Pandemic preparedness in Europe

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Science Policy Flu Summit, Brussels, 30 September 2015
Recent avian influenza virus outbreaks are a strong reminder of the fact that flu viruses are unpredictable and constantly changing.
Structure of influenza A or B

Polymerase

RNA

Ribonucleoproteine

Lipid layer

Matrix Proteine

Haemagglutinin

Neuraminidase
Influenza A virus reservoir
## Influenza - Zoonotic events -

<table>
<thead>
<tr>
<th>Subtype</th>
<th>Year, country</th>
<th>Confirmed cases (fatalities)</th>
<th>Illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>H5N1</td>
<td>1997/2003-present, Asia, Europe, Africa</td>
<td>667 (393)</td>
<td>ILI, pneumonia, encephalitis</td>
</tr>
<tr>
<td>H6N1</td>
<td>2013, Taiwan</td>
<td>1 (0)</td>
<td>ILI</td>
</tr>
<tr>
<td>H7N2</td>
<td>2003, USA</td>
<td>1 (0)</td>
<td>ILI</td>
</tr>
<tr>
<td></td>
<td>2007, UK</td>
<td>4 (0)</td>
<td>Conjunctivitis, ILI</td>
</tr>
<tr>
<td>H7N3</td>
<td>2004, Canada</td>
<td>2 (0)</td>
<td>Conjunctivitis, ILI</td>
</tr>
<tr>
<td></td>
<td>2006, UK</td>
<td>1 (0)</td>
<td>Conjunctivitis</td>
</tr>
<tr>
<td></td>
<td>2012, Mexico</td>
<td>2 (0)</td>
<td>Conjunctivitis</td>
</tr>
<tr>
<td>H7N7</td>
<td>1996, UK</td>
<td>1 (0)</td>
<td>Conjunctivitis</td>
</tr>
<tr>
<td></td>
<td>2003, Netherlands</td>
<td>89 (1)</td>
<td>Conjunctivitis, ILI, pneumonia</td>
</tr>
<tr>
<td></td>
<td>2013, Italy</td>
<td>3 (0)</td>
<td>Conjunctivitis</td>
</tr>
<tr>
<td>H7N9</td>
<td>2013, China, Taiwan, Hong Kong</td>
<td>450 (165) (27 June, 2014)</td>
<td>ILI</td>
</tr>
<tr>
<td>H9N2</td>
<td>1999 - present, Hong Kong</td>
<td>7 (0)</td>
<td>ILI</td>
</tr>
<tr>
<td>H10N7</td>
<td>2004, Egypt</td>
<td>2 (0)</td>
<td>ILI</td>
</tr>
<tr>
<td></td>
<td>2010, Australia</td>
<td>2 (0)</td>
<td>Conjunctivitis</td>
</tr>
<tr>
<td>H10N8</td>
<td>2013, China</td>
<td>3 (2)</td>
<td>Pneumonia</td>
</tr>
</tbody>
</table>

Richard et al., Future Virology, 2014
Areas with confirmed human cases for avian influenza A(H5N1) reported to WHO, 2003-2013*

- Canada: 1 case, 1 death
- Turkey: 12 cases, 4 deaths
- Azerbaijan: 6 cases, 5 deaths
- China: 45 cases, 30 deaths
- Lao People’s Democratic Republic: 2 cases, 2 deaths
- Egypt: 173 cases, 63 deaths
- Nigeria: 1 case, 1 death
- Iraq: 3 cases, 2 deaths
- Pakistan: 3 cases, 1 death
- Bangladesh: 7 cases, 1 death
- Myanmar: 1 case, 0 deaths
- Thailand: 25 cases, 17 deaths
- Vietnam: 125 cases, 62 deaths
- Cambodia: 47 cases, 33 deaths
- Indonesia: 195 cases, 163 deaths

*All dates refer to onset of illness

Data as of 24 January 2014

Source: WHO/GIP
Pandemic preparedness: five pillars

- Surveillance and detection
- Antiviral stockpiling
- Vaccination
- Non-medical measures
- Communication
ESWI FluQuest Survey

- Comparative analysis of pre and post pandemic plans in nine European countries: Austria, Belgium, the Czech Republic, Finland, France, Germany, the Netherlands, the UK and Turkey
- Data collection August 2012 until August 2013
- Purpose: to learn about Europe’s level of pandemic preparedness and enhance European preparedness for the next influenza pandemic
- General trends and conclusions widely disseminated
Has European pandemic preparedness improved since FluQuest?
Preparedness plan updates are often postponed

- Still, a minority of 8 out of 28 EU countries has updated its pre-pandemic preparedness plan
- Many countries lack the urgency to revise their plans, for a variety of reasons:
  - Lack of political interest
  - Lack of scientific consensus over pandemic evaluation
  - Waiting for coordinated response by international community (WHO/ECDC)
Revised pandemic preparedness plans based on lessons learned:

- Flexibility built in, response is dependent on actual circumstances
- WHO pandemic phasing largely abandoned
- New WHO Pandemic Influenza Risk Management Guidance issued in 2013
- Countries now strongly advised to develop their own national risk assessments based on local circumstances
## Antiviral stockpiling: current antiviral drugs for influenza

<table>
<thead>
<tr>
<th>Class/Antiviral drug</th>
<th>Brand name</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M2-channel inhibitors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amantadine</td>
<td>Symmetrel</td>
<td>Oral</td>
</tr>
<tr>
<td>Rimantadine</td>
<td>Flumadine</td>
<td>Oral</td>
</tr>
<tr>
<td><strong>Neuraminidase inhibitors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oseltamivir</td>
<td>Tamiflu</td>
<td>Oral</td>
</tr>
<tr>
<td>Zanamivir</td>
<td>Relenza</td>
<td>Inhaled</td>
</tr>
<tr>
<td>Peramivir *</td>
<td>Peramiflu</td>
<td>IV</td>
</tr>
<tr>
<td>Laninamivir *</td>
<td>Inavir</td>
<td>Inhaled</td>
</tr>
</tbody>
</table>

*Not licensed in Europe*
Antiviral stockpiling

- Large-scale antiviral stockpiling since 2005 due to intense fears of an imminent H5N1 avian influenza pandemic
- Controversy has arisen due to:
  - ‘mild’ course of 2009 H1N1 pandemic
  - questions of effectiveness
- It is now unclear whether individual countries are maintaining stockpile level to ensure continued preparedness
Some countries currently have Advanced Purchase Agreements in place with vaccine producing companies.

In post-pandemic era, governments are hesitant to openly communicate about agreements with vaccine producing companies.

Joint Procurement Agreement in place since 20 June 2014

On 22 September 2015, France became the 22nd EU country to sign the agreement.
Health Care Capacity

- Although primary care and hospital care systems were able to cope with all patients during this relatively mild pandemic, it is estimated that many countries were close to 100% occupation of hospital capacities.
- Consequently, hospital capacity would have been overstretched if pandemic would have been worse.
- Triage?
- Lack of hospital capacity in case of severe pandemic is not addressed in pandemic preparedness plans.
Several European countries chose not to install a single flu spokesperson to inform the public at large.

Trial and error communication during pandemic left room for confusing messages on social media.

There was a clear need for concerted communication on an international level in order to spread uniform messages (question of leadership).

Where are we now?
Conclusions

- Flu viruses are unpredictable and are constantly changing
- European policy makers are, in general, complacent to develop decisive pandemic response plans, based on lessons learned during the 2009 pandemic
- Revised pandemic preparedness plans are often extremely flexible: “The most appropriate course of action would depend on the particular circumstances.”
- EU countries await actions by WHO (revision pandemic phases), ECDC and DG SANTE (vaccine procurement initiative)
- Challenges lie ahead in terms of vaccine/antiviral stockpiles, vaccine procurement (APA’s in place) and healthcare capacity (lack of emergency response plans)
General lessons learned

• Make one professional accountable:
  – GP with a list-based system
• Electronic medical records with selection software (age, risk code, medication)
• Postcard invitation with flyer from GP
• Special vaccination hours, also to the evening
• Vaccine distribution to the surgery
• Discipline-specific guidelines
  – GPs, pulmonologists, cardiologists, paediatricians
General lessons learned (cont)

- Vaccination free for at-risk patients
- Fee for service (for invitation/reminder)
- Central contract for vaccines
- Simple paper work
- Feedback results to GP
- ‘Academic detailing’; CME (ethics)
- Seasonal vaccination organisation is best preparation for a pandemic situation