AVIAN FLU SCENARIO

Health Aspects of Disasters Colloquium
Adelaide: Tuesday 3rd April 2007

Peter Aitken
Senior Staff Specialist, Emergency Department, The Townsville Hospital
Senior Lecturer, School of Medicine, James Cook University
Senior Lecturer, Anton Breinl Centre, James Cook University
SCENARIO

- 42 F returns from holiday in Country X
- Day before departure (D-1: Wed 4\textsuperscript{th} April) travels to village arts show with ceremonial lunch included
- Travels back home to Adelaide and arrives at 1150 Friday 6\textsuperscript{th} April (D-3)
- Asymptomatic on return
- Back to work that weekend ......

- Develops fever, cough, runny nose on Tuesday 10\textsuperscript{th} April (D-7)
- Continues to work but progressively feeling worse and leaves work early Friday 13\textsuperscript{th} April (D-10)
QUESTIONS

CLINICAL REVIEW AVIAN FLU

- Incubation period?
- Onset and progression of symptoms?
- Period of communicability?
- Risk areas internationally?
- Case fatality?
QUESTIONS

CLINICAL REVIEW AVIAN FLU

- **Incubation period?**
  
  *N2-3/7 but AI 2-7? longer up to 17*

- **Onset and progression of symptoms?**
  
  *High fever (38+), influenza like symptoms, diarrhoea more common dominance LRT symptoms with dyspnoea and resp distress evident 5 days post onset*

- **Period of communicability?**
  
  *7 days from onset symptoms, although may be longer in children*

- **Risk areas internationally?**
  
  *Asia but also others emerging e.g. Egypt Most recent case in China has no obvious exposure to birds on initial review*

- **Case fatality?**
  
  *50%*
THE CURRENT SITUATION

Affected areas with confirmed human cases of H5N1 avian influenza since 2003

Status as of 9 August 2006
Latest available update

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: WHO / Map Production: Public Health Mapping and GIS
Communicable Diseases (CDS) World Health Organization

© WHO 2006. All rights reserved.
### CLINICAL PRESENTATION

(Data from WHO)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>9.5</td>
<td>14</td>
<td>13.7</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Range</td>
<td>1-60</td>
<td>2-58</td>
<td>5-24</td>
<td>6-35</td>
<td>8-28</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males (%)</td>
<td>8 (44%)</td>
<td>9 (53%)</td>
<td>6 (60%)</td>
<td>3 (30%)</td>
<td>1 (25%)</td>
</tr>
<tr>
<td><strong>Time from exposure to onset illness</strong></td>
<td>NS</td>
<td>4 (2-8)</td>
<td>3 (2-4)</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Time from onset illness to presentation</strong></td>
<td>3 (1-7)</td>
<td>NS</td>
<td>6 (3-8)</td>
<td>6 (4-7)</td>
<td>8 (5-8)</td>
</tr>
<tr>
<td><strong>Patients with poultry exposure</strong></td>
<td>11/16 (70%)</td>
<td>14/17 (82%)</td>
<td>8/9 (82%)</td>
<td>6/6 (100%)</td>
<td>¾ (75%)</td>
</tr>
</tbody>
</table>
## CLINICAL PRESENTATION
(Data from WHO)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever (&gt;38)</td>
<td>17/18 (94)</td>
<td>17/17 (100)</td>
<td>10/10 (100)</td>
<td>10/10 (100)</td>
<td>4/4 (100)</td>
</tr>
<tr>
<td>Headache</td>
<td>4/18 (22)</td>
<td>NS</td>
<td>NS</td>
<td>1/10 (10)</td>
<td>4/4 (100)</td>
</tr>
<tr>
<td>Myalgia</td>
<td>2/18 (11)</td>
<td>9/17 (53)</td>
<td>0</td>
<td>2/10 (20)</td>
<td>NS</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>3/18 (17)</td>
<td>7/17 (41)</td>
<td>7/10 (70)</td>
<td>NS</td>
<td>2/4 (50)</td>
</tr>
<tr>
<td>Abdominal Pain</td>
<td>3/18 (17)</td>
<td>4/17 (41)</td>
<td>NS</td>
<td>NS</td>
<td>2/4 (50)</td>
</tr>
<tr>
<td>Vomiting</td>
<td>6/18 (33)</td>
<td>4/17 (41)</td>
<td>NS</td>
<td>1/10 (10)</td>
<td>0</td>
</tr>
<tr>
<td>Cough</td>
<td>12/18 (67)</td>
<td>16/17 (94)</td>
<td>10/10 (100)</td>
<td>10/10 (100)</td>
<td>4/4 (100)</td>
</tr>
<tr>
<td>Sputum</td>
<td>NS</td>
<td>13/17 (76)</td>
<td>5/10 (50)</td>
<td>3/10 (30)</td>
<td>NS</td>
</tr>
<tr>
<td>Sore Throat</td>
<td>4/12 (33)</td>
<td>12/17 (71)</td>
<td>0</td>
<td>0</td>
<td>1/4 (25)</td>
</tr>
<tr>
<td>Rhinorrhoea</td>
<td>7/12 (58)</td>
<td>9/17 (53)</td>
<td>0</td>
<td>0</td>
<td>NS</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>1/18 (6)</td>
<td>13/17 (76)</td>
<td>10/10 (100)</td>
<td>10/10 (100)</td>
<td>NS</td>
</tr>
</tbody>
</table>
AVIAN FLU CASE FATALITY

Case Fatality Rate
- approx 5% in 1918
- at least 50% with H5N1

Modelling data Australia based on 1918 Pandemic
- 70,000 deaths / 7 million cases = 1% case fatality rate
- If 50% case fatality
  > 3 million deaths
Monday 16th April (D-13) the following occur:
- 0700: 42 F staff member doesn’t arrive at work
- 0930: noted that 3 residents of aged care facility have fever with URTI symptoms and one didn’t come to breakfast
- 1000: radio news that WHO is moving to Global Alert Phase 4 following reports of deaths of 7 people in provincial town of Country X and unconfirmed deaths of three European tourists elsewhere that may have visited this town.
- 1100: a call received from Health Department about staff member off sick who has been found moribund at home by neighbours
WHAT DO YOU DO?

- Who do you keep at NH?
- Who do you send to hospital?
- How will you screen patients? What is reliability of methods?
- If you keep them where does this happen?
- How do you approach isolation and quarantine?
- Will staff be available to care for residents?
  - Off sick? Looking after family? Not want to come and risk personal exposure? Not want to leave and risk exposing own family?
- How do you keep your staff safe?
  - Do you have PPE? Fit testing? Vaccination?
- How do you keep other residents safe?
- How do you create bed capacity? (unwell patients, well patients, staff)
- What medication will you have access to?
- What if patients deteriorate to point of needing intensive care?
- What about the community (family, media, general community)?

- Is there a plan?
- Has there been advance discussion with local health services?
CONSIDER

- Pharmacological treatment principles?
  - vaccination (residents / staff)
  - antiviral availability

- Non pharmacological treatment?
  - isolation and quarantine
  - social distancing
  - contact tracing

- Staff availability
HOW DO YOU DIFFERENTIATE?

83 yo male
Fever, cough and dyspnoea

72 yo male
Fever, cough and dyspnoea

64 yo female
Fever, cough and dyspnoea

96 yo male
Fever, cough and dyspnoea
HOW DO YOU DIFFERENTIATE?

83 yo male
Fever, cough and dyspnoea
AVIAN INFLUENZA

72 yo male
Fever, cough and dyspnoea
SIMPLE URTI

96 yo male
Fever, cough and dyspnoea
STREP PNEUMONIA

64 yo female
Fever, cough and dyspnoea
INFLUENZA A
HOW DO YOU DIFFERENTIATE WITH LARGER NUMBERS?

83 yo male
Fever, cough and dyspnoea
AVIAN INFLUENZA

65 yo male
Fever, cough and dyspnoea
SIMPLE URTI

64 yo female
Fever, cough and dyspnoea
INFLUENZA A

66 yo female
Fever, cough and dyspnoea
STREP PNEUMONIA

96 yo male
Fever, cough and dyspnoea
AVIAN INFLUENZA

65 yo male
Fever, cough and dyspnoea
SIMPLE URTI

64 yo female
Fever, cough and dyspnoea
INFLUENZA A

45 yo female
Fever, cough and dyspnoea
STREP PNEUMONIA

72 yo male
Fever, cough and dyspnoea
AVIAN INFLUENZA
HOW DO YOU TRIAGE?

Case Definition
- Fever (>38C)
- Cough + Fatigue
- Exposure

Accuracy?

Effects of creating cohorts (exposure and clearance)

Exposure staff and other patients (air con)
HOW DO YOU DIAGNOSE?

- Clinical
- Laboratory
- Point of Care

Cost
Accuracy (Sens and Spec)
Timeframe
MANAGEMENT

- **Therapeutic countermeasures**
  - vaccines
  - antiviral medications
  - stockpiling of resources
  - access to care
  - health care workers

- **Non therapeutic countermeasures**
  - infection control
  - surveillance and contact tracing
  - social separation / distancing
  - quarantine and containment
There will almost certainly be extreme scarcity of therapeutic counter measures (vaccine & antiviral)

How do we deal with this
- Clinically ??
- Ethically ??
- Legally ??

- Increase availability
- Decrease offers of treatment

2004 manufacturing problems meant USA lost half its supply when UK withdrew Chiron’s license due to contamination

(Gostin, JAMA 2006)

Roche (patent until 2016) stated global demand exceeds production capacity.

(Wall Street Journal 2005)
ETHICAL ALLOCATION OF SCARCE RESOURCES?

- Single biggest question is how to ration scarce life saving resources.... “who shall live when not all can?”

- WHO GETS IT? (Fleming, BMJ 2005)
  Blind Justice (1st come or lottery)
  High risk given priority?
  (old, chronic disease)
  Healthcare workers?
  Essential services?
  Will serious illness in children redefine the risk?
  (Intergenerational equity)
  Global perspective

What counts most?
What will save most lives?
Are some lives more important than others?

What you may contribute in the future?
What you have contributed in the past?

VALUE LADEN?
SCIENCE BASED?
VACCINATION ISSUES

- BLANKET vs SELECTIVE
  - US found cost effective to blanket vaccinate people aged over 65 to reduce morbidity and mortality. (King, BMJ 1997)
  - UK used selective criteria but found high levels of missed eligible patients (Morgan Postgrad Med J 1995)
    - 100 eligible – 37 vaccinated (4 self initiated)
    - 75% would have had vaccination if offered
    - 47% GP sent letters, 42% relied on media and notices only

Ethics of blanket vaccination (King, BMJ 1997)
  - demented bed bound elderly with poor QOL
  - Consent?
  - Efficacy?
HEALTH CARE WORKERS
- DO THEY PROTECT THEMSELVES?

- **Vaccination rates in Canada** *(Rea & Upshur, CMAJ 2001)*
  - *influenza vaccination rates:* 82.5% residents
  - *34.9% staff*

  *Facilities with higher staff vaccination rates had lower rates of influenza outbreaks*

- **Staff Illness Canada**
  - Non vaccinated staff (medical residents) had 40.6 days of influenza like illness per 100 subjects but only 21 days off work per 100 subjects.* *(JAMA 1999)*

  *Staff go to work ill, and contagious, to care for hospital patients.*

- **Influenza vaccination for staff**
  - North Carolina nursing homes 268 / 312 (86%)
    - *most relied on voluntary vaccination*
    - 2% mandated vaccinations
    - 50% would support mandatory

  *(Goldstein, Inf Cont & Hosp Epi 2004)*

"First do no harm"

Health care workers argued that mandatory influenza vaccination impinges on personal freedom
ACCESS TO CARE

- ICU situation easiest to define

- If pandemic flu behaves same way as current cases H5N1
  - UK estimates a large district hospital serving 250-500,000 expect 10 extra ICU bed requests / day (Marsh, BMJ 2006)
  - Australian estimates face similar shortfalls.

- Adequate ICU bed numbers will not be available

- Will mean triage of ICU requests
  - *what criteria used?*
  - "greatest good for the greatest number"
  - "those most likely to benefit"
  - e.g. groups with higher mortality : less likely treated
ACCESS TO CARE

- Will mean different standards of care
  - trials of progress?
  - non invasive ventilation?
  - some not offered care?

- Needs advance discussion between healthcare workers of all disciplines, planners and community.

Levels of ambition need to be determined
- effective resource use
- consistency
- best outcomes for most number
- medico legal protection staff

WHO DEFINES BENIFICENCE?

JUSTICE

AUTONOMY AND CONSENT

GRADED RESPONSE
Initial Cases
Early phases
Overwhelmed

ADVANCE DISCUSSION
HEALTH CARE WORKERS

- When should a health care worker risk their own welfare to care for others ?

- What should be a health care workers priorities ?

- SARS changed dress code in Hong Kong Jacket & tie evolved to scrubs.

Doctors would change to scrubs on arrival, shower and wear clothes home so clothes not exposed to hospital to minimise risk to own family

(Au-Yeung, BMJ 2005)
HEALTH CARE WORKERS AT RISK

―“To recklessly to treat a highly contagious individual without taking adequate Precautions would be imprudent & irresponsible. Equity and fairness requires a professional to judiciously balance the needs of one patient with the needs of others, including those of his or her own family.” (Murray, BMJ 2006)

―“...in an epidemic of bird flu..... that a specialist decided they valued their own life more than their duty to treat patients. Such a set of values would be incompatible with being a doctor.” (Savulescu BMJ 2006)
NON THERAPEUTIC MEASURES

- Quarantine and containment singled out as the biggest unresolved problem at expert meeting.

  Keiji Fukoda – acting coordinator of WHO global influenza program
  (Zaracostas BMJ 2006)

- Three values brought into tension
  (1) The duty to protect the public (common good)
  (2) The individual right of privacy
  (3) The individual right of liberty

- Three critical questions (Gostin, JAMA 2003)
  (1) What limits on privacy are justified by surveillance?
  (2) What limits on liberty are justified by isolation / quarantine?
  (3) What restrictions on movement and economic liberty are justified by travel advisories?

WHO: “Prompt reporting, vigorous contact tracing and confinement of close contacts helped curtail the SARS outbreak.”
**ISOLATION AND QUARANTINE**

- **Isolation** is the separation, for the period of communicability, of known infected persons in such places and under such conditions to prevent or limit the spread of infection.

- **Quarantine** is the restriction of activities of healthy persons who have been exposed to a communicable disease to prevent disease transmission during the incubation period if infection should occur.
With SARS most countries confined patients to
- their homes
- general hospitals or specific hospitals

Examples

- Canada closed high school and put 1500 students on home quarantine because of single case
- Singapore thousands subjected to quarantine
- New York issued 10/7 hospital quarantine order for a foreign tourist
- San Jose (USA) held an incoming flight on tarmac for hours to investigate a potential SARS case.
- Hong Kong police used electronic tracking system enforce quarantine
- Singapore used a private security company
- Canada warned it would enforce hospital quarantine for those who did not comply with home quarantine
Identification of SARS cases by name has been a central feature of all national responses.

Levels of aggression in contact tracing varied
- Singapore - military
- Hong Kong - police
- Canada - hospitals

Surveillance more intrusive than simply reporting names
- daily temperatures, health questionnaires
- complete daily certificates
WHO WILL GO TO WORK?

“isn’t it worth 2 weeks lost productivity to prevent serious illness or even death”

(Jeffrey Kahn, Bioethicist at University of Minnesota)

vs

“I don’t think anybody is looking at ‘we’ll simply shut our doors and go home until it’s over’”

(Chris Terzich, Head Emerg Planning Wells Fargo Bank)
- “social distancing”
- staggering shifts
- spacing out work areas
- work from home (electronically)
- 30% absenteeism rate

How will the health system cope with the loss of 30% of staff?

and which staff?
QUESTIONS ??

acchhooo!

very funny Dave!