From Strategy to Operation: Experience with Influenza in Hong Kong

Dr Thomas TSANG
Controller, Centre for Health Protection,
Department of Health, Hong Kong SAR, China

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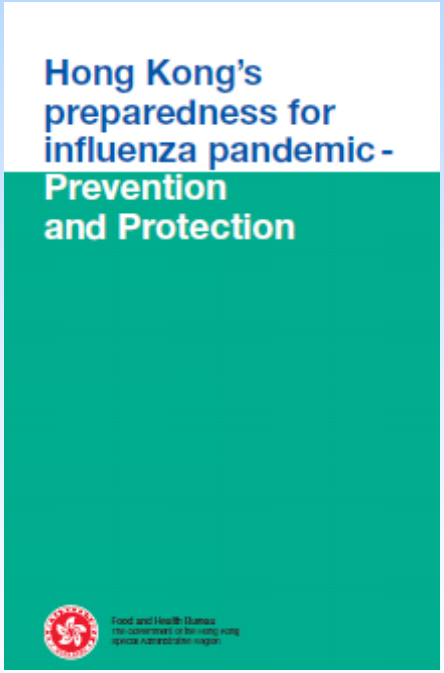
Emergency preparedness
3-tiered response levels

Response level	Strategic Objective	Scenario
Alert	Prevent importation of disease	Novel influenza outside Hong Kong
Serious	Detect and contain early	Novel influenza detected in Hong Kong without significant person-to-person transmission
Emergency	Minimise morbidity & mortality	Novel influenza detected in Hong Kong; significant person-to-person transmission



Containment

- Small number of cases, limited local transmission
- Delay local spread
- Buy time
  - Understand novel virus
  - Get healthcare system prepared
  - Procure vaccines
  - Summer break for schools

Mitigation

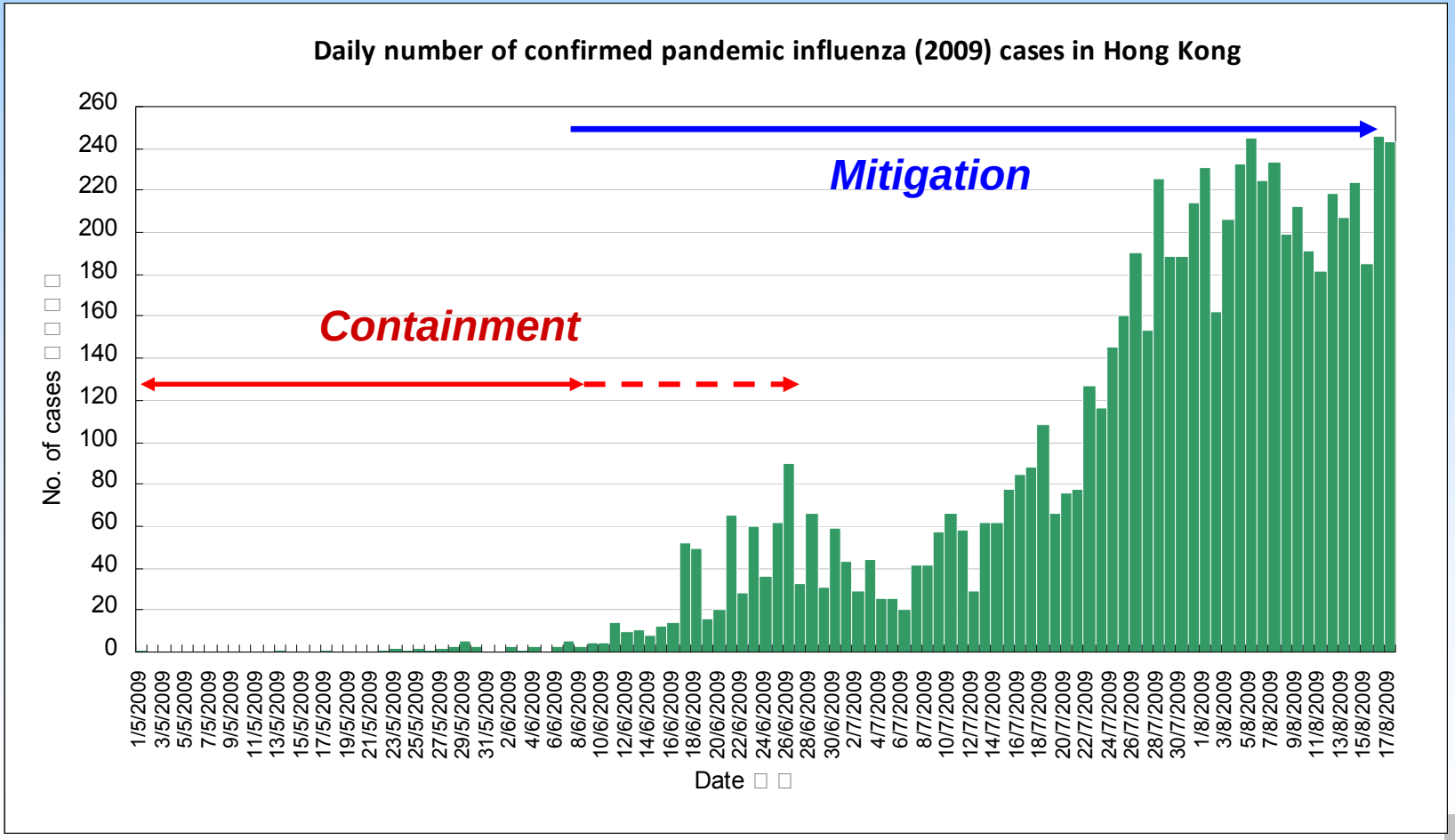
- Containment no longer feasible; significant number of cases or local transmission

- Relieve disease burden and impact of influenza pandemic

From containment to mitigation

- Containment phase starts
  - May 1, 2009: first imported case of pandemic H1N1 (2009) from Mexico
- Mitigation phase starts
  - June 11, 2009: first local cluster of pandemic H1N1 (2009) in a school
- Transition from containment to mitigation is GRADUAL

Progression of pandemic influenza H1N1 (2009)



Data as of 17 August 2009

Containment phase strategies

- Health screening at ports of entry
- Contact tracing in incoming flights
- Case isolation
- Contact tracing, quarantine, chemoprophylaxis

Containment phase

Health screening at ports of entry

Temperature screening & health declaration

- Travelers with fever and respiratory symptoms referred to hospital for isolation and tests for pandemic influenza H1N1 (2009)

Border screening is resource intensive

- Border control points
  - Airport (1), seaports (5), land ports (7)
- ~ 500 additional frontline staff needed besides internal mobilization
- ~ 310,000 health declaration forms received daily
- 50-150 incoming passengers screened out at the airport daily; up to 8% of them referred to hospital
- Fewer than 1/3 of imported cases were picked up by border screening

Containment phase

Contact tracing in incoming flights

Incoming flights with confirmed pandemic influenza (2009) case

- Trace passengers from 3 rows in front to 3 rows behind a case (change to +/- 2 rows in late containment phase)
- Trace passengers in same cabin if multiple cases in a plane

Yield of contact tracing in flights is low

- Traced 53 planes with cases confirmed in Hong Kong
- 801 traceable contacts in these planes
  - 8 (15%) planes had positive contact(s)
  - 11 (1.4%) positive contacts identified

Containment phase

Case isolation

Expertise development and sharing in managing cases

- ~1,400 isolation beds in Hong Kong
- First 20 cases isolated in a designated infectious disease hospital (Princess Margaret Hospital)
- Subsequent cases isolated in other 13 public hospitals

Containment phase

Contact tracing, quarantine, chemoprophylaxis

Holiday camp as quarantine site

- Close contacts quarantined at holiday camp for 7 days

- 2 government-run camps had capacity of 413 persons/83 units

Direct Observed Chemoprophylaxis

- Starting 21 May 09, close contacts could opt for Direct Observed Chemoprophylaxis (DOC)

- Took tamiflu under direct supervision of medical personnel at clinic every day

Mitigation phase strategies

- Suspension of schools
- Activation of designated clinics
- Community hygiene campaign & self-care
- Management of serious cases
- Antivirals and vaccines
- Gradual discontinuation of contact tracing, case isolation, etc.

Mitigation phase

Suspension of schools

School suspensions for young children

- July and August are traditional summer flu peak season
- All primary schools, kindergartens, childcare centers suspended for 14 days following first local cluster of indigenous cases
- Objectives
  - Protect young children
  - Minimize school outbreaks
  - Slow down community spread

Suspension of individual secondary schools with confirmed case(s)

- One case in secondary school → suspend classes or early summer break
- 43 secondary schools with 245 confirmed cases of pandemic influenza H1N1 (2009)
- 34 (~80%) of affected schools had <5 confirmed cases
- Largest school cluster involved 65 persons

School suspension appears effective

- Effectiveness of school closure to mitigate pandemic influenza A/H1N1, Hong Kong, 2009 (Pending publication)
  - Based on 4,824 confirmed cases up to early August
  - Sustained kindergarten and primary school closures were associated with lower attack rates in younger children
  - Decline in R_0 following school closures demonstrated

When schools re-open

- Traditional summer flu season ends in early September

- School suspension if
  - Outbreak with ~10% absenteeism
  - Fatal/serious case in a healthy school child

Mitigation phase

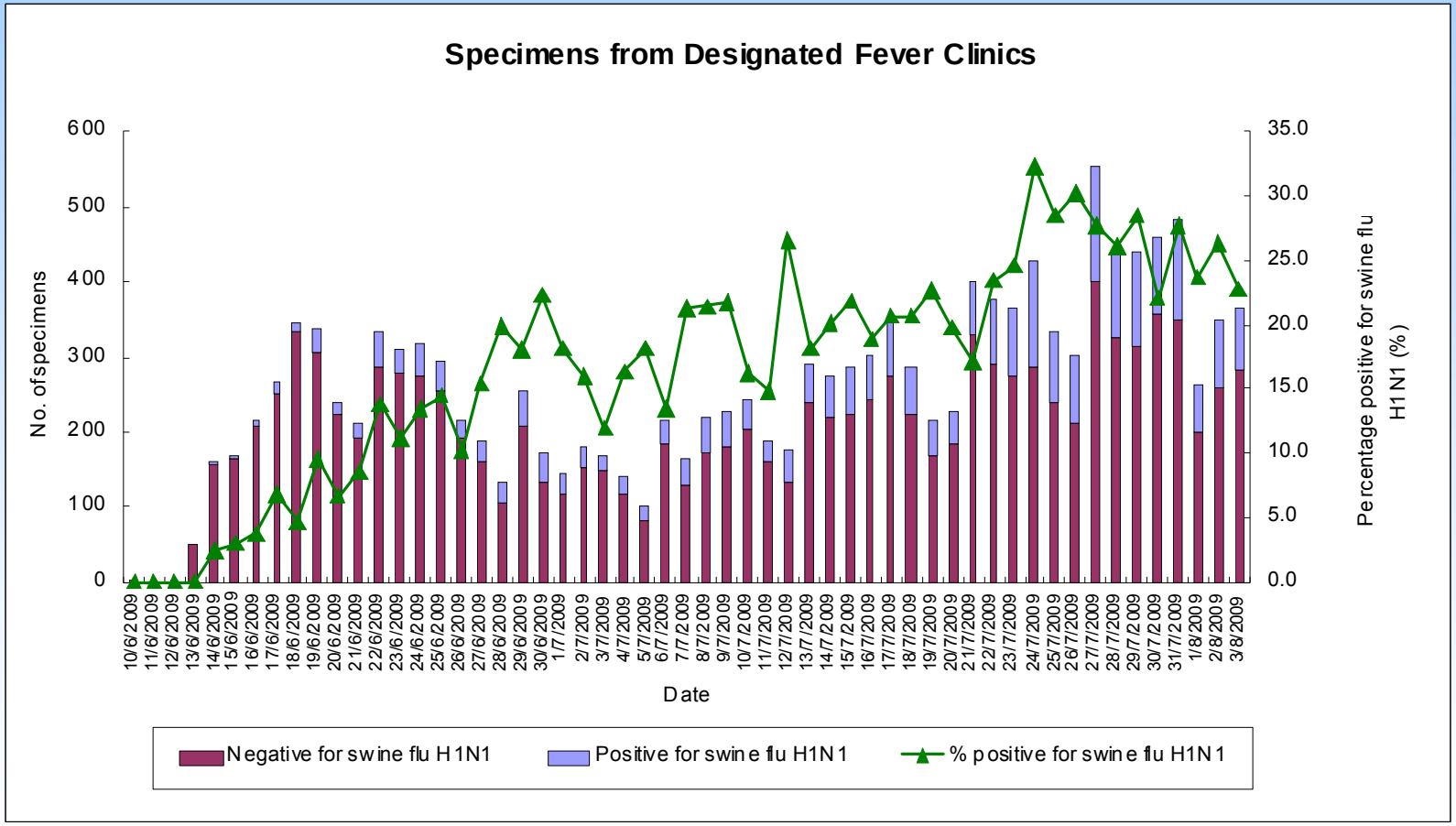
Activation of Designated Flu Clinics

Designated Flu Clinics relieve hospital workload

- 8 Designated Flu Clinics to assist in the diagnosis and treatment of patients with symptoms of influenza-like-illness since June 13, 2009
- Share out workload of public hospitals, which would concentrate on more serious cases
- Surveillance of pandemic influenza H1N1 (2009) in the community

DFC surveillance shows 20-30% of ILI patients had pandemic influenza H1N1 (2009)

Attendance and specimens tested at Designated Fever Clinics



From Jun 13 to Aug 6:

- Total number of attendance = 25,115

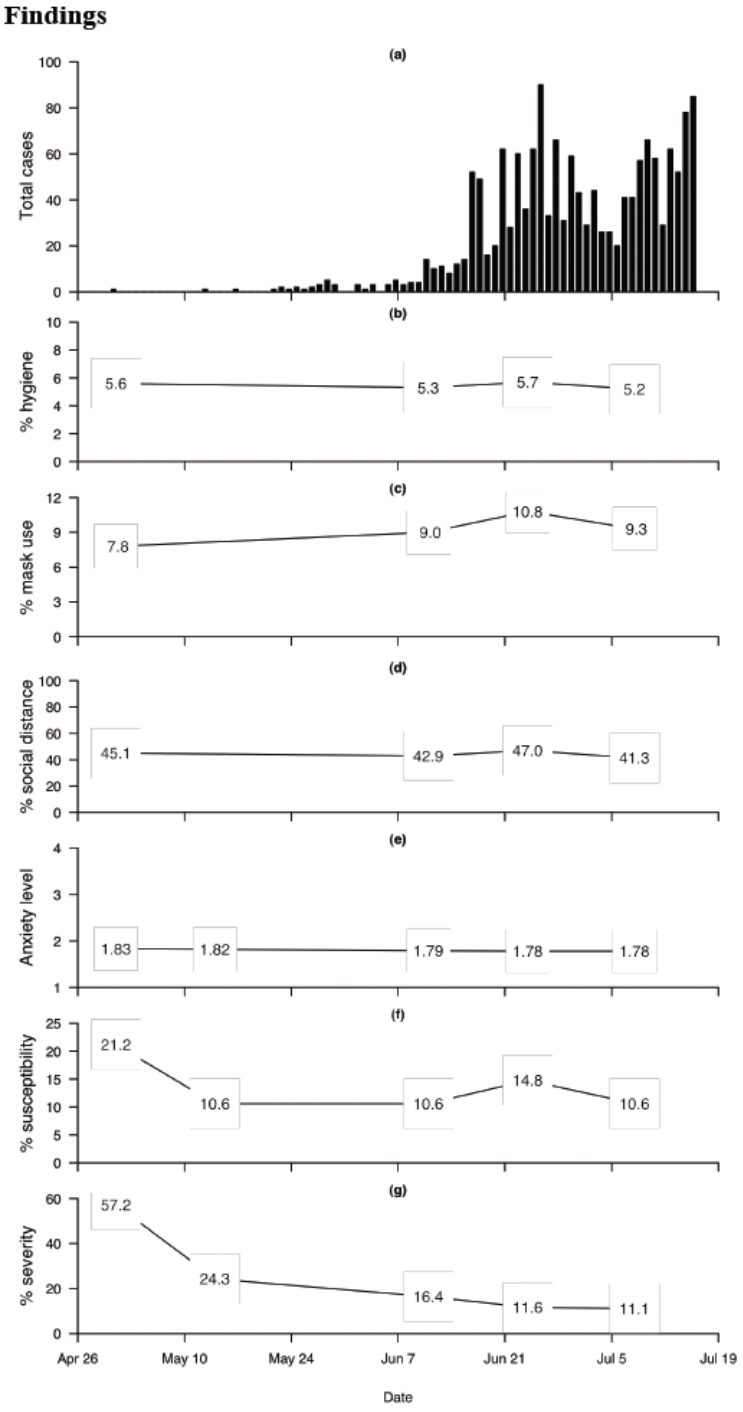
- 15611 specimens were tested for HSI, of which 3,178(20.4%) were tested +ve

Mitigation phase

Community hygiene campaigns

Community hygiene campaigns

- Community campaigns to promote personal hygiene and self care, massive cleansing operations



5 serial telephone surveys (n ~1000-1400 each) conducted by the University of Hong Kong, 28/4-10/7/2009 (unpublished study)

a No. of confirmed influenza A/H1N1 cases by date of confirmation during the study period

b Proportion of population reporting washing hands after sneezing, coughing or touching nose;

c Proportion reporting wearing face masks in the preceding 3 days

d Proportion reporting either avoiding eating out, avoiding using public transport, or avoiding going to crowded places;

e State Trait Anxiety Inventory

f Proportion believing that they are likely to be infected with influenza A/H1N1 in the next month;

g Proportion believing that influenza A/H1N1 is the same or more serious than SARS

Mitigation phase

Management of serious cases

Adjustments in patient management

	Containment phase	Mitigation phase
Hospitalization policy	All confirmed cases	Clinically more serious, pregnancy, children <2y, medical risk factors (triaged in designated flu clinics). *Home care for others*
Treatment policy	Antivirals for all confirmed cases	Antivirals for (1) clinically more serious, (2) medical risk factors, (3) pregnancy (following specialists' assessment), (4) community acquired pneumonia (if preceded by ILI OR known contact of confirmed HSI OR failure to respond after 48 hrs of conventional medical treatment). *Symptomatic treatment for others*.

¾ of serious cases have predisposing medical factors

- 27 serious cases (as of 17 August)
  - <0.5% of confirmed cases
  - 85% between ages of 20 and 64
  - 22 (81%) have predisposing medical factors
    - Chronic obstructive pulmonary disease 7 (26%)
    - Obesity 6 (22%)
    - Chronic smoker / Ex-smoker 12 (44%)
    - > 7 days between symptom onset and hospital admission 2 (7%)
  - 11 recovered
  - 12 still under treatment,
  - **4 fatal cases (case fatality ratio = 0.05%)**

Mitigation phase

Antivirals and vaccines

Maintain and adjust antiviral stockpile

- Current antiviral stockpile
  - Oseltamivir 19.8 million doses
  - Zanamivir 1.7 million doses
- Challenges
  - Shortage of pediatric formulation (syrup) oseltamivir
  - Emergence of oseltamivir resistance
- Procure additional antivirals to replenish stockpile
  - Increase zanamivir stockpile from 10% to 15%

Vaccine strategy

- Pandemic influenza H1N1 (2009) vaccine
  - 4 target groups covering 2 million people: free
    - Healthcare workers
    - Children aged ≥ 6 months and below 6 years old
    - Elderly persons aged ≥ 65; and
    - Persons with pre-existing medical conditions
  - Additional vaccines for 500,000 people: user-pay

- Seasonal flu & pneumococcal vaccine
  - Programs for children and elderly

Lessons

- Risk communication crucial
  - Key community informed of current and future strategy in relation to different scenarios
  - Do not take them by surprise
- Top-level Government leadership vital
  - Steering Committee chaired by the Chief Executive of HKSARG

Challenges

- Medical/laboratory capacity
- Vaccination
- Future evolution of outbreak
- Sustained community momentum

Thank you