2009 H1N1 Influenza Response in China

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Director of Chinese Center for Disease Control and Prevention
Current situation in China
Spreading of Pan(H1N1) influenza in mainland China

As of June 30, N=131
As of July 31, N=246
As of Sep. 6, N=440
As of Oct. 25, N=1522
School outbreaks of pan(H1N1) 2009 influenza by county, China  (May 30-Oct.25)

612 Counties reported pandemic (H1N1) 2009 influenza school outbreaks.
Epi-Curve of pan(H1N1) 2009 Influenza outbreaks in schools, China (May 30-Oct. 25)

The number of H1N1 outbreak in school accounts for 90% and 62% of the total number of H1N1 outbreak in China and the total number of ARI/ILI outbreak in school respectively.

- ILI Outbreaks
- Seasonal Flu Outbreaks
- H1N1 Outbreaks

- Sep 30, 2nd version of surveillance protocol released
- Oct 1st-8th, National Day vacation
- Summer holiday Jul 10-Aug 31
- Week (Onset time of first case in school outbreaks)
Percentage of ILI internal outpatient visits reported by sentinel hospitals in Southern China

Percentage of ILI paediatric outpatient visits reported by sentinel hospitals in Southern China

Percentage of ILI internal outpatient visits reported by sentinel hospitals in Northern China

Percentage of ILI paediatric outpatient visits reported by sentinel hospitals in Northern China
Percent of Specimens Positive for Influenza Reported by Influenza Lab Network: Novel Influenza A(H1N1) vs. Seasonal Influenza by Week, southern China, 2009

Percent of Specimens Positive for Influenza Reported by Influenza Lab Network: Novel Influenza A(H1N1) vs. Seasonal Influenza by Week, Northern China, 2009
Number of reported case, by age and sex

Reported Cases

Age group (years)

- Male
- Female
Reported severe case and death by onset time

Cumulative cases (Semi-logarithmic line chart)
Characteristic of severe ill cases
(As of Oct. 25)

- 49 severe ill cases (4 deaths included)
- Gender: 31 male, 18 female
- Median age: 19 yo, range: 7 mo-72 yo
- Oseltamivir: 100% (7/7)
- ICU: 22.7% (5/22)
- Ventilator: 43.8% (14/39)
- Underly condition: 54.5% (24/44)
  - Diabetes, COPD, Hypertension, Uraemia, TB, Hepatitis B, Heart disease
- Complications:
  - Pneumonia: 81.8% (18/22)
  - Respiratory failure: 54.5% (12/22)
Response to pandemic(H1N1) 2009 influenza
Pandemic Trajectory

**Southern Hemisphere**

**Northern Hemisphere**

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
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<tbody>
<tr>
<td>Surveillance</td>
<td>Mitigation</td>
<td>Immunization</td>
</tr>
<tr>
<td>Spring</td>
<td>Summer</td>
<td>Fall</td>
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\[\text{NORTHERN HEMISPHERE}\]

\[\text{SOUTHERN HEMISPHERE}\]
Quick Response

- Government emergency response
- Border screening
- Expanding laboratory testing capacity (training)
- Enhancing surveillance
- Case isolation, close contact quarantine
- Anti-viral drug production and stockpiling
- Vaccine development and innoculation
- Public health education and communication
- Timely technical guidelines updating according to the situation evolution
- International cooperation, WHO, US CDC, eCDC
Joint Working Mechanism
Established on April 27, 2009

National Joint Working Mechanism in Response to Pandemic(H1N1) 2009 Influenza in China

- Coordination
- Border Control
- Medical Service
- Logistic support
- Communications
- International Collaboration
- Science & Technology
- Animal husbandry & Veterinary
- Expert Consultation

由卫生部牵头、中宣部、外交部、发改委、科技部、质检总局、农业部等33个部门组成，分为8个组和1个专家委员会
Change of Response Strategies

- April 25-July 10
  - Containment of transmission caused by imported cases
- July 10-
  - Mitigation of community-level spreading
  - Preparation for winter season
Border Entry Screening

• As of August 23, 56 million travelers screened
• 17,909 febrile patients found by fever screening
• 757 (4.2%) confirmed infection with novel H1N1 influenza
Containment Stage

- Border entry screening (BES)
- Case isolation and contact quarantine
- Expanding surveillance system and laboratory diagnosis capacity
- Development of guidelines
WHO External Quality Assessment Programme for the Detection of Influenza Virus Type A by PCR

Panel 5
Preliminary Report

<table>
<thead>
<tr>
<th>Dispatch dates:</th>
<th>19 Jan 2009</th>
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<tbody>
<tr>
<td></td>
<td>30 Jan 2009</td>
</tr>
<tr>
<td></td>
<td>2 Feb 2009</td>
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<tr>
<td></td>
<td>4 Feb 2009</td>
</tr>
<tr>
<td></td>
<td>5 Feb 2009</td>
</tr>
<tr>
<td></td>
<td>9 Feb 2009</td>
</tr>
</tbody>
</table>

May 11, first H1N1 case of mainland China was confirmed by Sichuan province CDC.
Case Isolation & Contact quarantine

- **Case isolation**
  - Admitted to designated hospitals
  - Strict isolation in single room

- **Contact quarantine**
  - As of Aug10, tracing 9,938 close contacts quarantined at home or at designated hotels
  - Among them, 551 (5.5%) confirmed infection with novel H1N1 influenza
Expanding surveillance system and laboratory diagnosis capacity

- Diagnostic kit development, distribution and training
- Influenza laboratory network expanded to all prefecture CDCs
- Expand ILI sentinel hospital surveillance system
- Mandatory reporting requirement of novel H1N1 influenza case
Expand ILI Surveillance Sentinel Hospitals and Influenza Lab Network

• Laboratories: 63
• Sentinel Hospitals: 197

Before May, 2009

• Laboratories: 411
• Sentinel Hospitals: 556

After June 2009
Epidemic Curve of Pan(H1N1) Influenza Cases, China (As of Oct. 25, 2009, N=44212)

Reported cases

- Suspected cases
- Clinical diagnosis of cases
- Confirmed cases

Week (date of illness onset)

May 11, First imported case
June 18, School outbreak
July 8, Adjustment of the measures for prevention and control
Close contacts: Medical observation in home
Mild cases: Isolation and treatment in home
July 10--Aug. 31 Summer holidays
Sep.1 Term began
Sep 30, 2nd version of surveillance protocol released
Oct. 1st-8th, National Day vacation

Note: April 27 (Monday of Week 17), Oct. 25 (Sunday of Week 42)
Mitigation stage

- Change case reporting requirement
- Mass campaign of health education focusing on personal hygiene and community prevention
- Control and management of school outbreaks
Case reporting requirement

- Emphasizing severe ill case and death
- Laboratory diagnosis focus on
  - severe ill cases
  - cases with underlying medical condition
  - Outbreak confirmation
Vaccine and immunization

- Clinical trial conducted by China CDC
  - 10 candidate vaccines
  - 3 formulas of vaccines: adjuvant whole virus inactivated vaccine, unadjuvant whole virus inactivated vaccine, unadjuvant split virus vaccine
  - 13,800 subjects and 4 age groups
    - 3-11 years, 12-17 years, 18-60 years and >60 years
  - Study design: randomized, double-blinded and controlled
  - Intervention: two IM dose novel H1N1 separated by 21 days
    - 7.5 mcg, 15 mcg and 30 mcg
- Field studies launched on July and completed by 26, August
- SFDA conferred licenses to 10 domestic manufactures on September 14
  - Unadjuvant split virus vaccine
  - One dose for > 3 years old population
<table>
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<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>22-26 Jul</td>
<td>inoculate first dose and collect blood specimen on day 0</td>
</tr>
<tr>
<td>27 Jul-11 Aug</td>
<td>inoculate second dose and collect blood specimen on day 21</td>
</tr>
<tr>
<td>16 Aug</td>
<td>test the blood sample</td>
</tr>
<tr>
<td>17-20 Aug</td>
<td>Uncode and primary data report</td>
</tr>
<tr>
<td>21 Aug</td>
<td>register for approval and examine vaccine's introduction and label</td>
</tr>
<tr>
<td>22-23 Aug</td>
<td>print labels, subpackage, label the products</td>
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<tr>
<td>24-26 Aug</td>
<td>approval</td>
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<td>27-29 Aug</td>
<td>storage</td>
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<tr>
<td>30 Aug-13 Sep</td>
<td>delivery</td>
</tr>
<tr>
<td>14 Sep</td>
<td>Prepare vaccination</td>
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<tr>
<td>15-17 Sep</td>
<td>Initiate vaccination in Beijing</td>
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<tr>
<td>18-22 Sep</td>
<td></td>
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<tr>
<td>21 Sep</td>
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</table>
H1N1 vaccine clinical trials of 10 manufactories

- 天坛生物 - 广西
- 科兴 - 北京
- 华兰 - 江苏
- 上海生物 - 湖南
- 兰州生物 - 内蒙古
- 长春生物 - 江苏
- 长春长生 - 广西
- 雅利峰 - 河南
- 天元 - 河北
- 延申 - 河南
<table>
<thead>
<tr>
<th>Vaccine Type</th>
<th>No.</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Without Adjuvant 15μg</td>
<td>440</td>
<td>10.7</td>
<td>0.7</td>
<td>0.0</td>
<td>0.0</td>
<td>11.4</td>
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<tr>
<td>Without Adjuvant 30μg</td>
<td>440</td>
<td>14.1</td>
<td>1.1</td>
<td>0.7</td>
<td>0.0</td>
<td>15.9</td>
</tr>
<tr>
<td>with Adjuvant 15μg</td>
<td>440</td>
<td>9.1</td>
<td>0.7</td>
<td>0.0</td>
<td>0.0</td>
<td>9.8</td>
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<tr>
<td>With Adjuvant 30μg</td>
<td>330</td>
<td>9.1</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
<td>9.4</td>
</tr>
<tr>
<td>With Adjuvant 7.5μg</td>
<td>440</td>
<td>8.6</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
<td>9.1</td>
</tr>
<tr>
<td>Total</td>
<td>2200</td>
<td>9.9</td>
<td>0.6</td>
<td>0.1</td>
<td>0.0</td>
<td>10.6</td>
</tr>
</tbody>
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Local reactions: Pain, Swelling, Induration, Rash, Itching
Systemic reactions: Fever, Fatigue, Muscle Pain, Diarrhea, Allergy, Headache
Immunogenicity by Age, without Adjuvant-15ug

- A (3-11y)
- B (3-11y)
- A (12-17y)
- B (12-17y)

Seroprection, Seroconversion, GMT Ratio
Antiviral drug

- Emergency authorization on Oseltamivir production for domestic manufacture
- Increasing production
- National stockpile and deployment
  - 1.3 million of treatment doses by 30 Sep. 2009
  - Second Lot. by November
- Priority of antiviral drug treatment
  - severe ill cases
  - cases with underlying medical conditions
Health education campaign for personal hygiene and community prevention

• Core information delivered
  • Hand washing
  • Respiratory etiquette
  • Stay home when sick with flu-like illness
Control and management of school outbreaks

- Promoting hand hygiene and respiratory etiquette
- Morning fever screening
- Stay home when sick with flu-like illness
- Separate students with ARI and ILI from the healthy
- School closure and class dismissal
Preparing for fall/winter season
Preparing for winter season

- Enhance surveillance
- Vaccine production and inoculation
- Antiviral drug stockpiling and distribution
- Medical service preparedness
- Monitoring of medical care burden and guidance for social distancing measures
- Public communication and advice
Enhance surveillance

- Strengthen situation analysis and awareness
- Establish severe acute respiratory infection (sARI) surveillance in selected sentinel hospitals
- Analysis of hospital mortality reporting
Vaccine and immunization

Results and conclusions of clinical evaluation:

• All vaccine formulations were well tolerated without immediate serious adverse events.

• Seroconversion rate and protective rate was >85% among both 15µg and 30µg group without adjuvant
  • 1 dose split-virion vaccine without adjuvant had better immunogenicity than vaccine with adjuvant
  • Adolescent and adult had better response than children and elder

• The AEs occurrence rate similar as seasonal influenza vaccine

• Considering safety, immunogenicity and cost, 15µg split vaccine without adjuvant could be used for future vaccination
Vaccine and immunization

- Vaccine production and distribution
  - As of Oct. 21, 20 millions doses distributed and 222 thousands of persons vaccinated
  - 100 million doses of vaccine expected to be produced by the end of first qua of year

- Priority of population groups:
  - primary and middle school student
  - health care workers and other essential service worker
  - people with underlying medical condition

- Enhance surveillance of AEFI(adverse events following immunization)
Surge capacity of medical care

- Development of clinical management of severe ill case and patients triage guidelines
- Development of infection prevention and control guidelines
- Ventilator stockpile and increasing ICU capacity
- Physicians training
Guidance for reduce surge burden on Local medical care

<table>
<thead>
<tr>
<th>No. of cases</th>
<th>Local social distancing measure</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>• School closure</td>
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<tr>
<td></td>
<td>• Cancellation of mass gathering</td>
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<td></td>
<td>• Closure of restaurants and entertainment venues</td>
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<td></td>
<td>• Suspension of commercial activities</td>
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No. of days:
- Surge capacity
- Current healthcare capacity
- Threshold
Communication and advice service

- Continued mass campaign of health education to promote personal respiratory hygiene and prevention

- Main topic of public communication
  - Rationale of vaccination priority group policy
  - Vaccine safety concern
  - Mild case “self-isolation” and home care
  - Dealing with stress and anxiety for increasing of severe case and death
Public communication and advice
Challenges

• Huge population vs. limited resources

• Uneven development between eastern and western areas.
Thanks