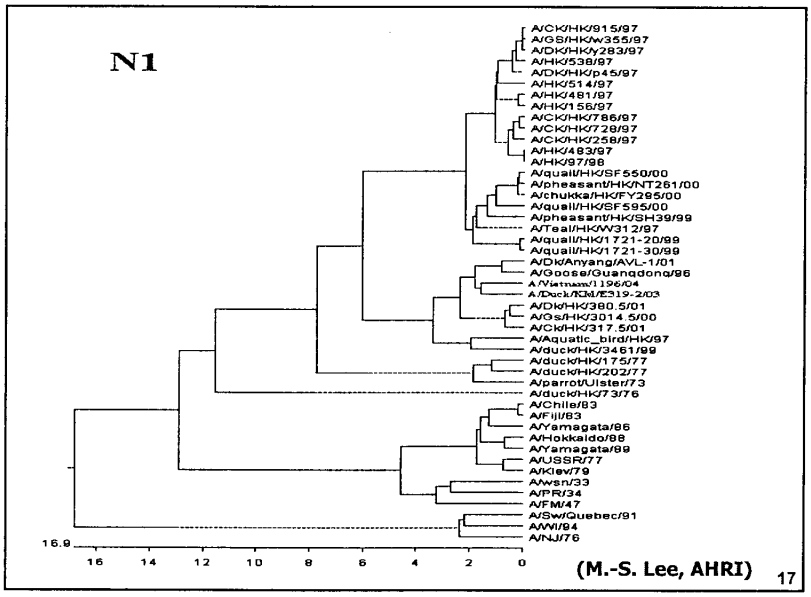
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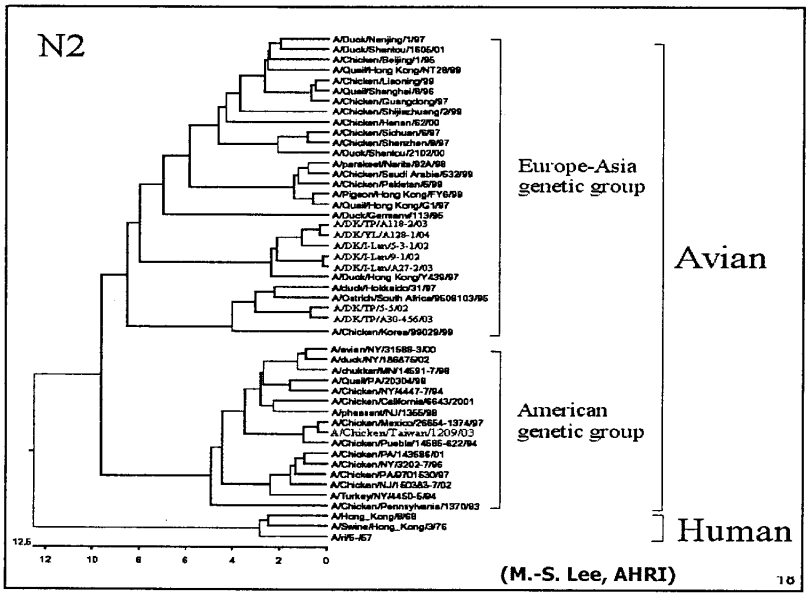
A/DK/HK/p45/97
A/HK/514/97
A/HK/481/97
A/HK/156/97
A/CK/HK/786/97
A/CK/HK/728/97
A/CK/HK/258/97
A/HK/483/97
A/HK/97/98
A/quail/HK/SF550/00
A/pheasant/HK/NT261/00
A/chukka/HK/FY285/00
A/quail/HK/SF595/00
A/pheasant/HK/SH39/99
A/Teal/HK/W312/97
A/quail/HK/1721-20/99
A/quail/HK/1721-30/99
A/Dk/Anyang/AVL-1/01
A/Goose/Guangdong/96
A/Vietnam/1196/04
A/Duck/KM/E319-2/03
A/Dk/HK/380.5/01
A/Gs/HK/3014.5/00
A/Ck/HK/317.5/01
A/Aquatic_bird/HK/97
A/duck/HK/3461/99
A/duck/HK/175/77
A/duck/HK/202/77
A/parrot/Ulster/73
A/duck/HK/773/76
A/Chile/83
A/Fiji/83
A/Yamagata/86
A/Hokkaido/98
A/Yamagata/99
A/USSR/77
A/Kiev/79
A/wsn/33
A/PR/34
A/FM/47
A/Sw/Quebec/91
A/WI/94
A/NJ/76
16.9
16 14 12 10 8 6 4 2 0
(M.-S. Lee, AHRI)
17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A/Quail/Shanghai/8/96
A/Chicken/Guangdong/97
A/Chicken/Shijiezhuang/2/99
A/Chicken/Henan/6/200
A/Chicken/Sichuan/6/97
A/Chicken/Shenzhen/8/97
A/Duck/Shantou/2102/00
A/parakeet/Narita/92A/98
A/Chicken/Saudi Arabia/532/99
A/Chicken/Pakistan/5/99
A/Pigeon/Hong Kong/FY6/99
A/Quail/Hong Kong/G1/97
A/Duck/Germany/113/95
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A/DK/YL/A128-1/04
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A/DK/I-Lav/A27-2/03
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A/Ostrich/South Africa/9509103/95
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A/chukker/MN/14591-7/98
A/Quail/PA/20304/98
A/Chicken/NY/4447-7/94
A/Chicken/California/6643/2001
A/pheasant/NJ/1355/98
A/Chicken/Mexico/26854-1374/97
A/Chicken/Taiwan/1209/03
A/Chicken/Puebla/14686-422/94
A/Chicken/PA/143686/01
A/Chicken/NY/9202-7/96
A/Chicken/PA/27015-30/97
A/Chicken/NJ/160383-7/02
A/Turkey/NY/4450-5/94
A/Chicken/Pennsylvania/1370/83
A/Hong_Kong/8/68
A/Swine/Hong_Kong/9/76
A/H5-457
12.5
12 10 8 6 4 2 0
Europe-Asia genetic group
American genetic group
Avian
Human
(M.-S. Lee, AHRI)
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HA cleavage site amino acid sequences (H5)

HPAI	P Q R E - - - - T R G L F (350)	Majority
+	P Q R E R R R K - R G L F	A/duck/KM/E319-2/03
+	P Q R E R R R K K R G L F	A/Vietnam/1196/04
+	P Q R E R R K K - R G L F	A/Duck/Hong Kong/573.4/01
+	P Q R E R R R K K R G L F	A/Hong Kong/481/97
+	P Q R E R R R K K R G L F	A/Chicken/Hong Kong/y385/97
+	P Q R E R R R K K R G L F	A/Goose/Guangdong/3/97
+	P Q R - - R R K K R G L F	A/Chicken/Italy/367/97
+	P Q R E T R R Q K R G L F	A/tern/South Africa/61
-	P Q R E - - - - T R G L F	A/duck/Malaysia/F119-3/97
-	P Q K E - - - - T R G L F	A/Chicken/Italy/9097/97
-	P Q R E - - - - T R G L F	A/Duck/Ho Chi Minh/14/78
-	P Q R E - - - - T R G L F	A/turkey/England/N28/73
-	P Q R E - - - - T R G L F	A/duck/NY/44018-1/00
-	P Q R E - - - - T R G L F	A/Duck/Minnesota/1525/81
-	P Q R E - - - - T R G L F	A/Mallard/Ohio/556/1987
-	P Q R E - - - - T R G L F	A/Chicken/Mexico/31381-Avilab/94
+	H Q R K - - - - K R G L F	A/Chicken/Pennsylvania/1/83
+	P Q R K R - - K T R G L F	A/Chicken/Queretaro/14588-19/95
+	P Q R K R - - K T R G L F	A/Chicken/Puebla/8623-607/94
-	P Q R K - - - - T R G L F	A/chicken/Pennsylvania/13609/93
-	P Q R E - - - - K R G L F	A/chicken/Taiwan/1209/03

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HA cleavage site amino acid sequences (Taiwan isolates)

P Q R E K R* G L F G A I A G

340 350

P Q R E K R G L F G A I A G	A/CK/CH/1209/03
P Q R E K R G L F G A I A G	A/CK/CY/A127-5/04
P Q R E K R G L F G A I A G	A/CK/CY/0109/04
P Q R E K R G L F G A I A G	A/CK/TN/0110/04
P Q R E K R G L F G A I A G	A/CK/CY/A132-2/04
P Q R E K R G L F G A I A G	A/CK/TN/0111/04
P Q R E K R G L F G A I A G	A/CK/TN/0115/04
P Q R E K R G L F G A I A G	A/CK/TY/0116/04
P Q R E K R G L F G A I A G	A/CK/ML/0117/04
P Q R E K R G L F G A I A G	A/CK/NT/0118/04
P Q R E K R G L F G A I A G	A/CK/NT/0120/04
P Q R E K R G L F G A I A G	A/CK/NT/0121/04
P Q R E K R G L F G A I A G	A/CK/CH/0124/04
P Q R E K R G L F G A I A G	A/CK/TN/0128/04
P Q R E K R G L L G A I A G	A/CK/CH/A135/04
P Q R E K R G L F G A I A G	A/Swinhoe's Blue Pheasant/TN/0201/04
P Q R E K R G L F G A I A G	A/CK/TN/0204/04
P Q R E K R G L F G A I A G	A/CK/CH/A137/04
P Q R E K R G L F G A I A G	A/CK/TN/0206/04

(M.-S. Lee, AHRI)

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Comparison H5 gene of AIV isolated in Taiwan

Percent identity

Divergence

2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
99.0	99.1	98.8	99.0	98.8	99.1	99.1	99.0	98.2	98.9	99.0	98.9	98.8	99.5	99.0	99.1	98.8	98.4	1 A/CK/CH/1209/03
	99.7	99.4	99.7	99.4	99.6	99.6	99.6	98.8	99.5	99.7	99.5	99.4	98.9	99.7	99.3	99.4	98.1	2 A/CK/CY/A127-5/04
0.3		99.4	99.8	99.4	99.7	99.7	99.7	98.7	99.6	99.7	99.5	99.5	98.9	99.7	99.3	99.4	98.1	3 A/CK/CY/0109/04
0.3	0.3		99.4	99.1	99.3	99.3	99.3	98.4	99.3	99.4	99.2	99.2	98.5	99.4	99.0	99.1	97.8	4 A/CK/TN/0110/04
0.3	0.2	0.3		99.5	99.6	99.6	99.6	98.6	99.5	99.7	99.5	99.4	98.8	99.7	99.3	99.4	98.1	5 A/CK/CY/A132-2/04
0.6	0.6	0.6	0.5		99.3	99.3	99.3	98.5	99.4	99.5	99.3	99.3	98.5	99.7	99.0	99.2	97.8	6 A/CK/TN/0111/04
0.4	0.3	0.4	0.4	0.7		99.7	99.5	98.7	99.5	99.6	99.4	99.4	98.9	99.6	99.3	99.3	98.1	7 A/CK/TN/0115/04
0.4	0.3	0.4	0.4	0.7	0.3		99.5	98.7	99.5	99.6	99.4	99.4	98.9	99.6	99.3	99.3	98.1	8 A/CK/TY/0116/04
0.4	0.3	0.4	0.4	0.7	0.5	0.5		98.6	99.5	99.6	99.4	99.4	98.8	99.6	99.2	99.3	98.1	9 A/CK/ML/0117/04
1.4	1.3	1.4	1.4	1.5	1.3	1.3	1.4		98.6	98.8	98.8	98.7	98.0	98.8	98.5	98.6	99.0	10 A/CK/NT/0118/04
0.5	0.4	0.5	0.5	0.6	0.5	0.5	0.5	1.4		99.7	99.5	99.4	98.7	99.7	99.2	99.4	98.0	11 A/CK/NT/0120/04
0.3	0.3	0.3	0.3	0.5	0.4	0.4	0.4	1.3	0.3		99.6	99.5	98.8	99.8	99.3	99.5	98.1	12 A/CK/NT/0121/04
0.5	0.5	0.5	0.5	0.7	0.6	0.6	0.6	1.3	0.5	0.4		99.8	98.6	99.6	99.4	99.8	98.0	13 A/CK/CH/0124/04
0.5	0.5	0.5	0.5	0.7	0.6	0.6	0.6	1.3	0.5	0.4	0.1		98.6	99.5	99.4	99.7	97.9	14 A/CK/TN/0128/04
0.9	0.8	0.9	0.9	1.1	0.8	0.8	0.9	1.7	1.0	0.9	1.0	1.0		98.8	98.9	98.5	98.2	15 A/CK/CHA135/04
0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	1.3	0.3	0.2	0.4	0.4	0.9		99.3	99.5	98.1	16 A/Swinhoe's Blue Pheasant/TN/0201/04
0.7	0.7	0.7	0.7	1.0	0.7	0.7	0.8	1.5	0.9	0.7	0.6	0.6	0.8	0.7		99.3	98.0	17 A/CK/TN/0204/04
0.6	0.6	0.6	0.6	0.8	0.7	0.7	0.7	1.4	0.6	0.5	0.2	0.2	1.1	0.5	0.7		97.8	18 A/CK/CHA137/04
1.7	1.6	1.7	1.7	2.0	1.6	1.6	1.7	0.7	1.8	1.7	1.8	1.8	1.8	1.7	1.8	1.9		19 A/CK/TN/0206/04
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	

(M.-S. Lee, AHRI) 21

Comparison N2 gene of AIV isolates in Taiwan

Percent identity

Divergence

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
	99.6	99.4	99.5	99.1	99.2	98.9	99.1	99.3	97.9	98.9	99.0	99.0	99.2	99.7	99.4	99.0	99.1	98.2	1 A/CK/CH/1209/03
0.4		99.6	99.8	99.4	99.5	98.9	99.3	99.6	98.1	99.1	99.3	99.3	99.5	99.4	99.7	99.0	99.4	98.4	2 A/CK/CY/A127-5/04
0.6	0.4		99.7	99.5	99.3	98.9	99.2	99.4	98.0	99.1	99.1	99.2	99.4	99.4	99.6	98.9	99.4	98.2	3 A/CK/CY/0109/04
0.5	0.2	0.3		99.5	99.4	99.0	99.4	99.5	98.1	99.2	99.2	99.4	99.6	99.5	99.8	99.1	99.5	98.3	4 A/CK/TN/0110/04
0.5	0.2	0.1	0.1		99.1	99.0	99.4	99.1	98.1	99.2	99.2	99.0	99.2	99.1	99.4	99.1	99.1	98.3	5 A/CK/CY/A132-2/04
0.7	0.4	0.6	0.5	0.5		99.1	99.0	99.6	98.1	99.4	99.4	99.5	99.3	99.2	99.6	98.9	99.2	98.2	6 A/CK/TN/0111/04
0.6	0.6	0.7	0.6	0.6	0.6		99.4	99.0	98.6	99.5	99.3	98.9	98.7	99.1	99.1	99.4	98.6	98.4	7 A/CK/TN/0115/04
0.5	0.4	0.4	0.3	0.3	0.6	0.6		99.1	98.5	99.4	99.4	98.9	99.1	99.1	99.3	99.4	99.0	98.6	8 A/CK/TY/0116/04
0.6	0.4	0.6	0.4	0.4	0.4	0.6	0.5		98.2	99.3	99.3	99.4	99.2	99.1	99.4	98.8	99.1	98.2	9 A/CK/ML/0117/04
1.7	1.5	1.6	1.4	1.4	1.6	1.4	1.4	1.5		98.6	98.4	98.1	97.8	97.9	98.1	98.2	97.7	98.3	10 A/CK/NT/0118/04
0.7	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.4	1.4		99.6	99.3	99.1	98.9	99.3	99.1	99.0	98.4	11 A/CK/NT/0120/04
0.6	0.4	0.6	0.4	0.4	0.3	0.7	0.6	0.4	1.6	0.4		99.1	99.1	98.9	99.3	99.1	99.0	98.5	12 A/CK/NT/0121/04
0.9	0.6	0.7	0.6	0.6	0.5	0.8	0.6	0.6	1.5	0.4	0.5		99.6	99.0	99.4	98.6	99.4	97.8	13 A/CK/CH/0124/04
0.8	0.5	0.6	0.4	0.4	0.6	0.9	0.6	0.7	1.7	0.5	0.6	0.3		99.2	99.6	98.8	99.6	97.9	14 A/CK/TN/0128/04
0.3	0.6	0.8	0.5	0.5	0.7	0.5	0.5	0.8	1.7	0.7	0.8	0.9	0.8		99.6	99.1	99.1	98.2	15 A/CK/CHA135/04
0.6	0.3	0.4	0.2	0.2	0.3	0.5	0.4	0.5	1.5	0.3	0.4	0.5	0.4	0.4		99.1	99.6	98.4	16 A/Swinhoe's Blue Pheasant/TN/0201/04
0.6	0.6	0.7	0.6	0.6	0.7	0.6	0.6	0.8	1.7	0.8	0.9	0.9	0.9	0.5	0.5		98.7	98.5	17 A/CK/TN/0204/04
0.9	0.6	0.8	0.5	0.5	0.7	0.9	0.6	0.9	1.8	0.6	0.6	0.5	0.4	0.9	0.4	0.9		97.9	18 A/CK/CHA137/04
1.4	1.3	1.5	1.4	1.4	1.4	1.5	1.4	1.4	0.6	1.6	1.5	1.7	1.7	1.4	1.3	1.5	1.7		19 A/CK/TN/0206/04
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	

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Intravenous pathogenicity test (IVPI)

- Strain: A/Chicken/Taiwan/1209/03
- Challenge room: category 3 high security animal facility
- Inoculation: 0.2 ml of the diluted virus (1:10) intravenously into each of 10 six-week-old SPF chickens.
- Result: IVPI = 0.0, Non-Pathogenic AI

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LPAI vs. HPAI

The Intravenous Pathogenicity Index (IVPI)

Clinical signs	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Total	Score
Normal	10	10	10	10	10	10	10	10	10	10	100x0	0
Sick	0	0	0	0	0	0	0	0	0	0	0 x1	0
Paralyzed	0	0	0	0	0	0	0	0	0	0	0 x2	0
Dead	0	0	0	0	0	0	0	0	0	0	0 x3	0
Total	10	10	10	10	10	10	10	10	10	10	**IVPV**	0

OIE criteria: Any influenza virus that is lethal for 6, 7 or 8, 4-8 week-old susceptible chickens within 10 days following intravenous inoculation with 0.2 ml of a 1/10 dilution of a bacteria-free, infective allantoic fluid.

IVPI examples	
Highly pathogenic	200 – 300
Intermediate	100 – 200
Non-pathogenic	< 100

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Surveillance of poultry

- Serological survey: no H5 or H7 subtype antibody was found until 2002.
  - chicken, duck and goose serum samples were tested.
- AIV isolation: Many H subtypes of AIV except H5 and H7 were isolated until 2002.
  - tracheal and fecal swabs were collected from chicken and waterfowl flocks.

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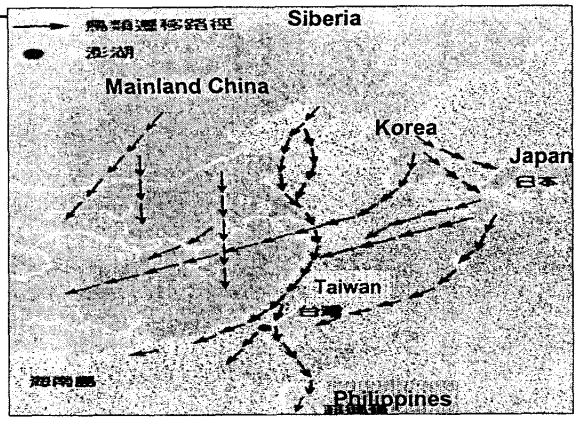
Map of bird migration routes in east Asia



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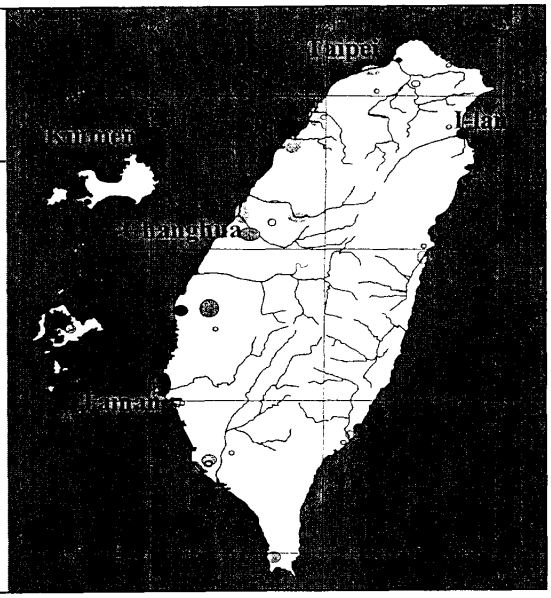
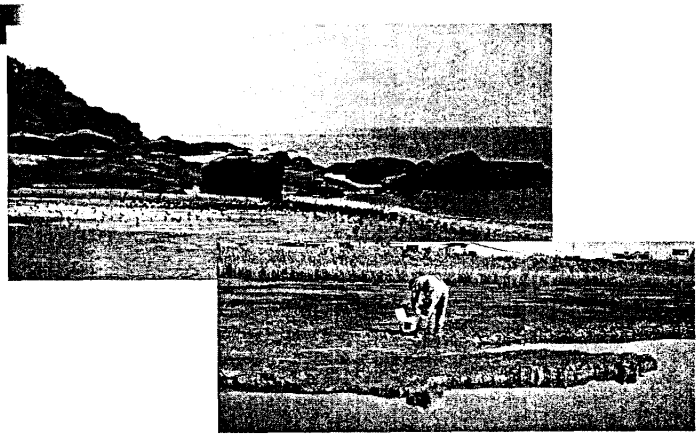
Migratory Waterfowl Surveillance Sample Collection Sites



Fecal sample collection from migratory bird pool



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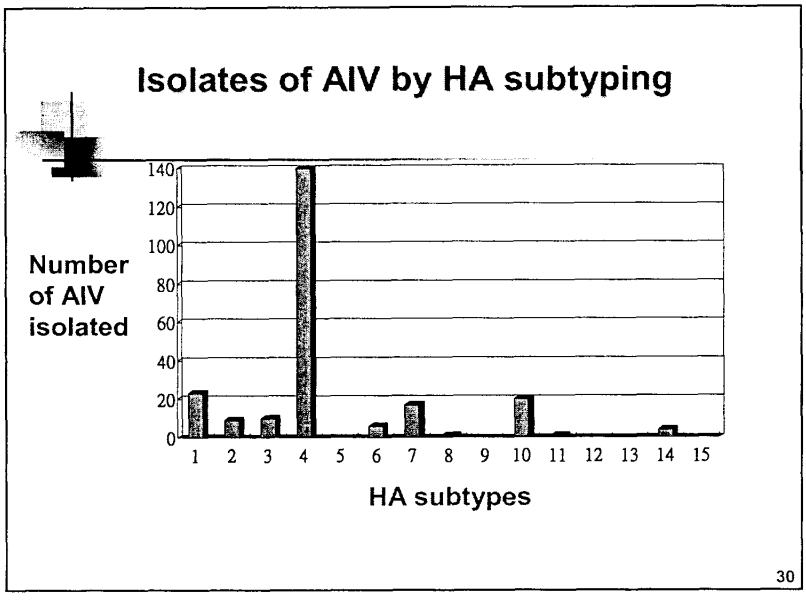
Time	No. samples	No. Isolates (%)	No. substypes	Subtypes
1998/2-1998/4	906	13 (1.4)	1	H1N3
1998/9-1999/4	2,134	163 (7.6)	10	H1N1, H1N3, H2N3, H3N8, H4N2, H4N6, H4N7, H4N8, H7N1, H10N7
1999/8-2000/7	1,831	36 (2.0)	8	H1N1, H4N6, H6N1, H7N1, H8N4 ,H10N4, H11N9, H14N7
2000/8-2001/3	1,427	3 (0.2)	1	H7N1
2001/10-2002/5	2,781	9 (0.3)	3	H4N6, H4N8, H10N4
2002/9-2003/6	2,888	8 (0.3)	5	H4N6, H3N8, H6N2, H3N6, H6N1,
2003/8-2004/1	2,006	3(0.15)	2	H11N9, H10N3
Total	13,973	235 (1.6)	18	



Epizootic analysis of LPAI

- H5N2 isolates of LPAI have been detected from duck farms in Yilan and Tainan in 2002 and 2003, respectively.
  - The ducks were stamped out.
- Cross contamination of mechanical transmission
- Invasion of migratory or domestic birds.
- High density of poultry farm.

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Future plan for the Control of AIV in Taiwan

- No vaccine is permitted in poultry.
- Continuous serological surveillance of AIV in the poultry.
- Continuous sampling of the fecal samples of migratory birds and isolation of AIV.

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Conclusions

- A recent outbreak of avian influenza in Taiwan was due to low pathogenic AIV infection and its serotype is H5N2.
- The H5N2 avian influenza virus was obviously not the primary causative agent of the disease based on the pathological findings.
- All of the isolates were low pathogenic avian influenza virus (LPAI) and recognized as the same strain.
- Respiratory disease is the most common disease of chickens influenced greatly by cold weather in winter in Taiwan.

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Conclusions

- Co-infection of other viruses with H5N2 LPAI was found in many cases.
- The immune system of chicken is damaged by other viruses which predispose the chicken with chronic respiratory disease and colibacillosis when the temperature changes.
- We believe that most of the chickens were killed by the complication of chronic respiratory disease and colibacillosis.
- Active surveillance of AI will be proceeded continuously and the stamping out policy is operated.

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附錄二

1. 會議議程
2. 與會國家報告與專家報告資料

FAO/OIE Emergency Regional Meeting on Avian Influenza Control in Animals in Asia, Bangkok, Thailand, 26-28 February 2004

Organisers: FAO, OIE, Government of Thailand (Ministry of Agriculture and Cooperatives Thailand) in collaboration with WHO

Sponsors: FAO, OIE, Government of Thailand (Ministry of Agriculture and Cooperatives Thailand), and JLTA (Japanese Livestock Technology Association)

Meeting place: **Sofitel Central Plaza Bangkok**
1695 Phaholyothin Rd,
Chatuchak, Bangkok 10900 Thailand
Tel: +66 (0) 2541 1234 **Fax:** +66 (0) 2541 1087
Email: scp@chr.co.th, centel@chr.co.th
Website: www.centralhotelsresorts.com

Programme

Thursday, 26 February 2004
11:00-13:00: **Registration**

Opening Session;

Chair: Dr Samuel Jutzi, Director, Animal Production and Health Division, FAO

13:00-14:00:
- Address by WHO: Dr Francois Meslin, Coordinator Zoonoses, Foodborne diseases and Kinetoplastidae (ZFK), CDS/CPE
- Address by FAO: Dr. Changchui He, FAO Assistant Director-General / Regional Representative, Asia and Pacific
- Address by OIE: Dr Bernard Vallat, Director-General
- Opening address by H.E. Mr Newin Chidchob, Deputy-Minister of Agriculture and Cooperatives, Government of Thailand

14:00-14:30 Coffee break

Session I: Situation in participating countries

Countries where the disease has been reported: a written report will be prepared in advance by each country and presented at the meeting: 10 minutes presentation and 5 minutes discussions.

14-30- 17:15

Chairperson: Dr. Karim BenJebara, OIE
Rapporteur: Dr. Hans Wagner, FAO

- Cambodia (14:30 – 14:45)
- P. R. China (14:45 – 15:00)
- Indonesia (15:00 – 15:15)
- Japan (15:15 –15:30)
- RO Korea (15:30 – 15:45)
- Lao PDR (15:45 –16:00)
- Pakistan (16:00 – 16:15)
- Thailand (16:15 –16:30)
- Vietnam (16:30 – 16:45)
- Other reports (16:45 – 17:15) TAIWAN Hong Kong

18:30 – 20:30 Dinner hosted by the Government of Thailand

Friday, 27 February 2004

08:30 – 09:30

Chairperson: Dr. Barry O' Neil, CVO, New Zealand,
Rapporteur: Dr. Emmanuelle Guerne Bleich, FAO

Declared non-infected countries: Report on preventive measures; a written summary is to be prepared and submitted in advance by each country. Presentations are to be of 5 minutes duration.

- Australia
- Bangladesh
- Brunei
- Bhutan
- D.P.R. Korea
- India
- Malaysia
- Myanmar
- Nepal
- New Zealand
- Philippines
- Singapore
- Sri Lanka
- Timor Leste

Session II: Specific issues

Chairperson: Dr. Joseph Domenech, FAO
Rapporteur: Dr. Dewan Sibartie, OIE

09:30 - 16:00 (Presentation and Questions & Answers session)

- 09:30 – 09:55 Quality of Veterinary Services — Dr. Bernard Vallat, OIE
- 09:55 – 10:25 Surveillance, Diagnosis and Biosecurity and Research — Dr. Juan Lubroth, FAO

10:25 – 11:00 Coffee break

- 11:00 –11:20 Disease Notification — Dr. Karim BenJebra, OIE
- 11:20 –11:50 Human Health Issues — WHO

11:50 – 13:30 Lunch

Chairperson: Dr. Bernard Vallat, OIE
Rapporteur: Dr. John Edwards , SEAFMD

- 13:30 – 13:50 Welfare aspects and carcass disposal — Dr. John Galwin, OIE
- 13:50 –14:15 Vaccine and Vaccination — Dr. Veronique Jestin
- 14:15 –14:35 Trade issue, sanitary and food safety aspects — Dr. Dewan Sibartie, OIE

14:35 – 15:00 Coffee break

Chairperson: Dr. Rafaqat Hussain Raja, CVO, Pakistan,
Rapporteur: Dr. Subash Morzaria, FAO

- 15:00 – 15:30 Economic issue including trade — Dr. Anni McLeod, FAO,
- 15:30 –16:00 Rehabilitation post crisis — Dr. E. Guerne Bleich, FAO

Session III: Possible Strategies

Chairperson: Dr. Teruhide Fujita, OIE
Rapporteur: Dr. Juan Lubroth, FAO

16:00 – 17:30 (Presentation and Questions & Answers session)

- 16:00 – 16:20 Presentation of the conclusions of the E-Forum (Criteria, feasibility, cost, capacity building, communication) — Dr. Joseph Annelli, USA
- 16:20 – 17:30 General discussions

Official reception offered by OIE

Saturday 28 February 2004

Session III (continuing): Possible Strategies

Chairperson: Dr. Gardner Murray, CVO, Australia,

Rapporteur: Dr. Anni McLeod, FAO

- 08:30 – 10:30 Proposed strategies by country (divided into groups?)

10:30 – 11:00 Coffee break

- 11:00 – 11:15 Conclusion

Session IV: Regional and international coordination and donors' views

Chairperson: Dr. Samuel Jutzi, FAO
Rapporteur: Dr. Teruhide Fujita, OIE

- 11:15 – 11:35 Networking and GF TADs — Dr. Joseph Domenech, FAO
- 11:35 – 11:55 Presentation by FAO Regional Office, — Dr. Hans Wagner, FAO

11:55 –13:30 Lunch

- 13:30–13:50 Presentation by OIE Regional Office Dr. Teruhide Fujita
- 13 50- 14:10 Presentation by WHO Regional Office
- 14:10-17:00 Donors' views for 5 to10 minutes each:

ASEAN
SAARC
ADB
EC
World Bank

15:00 – 15:20 Coffee break

Australia
Belgium
Canada
France
Germany
Italy
Japan
New Zealand
The Netherlands
Norway
Sweden
Switzerland
USA

Session V: Conclusions and recommendations

Chairperson: Dr. Bernard Vallat, OIE
Rapporteur: Dr. Joseph Domenech, FAO

- 17: 00 Presentation and adoption by the meeting 1/2 hr
- 17 :30 Press Conference

Closing Session

Opening Speech by
Mr. Newin Chidchob
Deputy Minister of Agriculture and Cooperatives
For the Emergency Regional Meeting on the Control of
Avian Influenza in Animals in Asia
26-28 February 2004
at the Sofitel Central Plaza Hotel,
Bangkok, Thailand

Distinguished representatives from the Food and Agriculture Organization of the United Nations (FAO),
Director General of the International Office of Epizooties (OIE),
Representatives from the World Health Organization (WHO),
And all specialists,

I am pleased and honoured to be present at a meeting of such great importance, and would like to take this opportunity to thank the Food and Agriculture Organization and the International Office of Epizooties who have recognized the significance of the Avian Influenza problem, and agreed with Thailand to jointly host the technical meeting between the 26th – 28th February 2004 here in Bangkok.

On the 28th of January 2004, Thailand had hosted a 12-nation Agriculture and Public Health Ministerial Meeting. It is currently evident from the spread of Avian Influenza and the economic, trade, and social repercussions, that the problem is not merely regional, but has become a global and multi-faceted problem involving animal health, human health, food security, the economy and society. Even countries that are not facing an

infection problem domestically have had to experience the adverse impacts of the disease indirectly. For example, they have had to employ protective measures to ensure that the virus would not spread into their country, and implement import control measures of poultry and poultry products, which in turn affected their population's food security status, both quantity-wise and price-wise.

Present production for chicken and chicken products amount up to 48 million tons a year, and of this production, 6 million tons are traded internationally. The Avian Influenza crisis in Asia and North America has seriously affected the poultry trade, reducing it by 3.5 million tons and increasing the world price of chicken by 50%. This has had a great effect on the food security of many countries importing poultry products.

Thailand had never experienced the spread of Avian Influenza up until last months. Over this period, we have taken measures which have effectively eliminated most of the problems with regards to the spread of the epidemic, and the government is currently undergoing active surveillance on the situation. The most important consideration right now is the formulation of a strategy for the future development of poultry farming that ensures FAO's policies on food safety and food security. The strategies can be summarized as follows:

1) Ensuring public awareness: Informing and educating the public about Avian Influenza, and protecting and ensuring the health and safety of consumers is essential during the spread of the disease in order to prevent panic and misunderstandings by the public, which can eventually create

drastic economic and social effects both in the long term and the short term. Keeping the farmers and producers informed is just as important. They need to be kept notified about the extent of the spread of the disease, movement control of poultry, and techniques and sanitary measures that should be implemented for their own safety, and those that need to be implemented to prevent the spread of the disease.

2) The Thai government places great emphasis on the utilization of new technology and bio-security methods for the recuperation and development of the poultry farming system: Like many other developing countries, Thailand has various poultry farming systems ranging from commercialized farming to small-scale farming for household consumption. Therefore, concept of a bio-security system featuring technology that compartmentalizes farming is an important strategy. In order to realize this bio-security goal, Thailand has come up with long-term strategy for systematic poultry farming as follows:

2.1) Categorize farming standards into 3 levels. The first one being large, commercialized farming, second being medium-level commercialized farming, and the third being small-scale farming. The farms can be categorized according to their risk levels with regards to the intuition of a disease. This can be deduced from the given the surrounding environment, population in the area, measures being to avoid the spread of the disease, animal health services available, and movement control of poultry. The government will support with financial animal package to various farmers to improve the infrastructure. Of their farms, and provides standard certification for products from farms that have achieved the set benchmarks and standards

2.2) Establishing an early warning system by capacity building of the Department of Livestock Development to surveillance in areas of high risk, to control movement and transportation of poultry in order to prevent the spread of the disease, and to perform frequent random tests and sampling from farms.

2.3) Registration and stricter controls are going to be a requirement for the breeding of native chickens as pets. Since this kind of poultry if often transported, stricter controls include frequent, regular health checks to avoid the spread of diseases through these animals.

3) Thailand will develop research and development technology in collaboration with international organizations and involved countries, in order to develop guidelines in the prevention of the disease in the future, both in terms of disease diagnosis, risk assessment, and future preventive measures.

4) Restructure of the poultry trading will be introduced to the processing factories and local poultry market to ensure modern sanitation and promote the change of processing to increase cooked items in the future.

5) The government will establish a mechanism to compensate poultry farmers who have been adversely affected by the spread of Avian Influenza. This mechanism will include risk insurance, whereby such outbreaks will be treated in the same manner as natural disasters.

As a final point, I would like to express, on behalf of the Thai government, our hope that these 5 strategies mentioned will be seriously consider during for all the specialists attending the meeting, bringing about the recommendation, and that the International Office of Epizooties and the Food and Agriculture Organization of the United Nations would take into consideration the principles on Bio-security and the guidelines on Compartmentalization farming so as to adjust the technical regulations related with poultry farming which can ensure the future food safely and food security of the global community.

Thank you

No. 1

POULTRY DISEASE SITUATION IN CAMBODIA

I. General Characteristic of Poultry Production

Livestock plays an important role in ensuring and elevating food security for the entire Cambodian people. Besides poultry production plays a key role in daily lives of Cambodian farmers, which has a total poultry population of 16,013,713. It is usually classified into semi-industrial and traditional or family production system. Local chicken, duck and goose are extensively raised.

The majority of the semi-industrial poultry production is primary for meat or eggs with the average of 500 to 5000 heads per farm. There are 1178 poultry farms (layers 67, broilers 135, and duck 976) in Cambodia, where in the Municipality consists of 10 layer, 4 broiler, and 11 duck farms. All chicken breeds are imported.

Most of Cambodian farmers raise animals traditionally, without using modern technology. Although the extensive production system is not well developed and in small scale it plays a vital role in providing meat and eggs to local demands effectively. This raising system is under the Department of Animal Health and Production (DAHP) providing services to provincial and local level, where village animal health workers (VAHW) play an important role in providing veterinary services directly to farmers.

II. History of Poultry Diseases in Cambodia

Poultry production has undergone remarkable changes. In addition to the family poultry production system (free scavenging and no protection), there is also noticeable increase in rearing of imported breeds (broiler and layer) due to its lower price at the market place. Duck raising in the rice fields as flock is also gradually increasing.

To date, traditional poultry raising is facing with common poultry diseases such as Newcastle disease, fowl cholera, duck plague, infectious bronchitis, ascariosis and coccidiosis, and some mortality among the flock has observed. In contrast, within semi-industrial poultry production the mortality is very low.

According to annual reports from the provincial animal health and production offices and the diagnostic results from the National Animal Health and Production Investigation Center (NAHPIC) have revealed that Newcastle disease, fowl cholera and duck plague are the most common poultry diseases in the Kingdom of Cambodia.

Avian Influenza has not been reported previously in Cambodia, as it is an exotic disease.

III. Current Emerging Poultry Diseases/ Outbreak(s)

In early 2004, a number of outbreaks of poultry diseases have been reported to occur among family poultry and some semi-industrial farms and since 01 January 2004 to 21 February 2004 there were 26294 heads of chicken death and also 6794 ducks, 17 gooses, 68 turkey, 65 guinea fowl and 2 parrots death. Some cases were suspected with Newcastle disease and fowl cholera. On the 6th January 2004, NAHPIC received samples from Kandal province and Phnom Penh, and tested positive of Newcastle infection. Moreover, every year at the beginning of dry season poultry are infected with and died from fowl cholera, Newcastle disease and other infectious diseases.

To see the outbreak of avian influenza in neighbouring countries, Ministry of Agriculture, Forestry and Fisheries has set up the measure to control and surveillance of poultry disease situations throughout the country.

On the 12th January 2004, one layer farm in Paungpeay with high mortality rate (3300 died) was investigated by NAHPIC staff and samples from clinical chicken were collected and sent to the Pasteur Institute (Research Center for Influenza) in France on the 13th January 2004 for further analysis. To prevent the spread of the disease, the infected farm was thoroughly disinfected and remain chicken were culled.

The results were confirmed on the 23rd January 2004 with Influenza virus A, subtype H5N1.

On 14 January 2004, three samples of wild birds (gray heron) from Tamao Zoo in Takaov province were sent to Pasteur Institute in France. The results were confirmed on 31 January 2004 with Influenza virus A, subtype H5 N1.

On 16 January 2004, two samples of gooses from Boeung Chouk village, Km 6 commune, Roeusseykeo district in Phnom Penh city were sent to Pasteur Institute in France. The results were confirmed on 31 January 2004 with Influenza virus A, subtype H5N1.

On 25 January 2004 three samples of gooses from Prekthom village, Kbalkoh commune, Kiensvay district in Kandal province were sent to Pasteur Institute for further analysis. The results were confirmed on 05 February 2004 with Influenza virus A, subtype H5N1

On 28 January 2004 one sample of local chicken from Boeungdonpa village, Siemriep district in Siemriep provinve was sent to Pasteur Institute in Phnom Penh. The result was confirmed on 05 February 2004 with Influenza virus A, subtype H5N1

The Department of Animal Health and Production (DAHP) is continuing to investigate and collect more samples from the possible outbreak throughout the country, to analyze for Avian Influenza.

IV. Measures to prevent the spread of avian influenza (Legislation and technique)

Due to Avian Influenza situation in neighboring countries is still continuing and number of local poultry died, the Cambodian Government has decided to establish an inter-ministerial committee, whose purposes is to prevent the spread of Avian Influenza. The committee is also responsible for providing advice and collaborating with FAO, WHO, OIE and other international organizations if necessary.

Measures of the Ministry of Agriculture, Forestry and Fisheries:

- Has issued an announcement on prevention of the spreading of avian influenza by temporary ban of importation, transportation, sale and buy poultry, eggs, fresh and refrigerated poultry meat, and any products of both wild and domestic poultry origin from countries with avian influenza outbreaks, dated on January 12, 2004
- Prakas on the establishment of animal and animal product check points at international borders to control the importation of both wild and domestic poultry and poultry products, dated on January 16, 2004
- Prakas on prevention of spreading of avian influenza by temporary ban of importation, transportation, sale and buy poultry, eggs, fresh and refrigerated poultry meat, and any products of both wild and domestic poultry origin from countries with avian influenza outbreaks, dated on January 16, 2004
- Has issued an announcement on avian influenza disease, dated on January 23, 2004
- Prakas on declaration of disease outbreak area, dated on January 23, 2004
- Has issued a circulation on prevention of spreading of avian influenza

Technical measures of Department of Animal Health and Production

- Organized the meeting with the chiefs of provincial animal health and production offices (PAHPO) along the border, to set up the control to avoid the spread of avian influenza into Cambodia followed the Prakas on prevention of the spreading of avian influenza by temporary ban of importation, transportation, sale and buy poultry, eggs, fresh and refrigerated poultry meat, and any products of both wild and domestic poultry origin from countries with avian influenza outbreaks
- Warn the public, traders, poultry importing agency, producers about the avian influenza. In order to prevent the spread, officers of DAHP and PAHPO have worked closely with VAHWs to investigate and surveillance poultry disease situation throughout the country
- Has issued a decision on appointment of working groups to investigate avian influenza, dated on January 23, 2004

At the farm, where Avian Influenza was suspected the DAHP had put the following measures:

- Quarantine
- Control of any movement from and to the suspected farm
- Disinfected the premise, materials and equipment, feed and chicken waste
- Monitor, surveillance and inspect the suspected farm and surrounding areas

V. The effort with the region in prevention of avian influenza risk

Receiving the appointment from Prime Minister of Royal Government of Cambodia, dated January 26, 2004 The ministerial cabinet, MAFF and Ministry of Health were invited to join the international meeting immediately through Thai Prime Minister invitation. The meeting was agreed as the following points:

1. Focus on effective investigation and information through increasing the investigating capacity and sharing information
2. Increase the national, regional and international effort to control disease spread in the future
3. Carry out the diagnosis to monitor avian influenza which was advised by OIE, WHO and FAO
4. Closely cooperate with OIE to strengthen the reporting and investigating system
5. Share information with clear and transparent scientific information in order to warn the disease outbreak and investigating system connecting with human investigation include APEC of the special meeting of Health Ministers in KL and ASEAN Leader Meeting on SARS in Bangkok
6. Strengthen the cooperation in the region and with international organizations to work closely to investigate and initiate developing for reducing disease risk with sharing work experiences for disease diagnosis, producing vaccine
7. Appeal for assistance and exchange techniques in order to help the countries with avian influenza through increasing capacity of epidemiology, diagnosis, monitor and prevention of disease
8. Establish the strategies for communication in order to have transparency and increase the knowledge through disease warning
9. Choose any choices for bio-safety on animal production both small and large scale

VI. Conclusion

No new case observed since the 28nd January 2004. This may due to the fact that:

- Implementing temporary ban of import, transportation, sale and buy poultry, eggs, fresh and refrigerated poultry meat, and any products of both wild and domestic poultry origin by sending out 75 veterinary officers to work at the international check points.
- Disinfected the farm, where Avian Influenza occurred before and after the confirmation of the result.
- Family and semi-industrial poultry farms are few and not concentrated as poultry production in Cambodia is to serve the local demand only.
- Although there is no new case the MAFF is strictly continuing to permanently monitor, survey and inspect, and if necessary, take sample(s) from where the Avian Influenza and other infectious diseases is suspected.
- Increase the control of poultry and poultry products throughout the country. The poultry and its products can come to the market places must have a veterinary

certificate to certify that they are from the healthy farms and from the areas that are free from Avian Influenza.

VII. Suggestion

In order to control and eradicate Avian Influenza effectively we must:

- Have good cooperation between the countries in the region especially the countries we are sharing border with and must establish an international network to share information on animal diseases so we can prevent the spread of disease effectively.
- Must have assistance from FAO, OIE, WHO, JICA and other international organization in advisory, technical assistance, finance, equipment, and other materials.

Avian Influenza outbreak in Cambodia

Department of Animal Health and Production

Poultry Production System

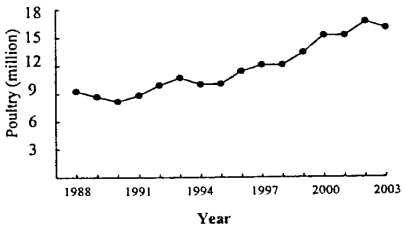
Family Production System 80-90%

- Poultry (local breed)
- Family consumption
- Average of 12-13 head

Semi-industrial production

- Broilers 135 farms
- Layers 67 farms
- Duck 976 farms
- Between 500 – 5000 head

Poultry production



Poultry disease in Cambodia

Common poultry disease

- Newcastle disease
- Fowl Cholera
- Duck Pleague
- Infectious Bronchitis
- Parasitic diseases

?

Avian Influenza (H5N1)

AI occurred in some areas in Cambodia

Places	Subtype	Date	Number of bird death
Paungpeay, Phnom Penh	H5N1	23 Jan 04	Chicken: 3300
Beung Chouk, Phnom Penh	H5N1	31 Jan 04	Local chicken: 95 Geese: 10 Duck: 13
Tamao Zoo, Takeav	H5N1	31 Jan 04	Wild bird: 59
Kiensvay, Kandal	H5N1	05 Feb 04	Local chicken: 50 Duck: 18 Geese: 6 Turkey: 68 Guinea fowl: 65
Boeungdongo, Siemriep	H5N1	05 Feb 04	Local chicken: 3

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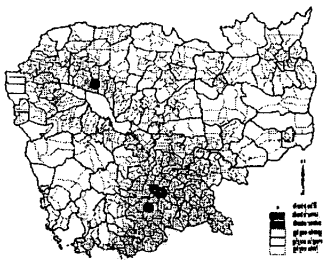
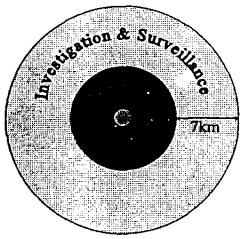
* Declared the outbreak areas and implement the control measures

AI outbreak in Cambodia



Control measures



Measures to prevent the spread of AI

AI outbreak in Asia and neighboring countries

⬇

Measure to control poultry disease throughout the country

⬇

First outbreak of one layer farm in Phnom Penh
(Took samples and sent to PI in France)

↙ ↘

Legislative measure **Technical measure**

Legislative measures
Ministry of Agriculture Forestry and Fisheries

- Has issued an announcement on prevention of the spreading of AI on 12 Jan 04
- Prakas on the establishment of the International borders check points on animal and animal product temporary on 16 Jan 04
- Prakas on prevention of spreading of AI by temporary ban of importation, transportation, sale, buy poultry, eggs, fresh and refrigerated poultry meat, and any products of both wild and domestic poultry origin from countries with AI outbreak date on 16 Jan 04
- Has established an inter-ministerial committee to prevent the spread of AI on 22 Jan 04
- Has issued an announcement on AI disease on 23 Jan 04
- Prakas on declaration of AI outbreak areas, date on 23 Jan 04
- Has issued a circulation on prevention of spreading of AI, date 26 Jan 04

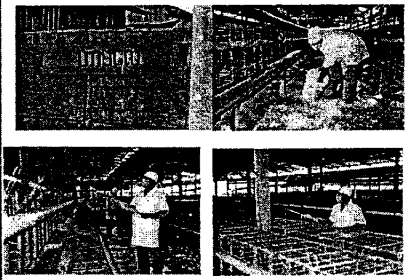
Technical measures
Department of Animal Health and Production

- Meeting with the chiefs of Provincial Animal Health and Production Offices (PAHPO) for immediate control and surveillance of the suspected farm with AI
- Warn the public, traders, poultry importing agency, producers about AI
- Officers of DAHP and PAHPO have worked closely with VAHWs to investigate and surveillance poultry disease situation throughout the country
- Has set up the working groups to investigate AI, dated on 23 Jan 04

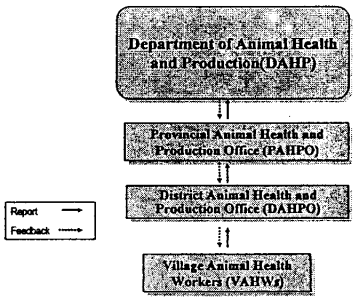
At the farm, where AI was suspected the DAHP had put the following measures

1. Send sample to the laboratory
2. Control of any movement from and to the suspected farm
3. Disinfected the premise, materials and equipment, feed and chicken waste
4. Monitor, surveillance and inspect the suspected farm and surrounding areas

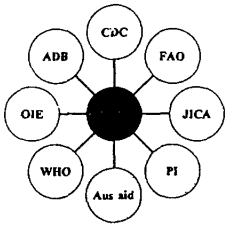
Control measures at the infected AI farms



Reporting system



Communication



In order to control and eradicate AI effectively Cambodian government would like to suggest and appeal as the following:

- Have good cooperation between the countries in the region especially the countries are sharing border with
- Establishment of an International network is needed to share information on disease so we can prevent the spread of disease effectively
- Carry out the diagnosis to monitor AI which was advised by OIE WHO and FAO
- Closely cooperate with OIE to strengthen the reporting and investigating system
- Must have assistance from FAO, OIE, WHO, Aus-aid, ADB, JICA and other International donor to provide technical assistance, finance, equipment and other material.

Thank you for your attention

NO. 2

Epidemiological situation and control strategy of highly pathogenic H5N1 avian influenza in China

Hualan Chen
陈化兰

1. Current situation

Country: P. R. China
CVO/OIE delegate:
Ministry responsible: Ministry of Agriculture of P. R. China
Numbers of full time official veterinary officers: 11, 000
Number of other veterinarians involved on the management of the disease control: 340,000

Information of HPAI in Mainland, P.R.China (Follow up report No3)

Last report date			Feb. 19, 2004	
Current report date			Feb. 22, 2004	
Total outbreaks since Jan. 27, 2004			49 outbreaks have been reported and of which 48 has been confirmed	
New cases since Feb. 19, 2004			0	
The numbers of animals in the outbreaks since Jan. 27, 2004				
Species	Susceptible	Cases	Death	Destroyed
Chickens	1932796	80483	70104	1932796
Ducks	1347214	13800	7731	1347214
Geese	94960	1457	1127	94960
Others	1048192	48192	48192	1048192

Diagnostic information	
Laboratory	National Avian Influenza Reference Laboratory, Harbin Veterinary Research Institute, CAAS
Diagnostic method	Virus isolation
Pathogen confirmed	H5N1 highly pathogenic avian influenza virus
Epidemiology	Under investigation
Vaccine availability	Vaccine is available
Vaccination	Yes
Control strategy	Stamping out, vaccination, movement control and following -up surveillance

NO 3 1/26 PM

CURRENT SITUATION OF AVIAN INFLUENZA IN INDONESIA AND ITS CONTROL AND ERADICATION MEASURES

DIRECTORATE OF ANIMAL HEALTH
DIRECTORATE GENERAL OF LIVESTOCK SERVICES
DEPARTMENT OF AGRICULTURE
Bangkok, 26-28 February 2004

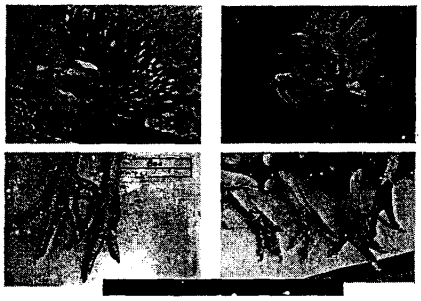
Distribution of AI cases in Indonesia

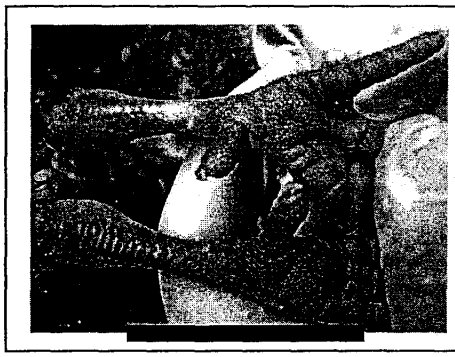
Province	District/Municipality
1. Banten	1
2. Jakarta	1
3. West Java	8
4. Central Java	22
5. Yogyakarta	4
6. East Java	25
7. Bali	6
8. Lampung	9
9. Central Kalimantan	1
10. South Kalimantan	1
11. West Kalimantan	2
Total	80

Poultry Population in Indonesia

- 65% in Java island, 15% in Sumatera island and 20% in the remaining islands
- Breeder:
  - DOC for layer: 1,8 – 2 million per week
  - DOC for broiler: 18 – 20 million per week
- Layer: 80 – 85 million
- Broiler: 1,2 billion
- Native chicken: 295 million
- Other indigenous poultry: 45 million

Clinical Diagnosis of AI





Gross Pathology of AI

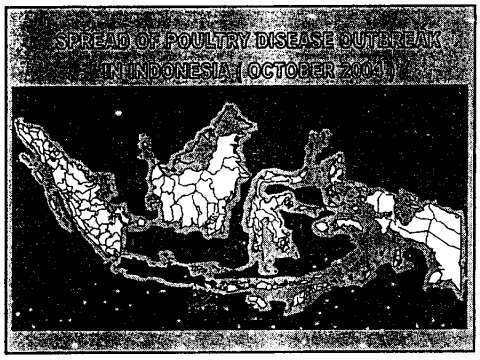
Method of Identification of Subtype of Avian Influenza Virus in Indonesia

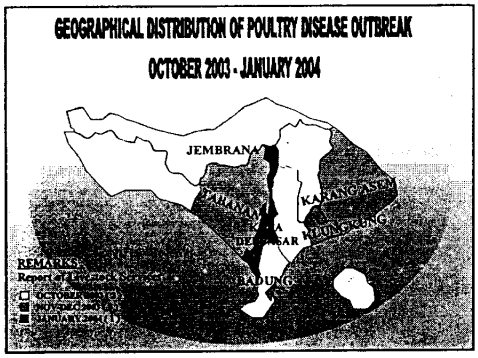
- Agar Gel Presipitation test (AGP)
- Hemagglutinin Inhibition test (HI)
- Pathogenicity test
- RT-Polymerase Chain Reaction (PCR)
- Electrone microscope
- DNA sequencing

Laboratories Where Diagnosis Made

- Disease Investigation Centre (DIC) Regional IV Yogyakarta
- Research Institute for Veterinary Science (RIVS) Bogor
- Veterinary Drug Assay Laboratory (VDAL), Gunung Sindur, Bogor
- Laboratory of Faculty of Vet. Medicine of University of Airlangga, Surabaya

GEOGRAPHICAL DISTRIBUTION OF POULTRY DISEASE OUTBREAK DURING AUGUST 2003 - JANUARY 2004


SPREAD OF POULTRY DISEASE OUTBREAK
IN INDONESIA (OCTOBER 2003)


GEOGRAPHICAL DISTRIBUTION OF POULTRY DISEASE OUTBREAK
OCTOBER 2003 - JANUARY 2004
JEMBRANA
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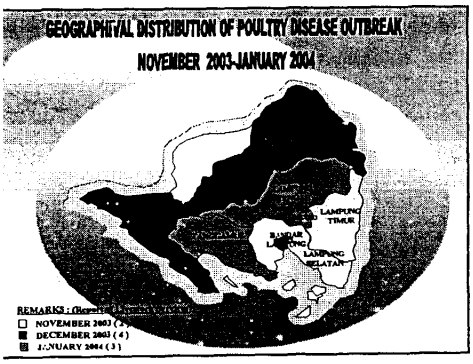
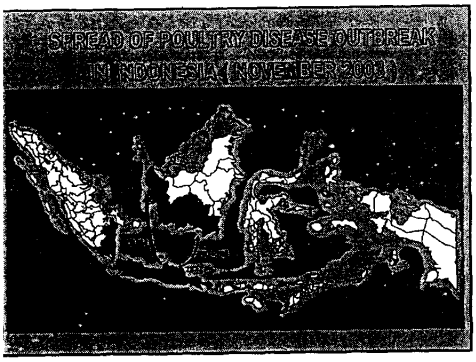
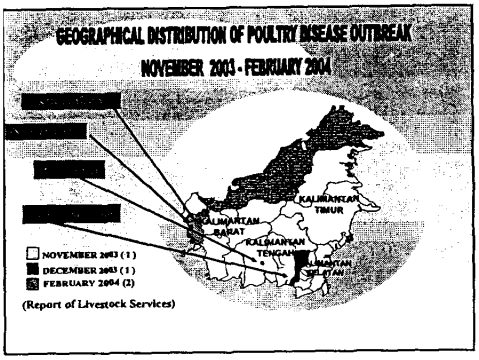
REMARKS

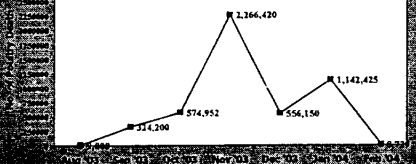

SPREAD OF POULTRY DISEASE OUTBREAK
IN INDONESIA (NOVEMBER 2003)


GEOGRAPHIVAL DISTRIBUTION OF POULTRY DISEASE OUTBREAK
NOVEMBER 2003-JANUARY 2004
LAMPUNG TIMUR
LAMPUNG SELATAN
REMARKS :
NOVEMBER 2003 (2)
DECEMBER 2003 (4)
JANUARY 2004 (3)


SPREAD OF POULTRY DISEASE OUTBREAK
IN INDONESIA (NOVEMBER 2003)


GEOGRAPHICAL DISTRIBUTION OF POULTRY DISEASE OUTBREAK
NOVEMBER 2003 - FEBRUARY 2004
KALIMANTAN TIMUR
KALIMANTAN BARAT
KALIMANTAN TENGAH
KALIMANTAN SELATAN
NOVEMBER 2003 (1)
DECEMBER 2003 (1)
FEBRUARY 2004 (2)
(Report of Livestock Services)

NO. OF CHICKEN DEATH (AUGUST 2003 - FEBRUARY 2004)



AI Cases per Species

- Most affected cases are breeders and layers
- Only a small percentage in broiler
- Other poultry affected:
  - Native chicken
  - Ducks
  - Quail

FACTORS INFLUENCING SPREAD OF DISEASE

A. MOVEMENT OF POULTRY, POULTRY PRODUCTS AS WELL AS FARM WASTE, INCLUDING DOC BOXES, HATCHING EGG BOXES FROM INFECTED FARMS

B. MOVEMENT OF HUMAN AND VEHICLES FROM INFECTED FARMS

C. MIGRATION OF WILD BIRDS OR THROUGH DOMESTIC/PET BIRDS OR WATER FOWL

D. ILLEGAL IMPORT OF VACCINES AND BIOLOGICS

POLICY IN CONTROL AND ERADICATION OF AI

- Strategy :
  - VACCINATION
  - DEPOPULATION (selective culling)
- MASS VACCINATION campaign to all poultry population within 6 months & followed by regular vaccination
- DEPOPULATION to all infected farms through elimination of healthy poultry which are in-contact with infected poultry

Policy Consideration

- The outbreak has been widely spread into several provinces (the whole Java island infected)
- 65 - 70% of the poultry industry located in Java island (including GP breeders and feedmills)
- Structure of poultry industry, where small farms of native chicken and other indigenous poultry are scattered around the poultry commercial farms

ZONING BASED CONTROL

- INFECTED AREA: an area which is declared as having AI cases based on diagnosis of clinical, gross pathology and histopathology
- SUSPECTED AREA: an area which is located adjacent to infected area or not having natural barrier with infected area
- FREE AREA: an area with no cases of AI and having natural barrier (such as island)

Short Term Objectives of Controlling and Eradication of AI

1. Controlling the outbreak by reducing poultry death cases to zero level
2. Controlling and reducing the spread of disease to other areas in Indonesia
3. Maintaining the free areas
4. Preventing the spread of disease to human by elimination of poultry disease sources

SHORT AND LONG TERM OBJECTIVES

1. Rehabilitation of consumption of poultry meat and eggs
2. Rehabilitation of the poultry business

CONTROL ACTION

1. Establishment of AI CRISIS CENTER at 9th Floor, Building C, DGLS
2. Approved 3 (three) local vaccine producers (PT. Vaksindo Satwa Nusantara, PT. Medion and Pusvetma)
3. Approved PT. Bio Farma as an importer for AI vaccine to fulfill the shortage of vaccines
4. Request government emergency fund to control and eradication of AI
5. Issued a Decree of MoA regarding Declaration of AI Outbreak in Indonesia
6. Issued a Guidelines on Prevention, Control and Eradication of AI

9 Strategies

1. Improvement of bio-security
2. Vaccination in infected area
3. Depopulation (selective culling) in infected area
4. Control on movement of poultry, poultry products and farm waste
5. Surveillance and tracing back
6. Restocking
7. Stamping out in newly infected areas
8. Public awareness
9. Monitoring and evaluation

IMPROVEMENT OF FARM BIOSECURITY

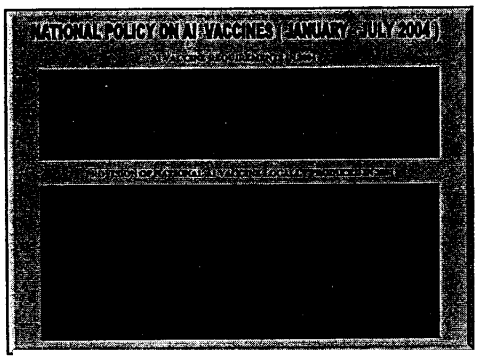
- Quarantine/isolation of infected farm
- Control movement of human, equipment and vehicles to and from infected farm
- Disinfection of every vehicles/trucks before and after entering the infected farm
- Workers must be in healthy condition when entering the infected farm
- Workers and any other person who entering the infected farm should wear protective equipment such as cloth, glove, mask, hat, goggle and boot.
- Workers should disinfect themselves before and after working at the infected farm

GUIDANCE FOR FARMERS

- Prohibition of movement of live poultry which are in-contact with infected poultry out of the farm
- Prohibition of bringing waste out of the infected farm
- Improve farm bio-security, induding control movement of equipment, feed and human in and out of the infected farm
- Decontamination of all media in the farm which are possibly infected by the virus
- Disposal of dead chicken, contaminated material, impermanent equipment and farm waste inside the infected farm area

VACCINATION

- '*Master seed*' has to be originated from field isolate (*autogenes vaccine*) or homologous with subtype of the field strain
- Vaccine must fulfill quality standard based on the existing government regulation
- Issue a Decree of Director General of Livestock Services regarding Emergency Guidelines on Importation of Vaccine for Control and Eradication of Avian Influenza to accelerate plant accreditation and import process
- Prior to distribution and use, vaccine should obtain a registration number from DGLS



Local Vaccine Production

PUSVETMA:
- AI Flu

PT. VAKSINDO SATWA NUSANTARA:
- Vaksiflu AI

PT. MEDION:
- Medivac AI

Vaccination to 4 – 7 days of age
Using inactive vaccines

DEPOPULATION

- Culling all live poultry in the same flock which are in contact with the infected poultry
- Culling method should comply with the animal welfare regulation using mass euthanasia or slaughtering standard procedure
- Culling should be followed by disposal through burning and/or buried in a hole with 1.5 m depth, then covered by lime

MOVEMENT CONTROL

- Prohibition to move DOC from infeded area to free area. Exception is given for DOC parent stock (has to be accompanied by Health Certificate stated that the DOC-PS originated from a breeding farm which shown no clinical symptom at least for the last 30 days).
- DOC boxes should be disinfected in farm of origin and destroyed in destination
- Prohibition to move live poultry from infected farm to other farms as well as from infected area to free area

STAMPING OUT IN NEWLY INFECTED AREA

- Prompt diagnosis (early detection)
- Spread of disease is localized and there is no potency to spread further
- There are natural barriers
- Economically consideration by farmer
- Culling of all poultry within 1 km radius from infected farm

SURVEILLANCE & TRACING BACK

- Sampling method in infected, suspected and free areas
- Objectives of laboratory testing are :
  - review the possibility of changing of virus (mutation) and antigenicity, including virus DNA characterization
  - monitor the efficacy of vaccine (post-vaccination)
  - determine disease zoning
  - disease mapping

REPLACEMENT AND RE-STOCKING

- Re-stocking is permitted after 30 days
- Before re-stocking, disposal and decontamination procedures must be properly implemented
- Replacement DOC has to be vaccinated for AI

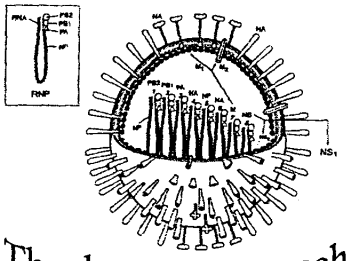
[AI virus can survive for 32 days in faeces and water]

COMMUNICATION

- CRISIS CENTRE FOR AI (Building C 9th Floor, Directorate of Animal Health, DGLS - Phone: 70220071, 70220072, 70220073, 78830617 - Fax: 7815781 - Website: www.ai-indonesia.org; www.keswan.ditjennak.go.id
- CRISIS CENTRE for Centre for Poultry Marketing Information (PINSAR Perunggasan)

CONCLUSION

1. SHORT TERM OBJECTIVES:
   A. MAINTAINING FREE AREAS
   B. DECREASING DEATH CASES IN INFECTED AREAS TO ZERO
   C. REHABILITATING CHICKEN PRODUCTS CONSUMPTION TO SUPPORT THE RECOVERY OF POULTRY INDUSTRY
2. LONG TERM OBJECTIVES:
   INFECTED AREAS COULD BE GRADUALLY FREE



Thank you vary much

NO. 4

Japan

Cases of Highly Pathogenic Avian Influenza

in Japan, 2004, after 79 year absence

1 Manual for controlling HPAI

a. Report to Animal Hygiene Service Center
b. Diagnosis at AHSC
c. Confirmatory diagnosis at NIAH
d. Official confirmation and announcement of HPAI
e. Destruction of poultry
f. Movement control within 30 km radius
g. Clinical, viral and immunological tests for freedom confirmation within the movement control area
h. Lifting of movement control

2 Outline of outbreaks

a farm with 34,640 layers in Yamaguchi Prefecture

Jan. 11 : Yamaguchi Prefecture's report to MAFFon a suspected case of HPAI
Jan. 12 : NIAH's confirmation of Influenza A infection with H5 subtype
Jan. 13 : Confirmation of the isolate as H5N1
Genome analysis revealed the isolate as
bird origin
different from the virus isolated from human infected with AI in Hong Kong and Vietnam

Control measures

during diagnosis
- No trespassing
- No shipping of eggs
- disinfection etc.

after confirmation

Under Domestic Animal Infectious Disease Control Law and Manual for controlling HPAI
- Destruction of total birds
- Disinfection
- Movement Control within 30 km radius
- Tests for freedom confirmation within the movement control area

※ lifted the movement control on 19 Feb.

b. a person with 13 bantams and one duck in Oita Prefecture

Feb. 16 : Oita Prefecture's report to MAFF

Feb. 17 : NIAH's confirmation of Influenza A infection with H5 subtype

Feb. 18 : Confirmation of the isolate as H5N1

(nucleotide sequence in 99% homology with Yamaguchi Prefecture's isolate)

Control measures

Same with those of Yamaguchi Prefecture

Gradual reduction of the size of the movement control area while confirming the freedom

3 Compensation

Infected farm

80 % of value of infected birds and articles

50 % of cost of destruction

Surrounding farms (Yamaguchi Prefecture)

50 % of lost value of eggs subject to the movement control

50 % of cost of transportation and storage

4 lessons from the 2 cases

- Importance of fundamental day-to-day hygienic measures
- Public awareness

Part 1

- Country : Japan
- CVO/OIE Delegate: Masako Kurimoto
- Ministry responsible: Ministry of Agriculture, Forestry and Fisheries
- Number of full time official veterinary officers: 409 (year 2002)
- Number of others veterinarians involved on the management of the control disease:13,935 (year 2002)

- Current epidemiological situation: this part should correspond to the OIEs follow up report format
  Vaccine available: No
- Vaccination: Yes or (No)

Part2 Spread of the disease

1 General overview, with an analysis of the spread of the disease since the beginning of the crisis
There was no spread from the affected farm to order near from, and no epidemiological relation both farms, this time.

2 Precise date:

Region or Province or State	Yamaguchi Prefecture	Oita Prefecture
District	Abu-gun	Kusu-gun
Locality	Ato-cho	Kokonoe-cho
GPS coordinates –deg-min-sec		
No outbreaks	1	1
Date of first observation(d/m/y)	11/01/2004	
Date of probable first case(d/m/y)	12/01/2004	14/02/2004
Species involved	Avian	Avian
No death	5,965	7
No destroyed	8,274	7
No vaccinated	0	0

Part 3 Control strategy: should include comprehensive information about the following Items

① Strategy for control of the disease pursued:
(1)What type of control measures has currently taken place
(・)Culling or selective culling
- Vaccination
- Mix

(2)What are the current constraints for disease control under the strategy followed?
Our Disease control the strategy was effective for these cases.

(3)Do you intend to adapt this strategy? If so, how?

② If vaccination is employed:
No

③ Other relevant information regarding AI in your country:

No. 5

Highly Pathogenic Avian Influenza Outbreak in Korea

February 2004

Ministry of Agriculture and Forestry

Republic of Korea

Highly Pathogenic Avian Influenza (HPAI) outbreak in Korea

1. History and current situation

The Republic of Korea had been free from Highly Pathogenic Avian Influenza (HPAI) until a suspect case was first reported on 10 December 2003. The case was reported at a parent stock farm for broilers, which was located in Eumsung county, Chungbuk-province and the farm was immediately placed under movement restrictions. Laboratory test confirmed the outbreak of HPAI on 12 December 2003 at the National Veterinary Research and Quarantine Service (NVRQS).

As of 25 February 2004, the total of 18 farms has been confirmed with HPAI, but there has been no HPAI outbreak since Feb. 5, 2004. The infected farms are gathered in 3 local areas (Fig. 1).

According to the interim result of the RNA sequencing test (CDC, US), the origin and gene of the virus of HPAI isolated in Korea was different from the one in Vietnam.

Table 1. HPAI outbreaks in Korea (10 December 2003 -25 Feb. 2004)

Farm No.	Province (City)	County (District)	Farm type	No. of Livestock	Date reported	Date of lab diagnosis	Date of slaughter
1	Chungbuk	Eumsung	Chicken	26,000	'03.12.10*	'03.12.12	'03.12.13
2	Chungbuk	Eumsung	Duck	3,480	'03.12.14	'03.12.15	'03.12.16
3	Chungbuk	Eumsung	Chicken	15,000	'03.12.16	'03.12.17	'03.12.17
4	Chungbuk	Eumsung	Duck	8,000	'03.12.18	'03.12.19	'03.12.22
5	Chungbuk	Eumsung	Duck	7,700	'03.12.18	'03.12.19	'03.12.22
6	Chungnam	Cheonan	Duck	4,758	'03.12.18**	'03.12.20	'03.12.20
7	Kyongbuk	Kyongju	Chicken	10,250	'03.12.20	'03.12.21	'03.12.23
8	Chonnam	Naju	Duck	14,900	'03.12.20	'03.12.21	'03.12.22
9	Chungnam	Cheonan	Duck	8,000	'03.12.18**	'03.12.21	'03.12.22
10	Chungbuk	Jincheon	Duck	5,000	'03.12.21**	'03.12.23	'03.12.24
11	Kyongbuk	Kyongju	Chicken	144,000	'03.12.21	'03.12.24	'03.12.27
12	Kyonggi	Icheon	Chicken	43,000	'03.12.23	'03.12.25	'03.12.24
13	Chungnam	Cheonan	Chicken	20,000	'03.12.21	'03.12.26	'03.12 27
14	Ulsan	Ulju	Chicken, Duck	3,600 10	'03.12.23**	'03.12.27	'03.12.29
15	Chungnam	Cheonan	Duck	8,500	'04.1.2	'04.1.4	'04.1.4
16	Kyongnam	Yangsan	Chicken	18,000	'04.1 11	'04 1.12	'04.1 13
17	Chungnam	Cheonan	Chicken	23,000	'04.1.25	'04.1 26	'04.1 28
18	Chungnam	Asan	Duck	14,700	'04.2.4	'04 2.5	'04 2.6

* The first case was reported to the local government at late night on 10 December 2003
**Cases detected by nationwide active surveillance

2. International notification

The outbreak of HPAI was reported to the OIE and notified to major trading partners on 12 December 2003. Updates are being provided as they become available (Annex 1).

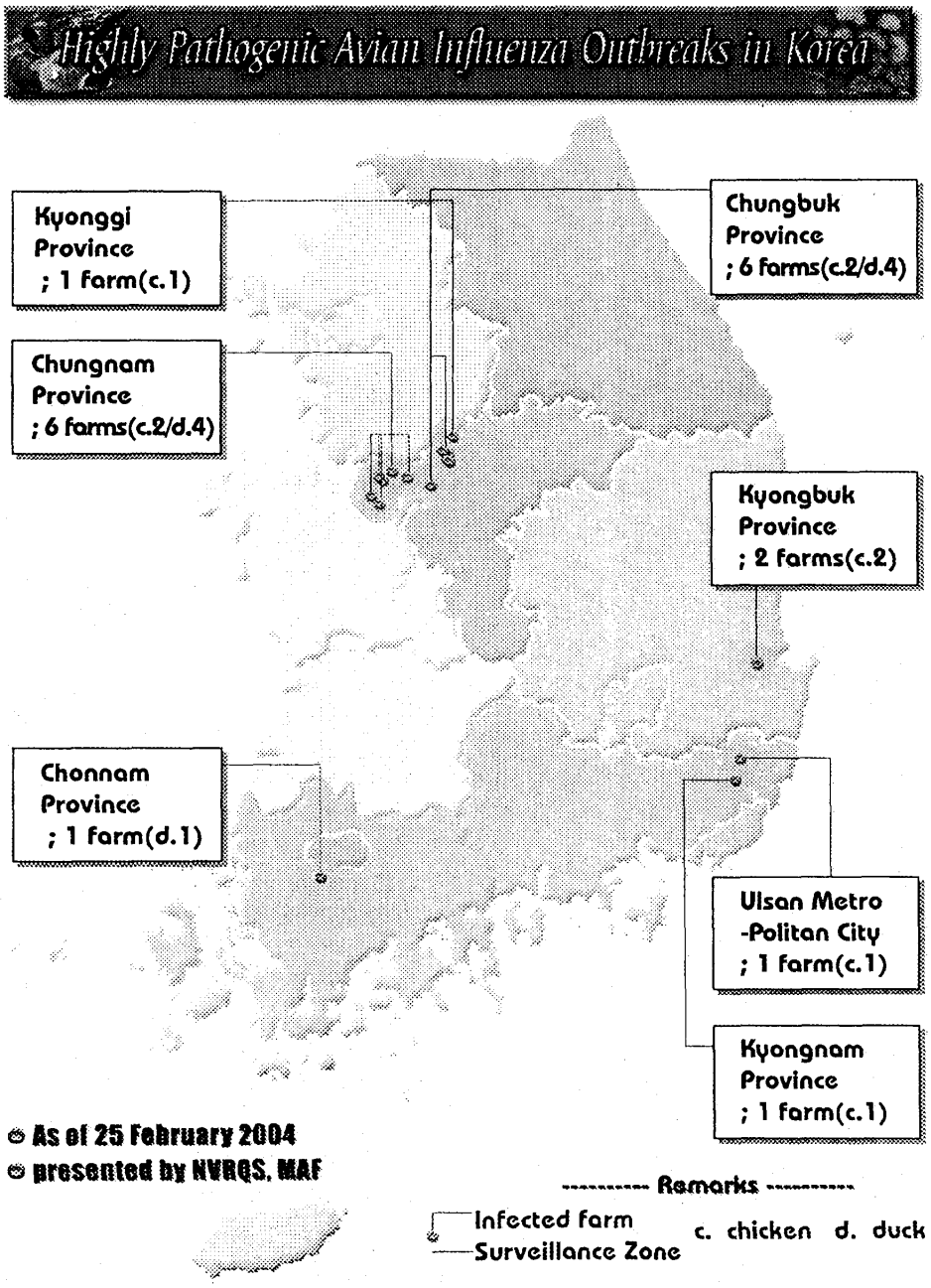


Fig. 1. Map of HPAI outbreaks in Korea as of 25 February 2004

3. Diagnosis

Diagnosis was conducted in accordance with the OIE manual.

Histopathological examinations were made to detect lesions indicative of HPAI. Serological tests consisting of Agar gel immunodiffusion (AGID) test and haemagglutination inhibition (HI) test were conducted to detect antibodies. For virus isolation, samples were inoculated into SPF eggs and for antigen detection, Polymerase chain reaction (PCR) using H5 specific primers was used. For subtyping, haemagglutination inhibition (HI) test and neuraminidase inhibition tests were conducted with antisera provided by OIE reference laboratory, VLA, UK. The causal agent was identified as avian influenza virus subtype H5N1.

4. Control Strategy

With the confirmation of the HPAI outbreak, emergency headquarters and emergency disease control center were established at MAF and NVRQS respectively. In response to the outbreaks, Korean animal health authorities implemented a range of control measures including stamping-out of susceptible animals in infected and neighboring farms, strict movement controls, disinfection activities and surveillance in accordance with the Exotic Animal Disease Control Guideline.

The government conducted epidemic investigation and surveillance targeting the total 1,897 people exposed to high risk including farmers, slaughterers and people who were engaged in disease control. No suspicious human case was found.

4.1. Stamping-out

In cases where HPAI was confirmed on a chicken farm, all chicken and ducks in the infected and neighboring farms within 3km radius were culled and buried. However, when HPAI was confirmed on a duck farm, only ducks were culled and buried. Pre-cautionary depopulation of animals epidemiologically linked and found to be at high risk was also performed. Eggs were buried on the premises. In addition, feed and contaminated materials were incinerated.

Table 2. Number of animals culled as of 24 February 2004

Province/city	Chicken		Ducks		Total	
	Farms	Animals	Farms	Animals	Farms	Animals
Kwangju*			2	24,200	2	24,200
Ulsan*	19	87,289	11	2,877	30	90,166
Kyonggi	6	200,899	2	146,428	8	347,327
Chungbuk	16	182,420	44	599,476	60	781,896
Chungnam	102	1,268,659	20	64,577	122	1,333,236
Chonnam			27	253,488	27	253,488
Kyongbuk	4	201,100	1	13,500	5	214,600
Kyongnam	76	1,373,953	5	9,921	81	1,383,874
Total	223	3,314,320	112	1,114,467	335	4,428,787

* Metropolitan city

** Other species: 33 farms 525,411 animals (11 species)

Strong emphasis was given to through and rapid culling measures in order to reduce any possible virus spreading. In some cases, culling was completed even before diagnosis was confirmed.

4.2. Movement Restrictions

Movement restrictions were placed on all susceptible animals within the 10km radius of the outbreak farm and farms epidemiologically linked to an infected farm in accordance with the Exotic Animal Disease Control Guideline. Movement of feces, pharmaceuticals and feed delivery trucks were also restricted. Movement restriction zone consisting of protection zone (area within 3km radius) and surveillance zone (area between 3 and 10km radius) were established. Check points were set along the border of the restriction zones and maintained 24 hours a day by government employees, local police and the military. Disinfection is required for all people and vehicles entering and leaving the zones. All transport vehicles are required to be marked and used only for the transportation of chicken and ducks.

* As of Feb. 26, there are 33 check points (259 staff) in 7 counties and cities.

As HPAI occurred in Asan (Feb. 5, 2004) and Cheonan Pungse (jan. 25, 2004) successively since HPAI outbreak was detected in Dec. 21. 2003 in Cheonan city, the government set the "special management region" (area within 30–40 km radius) and strengthened disease control measures such as surveillance and disinfections.

Movement restriction in 5 cities and counties was lifted since no suspicious sign was detected. The government will allow infected farms to raise poultry after restock test for one month using sentinel chickens. No farm has been conducting the sentinel test until now.

4.3. Vaccination

Vaccination against HPAI is prohibited.

4.4. Surveillance

Extensive clinical surveillance was conducted for farms in movement restriction zones and epidemiologically linked to. Clinical examinations were made by the provincial animal health officers. Farmers inside the movement restriction zones were strongly encouraged to do daily clinical examination of their livestock and check for any suspicious signs. The provincial animal health officers check vulnerable or large scale farms throughout the nation by telephone everyday.

Extensive serological surveillance was conducted by the NVRQS and provincial veterinary laboratories. This included farms epidemiologically linked to an infected farm, layer farms and broiler duck farms and breeding duck farms nationwide. In the case of the breeding duck farms, they have been tested 3 times since the outbreak. Total of 17,623 samples from 962 farms were tested, and 4 farms were found to be positive (Table 1).

5. Epidemiological investigation

The source of agent of the first case in Eumsung is currently unknown and is under investigation.

There were four clusters of cases and the routes of infection among clusters are as follows

- Eumsung, Jincheon and Icheon cases were connected each other directly and indirectly.
- Cheonan cases were caused by a contaminated duck hatching house in that area.
- Naju case was linked to the duck hatching house, and Kyungu cases were linked to another duck hatching house in Naju.
- Ulsan and Yangsan cases were found to be contacted from the previously contaminated regions

Genctic analysis has indicated that the virus isolated in Korea is different from that in Vietnam, which is blamed to cause human infection.

The causal agent has not been linked to any human infection.

6. Farm support and supply stabilization

The government allocates 150 billion won of budget for infected and neighboring farm support. (US$1=about 1,280 won)

Farms subject to stamping-out:

- 42.3 billion won for direct stamping out compensation: the number of poultry to be stamped out is expected to reach 5 million. (based on market price)
- 2 billion won for living expense.
- Financial support for the education of farmers' children and tax reduction.
- Loan to farmers for restocking amounting to 8.1 billion won

Farms subject to movement restriction

- 900 million won for income stabilization for farmers who were restricted to restock poultry and who have slaughtered their poultry in the past 3 months

Slaughterhouses, processing facilities and hatcheries

- Loan for management stabilization amounting to 16.6 billion won

7. Measures for poultry meat consumption increase

Just after AI outbreak, chicken meat consumption maintained about 70%, but plunged to 30% in Feb. after media report about human infection of AI in some Asian countries. However, with active and nation-wide campaign and events supported by mass media as well as civil and social organizations, the consumption has been restored. (in case of duck meat : 20-30%)

<Major activities for consumption increase>

- By establishing "Special committee for livestock product consumption promotion", the government is conducting nation-wide consumption campaign.

- By designating every Wed. as "chicken and duck meat eating day", the government encourages people to participate in poultry meat consumption.
- In cooperation with the Ministry of Education, the government provides students with correct information on the safety of poultry meat and encourages schools to serve poultry meat for lunch.
- Civil and social organizations launch various kinds of events participated by doctors, entertainers and etc.
- The military increases poultry meat share up to 50%.
- Public institutions and conglomerates also increase poultry meat consumption.

8. Future measures

Movement restrictions, disinfection and surveillance activities will continue to eradicate the disease. Movement restrictions should be maintained for 30 days after the last case is reported.

Currently, local authorities carry out test for ducks before forwarding to slaughterhouse.

9. Conclusion

Since the first reported case on 10 December 2003, the number of 18 cases of HPAI has been confirmed as of 25 February 2004.

The Republic of Korea has taken all the necessary measures to detect, control and prevent the spread of HPAI.

Swift control measures were implemented in accordance with the Exotic Animal Disease Control Guideline. The measures include stamping-out of infected and neighbouring farms, strict movement controls and thorough disinfection and surveillance.

Continued efforts are being exerted to quickly eradicate the disease in Korea without vaccination.

Annex 1

Disease Information

12 December 2003

Vol. 16 - No. 50

Contents

HIGHLY PATHOGENIC AVIAN INFLUENZA IN KOREA (REP. OF ~)
Suspected outbreak

See also: 19 December 2003

(Disease never reported before in the Republic of Korea).

Emergency report

Information received on 12 December 2003 from Dr Chang-Seob Kim, Chief Veterinary Officer, Animal Health Division, Ministry of Agriculture and Forestry (MAF), Gwacheon:

Date of the report: 12 December 2003.

Date of initial detection of animal health incident: 11 December 2003.

Outbreaks:

Location	No. of outbreaks
Eumsung district, Chungcheong-buk province, in the central part of the country)	1 farm

Description of affected population: a parent stock farm for broilers.

Total number of animals in the outbreak:

species	*susceptible*	*cases*	*deaths*	*destroyed*	*slaughtered*
avi	24,000*	19,000	19,000	5,000	0

* 47-week-old poultry

Diagnosis:

A. Laboratory where diagnosis was made: National Veterinary Research and Quarantine Service, Anyang, Kyonggi.

B. Diagnostic tests used: polymerase chain reaction (PCR) positive on 12 December 2003.

C. Causal agent: avian influenza virus subtype H5. The sequencing of the gene is in progress.

Epidemiology:

A. Source of agent / origin of infection: unknown. Under investigation.

B. Mode of spread: unknown.

C. Other epidemiological details:

- Migrating birds have frequently been observed in a corn field next to the affected farm.

- No clinical signs of highly pathogenic avian influenza have been detected in any other farm.

- There is only one farm within a 1-km radius of the farm where highly pathogenic avian influenza is suspected.

Control measures:

- stamping out;

- quarantine;

- zoning; movement restrictions set up within a 10-km-radius zone around the affected farm;

- vaccination is prohibited.

Annex 2

Veterinary System in Korea

1 Legislation

Act for Prevention of Livestock Epidemics and Exotic Animal Disease Control Guidelines prescribe the necessary disease control and preventive measures such as notification of suspicious cases, stamping-out, movement controls, disinfection, vaccination, surveillance, importation quarantine, disposal, compensation, and penal provisions.

2 Official veterinary service

Major veterinary services responsible for the prevention and control of livestock diseases are the Animal Health Division of the Ministry of Agriculture and Forestry (MAF), National Veterinary Research and Quarantine Service (NVRQS), and Provincial Veterinary Services. Their activities are supported by Livestock Health Control Association, National Agricultural Cooperative Federation, veterinary colleges and the Korean Veterinary Medical Association.

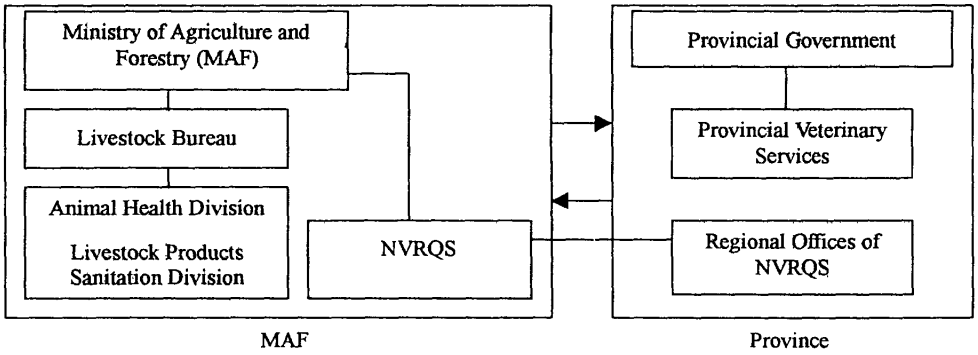


Fig. 2. National and provincial veterinary services involved in the prevention and control of livestock diseases.

Animal Health Division is a part of the Livestock Bureau under the MAF. The main tasks include the implementation of the Veterinarian Law and Pharmacist Law (for animals), inspection of imported and exported animals or livestock, enforcement of the Domestic Animal Contagious Disease Prevention Law, and the prevention and eradication of domestic animal diseases. Livestock Products Sanitation Division, also under the Livestock Bureau, is responsible for the application of the Livestock Sanitation Process Law, and the establishment and promotion of meat sanitation composite measures.

NVRQS is an executive agency of the MAF, with the headquarters located in Anyang, and 5 regional and 12 district offices located across the country. Its main tasks are the prevention and control of major animal diseases, quarantine inspection, livestock product safety and veterinary research.

Each of the 9 provinces and 7 cities has its own veterinary service, which is responsible for the prevention and control of major animal diseases, meat and milk hygiene, and animal welfare within their authority. These services include the National Livestock Research Institute and the animal health laboratory.

These veterinary services work closely for the common goal of prevention and control of animal diseases, and promotion of animal health and sanitation in Korea.

No. 6

Outbreak of Avian Influenza in Lao PDR

Part I. Current Situation

Country : Lao PDR
CVO/OIE Delegate
Ministry responsible : Ministry of Agriculture and Forestry.

Number of full time official veterinary officers accordingly to the record of list of the officials of the Department of Livestock and Fisheries in December 2003 :

- Veterinary officers at central level : 30
- Veterinary officers at provincial level : 178
- Total veterinary officers in the country : 208

Number of others veterinarians involved on the management of the control disease :

- The livestock officers in the country : 597

Since the Lao agricultural economy is still of subsistence to a large extent, most poultry production are located in small holders farms in the rural areas and in the periphery of the larger towns. In general, the Lao people have a long tradition in raising and keeping poultry for home consumption and as an additional source of income generation for their households. Base on the census of the Department of Livestock and Fisheries in 2003, there are about 20 million heads of poultry in the country. The backyard chicken or village chicken population accounts 82.5 % (16,5 million heads, whereas the commercial poultry with improved breed accounts 17.5 % (3.5 million heads). At present, more than 100 commercial farms exist in the country but most of them are located in the periphery of larger towns such as Vientiane Capital, Savannakhet, Champasak, and Luangprabang.

In general, the patterns of the occurrence of poultry disease outbreaks in the country are rather scattered and has an uneven distribution, with seasonal variation over the year. The main poultry diseases that occur commonly in the country are Fowl cholera, Duck plaque, New castle disease, and Infectious bronchitis and other parasitic diseases. The disease usually occurred during the climate change particularly the change from rainy season to dry season of the year. Each year, most of the infected poultry are those which have not been vaccinated against such diseases.

In the beginning of January 2004, there was a record of an unusual and relatively high outbreak of poultry disease in Vientiane Capital. This high epidemic disease had caused a significant loss of not only the household economy but also to some commercial poultry farms. It is of our understanding that the cause of the outbreak may be due to the high fluctuation of the climate, especially the change from hot to cold weather leading to the stress in poultry. In addition, we have collected the samples the Veterinary Diagnostic Laboratory in the National Animal Health Centre for disease confirmation. The diagnostic results revealed that the cause of death of the poultry was due to Fowl cholera, and according to the drug sensitivity test, it shown that the pathogen of the disease was sensitive to Gentamycin , thus the use of such antibiotic was recommended to use for the treatment for the poultry. However, the disease is still occurred severely. To this response, we have submitted 8 samples from infected chicken from Soksay Farm in Saysetha district Vientiane Capital to

the National Veterinary Diagnostic Laboratory in Vietnam, and also 8 samples from the same infected chicken to the Northeast Regional Animal Disease Diagnostic and Research Centre, Khone Kaen , Thailand for avian influenza disease confirmation. Finally, on 27 January 2004, the avian influenza positive tests were confirmed from these two laboratories.

Situation of the outbreak of Avian influenza

Nature of diagnosis : clinical signs, post mortem, and laboratory doagnosis
Date of initial detection of animal health incident : 27 January 2004
Estimate of first infection : 15 January 2004.

Location	No. of outbreaks
Vientiane Capital : (Saysetha , Saythany, Chanthabouly, Sisattanak Sikhottabong districts)	1
Savannakhet province : (Sayphouthong, Khanthabouly districts)	1
Champasak province : (Pakxe)	1
Total : ***(three provinces, 8 districts)***	**3**

Number of farms and number of poultry in the outbreak :

Species	No. of farm	Total number	No. of death	Destroy
I. Outbreak in Vientiane Capital :				
Chicken	33	107,000	33,039	73,961
Duck	2	2,422	1,295	1,127
Quail	3	2,600	2,600	0
Sub-total :	***38***	***112,022***	***36,934***	***75,088***
II. Outbreak in Savannakhet :				
Chicken	2	22,283	6,127	16,156
Duck	0	0	0	0
Quail	1	2,000	2,000	0
Sub-total :	***3***	***24,283***	***8,127***	***16,156***
III. Outbreak in Champasak :				
Chicken	1	500	63	437
Duck	0	0	0	0
Quail	0	0	0	0
Sub-total :	***1***	***500***	***63***	***437***
All total :	**42**	**136,805**	**45,124**	**91,681**

- So far, no vaccination is available for the control of avian influenza.

Part II. Spread of the disease

Up till now, about 44,500 heads of poultry died and 72,500 heads including chicken, ducks, and quails were destroyed. The situation of the spread of the disease define by time :

- First week (started from 10 to 17 January 2004	12 villages
- Second week :	8 villages
- Third week :	3 villages
- Fourth week :	0 village
- Fifth week :	1 village

Control strategies

Since the beginning of the outbreak :

1. The Ministry of Agriculture and Forestry (MAF) has paid specific attention to the strict control of the movement of poultry and poultry products, and has banned the import of the poultry and poultry products into the country. In addition, MAF has also released the notification on the preventive measures, and disseminated to all provinces.

2. To cope with the epidemic disease, the Prime Minister Office has also released the Decree to support the effective implementation on the control of the spread of avian influenza outbreak.

3. The Department of Livestock and Fisheries, which concerns directly in the implementation combat with disease outbreak, has came up the detailed plans of action for the effective and immediate prevention and control of spread of the disease.

4. Conduct the active surveillance of avian influenza in the whole ,and collect information on the cases.

5. To response immediately to this outbreak, the Department of Livestock and Fisheries has organized a technical team of veterinary service with the participation from different institutions, particularly mobile services Unit in order to gather all of the relevant data information on the outbreak situation. The Department of Livestock and Fisheries has also organized the permanent team work which based in the Department of Livestock and Fisheries to provide consultation on the control measures to farmers aiming to stop the spread of the disease from farm to farms as well as to prevent the spread of the disease from poultry. In this relation, the leaflets regarding the advices for farmers, butchers , and consumers for staying healthy and free from bird flu has been published and disseminated to public.

6. In term of collaborating with provincial level, the provincial authorities is become the network to report the information on the disease outbreak that occur in their provinces to the Task Force which bases in the Department of Livestock and Fisheries, and at the same time the provincial Livestock officers are also conduct the active surveillance and implement the Prime Minister Decree for the control strategies.

7. With regard to the personal protection, the Department of Livestock and Fisheries has received some personal protective equipment (PPE) from FAO, WHO, and the Department of Hygiene and Sanitary of the Ministry of Public Health for emergency assistance to protect the authorities as well farmers during culling out of chicken in the infected farms.

8. In term of international collaboration, the Department of Livestock and Fisheries has received the technical assistance from the National Veterinary Diagnostic Center in Hanoi,and the Northeast Regional Veterinary Diagnostic and Research Center in Khone Kaen Thailand for the confirmation of avian influenza cases. In addition, the department of Livestock and Fisheries has received the assistance from the Pasteur Institute that based in Cambodia for preliminary subtyping the pathogen of avian influenza that occur in Lao PDR.

9. Stamping out of the poultry of the infected farms is carried out by the task force team. which consist of the technical officers from different institutions and organizations concerned namely Department of Livestock and Fisheries, Department of Hygiene and Sanitary , Department of Agriculture and Forestry of Vientiane Capital, and the other authorities concern. Furthermore, the team is conducting the active surveillance within the 10 Km buffer zone of infected farms.

Control strategies to be put into action in the future

The control strategies to compete with the avian influenza are still rely on the control of the movement of poultry and poultry products, perform active surveillance and monitoring of the disease in the high risk areas. Furthermore, the strategies will also be performed the selective stamping out and disinfection the depopulated farms. Dispatch of the mobiles teams from the central levels will be continued to assist local staffs.

The Government of the Lao PDR would be ready stand to collaborate with the neighboring countries and the concerned competent regional and international organizations to combat in a harmonized manner the spread of the Avian influenza and to restore poultry production back to its normal trend.

Constraints

In dealing with the control of high pathogenic avian influenza, Lao PDR is still facing with the lack of capacity and high qualification of human resource available. In particular, no facility for the rapid diagnostic test technique available to provide timely the diagnostic results on avian influenza being occurred in order to support timely the decision of government on the control measures. In addition, epidemiological skills of the authorities at grass root level are still low. In addition, the fund support for the operation cost on the disease control activities is still limited.

Future Plan of avian influenza control operation frame work

1. Providing the personal protective equipment , disinfectant to the persons concern with the control of avian influenza and laboratory staffs

2. Set up the diagnostic facility for the diagnosis of avian influenza within the country.

3. Establish the information, education and communication and disseminate in a wide range throughout in the country.

4. Procure the budget support in the operating such frame work.

5. Rehabilitation the affected poultry production to its normal trend.

THE END

Annex 1. Spread of the avian influenza disease in Lao PDR.

Province	District	Locality	No. outbreak	Date of first observation	Date of probable first case	species involve	No. death	No. destroyed
Vientiane Capital	Saysetha	Nonsawang	1	15-Jan-04	13 Jan 04	layer chicken	2,100	950
		Chommany tai	1	28-Jan-04	28-Jan-04	Native chicken	1,000	150
		Xiengda	1	26-Jan-04		Duck	2,000	350
		Saengsavang	1	17-Jan-04		Broiler	1,146	0
		Soknoy	1	17-Jan-04		Cross breed	850	9,000
		Nongnieng	1	24-Jan-04		Quail	1,600	1,350
		Vangsai	1	23-Jan-04			97	525
		Phonxay	1	13-Feb-04			1775	5525
	Chanthabouly	Bona ngao	1	14-Jan-04		Broiler	959	1600
		Huayhong	1	14-Jan-04		Layer chicken	5404	19600
		Nongtha neu	1	19-Jan-04			950	300
	Saythany	Dongdok		16-Jan-04		Layer	2600	7950
		Saphangmeuk		20-Jan-04		Quails	2500	250
		Done noun		28-Jan-04		Broiler	2940	700
		Xangkhou		28-Jan-04		Duck	300	700
	Sisattanak	Donnokkhoum		14-Jan-04		Layer, quail	4246	4300
	Sikhottabong	Dongkalao		15-Jan-04		Layer, Broiler	200	800
		Dongnathong		15-Jan-04			1600	7785
		Nonsomboun		17-Jan-04			3388	6000
		Nongbeuk		18-Jan-04			910	675
		Akad		19-Jan-04			173	0
		Ang gnai		20-Jan-04			4	0
		Pakthang		17-Jan-04			824	0
	Hadxayfong	Somsanouk		28-Jan-04		Layer	345	255

		Nonghay		4-Feb-04			164	0
						Total :	***38,075***	***68,765***
Savannkhet	Khanthabouly	Phonsavanh		19-Jan-04		Layer	3394	1906
		Nonsavath		19-Jan-04		Quails	2975	1408
	Sayphouthong	Bung nady		20-Jan-04		Broiler	2000	0
						Total :	***8369***	***3314***
Champasak	Pakse	Thaluang		2-Feb-04		Layer	63	437
						Total :	***63***	***437***
						Total :	**46,507**	**72,516**

No. 7

AVIAN INFLUENZA IN PAKISTAN

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INTRODUCTION

Avian influenza is an infection of poultry caused by type A viruses of the ifluenza virus genus of the Orthomyxoviridae. Chicken and turkey are the main birds of economic importance affected by these viruses. Influenza A viruses are generally classified on the basis of their haemagglutinin (H) and neuraminidase (N) antigens. A total of 15 H and 9 N antigens have been reported in the literature.

Pathogenicity of avian influenza viruses vary greatly. It ranges from non-pathogenic to highly pathogenic types. Although a direct relationship of pathogenicity with H and N antigens has not been established, most of the pathogenic avian influenza viruses isolated so far belong to H_5 or H_7 type. However, many isolates of avian influenza viruses of type H_5 or H_7 with low virulence have also been isolated.

Avian influenza viruses are widely distributed in wild bird (particularly water fowls), geese and ducks. Thus their complete eradication is practically out of question. In fact we will have to live with avian influenza viruses and try developing measures by which AI viruses can be kept away from commercial poultry or can be controlled with minimum collateral losses.

POULTRY INDUSTRY IN PAKISTAN

Pakistan has two distinct type of poultry production systems; namely traditional rural poultry and commercial poultry.

1. Traditional Rural Poultry: More than 90% of rural families keep 5 to 10 hens and one or more cocks. Most of the birds are indigenous (desi) type but an increasing number of improved breeds such as Fayoumi and Rhode Island Red and their crosses are also kept. The birds live by scavenging and on household scraps. About 40% eggs and 25% of poultry meat produced in the country are estimated to come from rural poultry. Cockerels and adult females that have finished laying are eaten or sold. Rural poultry is attractive to rural families because it involves little cost. It is often said that poultry bird is the only animal, poor can afford to sacrifice for special occasions. The major problem may arise from disease outbreaks (mainly Newcastle disease) and epidemics may wipe out entire village poultry populations.
2. Commercial Poultry: There are four types of commercial poultry enterprise; breeding farms, hatcheries, layer farms and broiler farms. Breeding farms include grand parents, layer and broiler breeders. In some instances the four types are

integrated and may have links to a feed mill. The poultry industry is entirely in the hands of the private sector and modern production methods are the norm. The capacity of farms is fully utilized from September to March. To avoid the high summer temperatures breeding farms have been established in cooler hill areas in the north of Pakistan but ensuring year round supply requires careful management. The average farm consists of 10,000 birds but units up to 100,000 or more birds are not uncommon. The poultry industry is well-developed with estimated value of 55 billion rupees.

AVIAN INFLUENZA (AI) OUTBREAKS IN PAKISTAN

Avian influenza was never reported from Pakistan during 1963-1993, the period which saw poultry industry flourish from a single commercial poultry farm in Karachi to a full fledged industry spread throughout Pakistan.

The first outbreak of AI was seen at a broiler-breeder poultry farm at Salgran (a poultry farming region about 25 km north of Islamabad) in December 1994. Forty-five percent mortality was reported in two days, another 25 % died in next few days and the remaining birds were slaughtered by the farmer. This incident was followed by sporadic outbreaks with high mortality on the adjacent and nearby farms. The symptoms observed in the diseased flocks were anorexia, ruffled feathers and swollen faces with cyanotic combs and wattles. The hock joints were swollen with patchy discoloration of the shanks. The necropsied birds showed cyanotic carcasses, especially in the breast region. There was accumulation of mucus in the trachea which in some cases was congested. Patchy areas of haemorrhages were seen in the proventriculus and gizzard. Being not familiar with the disease, many veterinarians initially diagnosed the disease as ILT, ND or Swollen head syndrome. However, by February 1995, the disease was diagnosed as avian influenza. The disease was reproduced experimentally, virus was isolated, sent to World Reference Laboratory and typed as H_7N_3 (Naeem and Hussain, 1995). The isolate was found to be highly pathogenic (Afzal, et al, 2000). Epidemiological studies showed that some non vaccinated birds in the vicinity also showed seroconversion without any mortality . This was the first report of avian influenza in Pakistan. Serological evaluation of serum samples collected from different breeders in 1992, 1993 and 1994 did not yield any evidence of AI in Pakistan (Naeem, 1997).

In November 1998, an outbreak of disease of unknown etiology was reported in one of the heavily populated broiler-breeder regions in the Mansehra and Abbottabaad districts in northern Pakistan. The disease was reported mostly in breeding flocks of different ages, but flocks over 45 weeks old were mainly affected. Clinically the birds showed sudden decrease in egg production, facial swelling, listlessness and mortality of 2 to 3 % per day. Egg production fell from above 70 % to as low as 5 %. The major lesions at postmortem included tracheitis with blood clots in many cases, highly congested lungs with patchy pneumonic lesions, cloudy air sacs with caseous materials, oophoritis and egg peritonitis. These flocks were treated with various antibiotics and vaccines with varied results. AI H_9N_2 was isolated from these cases (Naeem et al, 1999). Experimental reproduction of disease resulted in mortality in 2/10 birds but all were found to positively

sero-convert to AI. Epidemiological studies carried out to assess the prevalence of avian influenza antibodies (Iddex ELISA) in southern Pakistan showed prevalence rate of 88 to 100 at 5 farms (3 with respiratory or reduced egg production problem and 2 apparently healthy farms). Subsequently, in another study involving 33 poultry farms (layers, broilers and broiler breeders) antibodies against H_9 AI were detected on all farms (respiratory problem history or not) in 54 to 83 % serum samples (Naeem et al, 2003). In 1999 in Karachi, a severe syndrome involving respiratory and gastrointestinal tract was reported in broiler and layers poultry farms. Mortality rate of 30 to 80 % was reported in broilers. Mortality in layers was 10-22 percent with severe drop in egg production. Studies carried out on this outbreak showed the involvement of H_9N_2 AI as shown by serology and virus isolation studies along with infectious bronchitis virus and some bacterial infections (Munir et al, 2001). Seven different isolates of AI H_9N_2 during this period were tested for their pathogenicity and were found to be of low pathogenicity type. However, these viruses showed increased mortality when infected birds were subsequently infected with infectious bronchitis virus, *Escherichia coli* or *Ornithobacterium rhinotracheale*. Furthermore, immunosuppressed chicken showed high mortality when challenged with this H_9N_2 virus (Bano et al, 2003).

Retrospective studies indicate that the recent outbreak most probably started in January-February 2003 in Gadap and Gulshan-e-Maymar areas in broiler farms along Super Highway in Karachi as isolated outbreaks. Only a few farms were hit. In March, a farm in Hyderabad was infected. By April it spread to Hub and Korangi areas. During June, the disease was also seen in nearby districts i.e. Sajjawal and Thatta. By November-December 2003, higher number of farms in these localities were affected. The youngest infected age group was 15 to 24 days but most of the outbreaks were seen in 3 to 5 weeks old broilers. Overall mortality was 20 to 50 percent. AI outbreak in layers at a farm was first recorded in February 2003 in Nooriabad along Super Highway. Isolated outbreaks were seen in April-May in the vicinity. During June-December 2003 and particularly in November-December, many outbreaks in layers were seen. Most of the outbreaks occurred in 40 to 60 weeks old layers although younger birds were also affected. High mortality of 70 to 80 percent was seen in most of the flocks. Disease was also reported in two broiler breeder flocks, a flock keeping indigenous poultry and even a pigeon flock (Arshad and Qureshi, 2004). Serological studies showed antibodies against AI H_7 and H_9. Viral isolation was attempted from 5 layer flocks. AI H7 was isolated from 4 flocks which were typed as H_7N_3 by World Reference Laboratory, Weybridge, UK. AI H_9 was also isolated from one flock along with a vaiant strain of IB (Naeem, K. 2004. Personal communications). Since January 2004, no new outbreak has been seen.

DIAGNOSTIC FACILITIES FOR AI

Diagnostic facilities for AI are present in Animal Health Labs., Animal Sciences Institute, National Agricultural Research Institute, Islamabad; a research centre of Pakistan Agricultural Research Council. These facilities include set-up for gel-diffusion, haemagglutination- inhibition test, virus isolation and PCR analysis. Most of the reagents are purchased from the international laboratories/sources. Facilities for ELISA are also available but are not routinely used for AI diagnosis.

Facilities for gel-diffusion, HI and virus isolation are also available in some provincial government institutes and universities imparting education in veterinary sciences. However, these will require necessary reagents and training if their services are to be utilized for AI diagnosis.

CONTROL OF AI IN PAKISTAN

Absence of required legislation and compensatory mechanisms for farmers resulted in not following stamping out policy for the control of AI in Pakistan. Thus Pakistan has followed AI control policy based upon the followings:

1. Voluntary stamping out by the farmers at the farm where highly pathogenic AI is diagnosed.
2. Movement control of the poultry and poultry products from the affected area. District government has the power to ban movement of animals.
3. Voluntary vaccination of the susceptible chicken population in the area.
4. Voluntary vaccination of the breeders (broiler and layers).
5. Proper disposal of the dead birds.
6. Increased biosecurity measures adopted by the farmers during and after an outbreak.

Following this policy, AI outbreak of highly pathogenic H_7N_3 was controlled in 1995 in 8 to 9 months. Similarly highly pathogenic H_7N_3 AI outbreak of 2003 was also controlled. However, since this policy is based upon the voluntary cooperation of the farmers, low pathogenic H_9N_2 could not be controlled through this policy.

AI vaccine was prepared by Veterinary Research Institute, Lahore during 1995 which was formalinized viral suspension without adjuvants. Later on oil-adjuvant vaccines were prepared and marketed by both public and private sector.

FUTURE STRAGTEGY FOR AI CONTROL

1. FAO TCP project: Government of Pakistan has signed a Technical Cooperation Programme with FAO in February 2004 to develop a control policy for AI in Pakistan. The project is also expected to do groundwork for a national epidemiological study of AI through surveillance, mapping, disease modeling and enhanced laboratory diagnostic capacity.

2. Epidemiology of the disease: Basic work on epidemiology of AI in Pakistan needs to be carried out. The study should particularly address emergence of the disease and its reservoirs in Pakistan.
3. Surveillance and monitoring: A programme of surveillance (serosurvellance as well as virus isolation) has been proposed to the government for vaccinated areas as well as areas where vaccination is not practiced.

4. Vaccination: Although Pakistan has the capacity to produce AI vaccine, quality control procedures need to be strengthened. Research on protection titres and improved quality of vaccine should also be carried out. Furthermore, we should also look at the vaccination policy based upon voluntary intake by the farmers. Should we develop a vaccine bank for AI? Should we go for homologous vaccine or venture into heterologous vaccine to differentiate between vaccinated and naturally infected birds.
5. Modified Stamping and Vaccination: A national emergency contingency plan for AI needs to be developed. This plan should be based upon modified stamping and vaccination policy and backed up by required legislation.

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No. 8/26

Avian Influenza Outbreak in Thailand

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Director-General
Department of Livestock Development

Laboratory Surveillance for HPAI 1997-2002

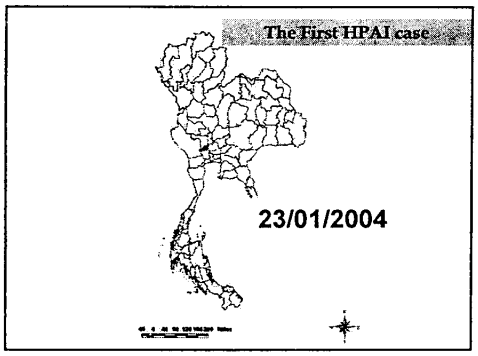
	# Sample	Result
Passive	3600	All negative
Active (Slaughter H.)	23,880	All negative
Active (Others)	514	All negative

Slaughter house surveillance for HPAI

Year	No. of samples	Results
2001	143,424	All negative
2002	108,648	All negative
2003	114,588	All negative

Note : one sample is a pooled cloacal swabs from 5 chickens

- Highly Pathogenic Avian Influenza was first isolated and confirmed in Thailand in January 2004



Emergency Response for Avian Influenza Outbreak in Thailand

Overall Operation

- Phase I : During the Outbreak
  - Eradication of the disease
- Phase II : Post Outbreak
  - Prove Freedom from disease
  - Pro-active surveillance
- Phase III : Surveillance and Monitoring
  - Long term surveillance

Phase I : During the outbreak

1.1 Initial

- Preemptive culling
  - With laboratory results
  - Depopulation and disinfection all flocks within 5 km radius (Control zone)
- Surveillance during the outbreak
  - all flocks within 50 km radius (Surveillance zone)
- Movement control
  - area within 50-60 km radius
- Public awareness campaign

Surveillance during the outbreak

- Initial Surveillance
- Second Surveillance
- Cloacal swabs for Viral Isolation
- Laboratory assays : OIE guidelines

[redacted]

- Area : every village, farm in the country
- Sampling: 95% CF
- No.samples: 75,623

[redacted]

- 161 cases (village, farm)
- 40 provinces
- 71 districts

H5N1 was isolated from

Broiler	19
Duck	11
Layer	12
Goose	3
Native Chicken	107
Turkey	3
Quail	9
Peacock	2
Total	161 cases

- Avian influenza viruses from Thailand are genetically very similar to the viruses isolated from humans in Vietnam (2004) as well as two human virus isolated from two patients in Hong Kong (2003)
- Low pathogenic avian influenza virus was also found

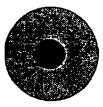
Phase I : During the outbreak

1.2 Later stage

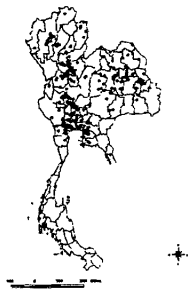
- **Second surveillance**
- **Preemptive culling**
  - **With laboratory result or suspected**
  - **Depopulation and disinfection all flocks within 1 km radius**

Second Surveillance

- Areas surrounding stamped out zone (>5-10 Km radius)



- Suspected areas (eg. low production, cases or deaths with other disease)



Second Surveillance

- 18 positive from ~8,500 samples (20 Feb 04)

Second Surveillance

- 17 cases locate in the previously positive provinces (40 prov.)
- One new case in one new province

(20 Feb 2004)

Results of the preemptive actions

- **Preemptive destruction**
  - **~ 30 million birds were culled**

Movement control

- 65 checkpoints were set up by the DLD to enforce the regulations
- More checkpoints by Police force etc.

Public awareness campaign

- 24 hr. call center
- Information, recommendation and guidelines have been distributed

Phase II : Post-outbreak

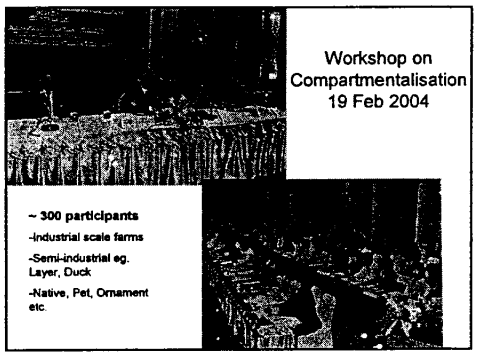
- To confirm freedom from disease (OIE)
- Includes clinical surveillance and laboratory surveillance
  - Control zone
  - Other
- Duration
  - Initial phase 30 days post outbreak
  - Later phase 5 months post outbreak

Phase III : Surveillance and monitoring

- For early detection of the disease
- Early warning system
- Long term
- Active and Passive surveillance
- All avian spp: farm, backyard, migratory, import, exotic etc.

Future Plans

- Center of Excellence for AI
  - Early detection
  - Early warning system
  - Risk Analysis
- Compartmentalization approach
- Research on vaccine and applications
  - No vaccination policy at present



Workshop on
Compartmentalisation
19 Feb 2004

~ 300 participants

-Industrial scale farms

-Semi-industrial eg. Layer, Duck

-Native, Pet, Ornament etc.

Thank you for your attention

Sawasdee

No. 9/56

AVIAN INFLUENZA IN VIETNAM

(Country report)

Dr. Dau Ngoc Hao

Vice Director of Department of Animal Health
Team leader of the MARD's Ad-hoc
Committee on Avian Influenza Control

Bangkok, 26-28 February, 2004

I/ GENERAL INFORMATION ON POULTRY AND VETERINARY ORGANISATION

II/ STITUATION OF THE AVIAN INFLUENZA OUTBREAKS

III/ CONTROL STRATEGIES

Part I

GENERAL INFORMATION ON POULTRY AND VETERINARY ORGANISATION

1.1. General information on poultry:

-Poultry production is traditional production

-Poultry population, approximate 253.9 millions

+ Chicken: 185.1 millions

+ Duck, Muscovik, Geese: 68.8 millions

-Natural distribution of chicken population

Ecological zone	Chicken population (millions)	Rate (%)
Red river delta	50,1	27
North East	34,5	18.6
Central North	27,2	14.7
Mekong river delta	26,6	14.4
South East	20,4	11
Central coast	11,0	5.9
Highland	8,8	4.8
North West	6,5	3.6

Diagram: Natural distribution of chicken population

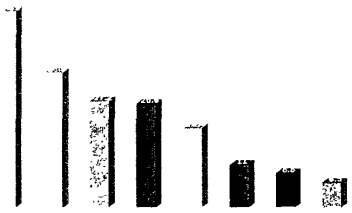


Table 1 Poultry population 1996 - 2003

Year	Total (millions)	Chicken	Duck, muscovik, groose
1996	151 41	112 89	38 62
1997	160 55	120.57	39 98
1998	167 89	126 36	41 53
1999	179 32	135 76	43.56
2000	198 05	147 05	51.0
2001	218 10	158.04	57 97
2002	233 29	159.45	73 84
2003	253 9	185 1	68 8

The table shows that the poultry population has been increased gradually every year The annual growth rate of chicken is around 6% and 10 2% with ducks There appears a significant increase in term of number and scale of commercial farms Apart from species mentioned above in the Table 1, there are other breeds such as quails, ostrich, pigeons, and pet raised in some specific areas

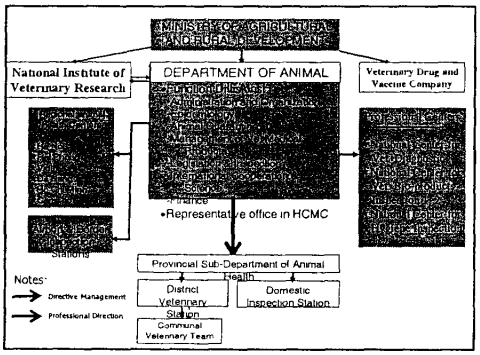
1.2. Veterinary Organisation:

The Ministry of Agriculture and Rural Development (MARD) is responsible for management of animal health.

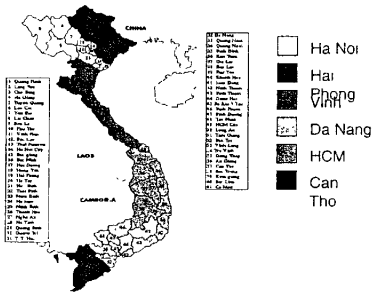
- At national level, there are some professional institutions belong to MARD such as the Department of Animal Health (DAH) and National Institute of Veterinary Research (NIVR). The DAH is responsible for administrative management of animal health in whole country.

- At provincial level, the sub department of animal health belongs to Sub-MARD is responsible for administrative management of animal health in province.

Look at Diagram of Veterinary Organisation



Regional veterinary centers



Part Ii

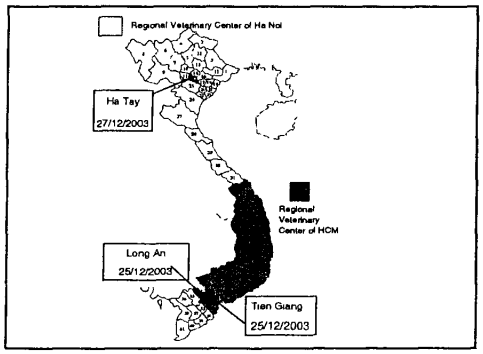
STITUATION OF THE AVIAN INFLUENZA OUTBREAKS

Date of start of the outbreak

On 25 December 2003, the first cases of avian influenza was reported from Tien Giang and Long An Provinces, then on 27 December 2003, from Ha Tay Province.

Outbreak Progress

Number of provinces, districts and communes has been affected by the outbreak is presented in Table 2 below:



ANIMAL HEALTH EMERGENCY OR FOLLOW-UP REPORT

1 E — No 0 1 — 2. 1 9 F e b 0 4 — Report date (dd/mmm/yy) — 3 Country: Viet Nam

4 Bui Quang Anh — Name of Sender — 5

6 Director — Position — Department of Animal Health

7 084 -48696788 — Telephone — 8 084 - 48691311 — Fax

9 quanganh dah@fpt.vn — E-mail — Address: Phuong Mai – Dong Da – Ha Noi

10. Highly Pathogenic Avian Influenza — Disease Name — 11. A 1 5 0 — Disease code

If emergency report → 12. Nature of diagnosis: ☐ Suspicion ☐ √ Clinical ☐ √ Post-mortem ☐ √ Laboratory

13. 0 6 J a n 0 4 — Date of initial detection (dd/mmm/yy) — 14. 2 7 D e c 0 3 — Estimated date of first infection (dd/mmm/yy)

15. Geographical location (provinces)	No. of new outbreaks	16. Species Code	Total number of animals in outbreaks: susceptible	cases	deaths	destroyed	slaughtered
Tiền Giang	91	avi	1,617,166			1,617,166	
Long An	152	avi	601,521			1,500,521	
Hà Tây	51	avi	600,869			600,869	
Cần Thơ	17	avi	54,967			54,967	
Sơn La	13	avi	14,136			14,136	
An Giang	143	avi	86,768			86,768	
Vĩnh Long	42	avi	25,560			25,560	
Thanh Hoá	42	avi	52,000			52,000	
Hà Nam	62	avi	35,201			35,201	
Phú Thọ	57	avi	51,490			51,490	
Yên Bái	24	avi	12,331			12,331	
Đồng Tháp	75	avi	80,869			530,178	
Bến Tre	60	avi	442,356			442,356	
Tây Ninh	22	avi	31,113			31,113	
Trà Vinh	10	avi	11,421			11,421	
Bình Dương	19	avi	201,336			201,336	
Đồng Nai	4	avi	30,250			30,250	
Cà Mau	28	avi	2,838			2,838	
Sóc Trăng	24	avi	74,901			74,901	
Thái Nguyên	27	avi	57,596			57,596	
Bình Định	14	avi	60,811			60,811	
Cao Bằng	1	avi	2,200			2,200	

Bạc Liêu	21	avi	103,867			103,867	
Vĩnh Phúc	33	avi	129,841			129,841	
Hải Dương	66	avi	196,309			196,309	
Hưng Yên	22	avi	42,004			42,004	
Kiên Giang	8	avi	1,437			1,437	
Quảng Nam	22	avi	363,664			363,664	
T. Thiên Huế	14	avi	43,874			43,874	
Lai Châu	17	avi	78,000			78,000	
Đắc Lắc	27	avi	17,820			17,820	
Đà Nẵng	23	avi	94,234			94,234	
Điện Biên	8	avi	48,622			48,622	
Lâm Đồng	8	avi	4,000			4,000	
Quảng Ngãi	3	avi	2,305			2,305	
Tổng số: 35							
Total	1247		5,253,508			6,621,985	

17. Description of (newly) affected population

18. Laboratory where diagnosis was made

National Center for Veterinary Diagnosis in Viet nam

19. Diagnostic tests used

Haemagglutination inhibition (HI) test: positive on 8 January 2004

20. Causal agent

Avian influenza virus subtype H 5 N1

21. Source of agent / origin of infection

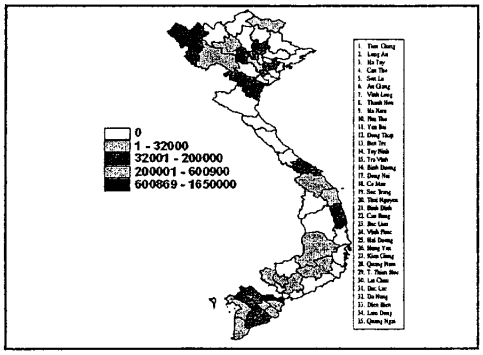
unknown; under investigation

22. Mode of spread

unknown

23. Other epidemiological details

24. Control measures during reporting period ☐ C ☐ Cn ☐ Cz ☐ D ☐ Qi ☐ S ☐ Sp ☐ Te ☐ V ☐ Vp ☐ Z



Susceptible animals

Infected species reported include chicken, ducks, quails and muscovik ducks.

Diagnostic

At the moment, in Vietnam there are two laboratories capable of making avian influenza diagnosis. The one responsible for the North of the country is the National Center for Veterinary Diagnostic (NCVD) and the other responsible for the South is the Ho Chi Minh Regional Veterinary Center.

Diagnosis methods:
+ Post-mortem
+ Laboratory diagnosis
- Identification of the agent The method of growing avian influenza A virus is by the inoculation of embryonated specific pathogen free (SPF) fowl eggs. 100% embryos died within 20-30 minutes and had haemorrhagic signs. The agent then, identified by HA and HI tests
- ELISA test was used to detect antigens.
+ Laboratory results Virus type A, subtype H5N1 were confirmed (local laboratories detected H5 antigen component and N1 was confirmed by CDC) CDC provided all diagnostic kits
+ So far there are total 774 samples has been examined
+ On 22 January 2004, DAH received 2 samples from Lao's, which then confirmed positive with H5 DAH had informed Lao's Department of Livestock and Fishery Production about the lab result.

Part Iii

CONTROL STRATEGIES

Administrative measures

+ On 6 January 2004, DAH reported to MARD on the outbreak in Tien Giang, Long An and Ha Tay Provinces

+ On 7 January 2004 MARD reported to the Government.

+ On 8 January 2004, the Government issued an telegram asking all provinces, cities and ministries to submit data on the outbreak and for establishing local ad-hoc committees for controlling the outbreak at different levels. The Government orders provincial authorities to release funds from the "Emergency Fund for Natural Calamity" for necessary measures applying in infected areas as well as to prevent the disease from further spreading

+ MADR has issued several guidelines on disease control and prevention On 9 January 2004, MARD's *Ad-hoc* Committee for Avian Influenza Control was set up.

Administrative measures

+ On 8 January 2004 DAH issued a guideline on avian influenza control and prevention

+ MARD held a number of scientific meetings on 7, 15 and 19 January 2004 to discuss control measures

+ On 28 January 2004, the Primer minister decided to establish the National Committee for prevention and control avian influenza. The Minister of Agriculture and Rural Development (MARD) was nominated the leader

+ The Primer minister has asked all the leaders of government's institutions to go to provinces for inspection of prevention and control avian influenza

Technical Actions Taken to Control the Outbreak

Quarantine

Infected communes/farms were surrounded with check-points established at all roads come to the infected areas. Surveillance zones of 10 km radius from the boundary of the outbreak has been identified and any form of animal movement being banned. Poultry and poultry origin products are not allowed to move out of the infected Province Provinces where the disease has not yet detected were called for not import chicken and chicken products from outside

Depopulation

It is required that all chicken in infected farms/communes must be destroyed by .burning or burying Compensation policy varies from province to province, in Long An, livestock owners receive 5000 VND (0.3USD) for a chicken being destroyed in the mean time in HCMC the amount of money is 15000 VND (1USD)

Hygiene and disinfection: infected areas were disinfected with different kinds of disinfectants.

People who often contact with infected chicken were provided with safeguard clothes.

Public awareness campaigns has been launched on mass media with respect to the pathogenicity of the disease, early detection of the disease based on clinical signs, lesions, and measures to control and prevent the disease.

Assistance from International Organisations

+ A team of FAO experts visited and has worked closely with Vietnamese veterinarians to evaluate the situation. FAO also provided 137 safeguard suits to Vietnam

+ OIE expert had came and contributed significant advice on control measures

+ CDC (USA) has sent diagnostic and epidemiology staff to Vietnam, as well as provided diagnostic equipment. And the NCVD/DAH has sent samples/isolates to CDC's laboratory for confirmation of results

+ HCMC Regional Veterinary Center had submitted samples to the Australian Animal Health Laboratory (AAHL), results awaiting AAHL also provided diagnostic materials such as standard antigen, antibody for use with HA and HI tests

Assistance from International Organisations

+ World Health Organisation (WHO) is working closely with human health staff and veterinarians to investigate and establish the relationship between disease in human and disease in animals; possibility of animal-to-human transmission has been examined

+ ADB provided 15 000 personal protective equiments such as mufflers, boots and gloves

+ WHO provided 3000 personal protective equiments

Informed about the recently presence of avian influenza other countries in the region such as in HongKong, South Korea, Japan, Indonesia, etc., MARD and DAH had developed a contingency plan in case the disease appears in Vietnam. However, due to this is the first time Vietnam has suffered from the disease, there had been some confusions initially in dealing with the disease, especially with regard to the applying of the stamping out policy recommended by OIE. Furthermore, due to lack of adequate equipment and expertise, local laboratories could not performed as good as expected at the beginning of the outbreak

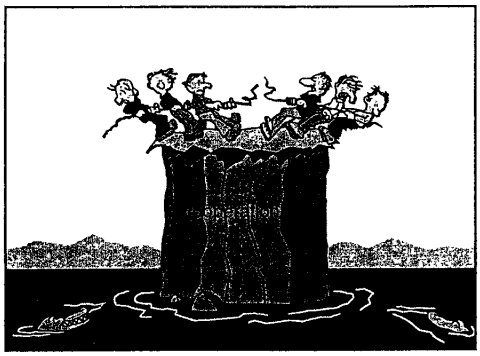
Compensation policy is not consistent over the country because funds have been heavily relied on provincial budgets. There was no independent fund for disease control established in Vietnam previously

Animal movement control has not been carried out strictly enough due to inadequate compensation policies, complicated geographic boundaries and the small-scale farming system The task of animal movement control has became much more difficult because higher demand for food during the Tet Festival

Discussion and Recommendation

At this stage, speed of spreading is slowing down, however, the risk of spreading is still very high. Probably all Provinces in the Red River Delta and Mekong River Delta areas will be affected.

Based on the disease status at present, DAH is seeking further assistance from OIE, CDC, WHO and other countries, especially with respect to diagnosis matters. On the other hand, consultation on disease control measures from FAO, Japan, Thailand, and other countries is highly appreciated.



Vaccination as Part of an Avian Influenza Control Strategy

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Wim de Körverstraat 35, 5830AA, Boxmeer, The Netherlands

Introduction

Avian influenza is a disease capable of causing extremely high mortality amongst infected poultry. Influenza viruses have a worldwide distribution and although not endemic in commercial poultry sporadic outbreaks do occur. In recent times these outbreaks have been occurring with increasing regularity. Outbreaks are typically of a low pathogenic form of avian influenza (LPAI). Past experience indicates that in a susceptible domestic poultry population, circulating LPAI (especially H5- and H7- subtypes) has the ability to mutate into a more devastating high pathogenic avian influenza (HPAI) resulting in Fowl Plague.

HPAI is an OIE List A disease, hence the accepted control measure is implementing a "stamping out" procedure. All poultry that are infected, suspected of being infected or suspected of being contaminated are culled. This is accompanied by severe restrictions on the movement of poultry, personnel and related industry activities within the designated quarantine area. However in areas with high poultry density these stringent control measures may not be sufficient in curtailing the spread of the virus as has been experienced with the current HPAI outbreak in The Netherlands. During a nine-week period (01/03/2003 – 02/05/2003) the virus has spread from an initial outbreak involving six poultry farms to a total of 243 confirmed cases, with new cases being confirmed daily. This is despite culling more than 21 million poultry during this time period and all efforts at strictly controlling movement within the industry. With the virus now jumping the border into Belgium questions must be asked whether there are not more effective strategies to control such an epidemic.

Avian Influenza Vaccination

Vaccination as an additional control tool has been used with success in controlling LPAI[5] outbreaks as well as HPAI outbreaks in the past (1995 - Utah, USA; 2000 – Italy* [3] & California, USA; 2001 – Hong Kong*; 2002 - Colorado, USA). At the Fifty-Second Western Poultry Disease Conference held in Sacramento, California during March 2003 Capua and Marangon[2] proposed a scheme, summarised in Diagram 1, whereby vaccination is included in the control strategy in certain scenarios.

The concept of vaccination in the face of HPAI is however met with much resistance based on the arguments that it is not in line with OIE or EU control strategies, would have an negative impact on export trade agreements and potentially masks the symptoms of the disease thus removing the most significant early warning signal for HPAI – acute increase in mortality.

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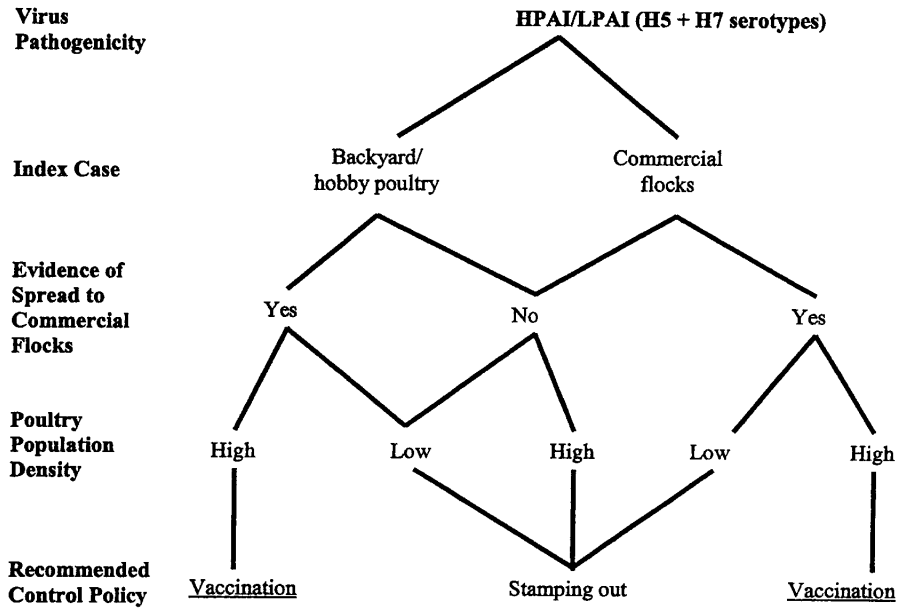
* Outbreaks reported as HPAI.

Diagram 1. Guidelines for the application of emergency vaccination for avian influenza infections.(Adapted from Capua and Marangon 2003)



Trade Regulations

As a list A disease (OIE) an HPAI outbreak has serious trade implications, such as a possible export ban on poultry products. Article 2.1.14.2. of the document 'International Animal Health Code (2002)' of the 'Office International des Epizooties'(OIE) defines a country as HPAI free:

- when it has been shown that HPAI has not been present in the country for the past 3 years, or
- six months after the slaughter of the last affected animal for countries in which a *stamping-out policy* is practised with or without vaccination.

Claiming this free status is achieved by the lack of fresh outbreaks and sufficient proof that repopulated flocks remain AI seronegative. AI vaccinated flocks test seropositive, thus effectively complicating the surveillance required to declare a region free of HPAI. However, by vaccinating with a heterologous vaccine and applying the "DIVA" (Differentiating Infected from Vaccinated Animals) monitoring strategy it is possible to demonstrate that there is no circulating virus in the vaccinated population. This principle was successfully used to lift trade bans in Italy during the 2000 Italian AI outbreak (Decision 2001/847/EC[**]).

[**] Official Journal of the European Communities (1.12.2001). Commission Decision of 30 November 2001 amending for the third time Decision 2000/721/EC to modify the Italian avian influenza vaccination programme and current trade restrictions for fresh meat originating from vaccinated turkeys

DIVA Strategy

The DIVA strategy[4] is based on the use of an inactivated oil emulsion vaccine containing the same haemagglutinin (H) subtype as the field virus, but a different neuramidase (N). The homologous H group ensures protection while it is possible to differentiate vaccinated from infected birds based on the serological response to the N group using an indirect immunofluorescence test. Vaccinated birds should only test positive to the N group used in the vaccine, a positive reaction to the N group of the prevailing infective virus would indicate a field challenge.

Reduction of Virus Excretion

What is the advantage of vaccination? The most significant benefit of vaccination is the dramatic reduction in virus shedding from infected birds, reducing the load of environmental contamination and consequently containing the spread of the virus. In a published article by Swayne et. al.[6], SPF chickens vaccinated at day old or 3 weeks of age with an inactivated whole AI vaccine (H5N2) were challenged 4 weeks later with the HP A/Hong Kong/156/97 (H5N1) influenza virus. Two days post challenge Swayne demonstrated a reduction in the re-isolation rate of the challenge strain from vaccinated birds in comparison to unvaccinated controls. Of more significance though was a significant reduction in the titre of virus re-isolated from vaccinated chickens in comparison to unvaccinated controls. Results of this trial are summarised in table 1.

Table 1. Response of chickens vaccinated at 1 day and 3 wk of age with a commercial H5 inactivated AI vaccine and challenged intranasally 4 wk post vaccination with HP 156/97. (Adapted from SWAYNE et.al. 2001)

Group	Age at vaccination	Morbidity (no. ill/total)[A]	Mortality (no. dead/total)[AB]	Virus isolation day 2 PC (no. positive/total)[AC]	
				Oropharyngeal	Cloacal
Unvaccinated	1 day	$10/10^{a}$	$10/10^{a}$ (2.4)	$10/10^{a}$ (6.1)^{a}	$10/10^{a}$ (4.1)^{a}
AI vaccine	1 day	$0/10^{b}$	$0/10^{b}$	$8/10^{a}$ (2.6)^{b}	$0/10^{b}$ (≤0,9)^{b}
Unvaccinated	3 wk	$10/10^{a}$	$10/10^{a}$ (2.7)	$10/10^{a}$ (6.3)^{a}	$10/10^{a}$ (3.7)^{a}
AI vaccine	3 wk	$0/10^{b}$	$0/10^{b}$	$4/10^{b}$ (1.2)^{b}	$0/10^{b}$ (≤0.9)^{b}

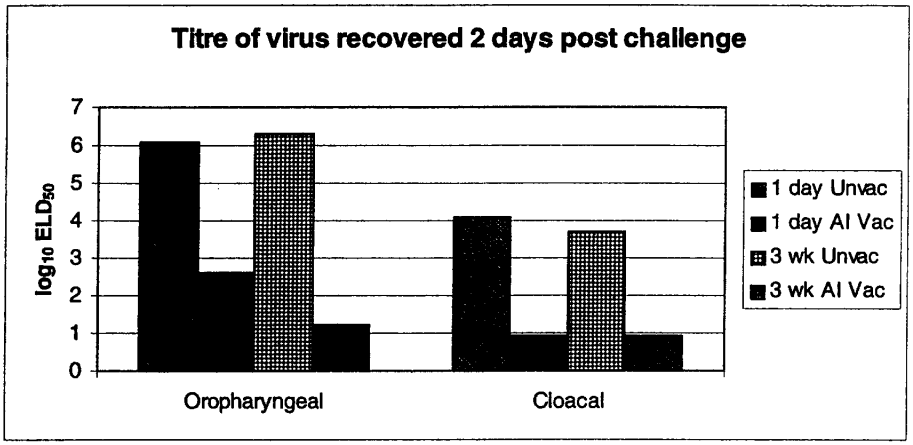
A Different superscript lowercase letters indicate significant difference in frequency between the AI vaccine and sham groups (Fisher exact test, $P<0.05$).

B Mean death time (in days) in parentheses

C In parentheses: Mean $\log_{10}$ titer expressed in ELD_{50}/ml; for statistical calculations, all isolation attempts without recovery of virus were given a value of $10^{0.9}$ ELD_{50}/ml. Data were not normally distributed. Significant differences ($P<0.05$) in titers for oropharyngeal swabs and cloacal swabs (Kruskal-Wallis test) were noted. Different superscript lowercase letters denote significance (Dunn multiple comparison test, $P < 0.05$).

Recent unpublished work by Dr Werner of the Federal Reseach Centre for Virus Diseases of Animals and the German National Influenza Centre confirm the findings of Dr Swayne. Twelve-week-old Lohmann Brown hens were vaccinated with half of the recommended dose of an inactivated AI vaccine (H7N1, Nobilis®Influenza H7, Intervet) and challenged 5 weeks later with the HP A/chicken/Italy/445/99 (H7N1) influenza virus. Werner also demonstrated a reduction in the number of chickens excreting virus as well as a dramatic reduction in the titre of excreted virus re-isolated from infected organs. Results of this trial are summarised in table 2 and graph 2.

Graph 1. Graphic representation of the titre of the recovery virus as tabulated in Table 1.



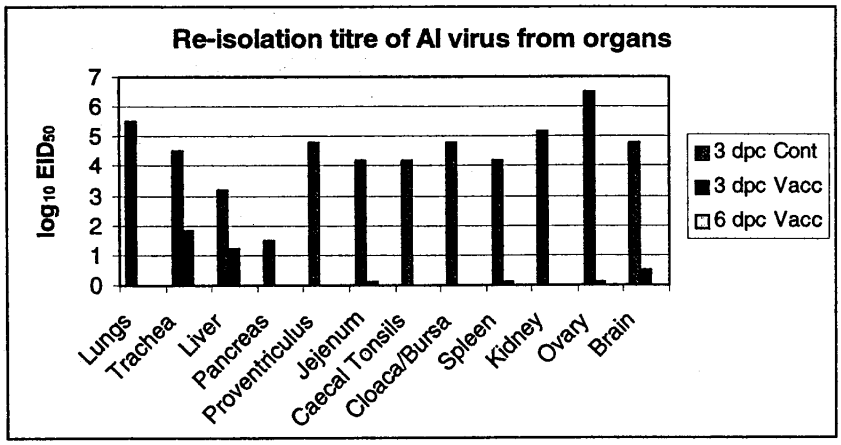
1 day Unvac = 1 day old chickens not vaccinated, challenged at 4 weeks of age.
1 day AI Vac = chickens vaccinated with an AI vaccine at 1 day of age, challenged four weeks later.
3 wk Unvac = 3 week old chickens not vaccinated, challenged at 7 weeks of age.
3 wk AI Vac = chickens vaccinated with an AI vaccine at 3 weeks of age, challenged four weeks later.

Table 2. Excretion of challenge virus (HP A/chicken/Italy/445/99), reisolation from throat and cloaca.

Group	No. of animals positive/group days post challenge					No. of animals pos./total	No. of samples pos./total
	2	3	6	8	10		
Vaccinates	1/10	1/10	0/10	2/9	0/10	4/10	4/49
Controls	10/10	6/6	NA			10/10	16/16

NA: not applicable, all controls dead

Graph 2. Re-isolation rate of challenge virus (HP A/chicken/Italy/445/99) from organs at 3 and 6 days post challenge



3 dpc Cont = Titre of virus isolated from controls 3 days post challenge.
3 dpc Vacc = Titre of virus isolated from vaccinated birds 3 days post challenge.
6 dpc Vacc = Titre of virus isolated from vaccinated birds 6 days post challenge.
No controls survived till 6 days post challenge.

Role of Vaccination in a Control Strategy

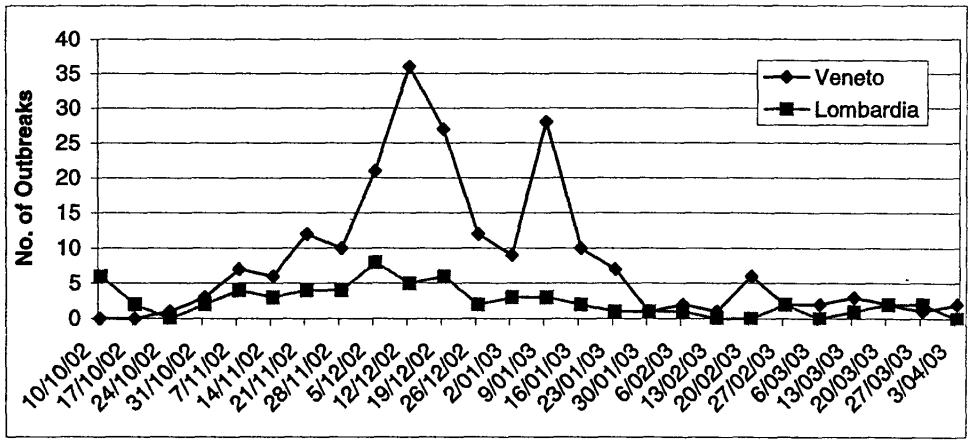
Vaccination should not be considered as a panacea to replace existing eradication procedures, but rather as an additional tool available for the containment and eventual eradication of AI from an infected area. Capua and Marangon[2] propose the following crucial steps in a successful AI control strategy. Firstly the index case must be promptly identified. This is not problematic when faced with a HPAI outbreak, but outbreaks of LPAI may go undetected for extended periods of time in the absence of routine surveillance strategies. For this reason Capua and Marangon suggest that countries or areas at risk of AI infection implement specific surveillance systems to detect infection with AI as soon as it appears. Secondly, a timely assessment of whether there has been spread to the industrial poultry population of that area should be performed. This is a crucial evaluation that must be made available to decision makers. Finally if the decision is made to vaccinate this should be implemented with urgency, necessitating the availability of vaccine banks. It takes 2-3 weeks before protection starts to develop post vaccination; hence the more prolonged the delay in the implementation of vaccination the higher the risk of the AI virus spreading unchecked. In addition a territorial strategy must be implemented to perform the adequate controls and assess whether the virus is circulating or not in the vaccinated population. This is crucial to the lifting of export trade bans.

Field Experience

During 2000-2002 a heterologous inactivated AI vaccine (H7N3) was successfully used to supplement control measures in the eradication of the 1991/2000 AI subtype H7N1 outbreak in Italy.

In October 2002 a different outbreak (LPAI subtype H7N3) was identified in a poultry dense area of Italy and a decision was taken to vaccinate. To implement the DIVA strategy a vaccine containing a heterologous N to the field virus was required. As there was no immediate suitable product available within the EU the vaccination campaign had to be delayed. The consequence of the delay as reported by Capua and Maragnon[1] was a massive spread of infection. Vaccination commenced towards the end of December. Weekly outbreak data is summarised in Graph 3.

Graph 3. Weekly distribution of LPAI (H7N3) outbreaks in Italy, per region. (*Source: Website of Centro Regionale Epidemiologia Veterinaria, Veneto.*)



Cost Evaluation

A group of scientists[5] evaluated the costs of a number of large LPAI outbreaks controlled by different measures. They reported a 100-fold difference in cost between the least and the most expensive campaign (Summarised in table 3). As a result of their investigation they propose a new model for controlling AI, a model that would draw from poultry industry expertise and government expertise to quickly, cooperatively and cost-effectively stop AI outbreaks. Their suggested control program calls for strict Biosecurity effectively halting all off farm movement of dead birds and manure. The movement of birds, eggs people and equipment should be strictly controlled. Controlled processing of all virus negative meat birds of a marketable age with a concurrent interruption of placement schedules is recommended. If following assessment the decision is made to vaccinate long-lived birds vaccination should commence as soon as possible and vaccinated flocks are under quarantine. Controlled repopulation of the area may commence after no new infected flocks are detected for four weeks. When all flocks are virus negative the outbreak is considered over, but antibody positive flocks remain under quarantine. Although this report specifically addresses LPAI there should be no reason why such principles are not considered in the control of HPAI.

Table 3. Costs associated with large LPAI outbreaks. (From Halvorson et. al. 2003)

Outbreak	Year	Serotype	Flocks	Cost*	Control**
Minnesota	1978	H6N1	141	$ 13.9 M	CM
Minnesota	1988	H2, H9N2	258	$ 5.1 M	CM
Minnesota	1991	Multiple	110	$ 1.3 M	CM
Minnesota	1995	H9N2	178	$ 7.4 M	CM
Utah	1995	H7N3	220	$ 2.6 M	Vac & CM
Italy	2000	H7N1	88	$ 10.3 M	Des & CM
			586	$ 2.6 M	Vac & CM
California	2000	H6N2	NA	NA	Vac & CM
Virginia	2002	H7N2	197	$ 149.0 M	Des & CM
Colorado	2002	H8N4	NA	NA	Vac & CM

* 2002 dollars

** Biosecurity is assumed in all outbreaks, CM=controlled marketing, Vac=vaccination, Des=destruction, Na=not available, costs have not been calculated yet.

Conclusions

The advantages of including vaccination in an HPAI strategy:

- Significant reduction in virus shedding from infected birds.
- Minimise the need for mass culling of healthy poultry flocks.
- Feasible alternative for high value poultry flocks and backyard/hobby poultry flocks
- Economically less devastating to the poultry industry

Perceived disadvantages:

- Non-compliance with international trade regulations. Vaccination is accepted as a control measure by the OIE (Article 2.1.14.2. of the document 'International Animal Health Code (2002)' of the 'Office International des Epizooties')
- Vaccinated flocks do not show AI symptoms. Placing 60 clearly tagged AI negative sentinels in each flock can solve this problem.

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附錄三　會議結論與建議

Recommendations of the joint FAO/ OIE Emergency Meeting on Avian Influenza Control in Animals in Asia
Bangkok, Thailand 26-28 February 2004

Group 1
Situation, Notification, Achievements, and Recommendations

1. Situation and Notification:

Heavy losses in poultry populations commenced in the region in mid 2003. Starting in Dec 2003, nine countries and territories[1] in the region have reported confirmed outbreaks of H5N1 to OIE. Since early Feb. 2004 outbreaks have not been reported from additional countries.

The geographic distribution, rate of spread and severity of this epizootic are unprecedented. It is estimated that more than 100 million birds have died or have been killed in stamping out measures following OIE guidelines. Two countries have used vaccination as an additional disease control tool (Indonesia and China).. In addition, Pakistan is currently experiencing an outbreak of H7N3 and has adopted a strategy of stamping out combined with vaccination.

The origin of the H5N1 outbreak and the mechanism(s) for its rapid and vast dissemination, both nationally and internationally, is not yet understood. The disease has had disastrous affects on the poultry industry through its impact on international trade and domestic consumption of poultry products. The public health impact has been most apparent in Viet Nam and Thailand with the deaths of 22 people. In some countries the disease situation is not clear because of weaknesses in diagnosis, surveillance capacity and variable adherence to obligations for timely and accurate reporting.

More frequent updates of the disease situation in animals is necessary to allow preventive measures in neighboring countries and to facilitate emergency preparedness for any necessary animal and public health interventions.

Reporting of significant animal disease events should be independent of commercial and political considerations.

2. Achievements:

Achievements to date have been significant.

There is evidence that in some countries the massive control efforts undertaken have reduced the overall level of disease. In other countries the disease situation is not clear.

Countries have taken various disease control measures including culling infected flocks, quarantine and movement control, disinfection of affected premises and emergency vaccination in some countries. However, implementation of these measures should be broadened, strengthened and tailored to individual country situations.

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[1] Cambodia, China, Indonesia, Hong Kong SAR, Japan, Laos, Republic of Korea, Thailand and Vietnam

Contingency plans have been prepared and activated by non-infected countries.

Efforts have been undertaken to link the activities by the different national ministries such as agriculture, human health, and trade to address this epizootic through a multi-sectoral and comprehensive approach.

3. Recommendations:

A regional avian influenza coordination group should be formed to facilitate joint decision making, information sharing and training.

Member countries better fulfill their obligations for early and regular disease and epidemiological information notification to the OIE.

There should be an agreed mechanism for the systematic collection and epidemiologic analysis of all animal disease outbreak data, and comprehensive molecular analysis of field virus strains.
This should be linked to public health surveillance systems.

The capacity of national animal and public health services for disease surveillance, response, control and prevention activities should be strengthened.

Group 2
Control Strategies for Highly Pathogenic Avian Influenza (H5N1) in Asia
Incident Action Plan

The overall goal for response to a Highly Pathogenic Avian Influenza is to detect, control, and eradicate the agent as quickly as possible to return individual farms to normal production and the Country to disease free status. The response target time to accomplish this goal should be four months or less, as response efforts become more difficult to maintain after such a period of time. Avian influenza may impact the abundance, availability, cost, or safety of the Country's food supply, and the ability to market agricultural products. Control and elimination of avian influenza relies on three basic principles which make up the operational components of a response:

- Preventing contact between susceptible animals and HPAI agents is accomplished by the following actions: quarantine and movement controls, biosecurity measures, and epidemiologic investigations with risk assessments, tracing, and surveillance.

- Stopping the production of the agent by the infected animals. This is accomplished using euthanasia and disposal of infected and exposed animals.

- Increasing the disease resistance of susceptible animals. This is accomplished by strategic vaccination.

To accomplish the control of HPAI the following is a summary of the specific recommendations were discussed by the participating countries:

Organizational Approach to the Delivery of Control Strategies

Throughout the course of the presentations by both infected and non infected Countries the need for cooperation across county boundaries was a common theme. For any country's program, be it to eradicate the disease or remain free depends upon their neighbour's success. For this reason it is imperative that the following be implemented immediately:

- A regional coordination group should be formed by FAO, OIE, WHO and the Central Governments of the Countries in the region to allow joint decision making, resource and information sharing. This group should establish goals and objectives of the regional plan in sufficient detail to guide planning and operations.

- Establish a Veterinary Task Force in charge of preparing emergency control, contingency, and response plans should include, among others from other Agencies, individuals responsible for the public health sector for consultation by these authorities.

- Each Country will need to assess and further develop adequate capacity within their veterinary infrastructure (human resources, equipment and laboratory supplies to name a few) to accomplish the recommendations contained in this report.

- The development of emergency preparedness programs should be completed to prevent the establishment of infection or reinfection.

- A zoning approach to expand free areas while driving the disease into smaller and smaller pockets is essential to control within the region.

- A regional laboratory network system needs to be established as the closest laboratory may be in a neighboring county. This would also allow reagent production and sharing as needed.

- Development of common educational materials for biosecurity and public health should be completed and shared with the region for translation and distribution across the region would be essential for biosecurity and containment.

Notification

- International reporting standards of the OIE is essential to establish confidence on the world stage of veterinary actions and progress toward stated goals.

- Additionally, the development and use a common daily situation reporting format that can be used for internal planning purposes is critical to continual evaluations of the program. This reporting format should be simple but sufficient to demonstrate progress toward goals.

Country Zoning/compartmentalization, Quarantine, Movement Controls and Surveillance

The primary means of spread is by movement of infected birds, materials or means of transport. While each country has applied quarantine and movement controls in known infected areas adequate surveillance may not have been conducted in what is thought to be "free" areas. Participants also discussed the need for a coordinated regional approach to eradication.

- Poultry populations should be divided into 3 categories (industrial commercial poultry, small commercial production and village poultry (subsistence farming and pet birds).

- Countries should move to a system of zones based on populations of poultry, geographic areas or disease status with the aim of developing free zones and recovery of export capacity.

Epidemiology

Given the unprecedented nature of the current disease outbreak it is inadequate on a global scale to allow a country by country epidemiologic report. A regional epidemiologic study must be conducted to assist in decision making and planning for the region.

- Resources should be made available to conduct an epidemiologic assessment by international and local experts to develop a descriptive epidemiologic analysis of the outbreak.

- A molecular analysis of isolates should be conducted with the assistance of the OIE/FAO/WHO reference laboratories to complement the epidemiological analysis.

- Support for research on disease transmission among other things to help control the disease in the region.

Strategic Vaccination

A discussion of the use or non use of vaccine followed a presentation on the advantages and disadvantages of vaccines for avian influenza. The generally acceptable summary of that discussion is that:

- Vaccine is a valuable tool in the control and elimination of avian influenza
- Vaccine alone is unlikely to lead to a successful eradication; however vaccination combined with stamping out and adequate surveillance will likely lead to eradication in less time.
- Strategic vaccination in birds, if accompanied by appropriate surveillance will reduce the amount of virus excreted and lead to less viral exposure for humans.
- Vaccine, if used, must be produced in accordance with OIE guidelines.

Stamping-out policy for infected poultry (including Valuation, Disposal, Cleaning and Disinfection, Biosecurity and Animal Welfare)

- Infected and susceptible animals will be euthanized and disposed of as soon as possible but striving for the recommended time of within 24 hours.
- Susceptible animals and on all suspect premises will be subject to regular inspection and observation over two or more incubation periods of the disease.
- If resources are limited, premises will be prioritized so that those with high potential for active spread of the agent are acted on before those that do not have a high potential for active spread.
- Depopulation should be accompanied with adequate and timely compensation payment to owners of animals and materials requiring destruction to prevent the spread of avian influenza.
- A study should be conducted looking at alternatives to compensation and analyzing the hazards, risks and alternative schemes for compensation should be conducted.
- Provide humane euthanasia methods for all animals to be euthanized.
- Contaminated and potentially contaminated materials, including animal carcasses, will be properly disposed of within 24 hours of the destruction of the susceptible animals. Disposal will be done in a manner that does not allow the avian influenza agent to spread, has little to no effect on the environment, and conserves meat or animal protein if logistically supportable from a biosecurity viewpoint.

- All premises on which animals are euthanized and disposed of will be required to be cleaned and disinfected.

- Biosecurity procedures to prevent the spread of avian influenza will be implemented within 24 hours of the identification of the first presumptive positive premises

Wildlife Management

Massive killing of wild birds thought to be pests in the region lead to massive famine and failed crops since the wild birds in fact were controlling crop pests more than being crop pests. Therefore wildlife not only warrant protection due to the aesthetic and cultural values, but also because of the ecosystem "services" provided at very low costs by animals and plants in the environment. As a result:

- Wild birds should not be depopulated in an attempt to control avian influenza but separation, as much as possible should be attempted.

- Reducing contact rates between wild birds and large commercial poultry operations to prevent wild waterfowl from direct or indirect contact.

- Village poultry health care programs, including possible vaccination programs and certainly health/husbandry education is the best approach to 1) provide entree for surveillance operations, 2) reduce disease incidence, 3) improve rural livelihoods, and 4) reduce the threat or introduction of diseases into wild bird populations.

- Ministries of Agriculture, as well as Ministries of Natural Resources should limit the trafficking of wild birds, and ban the mixing of domestic and wild animals in live markets.

- Wildlife infectious disease surveillance programs, both in semi-urban areas and in remote, rural areas may provide insights and early warning about diseases circulating in the wild prior to livestock outbreaks.

- Investment in raising awareness and capacity building is needed to allow more countries to begin integrating health monitoring programs as they develop natural resource management efforts.

Rehabilitation

- Plans to rebuild the poultry sector must be developed and implemented to set the poultry industry in a more biosecure position and protect livelihoods.

- Establishment of educational programs for improved poultry production should be started.

Group 3
Human Health

Conclusions,

- The occurrence of avian influenza in Asia is unprecedented in scope and geographical distribution.
- There is a clear link between the occurrence of highly avian influenza in humans and a history of exposure to poultry infected with highly pathogenic avian influenza.
- Where outbreaks are still present in animals, there remains a risk to public health.
- Since the source of infection is of animal origin, control strategies should be focused on avian species and prevention in other susceptible animals, including humans.
- Continued enhanced surveillance of both animal and human disease and transparency in sharing of information is essential for improved decision making.

Recommendations,

- Veterinary Task Force in charge of preparing emergency control, contingency, and response plans should include, among others from other Agencies, individuals responsible for the public health sector for consultation by these authorities.

- Preventing infection in individuals at higher risk of exposure (veterinarians, cullers, laboratory workers, health care workers, etc) should involve provision of personnel protective equipment (PPE), vaccines and antivirals, training, technical guidance, and advisories. Those individuals who, either working in specific diagnostic laboratories or in field control actions may be exposed to high concentrations of virus, should have baseline serum drawn.

- Public awareness programme for avian influenza should focus on health hazards of handling infected or diseased birds (farmers, children), or contaminated equipment and material (egg crates, cartons, bird cages, ...).

- Potential public health consequences of selected strategies for the control of HPAI should always be considered. In dealing with a zoonotic infection, the veterinary services should consult with the public health sector when developing animal health country or regional programmes. Accepted tools and procedures used for the control of the disease in animals (e.g., vaccines) should also decrease the risk of exposure of the infection in the human population at large. As new tools (e.g., new vaccines) become available these should be assessed to ensure they do not pose human health risk.

- There is no risk to human health from consumption of wholesome and properly cooked, or processed products, including eggs. Good hygienic practices should always be applied in food preparation.

- Potentially exposed, known infected, or diseased poultry which are culled, should never enter the human or animal food chain, and be must be properly disposed of. Eggs produced under systems of potential or known exposure should likewise not enter food chains.

- Samples of animal origin should be sent to the national reference veterinary laboratory for preliminary or primary diagnosis with further dispatch to reference laboratories. Reference laboratories of OIE, FAO, and WHO, are recommended to share timely results of their analysis with other laboratories, the world community and most certainly the authorities of the country of origin. Samples of the material and/or isolates should be shared with appropriate laboratories able to handle the agent in question and possessing proper import permits. Veterinary laboratories should conduct diagnostic procedures according to the OIE *Manual of Standards for Diagnostic Tests and Vaccines.*

- External communiqués by UN bodies and the OIE, as they relate to zoonotic disease control where concerted action is warranted, should deliver concordant messages.

Group 4
Regional and International Co-ordination, approach to countries

1) Asian member countries of the FAO and OIE have outlined their national strategies related to the control of highly pathogenic avian influenza (HPAI). They will take into account the recommendations from FAO-OIE Conferences held in Rome (3-4 February, 2004) and Bangkok (26-28 February, 2004) to prepare their short, medium and long term programmes related to the control of HPAI and other priority epizootics in animals to protect public health and to rebuild their poultry sector where relevant.

2) ASEAN and SAARC are the relevant institutions for the coordination of regional policies for animal health, in their member countries under the guidance of the Regional Steering Committee of Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs).

3) Member countries and donors will refer to the preliminary FAO-OIE assessment of needs defined during the Bangkok Conference (26-28 February, 2004) as a guide for bilateral and regional arrangements.

4) Emergency preparedness plans must be developed in each country and at regional levels to allow rapid response to new outbreaks of highly contagious diseases.

5) Member countries and donors will refer to the OIE standards as references in the definition of new policies on animal health and zoonoses to be implemented through national and regional programmes for the short, medium and long-terms.

These standards include:
- Quality of vaccines;
- Diagnostic methods;
- Quality and evaluation of Veterinary Services;
- Humane killing of animal and carcasses disposal methods;
- Safety of animal and animal products in regional and international trade;
- National surveillance and notification procedures of animal diseases to the OIE; and,
- Zoning and compartmentalization.

6) Member countries and donors will refer to WHO guidelines for all occupational human health and safety.

7) The world-wide FAO-OIE GF-TADs is an appropriate mechanism to ensure harmonization of policies to be implemented to face the avian influenza crisis and other epizootics in Asia. In this context, four Regional TCPs and six National TCPs have already been approved (5.5 million USD). Other emergency donors contributions have also been made available to countries.

8) Member countries and donors consider that the benefits of prevention outweigh the cost of emergency response.

In addition, the final general session in its final deliberations, recommended that the Chief Veterinary Officer or his/he representative of infected countries and countries at risk meet again in mid-2004 to monitor progress o the implementation of the programme.