出國報告（出國類別：國際會議）

赴德國柏林參加第二屆國際流感研討會「2nd International Conference on Influenza」

服務機關：衛生福利部疾病管制署
姓名職稱：張雅姿 技正
派赴國家：德國
出國期間：105 年 9 月 10 日至 9 月 15 日
報告日期：105 年 11 月 10 日

摘要

第二屆國際流感研討會為期 2 天，為 OMICS International 機構所舉辦的研討會之一，會議成員為來自各國學界、產界等領域之研究學者。本研討會發表內容豐富，主題包括流感疫苗的研製/發展、流感治療策略、流感病毒監測/鑑定技術、流感基因/蛋白質與免疫學、流感致病機轉，以及流感流行病學等。本次參與研討會主要目的是為了解國際對流感病毒、疫苗、檢測、監測等研究的最新發展，增進專業職能，同時藉由與與會人員之交流，將各研究成果做為修訂我國流感防治策略之參考，並發表一篇海報論文(Influenza Epidemic of 2015/16 Influenza Season in Taiwan)。透過本次研討會不僅獲得許多研究發展之新知，經由海報論文之發表，和與會人員交流更為頻繁，實屬寶貴經驗。

赴德國柏林參加第二屆國際流感研討會(2nd International Conference on Influenza) 報告

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壹、前言

第二屆國際流感研討會議(2nd International Conference on Influenza) 是由 OMICS International 機構舉辦，該機構成立於 2007 年，主要倡議 Open Access Initiative，即對於具有真實及可信度之科學研究成果，應開放予各界知曉及取用。因此，每年於世界各地舉辦超過 1,000 場次之研討會，且開放可公開取用之期刊超過 700 種以上。本次研討會議會場邊亦另有兩場與基因工程及藥物醫療等研究相關之研討會同步進行。

貳、目 的

本研討會議主題為流感研究之新興議題及最新發展，包括流感疫苗的研製/發展、流感抗藥性檢測、流感治療策略、流感病毒監測/鑑定技術、流感基因/蛋白質與免疫學，以及流感流行病學等，本次參與研討會主要目的是為了解國際對流感病毒、疫苗、檢測、監測等研究的最新發展，增進專業職能，且與與會人員進行交流，做為修訂我國流感防治策略之參考，並代表疾病管制署新興傳染病整備組發表一篇海報論文「Influenza Epidemic of 2015/16 Influenza Season in Taiwan」。

參、過程

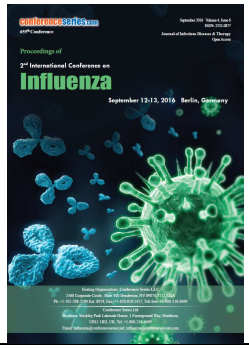
一、 行程

日期	工作日誌	地　點	行 程 內 容
105/9/10-11	路程/抵達	台北→德國柏林	啟程及抵達
105/9/12-13	會議	德國柏林	參加會議
105/9/14-15	路程/返國	德國柏林→台北	返程及返國

二、 會議過程

本次二天之研討會最終共計有 3 位 keynote speaker、9 篇口頭論文，以及 6 篇海報論文發表，較可惜為原定議程安排之 Management and prevention of pandemic flu:

One health approach 主題，講者因故未能出席，無法獲得相關之最新資訊。整體會議議程安排如下:



(一) 9 月 12 日

Opening Ceremony	
Keynote Forum	
Kevin Downard University of New South Wales, Australia	Improved molecular surveillance and new therapeutic responses to the influenza virus using mass spectrometry
Palayakotai Raghavan Nanorx Inc, USA	Controlling viral infection with Metadichol
Session： Influenza Vaccines: Designs and Developments Influenza: Causes, Symptoms and Treatment Influenza Vaccines : Safety and Effectiveness Advances in Viral Detection and Identification Technologies Host Genetics of Infection and Immunology Session Chair：Jerzy Radecki, Polish Academy of Science, Poland	
Marcus Hartman Cilian AG, Germany	CiFlu®: Development of a novel subunit influenza vaccine candidate based on the ciliate performance expression system
Sherwin Morgan University of Chicago Medicine, USA	Global recognition of Influenza-like severe respiratory illness
Hanna Radecka Polish Academy of Science, Poland	Electrochemical immunosensors: Universal tools for rapid detection of viruses
Jerzy Radecki Polish Academy of Science, Poland	Electrochemical genosensors based on redox active monolayers: Characterization and applications
Farhid Hemmatzadeh The University of Adelaide, Australia	DIVA tests for avian influenza, which antigen must be chosen
Daniel Lingwood	Multivalent influenza hemagglutinin promotes the

The Ragon Institute of MGH, MIT and Harvard University, USA	immundominance of non-neutralizing antibody responses through reptatively constrained orientation
Yuri M Vasiliev Mechnikov Research Institute of Vaccines & Sera, Russia	Challenges in development of chitosan-based adjuvants for influenza vaccines

(二) 9 月 13 日

Keynote Forum	
Ian A Wilson The Scripps Research Institute, USA	Broad neutralization of influenza viruses and progress towards a universal vaccine and therapy
Session： Pathogenicity of Influenza Virus Antiviral Drug Development and Treatment Strategies, Including Vaccination Influenza Lung Immunology: Major Aspects Animal Flu-Ecology Session Chair：Hanna Radecka, Polish Academy of Science, Poland	
Tatyana Ilyicheva, Vector State Research Center of Virology and Biotechnology, Russia	Influenza in Russia in 2014-2016
Sherwin Morgan, Institut National de la Santé et de la Recherche Médicale, France	Kallikrein-related peptidase 5 contributes to H3N2 influenza virus infection in human lungs
Poster Presentation	
Jana Pokorna Academy of Sciences of the Czech Republic, Czech Republic	H1N1 2009 pandemic influenza virus: Kinetic, structural and thermodynamic analysis of the H275Y, I223V and S247N neuraminidase resistant mutants
Ya Tzu Chang Centers for Disease Control, Taiwan	Influenza epidemic of 2015-16 influenza season in Taiwan
Milan Kozisek Academy of Sciences of the Czech Republic, Czech	Development and optimization of the assay for screening the compounds disrupting protein-protein interaction in influenza A polymerase

Republic	
Hyeon Jang Green Cross Corporation, South Korea	Comparison of microporous membranes in the concentration process for high- dose influenza vaccines
Aliou Barry Institute Pasteur of Dakar, Senegal	Early outbreak detection through sentinel surveillance system in Senegal
Sophie Buffin Sanofi Pasteur, France	Quantification of the haemagglutinin in monovalent influenza vaccines by a latex agglutination assay (LAA) as an alternative to the single radial immunodiffusion (SRID) assay

三、 演講內容摘錄

(一) Keynote speaker-1

- 講者：Kevin Downard
- 講題：Improved molecular surveillance and new therapeutic responses to the influenza virus using mass spectrometry
- 內容重點：此 keynote speaker 為澳洲新南威爾斯大學(University of New South Wales)，曾發表多篇以 Mass Spectrometry (質譜)方式偵測流感病毒之論文。本文主要介紹流感病毒演變快速，如何運用新科技-質譜，以及生物資訊，作為流感監測與分析之方法。流感病毒檢體經沉澱、切割病毒蛋白後，透過 MALDI-TOF MS 或 LC-MS/MS 等技術，將胜肽(peptide)片段進行分析，得出不同的胜肽指紋，再經由生物資訊的科技，運用龐大資料庫進行比對，來區分病毒型別、亞型，以及 lineage 等，對於容易變異的流感病毒，透過此法可鑑別出新興或重組之流感病毒，相較於 RT-PCR 及 HI 等傳統檢驗流感病毒方式，更為快速且直接。一般來說，質譜檢測所需時間小於 1 小時，且此方法不受限於需有吻合之 primer(引子)或參考抗體，可對新型流感病毒進行分型，另 HI 檢驗方法係利用參考抗體進行比對，無法進一步獲得病毒之分子訊息。

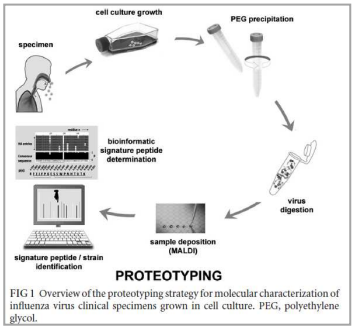


FIG 1 Overview of the proteotyping strategy for molecular characterization of influenza virus clinical specimens grown in cell culture. PEG, polyethylene glycol.

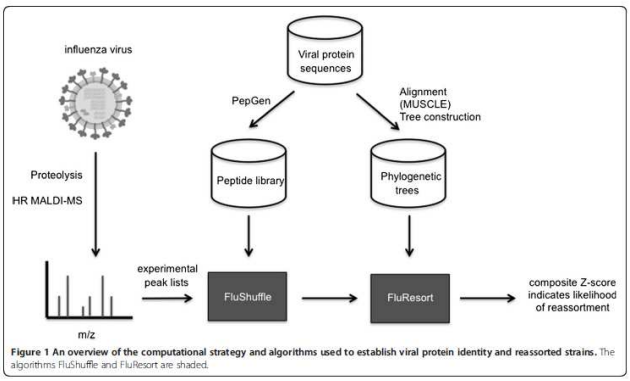


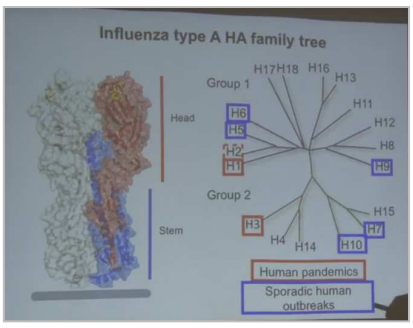
Figure 1 An overview of the computational strategy and algorithms used to establish viral protein identity and reassorted strains. The algorithms FluShuffle and FluResort are shaded.

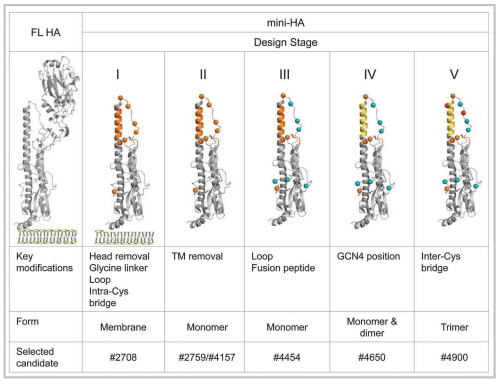
(二) Keynote speaker-2

- 講者：Palayakotai Raghavan
- 講題：Controlling viral infection with Metadichol
- 內容重點：本講者為美國 Nanorx 公司的總裁，主要介紹如何運用 Metadichol 預防病毒感染。Metadichol 是一種長鏈醇奈米乳化劑，存在於許多食物之中，如水稻、甘蔗、小麥及花生等，主要為核維生素 D 的受體(Vitamin D receptors, VDR)，在細胞中可刺激免疫系統，抑制病毒感染。Nanorx 公司研發之產品為 Metadichol®，以作為抗病毒藥劑，可在 Vero 及 MDCK 等受感染細胞內抑制 H1N1 流感、RSV、Dengue、Chikungunya，以及 Ebola 等病毒感染，且不會產生細胞毒性，在體外細胞實驗為安全且可有效抑制病毒感染，主要機制為與病毒顆粒競爭 VDR，抑制病毒外套膜與細胞融合。

(三)Keynote speaker-3

- 講者：Ian A Wilson
- 講題：Broad neutralization of influenza viruses and progress towards a universal vaccine and therapy
- 內容重點：本講者為美國斯克里普斯研究所(The scripps research institute)生物結構研究部門主持人，主要從蛋白質 3D 結構角度說明廣效型流感疫苗的研發。由於 HA 蛋白的 stem region 在不同型別的流感病毒中具有高度保留區域，因此目前被認為是研發作為廣效型流感疫苗之有效抗原之一。本講者研究團隊以 3D 結構製出與全長 HA 一樣可形成三聚體型態之 stem 抗原 (mini-HAs)，並透過一連串實驗證實該 mini-HAs 結構與中和抗體結合之親合度與全長 HA 相近，且在顯微鏡下可與中和抗體結合形成三聚體。以不同病毒株(H1 A/Puerto Rico/8/34、H5 A/Hong Kong/156/97)感染小鼠之免疫保護力實驗顯示，將小鼠經兩次免疫 mini-HAs(可形成三聚體者)，在兩種病毒株感染下，均能誘導免疫反應，產生中和抗體使小鼠 100%存活。而利用獼猴進行之動物實驗顯示其誘導之免疫反應與三價流感疫苗相近，但僅經 mini-HAs 免疫者，可廣效的在 H5N1 病毒感染下產生中和抗體。





(四)ScientificTracks Abstracts-1

- 講者：Marcus Hartmann
- 講題：CiFlu: Development of a novel subunit influenza vaccine candidate based on the ciliate performance expression system
- 內容重點：本講者為德國 Cilian AG 公司研發部門主持人，以往季節性/大流行流感疫苗的研製若運用雞胚胎培養，期程至少需 6-8 個月，且成本高。該公司研發一個新的重組抗原生產平台，稱為 Ciliate performance expression system (CIPEX-System)，主要為運用 Cilian (纖毛蟲)中的 Tetrahymena (四膜蟲)來表現重組抗原，優點為可減少流感疫苗製造的時間及成本，且生產的蛋白為分泌蛋白，產量高，具安全性，不須添加抗生素，又可直接於培養液中收集，經培養 2-3 天，可於培養液中純化約 9 成之表現蛋白。以該系統生產的流感疫苗為 CiFlu®，主要表現重組抗原 Hemagglutinin (rHA)，屬 subunit vaccine，目前已成功於小鼠及靈長類中表現，且相較雞胚胎或昆蟲細胞研製之疫苗效果更好。

(五) ScientificTracks Abstracts-2

- 講者：Sherwin Morgan
- 講題：Global recognition of influenza-like severe respiratory illness
- 內容重點：本講者為美國芝加哥醫學大學胸腔重症照護科醫師，主要從臨床角度說明目前嚴重呼吸道疾病(Severe Respiratory Illness, SRI)診斷的困難度，尤其類流感相關的呼吸道疾病不易與氣喘區別，可能因此低估 SRI 的發生。病毒性的 SRI，可引起的病毒種類繁多，美國於 2014 年 8 月起發現腸病毒 EV-D68 引起的 SRI 病例有逐漸增多趨勢，在美國 CDC 收集的 2,600 件檢體中，36%為 EV-D68。另外也分享臨床上診治 SRI 病患之方式，例如葉克膜、氧氣療法等。

(六) ScientificTracks Abstracts-3

- 講者：Hanna Radecka
- 講題：Electrochemical immunosensors: Universal tools for rapid detection of viruses
- 內容重點：本講者為波蘭科學院(Polish Academt of Sicience)動物繁殖及食品研究研究所生物化學分析實驗室首席教授，主要介紹運用 electrochemical immunosensors (電化學免疫感測)檢測 H5N1 禽流感病毒之技術。該檢測方法相

較於傳統之 ELISA 及 Western blot，所需成本較低且檢體量較少，多用於早期偵測。電化學免疫感測係以免疫反應，將抗原或抗體附著於電極表面，再經由 電化學阻抗頻譜法(Electrochemistry Impedance Spectroscopy, EIS)追蹤 redox marker，依偵測之強度對抗原或抗體進行定量或半定量，可運用於直接檢測自然環境之病毒顆粒或抗體檢體。

(七) ScientificTracks Abstracts-4

- 講者：Jerzy Radecki
- 講 題 ： Electrochemical genosensors based on redox active monolayers: Characterization and applications
- 內容重點：本講者為波蘭科學院(Polish Academt of Sicience)動物繁殖及食品研究研究所生物感測器部門首席教授，主要介紹運用 electrochemical genosensors (電化學基因感測器)偵測 H5N1 流感病毒之技術。運用原理與電化學面議感測相似，敏感度高，所需檢體量少，未來可運用於臨床醫療診斷鑑定。

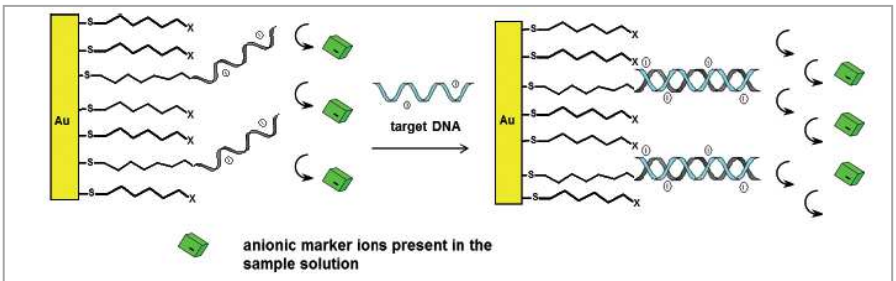


Figure 2. A scheme of the working principle of the ion-channel mimetic genosensor.

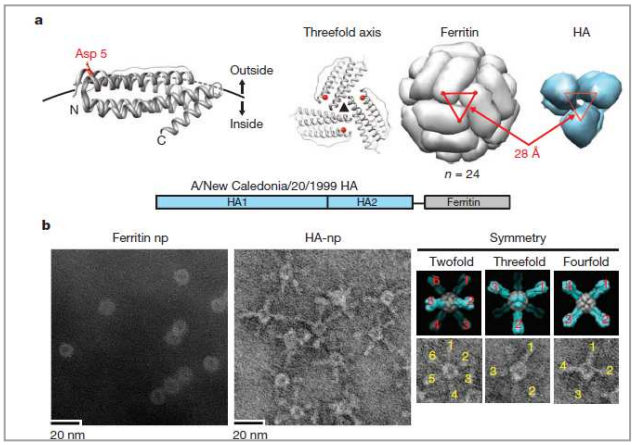
(八) ScientificTracks Abstracts-5

- 講者：Farhid Hemmatzadeh
- 講題：DIVA tests for avian influenza, which antigen must be chosen?
- 內容重點：本講者為澳洲阿德萊德大學 (The University of Adelaide)動物及獸醫學院病毒研究所教授，本文主要說明過去 15 年來，對區別禽流感動物感染及疫苗接種(Differentiate infected from vaccinated animals, DIVA)之技術發展。在禽流感流行的地區，如越南及印度，動物接種禽流感疫苗被視為控制禽流感疫情的重要方法之一，然而對於接種疫苗的動物受感染後可能引起的隱性傳播(silent spread of infection)，以及其感染後產生的病毒變異等皆是實施疫苗接種措施亟需解決的重要問題。過去為於實施接種禽流感疫苗的地區進行疫情監測，採取哨兵雞 (sentinel birds) 策略，接種場中約 1%的動物不予接種疫苗，並

定期追蹤檢測該些動物血清，以監測疫情之發生。另有關 DIVA 之策略尚包括，Subunit vaccine、Heterologous neuraminidase (NA)、Differential immune response against protein (NS1, M2, and HA2 glycoprotein) 等 3 大項。其中 Subunit vaccine 是利用僅表現禽流感病毒的 HA 或 NA 的疫苗接種動物，接種後不會產生其他病毒蛋白如核蛋白(NP)或基質蛋白(M)等；Heterologous neuraminidase (NA)則是疫苗所具有的 HA 與一般 field strain 相同，但具有不同的 NA，可經由檢測 NA 得知是否為自然感染； Differential immune response against protein (NS1, M2, and HA2 glycoprotein)則是利用感染後宿主免疫系統對不同病毒蛋白會引起不同免疫反應之原理來區別是否為自然感染，例如病毒 NS1 蛋白僅會在受感染的細胞內檢測的到、M2e 蛋白在受感染細胞表面表現量多，但如為疫苗產生的病毒顆粒則表現量低、HA2gp 蛋白只有在受感染細胞表現後才會被免疫系統辨識。因此，可透過這些策略將疫苗接種與感染進行區別。

(九) ScientificTracks Abstracts-6

- 講者：Daniel Lingwood
- 講題：Multivalent influenza hemagglutinin promotes the immundominance of non-neutralizing antibody responses through repetitively constrained orientation
- 內容重點：本講者為美國麻省理工學院暨哈佛醫學院雷根研究所(The Ragon Institute of MGH, MIT and Harvard)首席研究員。研究發現如改變抗原蛋白結構，限制抗原蛋白之空間，則可減少非中和抗體免疫反應產生，強化中和抗體反應。因此，本文運用幽門桿菌之鐵蛋白(ferritin)可形成奈米粒子(nanoparticle)的特性，將該段基因與 A/New Caledonia/20/1999 (H1N1)病毒株之 HA 基因重組，產生可形成 nanoparticle 的 HA 蛋白，經過與具同樣 H1N1strain 的三價流感疫苗比較，在小鼠內，其引起抗體免疫反應之強度效果均較三價流感疫苗佳，且如與不同 strain 的病毒株反應，nanoparticle 的 HA 蛋白具廣效性，與不同 strain 病毒株反應，亦可誘導免疫反應產生，其免疫強度與廣度均較三價流感疫苗高出 10 倍以上，且該鐵蛋白於體內亦不會誘導產生自體免疫反應，具安全性，該結構之改變可作為之後研發廣效型流感疫苗之基礎之一。



(十) ScientificTracks Abstracts-7

- 講者：Yuri M Vasiliev
- 講題：Challenges in development of chitosan-based adjuvants for influenza vaccines
- 內容重點：本講者為俄羅斯梅奇尼科夫疫苗及血清研究所(Mechnikov Research Institute of Vaccine & Sera)實驗免疫學實驗室主持人，主要介紹 chitosan(甲殼素或稱為殼多醣)作為流感疫苗佐劑之發展。Chitosan 為一種生物聚合物，因其具水溶性特性，且具安全、有效，以及經濟效益等因素，故以 chitosan 為基底的佐劑已廣泛應用於各類疫苗之研發中，部分已進入臨床前或臨床試驗。Chitosan 可促進巨噬細胞增生、分泌活性化合物(如 TNF-α)，以及增進抗體、T 細胞等專一性之免疫反應，且該研製之佐劑可以不同形式如針劑、噴劑等送入體內，目前以 chitosan 為基底之多種流感疫苗已被研製，部分可提高免疫效果達 100 倍之多。

(十一) ScientificTracks Abstracts-8

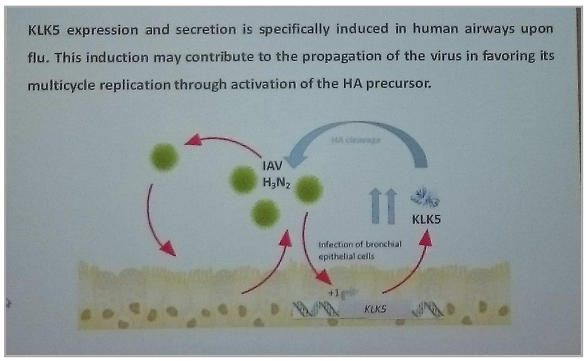
- 講者：Tatyana Ilyicheva
- 講題：Influenza in Russia in 2014-2016
- 內容重點：本講者為俄羅斯國家病毒學及生物技術中心流感實驗室主持人，主要說明 2014-2016 年俄羅斯的流感疫情。講者所在實驗室為 WHO 全球流感監測之參考實驗室之一，2014 年 10-11 月共計收集 3,888 件血清檢體，其中 1,939 件來自禽場工作人員，均未檢出禽流感病毒(包括 H5N1、H5N8、H7N9)，所有檢體中 41%為 A(H1N1)、36%為 A(H3N2)、40%為 B 型 Victoria lineage、47%型 Yamagata lineage，在 1,383 件血清檢體中僅 40%與疫苗株之

A/Tecas/50/2012(H3N2)具吻合度。整體而言，2014-2015 流感季，俄羅斯社區主要流行病毒型別為 B 型，流行之 H3N2 病毒株與北半球流感疫苗並未吻合。另 2015-2016 流感季，俄羅斯流感疫情自 2016 年第 2 週開始上升，至第 5 週達高峰，A(H1N1)pdm09 為主要流行之病毒型別，流行病毒株與北半球疫苗株吻合。

此外，該國處於全球候鳥遷徙必經之西伯利亞地區，故偶有禽流感疫情發生。2014-2016 年期間於 2014 年自赤頸鴨(Eurasian wigeon)分離出 1 株 H5N8 禽流感病毒，另 2015 年春天自野鳥也分離出 3 株 H5N1 禽流感病毒，境內無家禽禽流感疫情。另講者回答與會者提問有關俄羅斯流感疫苗接種涵蓋率約為 40%。

(十二) ScientificTracks Abstracts-9

- 講者：Melia Morgan
- 講題：Kallikrein-related peptidase 5 contributes to H3N2 influenza virus infection in human lungs
- 內容重點：本講者為法國國家衛生暨醫學研究所(Institut National de la Santé et de la Recherche Médicale)博士，宿主內的 serine-proteases 對於流感病毒感染相當重要，主要作用為切割 HA 蛋白前驅物，使 HA 蛋白活化產生作用，與細胞內促進病毒感染及複製有關。在肺臟支氣管上皮細胞的 serine proteases 屬於 Kallikerin-related peptidase (KLK) family， 經由重症病患氣管沖洗液之檢測，發現 KLK1、KLK5，以及 KLK14 之表現具意義，進一步研究發現，在細胞與小鼠實驗中未活化的 H3N2 病毒顆粒僅 KLK5 可有效活化 HA 蛋白，使病毒有效複製。



肆、心得及建議事項

一、心得

1. 本次參加由 OMICS International 機構所舉辦之會議，瞭解到研討會的樣貌其實是多元的，自己也是組成研討會重要的一員，該機構營造的研討會模式是期刊發表會的型式，藉由此平台，讓科學的真實與可信，可透過直接交流而取得，是很不一樣的國際經驗。

2. 研討會所提及之流感病毒檢測方法如質譜、電化學等，雖可克服流感病毒容易變異特性，然價格較為昂貴，較不適用於例行性之季節性流感病毒檢驗，但對於未來新興病毒之檢測，此類技術的研發則具重要性。另本研討會對於流感疫苗研製之相關介紹，包含廣效型疫苗或疫苗佐劑等，雖多僅進入動物實驗階段，但仍值得持續關注後續發展，如未來防治策略對相關技術有應用需求時，則可快速掌握提供訊息。

3. 本次研討會代表疾管署發表一篇海報論文(Influenza Epidemic of 2015/16 Influenza Season in Taiwan)，與會人員多對於我國即時疫情監測及預警系統(RODS)之運作方式，以及流感併發重症個案之定義等感到興趣並提出詢問，另俄羅斯國家病毒學及生物技術中心流感實驗室主持人與談中亦指出該國 2015/16 流感季之疫情趨勢與我國相近，H1N1 為主要流行病毒型別，導致流感重症個案數較往年為多。另經詢問加拿大公共衛生部門之與會人員有關該國之流感疫苗接種情形，其表示依地區不同，涵蓋率平均約為 35%，但部分地區可達 60%。透過海報論文發表，直接和與會人員交流，實屬寶貴之經驗，且受益良多。

二、建議事項

1. 本研討會發表之文章多屬技術之研發，且 OMICS international 機構每年舉辦研討會場次多達 1000 多場，議題廣泛，建議我國科技發展部門或技術類之檢驗單位可持續參加此類研討會議。
2. 透過海報論文發表，於研討會中可獲得更多國際交流經驗，建議日後出國同仁有機會可多多發表。

伍、附錄

一、海報論文

Influenza Epidemic of 2015/16 Influenza Season in Taiwan

Ya-tzu Chang, Yu-Ju Lin, Yi-Chien Chih, Shu-Mei Chou, Chang-Hsun Chen
Centers for Disease Control, Taipei, Taiwan, Republic of China

Overview

Taiwan experienced a more severe and prolonged influenza epidemic in 2015–2016. In this study we used the nationwide surveillance data of Taiwan Centers for Disease Control (TCDC) to analyze the whole picture of this season.
The proportion of emergency room (ER) visits for influenza-like illness (ILI) increased from Week 3 in 2016, peaked at Week 6, and the level exceeded baseline for 10 consecutive weeks. As the epidemic duration prolonged, the case number increased dramatically. As of June 30, 2016, a total of 2,018 confirmed severe complicated influenza cases, including 163 deaths, were recorded. Nighty-five percent of them did not receive the 2015–16 flu vaccine, 70% with chronic diseases, and the majority of them were infected with the influenza A(H1N1)pdm09 virus. As a result, the incidences among all age groups were the highest among the last three seasons, especially a dramatic rise among those who aged 50-64 years. To decrease the susceptible population, we plan to expand the target groups for vaccination and improve the coverage rates to 25% of whole populations in 2016-2017.

Introduction

Severe levels of seasonal influenza activity circulated in Taiwan in 2015-16, with the influenza A(H1N1)pdm09 virus becoming dominant from January 2016. In addition, admissions to intensive care units and fatal cases were particularly observed in adults aged 50-64 years. Taiwan has a longstanding influenza vaccination program targeting for individuals at an increased risk of developing severe diseases following infection (aged 50-64 years adults are not included), and the coverage rate of whole populations was approximately 13%. This report aims to provide a descriptive analysis of 2015–2016 influenza epidemic by using data from a nationwide influenza surveillance network.

Methods

To analyze the epidemic trend and demographic characteristics, we used data of confirmed severe complicated influenza cases during July 1, 2015 to June 30, 2016 from the National Notifiable Disease Surveillance System (NNDSS), and the data for the proportion of ER visits for ILI during 2013 to 2015 from the Real-time Outbreak and Disease Surveillance System (RODS) which included the daily ER data submitted by about 80% of hospitals in Taiwan.

Results

The percentage of weekly ER visits for ILI exceeded the national baseline level 13% at Week 5 in 2016 and stayed above baseline for 10 consecutive weeks during 2015–2016 influenza season. By contrast, it was 4.5 weeks in the past two seasons (Figure 1). The percentage of ER visits for ILI has dramatically increased during Week 5 and 6, and peaked at Week 6 with the percentage reached 23. After reaching a peak at Week 6 in 2016, the proportion of ER visits for ILI has not continuously decreased. Instead, the proportion decreased at Week 7, then increased to 19.9%, and maintained like plateau form until Week 11.

Cumulative case number of confirmed severe complicated influenza cases was 2,018 during July 1, 2015–June 30, 2016, including 163 deaths, and 95% did not have the 2015–2016 influenza vaccination, 70% had at least one chronic disease. According to virus sub-typing, 76% of them were infected with the influenza A (H1N1) pdm09 virus, 13% with the influenza B and 8% with the influenza A (H3N2), which were different from the past two seasons, which were predominated with the influenza A (H3N2) virus.
During 2015–2016, the majority of severe complicated influenza cases and deaths were adults aged 50-64 years. The highest incidence was observed among adults aged above 65 years (251.6 per million population), followed by adults aged 50-64 years (154.3 per million population), and young children aged under 3 years (57.7 per million population).

The incidences among all age groups of severe complicated influenza cases were the highest among the last three seasons, especially a dramatic rise among adults aged 50-64 years (nearly 4-fold than past two seasons) (Figure 2).

Figure 1. Proportions of ER visits for ILI during 2013-2016 influenza seasons in Taiwan

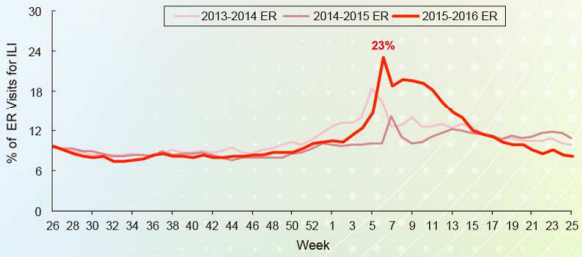
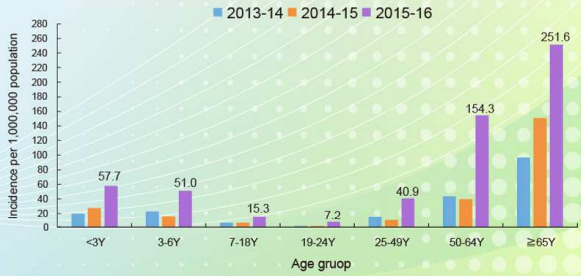


Figure 2. Incidence of severe complicated influenza cases by age groups during 2013-2016 influenza seasons

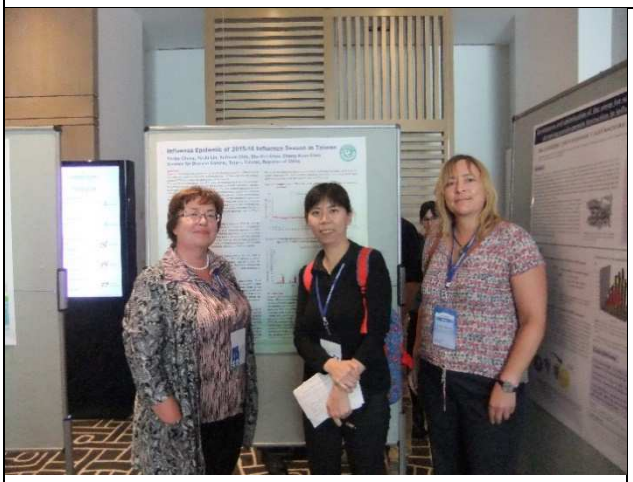


Conclusions

In 2015–2016 influenza season, the influenza A(H1N1)pdm09 virus predominated in Taiwan. This virus have been associated with severe illness in younger adults since 2009 pandemic. For this season, 95 % of severe complicated influenza cases have not receive the influenza vaccine and 70% of them had chronic disease. Particularly, the cumulative severe and fatal case number for adults aged 50–64 years were the highest. According to coverage rates of the government-funded influenza vaccination program in 2015-16 in Taiwan, most people aged 50-64 years have not received influenza vaccines. Although we have included adults aged above 50 years with chronic diseases for vaccination since 2014, the coverage rate was only 9.6% in 2015-2016.
Due to these reasons, this season accumulated more susceptible population contributed severe influenza epidemic in Taiwan. In 2016-2017, we plan to increase the purchase of influenza vaccines, to expand the target groups for vaccination, to improve the vaccination coverage rates to 25% of whole populations and subsequently lower influenza incidence among people with high risk.

二、研討會相關照片

1.與會人員合照



2.海報論文發表場地

3.會議場合

4.發表海報論文證書

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Centers for Disease Control, Taiwan

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Influenza epidemic of 2015-16 influenza season in Taiwan

at the "2nd International Conference on Influenza" held during September 12-13, 2016 in Berlin, Germany

Reza Nassiri

Michigan State University, USA