HUMAN INFECTION WITH AVIAN INFLUENZA A (H7N9) VIRUS

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BACKGROUND

BASED ON INFORMATION AVAILABLE ON: 3 MAY 2013

First IHR notification

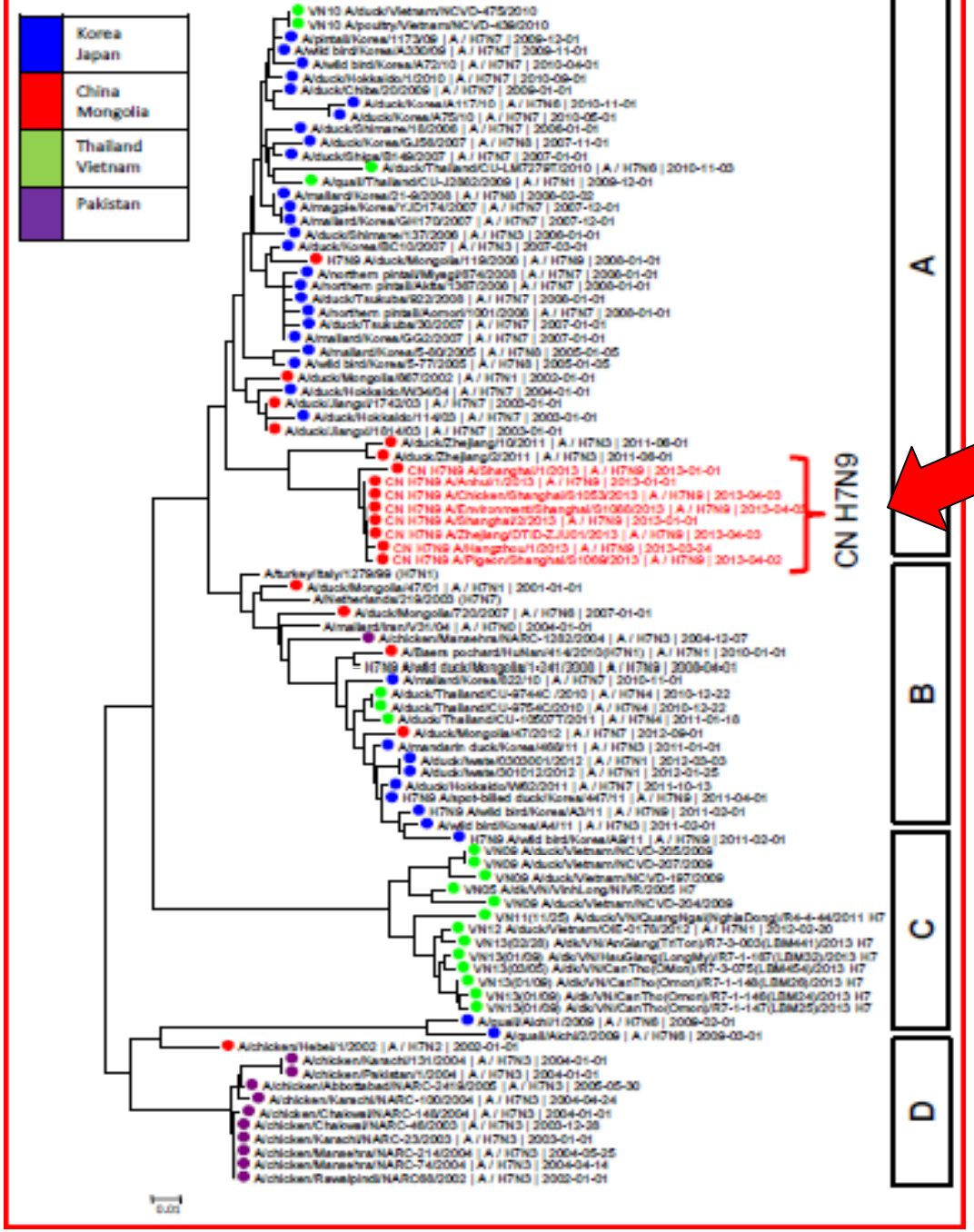
On 31 Mar 2013, China notified WHO of 3 cases (including 2 deaths) of human infection with avian influenza A(H7N9) virus as an event that may constitute a public health emergency of international concern under IHR (2005)

- 2 from Shanghai and 1 from Anhui
- Earliest onset date 19 Feb 2013
- All 3 presented with respiratory tract infection with progression to severe pneumonia

Avian influenza A(H7N9)

- Avian influenza A(H7N9) is one of a subgroup of influenza viruses that normally circulate among birds
- Although avian influenza A(H7N9) have been detected in birds before, this particular virus is new
- The virus is a triple re-assortment:
  - **Hemagglutinin** Asian H7 subtype from domestic ducks in China
  - **Neuraminidase** Asian N9 subtype from wild bird viruses
  - **Internal genes** most likely A(H9N2) from domestic poultry viruses in the region
- Avian influenza A(H7N9) has never been detected in humans before

Fig. 1 Phylogenetic relationship of Eurasian H7 viruses in Asia since 2000



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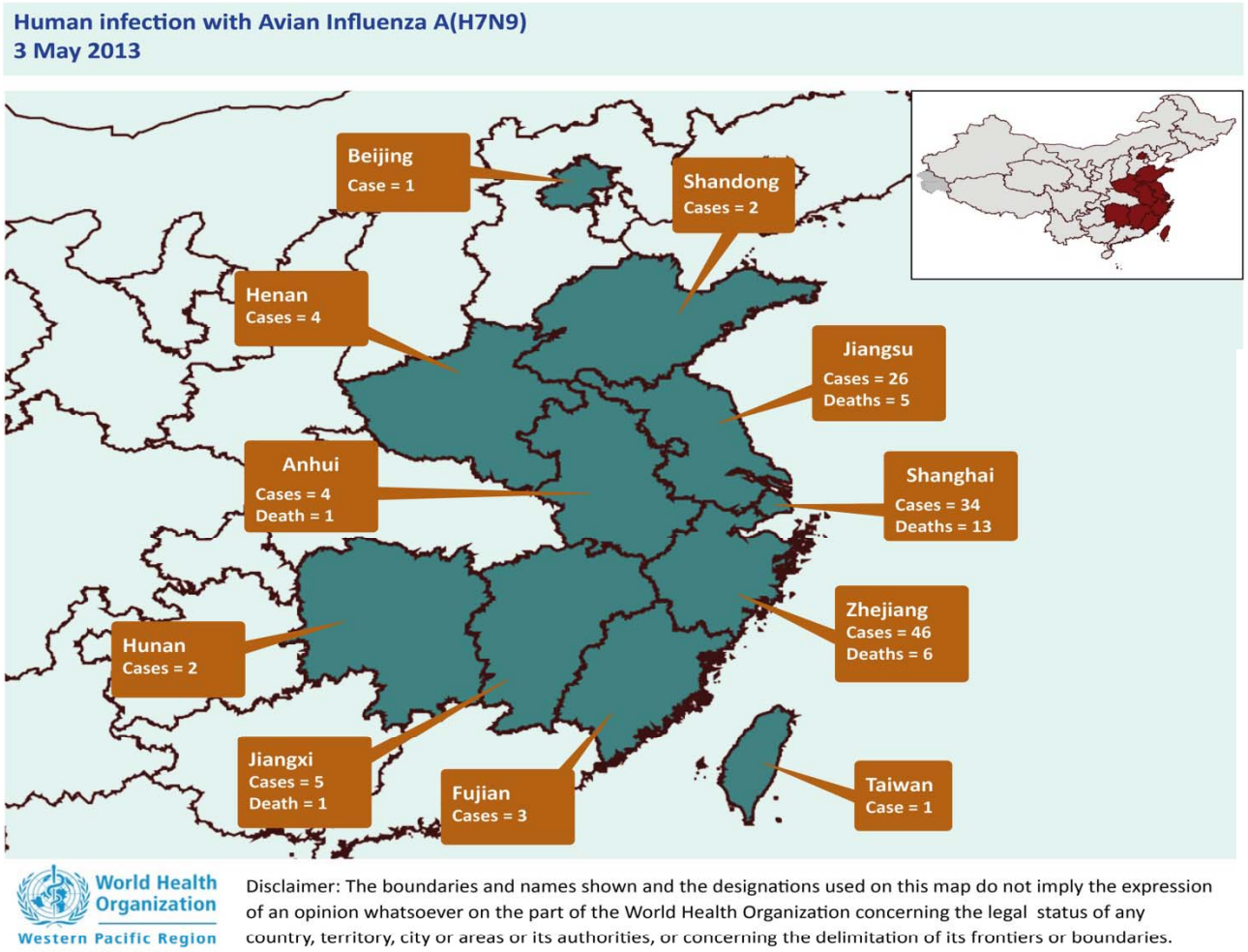
Why are we concerned?

- This is the first time it has infected humans
- It is low-pathogenic in poultry, and therefore difficult to detect since it will not cause bird die-offs
- It is potentially lethal in humans
- The virus shows some genetic changes associated with adaptation to mammals
- There is likely to be little or no immunity in the human population
- But, there is no evidence of sustained or ongoing person-to-person transmission

CURRENT SITUATION-HUMANS

Reported human cases of A(H7N9)

3 May 2013 08:00



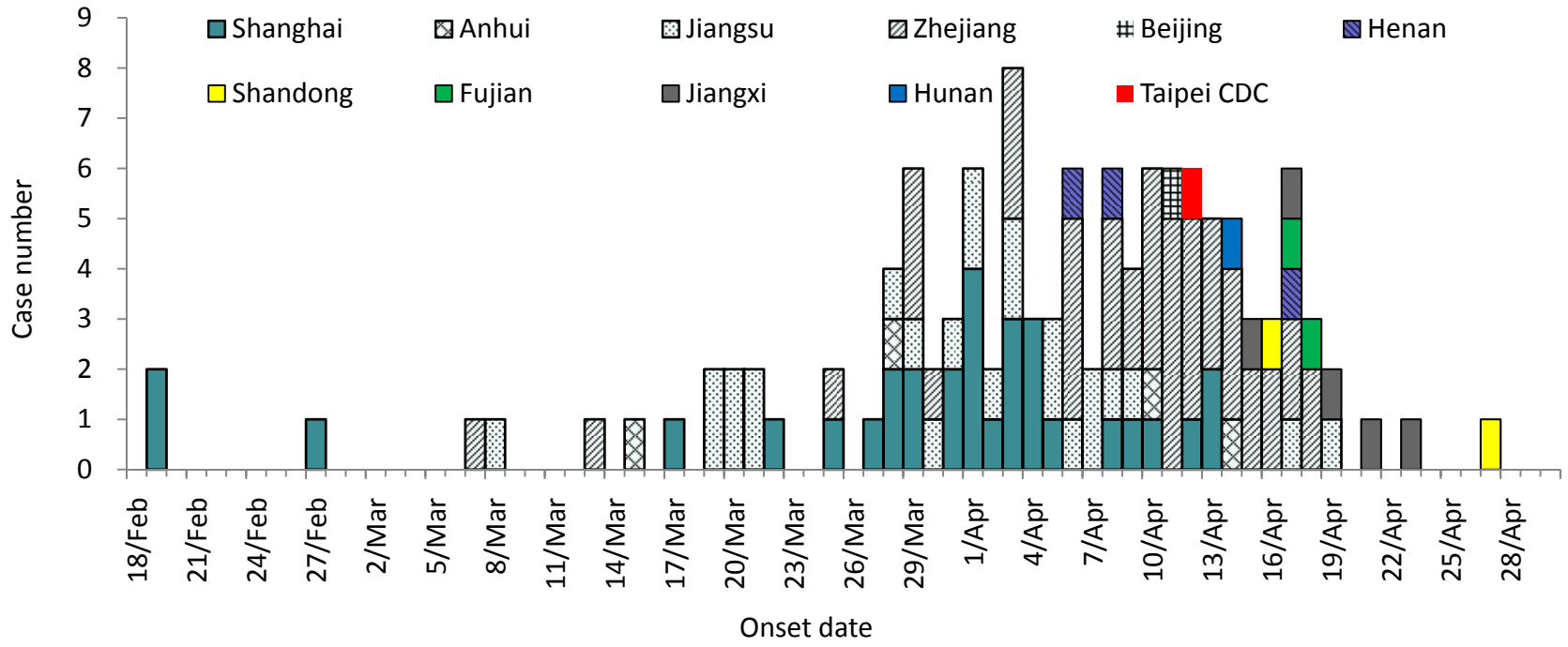
Total cases
128

Total deaths
26

Case fatality %
20%

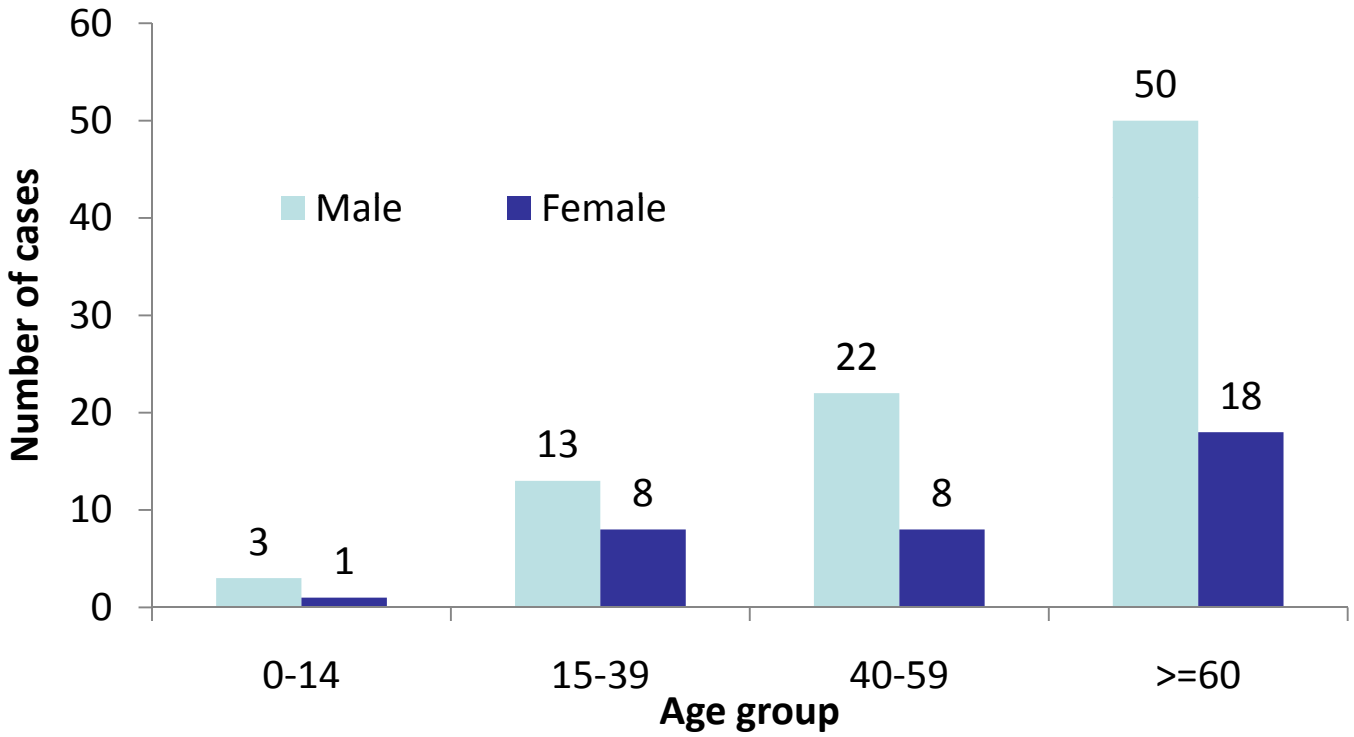
Epidemic curve – A(H7N9) cases

February – 30 April 2013 (n=121)



Note: The date of onset was not available for 5 cases

Age and gender A(H7N9) cases



Note: Age and sex details were not available for 5 cases

Clusters of human A(H7N9) cases

- Five clusters of human H7N9 infection.
- Li *et al* NEJM report that *"In two family clusters, human-to-human transmission of H7N9 virus could not be ruled out."*
- There is no evidence of efficient, sustained or ongoing human-to-human transmission.
- Previously H5N1 and H7N7 viruses have demonstrated limited human-to-human transmission and have **not** progresses to sustained human-to-human transmission .

CLINICAL PRESENTATION

Clinical picture of A(H7N9)

What we know so far:

- Many cases are elderly men
- Many cases have underlying medical conditions
- Clinical picture of severe cases is similar to H5N1
- Few show non-pulmonary symptoms (e.g. diarrhea, conjunctivitis).
- Few mild cases detected so far

Gao, R. *et al* N Engl J Med. 2013 Apr 11.

Infection Prevention and Control (IPC)

Current situation:

- **Unknown source of infection and transmissibility**
- **Unknown potential for human to human transmission**
- **Lack of vaccine for H7N9**

• Minimize Potential Exposures: Avoid visiting high risk areas without proper protection

• Always perform hand hygiene (i.e., washing with soap and water or using alcohol-based hand rubs): Before and after all patient contact, contact with potentially infectious material, and before putting on and upon removal of personal protective equipment.

• STANDARD PRECAUTIONS + AIRBORNE + CONTACT PRECAUTIONS, when visiting areas where is potentially a high risk of infection

LABORATORY DIAGNOSIS

Laboratory diagnosis A(H7N9)

- Respiratory specimens for detecting A(H7N9) by:
  - RT-PCR
  - Viral culture

- All National Influenza Centres will be capable of diagnosing H7N9 once they have received the kits.

- Serology (antibody) tests are being developed but are not useful for early diagnosis, only for retrospective diagnosis or for epidemiology studies.

CURRENT SITUATION: ANIMALS

VIET NAM POULTRY SURVEILLANCE

- Over 500 historically collected poultry samples from live bird markets and spent hens have been tested at NCVD
- They all tested negative for H7
- FAO currently is working with DAH/MARD to implement a heightened surveillance plan
  - collecting both oropharyngeal and cloacal samples for analyses from 60 live bird markets and bird collecting points
  - 9 Provinces in northern Vietnam
- Sampling will initially be conducted weekly for 5 weeks starting this week and upon completion, future surveillance will be considered based on the ongoing situation

Notification of H7N9 outbreaks in animals, China (OIE, 26 Apr)

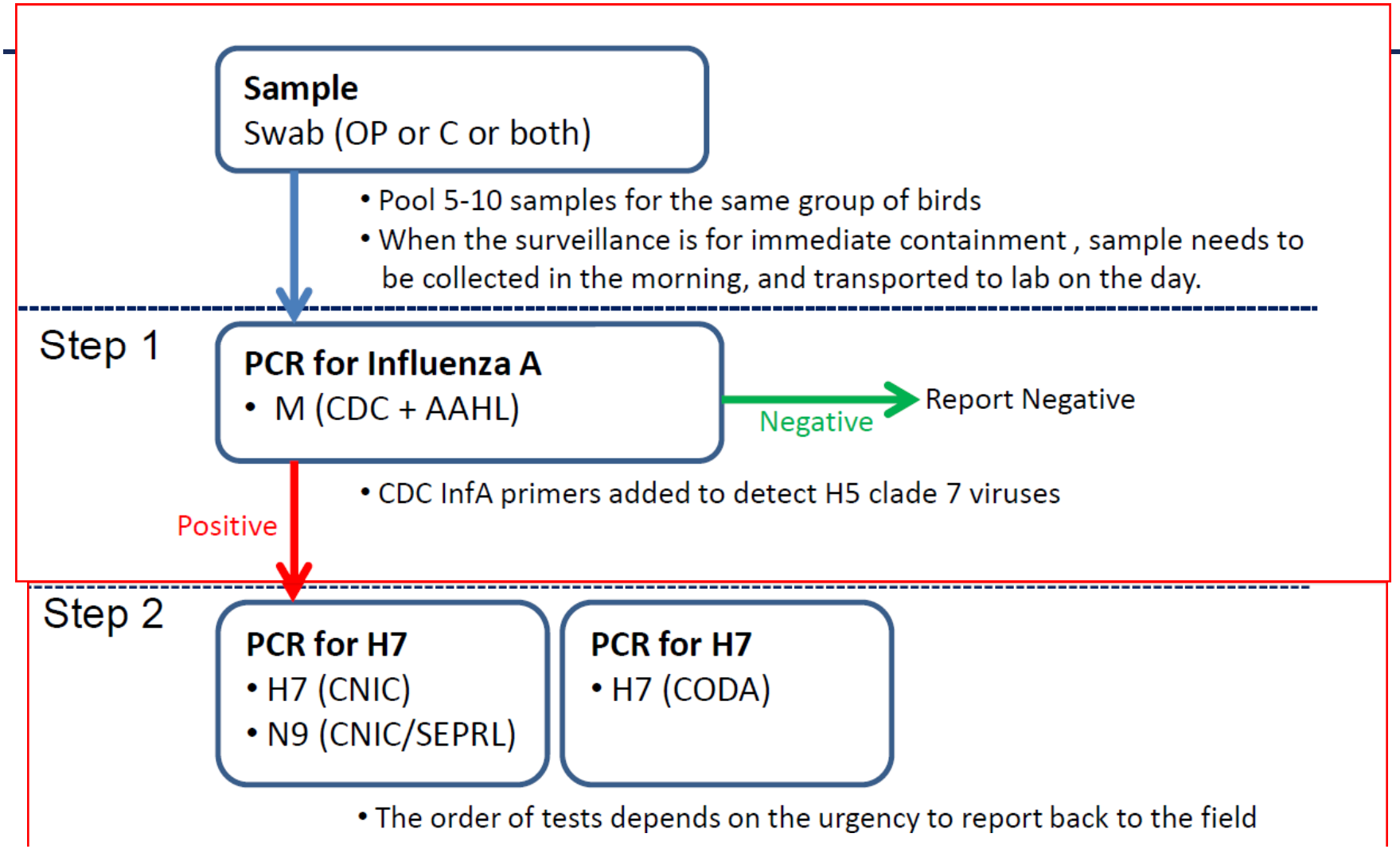
Province	Number of notification (Date of report)					Total
	Birds				Environment	
	Chicken	Ducks	Pigeon	Unknown		
Shanghai	7 (4 Apr) 3 (5 Apr)		2 (5 Apr)		1 (4 Apr) 5 (5 Apr)	18
Jiangsu	11 (10 Apr)		1 (22 Apr)	1 (16 Apr)		13
Anhui		1 (10 Apr)				1
Zhejiang		2 (10 Apr)		4 (16 Apr) 1 (24 Apr) 3 (26 Apr)		10
Henan					2 (24 Apr)	2
Total	21	3	3	9	8	44

A(H7N9) surveillance in animals

as of 1st May 2013

- Data increasingly support a role for poultry in live poultry markets as an important source of human infections.
  - Thirteen out of 215 (6.0%) bird samples collected from three live poultry markets in Shanghai were positive for A(H7N9) (*JianZhong et al., Chinese Science Bulletin*).
  - A study of animals in markets epidemiologically linked to human cases detected H7N9 in 2/5 pigeons, 4/20 chickens, zero of 4 quails, and zero of 57 ducks (*Chen et al Lancet*)
  - Of 68,060 animal samples, 44 samples were positive (0.07%) for A(H7N9) from live poultry market poultry and environmental samples in Shanghai, Anhui, Zhejiang, Jiangsu, and Henan province. The other two were pigeon samples in Jiangsu province.
- H7N9 has not been detected in swine.
  - A total of 2,150 swabs and 2,000 sera had collected from the pigs from 35 farms and 11 slaughter houses in the affected provinces and none of them were positive for A(H7N9).

VIET NAM Animal Testing Protocols



ADDITIONAL CONSIDERATIONS: ANIMAL HEALTH

- FAO does not recommend poultry vaccination
- FAO recommends following good biosecurity and farm hygiene practices throughout the entire poultry production & market chain to reduce the risk of virus introduction
- FAO recommends keeping all birds and livestock separate from people and living areas
- FAO recommends eating well cooked, properly prepared food and not consuming sick poultry or poultry from unknown sources

OUTSTANDING QUESTIONS

Some outstanding questions

- What is the primary animal source of human infections?
  - H7N9 has been detected in relatively few animals
  - H7N9 has been found in birds from live bird markets but not on farms
- Why are most cases elderly men?
- Are there many undetected mild cases?

Public health advice

As of 1st May 2013

- Avoid live bird markets
- Avoid any surfaces that may have been contaminated with poultry feces or blood
- Cook poultry to internal temperature of 70C— "piping" hot — no "pink" parts
- Clean cooking implements that have been in contact with raw meat before re-using
- Wash hands regularly with soap and water, especially while cooking and before eating
- “Cover your cough”

Travel and trade

As of 1st May 2013

- WHO does not advise screening at ports of entry.
- WHO & FAO do not recommend import bans on animals or animal products as a measure to protect human health

Summary

As of 3rd May 2013

- 128 cases, 26 deaths and CFR 20%
- Many cases are elderly men
- Cause of concern, but **no evidence of sustained or ongoing person-to-person transmission**
- **Many questions** remain to be answered
- WHO does not advise screening at ports of entry or recommend import bans as a measure **to protect human health.**
- FURTHER INFORMATION: www.fao.org/news/story/en/item/173704/icode/
- http://www.who.int/influenza/human_animal_interface/faq_H7N9/en/index.html