

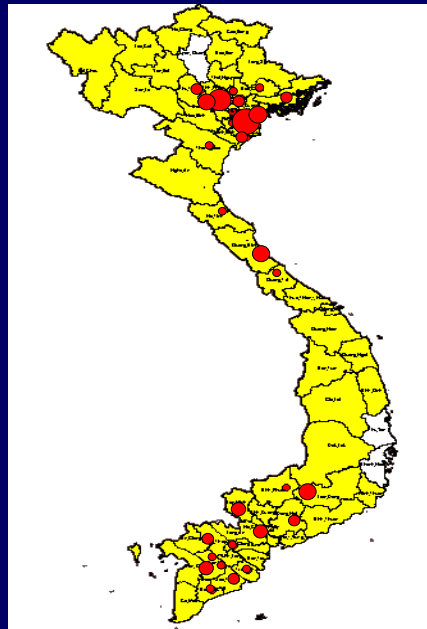


## AVIAN INFLUENZA IN VIETNAM: SITUATION AND LESSONS LEARNED

Assoc. Prof. Nguyen Tran Hien, MD, MPH, PhD.  
Director, National Institute of Hygiene and Epidemiology (NIHE)  
Hanoi, Vietnam

### OVERVIEW OF AVIAN INFLUENZA SITUATION IN VIETNAM, DEC 2003 – UNTIL NOW

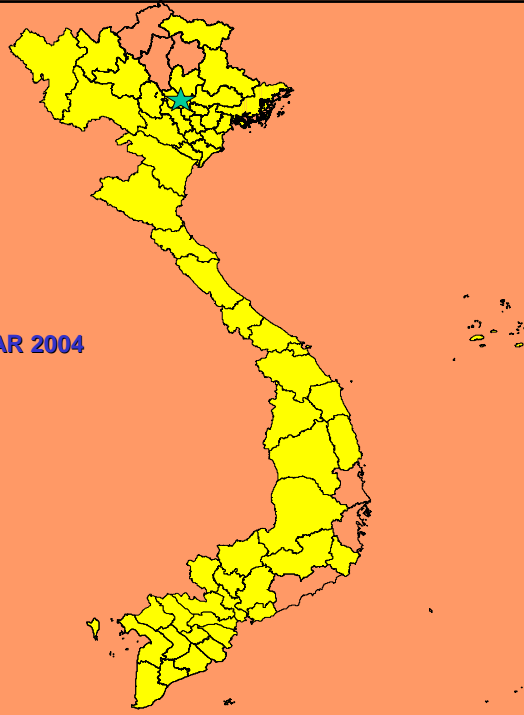
- From Dec. 2003 – March 2008
  - 5 epidemic waves of avian influenza A/H5N1
  - Almost all provinces have reported outbreaks in poultry;  
~ 50 million poultry culled
  - 36/63 provinces have human cases; Total 106 cases, 52 deaths  
(CFR: 49.0%)
- No new outbreaks in humans have been reported since March 4, 2008.



**GEOGRAPHIC DISTRIBUTION  
OF H5N1 CASES IN VIETNAM**

**WAVE 1: FROM DEC 2003 TO MAR 2004**

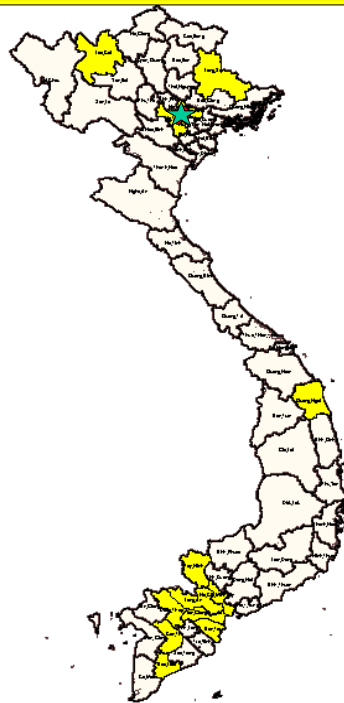
- 57/64 provinces reported poultry outbreaks; 43.9 million poultry culled.
- 13/64 provinces reported human outbreaks: 23 cases, 16 deaths; CFR: 69.6%.



**GEOGRAPHIC DISTRIBUTION  
OF H5N1 CASES IN VIETNAM**

**WAVE 2: FROM JUL 2004 TO AUG 2004**

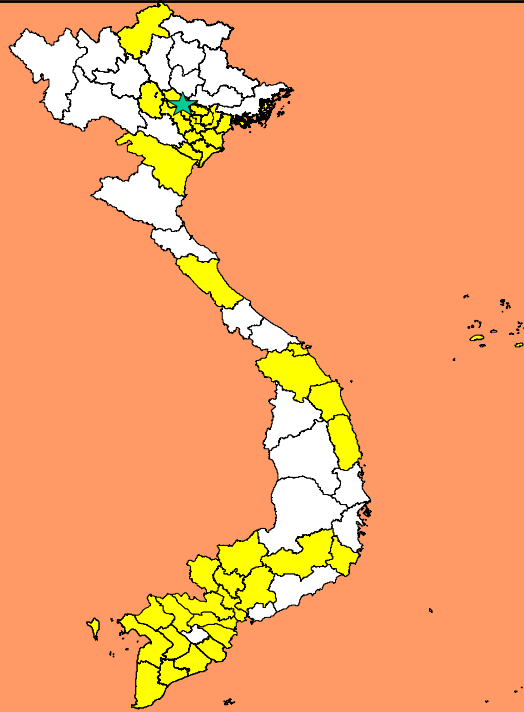
- 17/64 provinces reported poultry outbreaks; 84,000 poultry culled)
- 3/64 provinces reported human outbreaks: 4 cases, 4 deaths; CFR: 100%.



**GEOGRAPHIC DISTRIBUTION  
OF H5N1 CASES, IN VIETNAM**

**WAVE 3: FROM DEC 2004  
UNTIL NOV.2005**

- 36/64 provinces have poultry outbreaks; 470,000 poultry killed
- 25/64 provinces had human outbreaks; 66 cases, 22 deaths; CFR:33.3%)

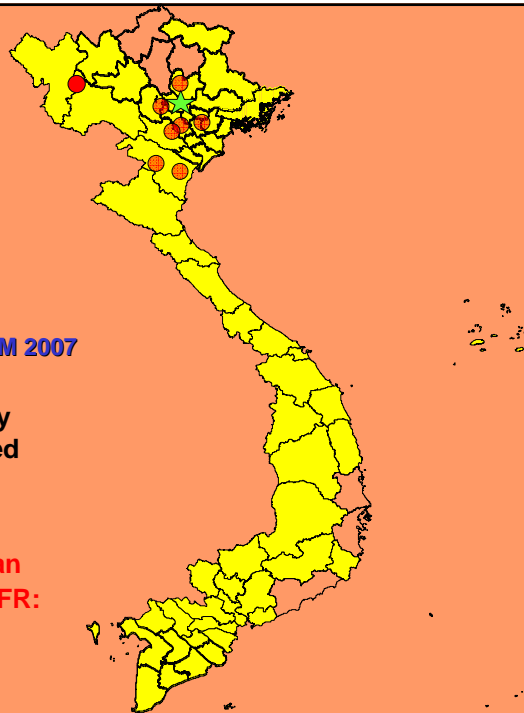


**GEOGRAPHIC DISTRIBUTION  
OF H5N1 CASES  
IN VIETNAM**

**WAVE 4: FROM MAY 2007 TO DECEM 2007**

18/64 provinces reported poultry outbreaks; 176.407 poultry culled (data source of Department of Animal Health)

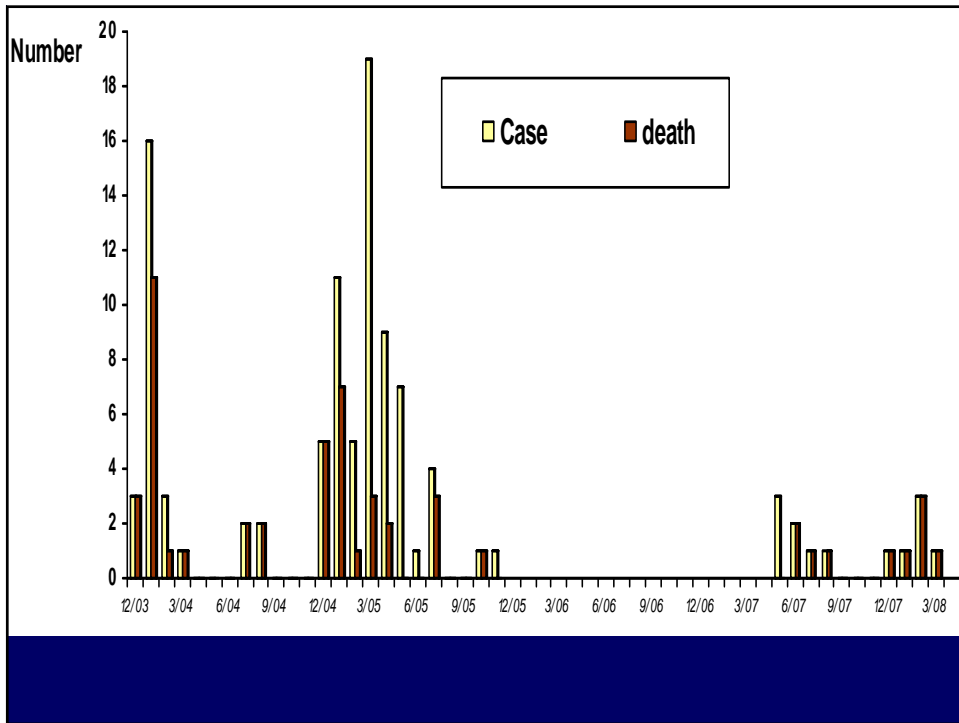
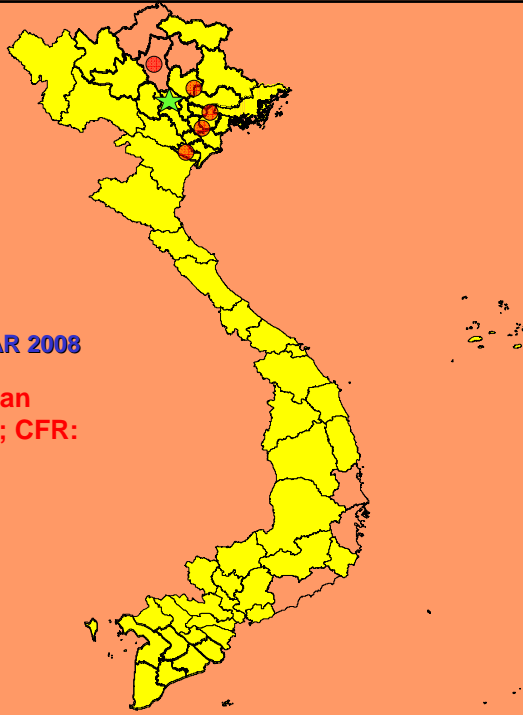
- 6/64 provinces reported human outbreaks: 8 cases, 6 deaths; CFR: 75%.



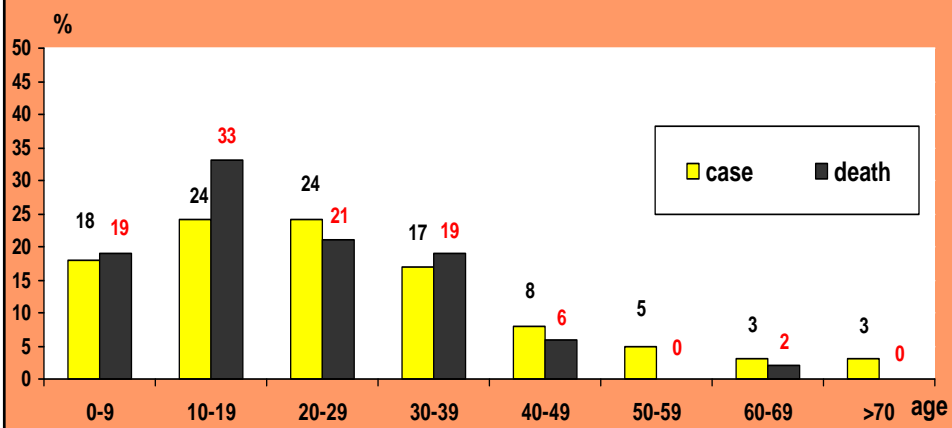
**GEOGRAPHIC  
DISTRIBUTION OF  
H5N1 CASES IN  
VIETNAM**

**WAVE 5: FROM JAN 2008 TO MAR 2008**

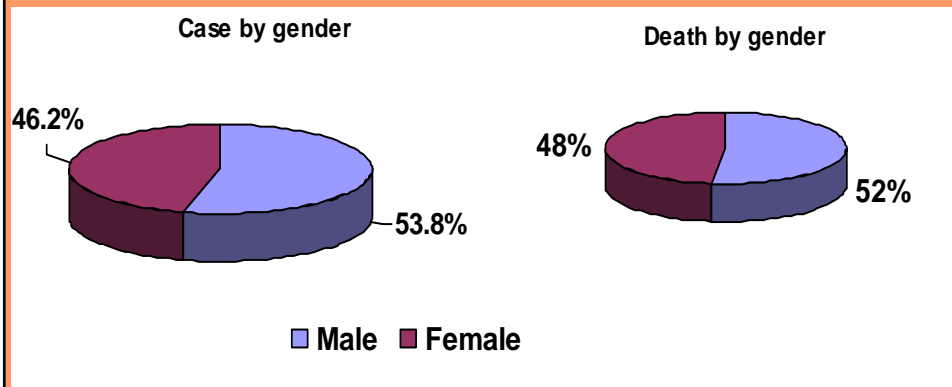
**5/64 provinces reported human  
outbreaks: 5 cases, 5 deaths; CFR:  
100%.**

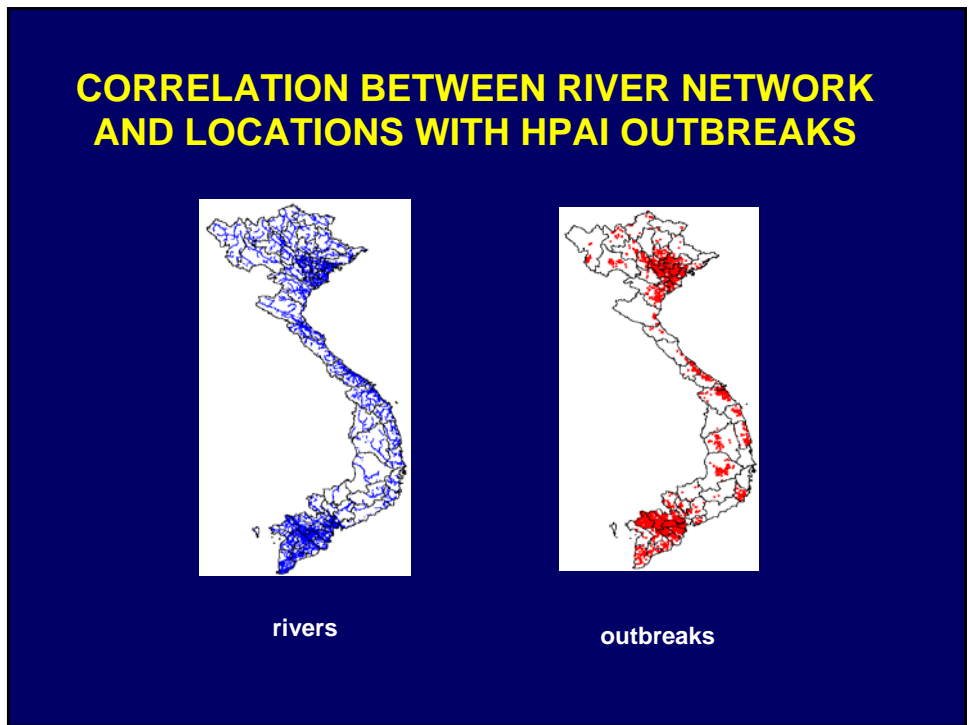
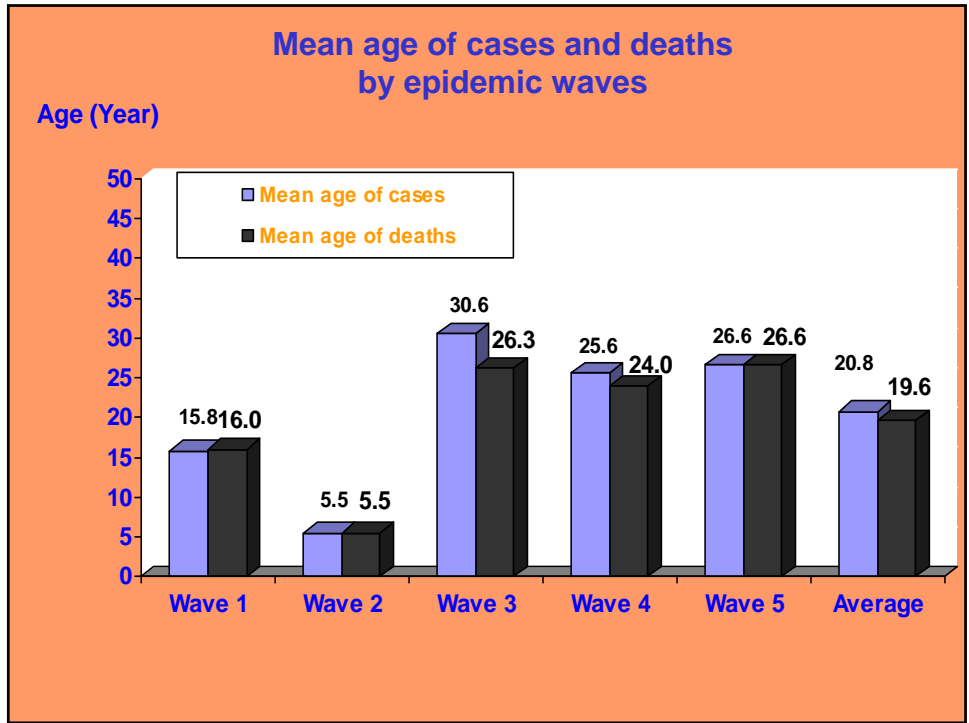


### DISTRIBUTION OF CASES AND DEATHS BY AGE GROUPS



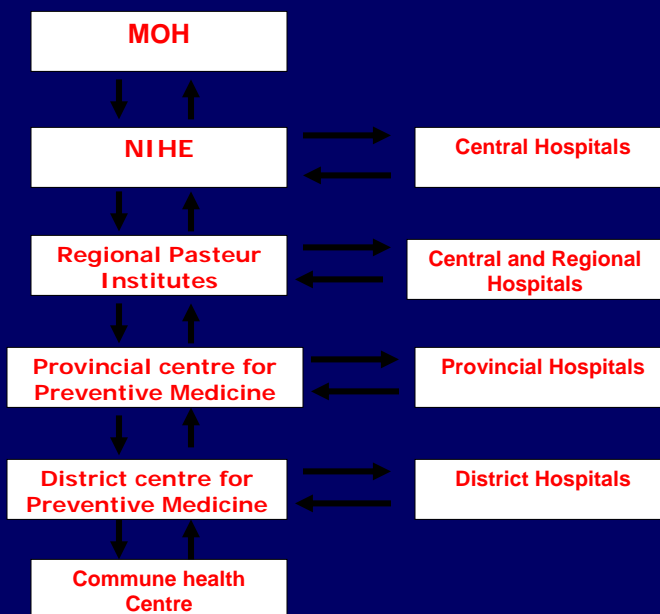
### DISTRIBUTION of avian influenza cases and deaths by gender





# SURVEILLANCE OF AVIAN INFLUENZA IN VIETNAM

## COMMUNICABLE DISEASE SURVEILLANCE SYSTEM



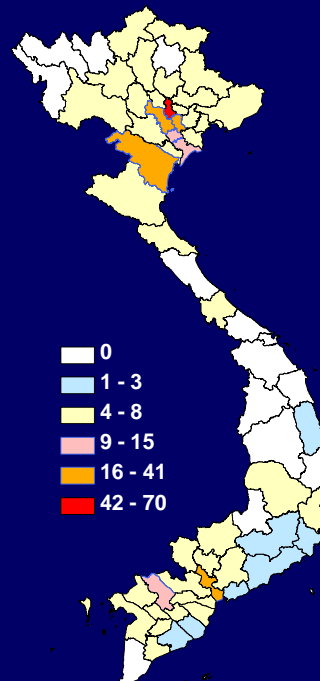
## Severe Viral Pneumonia (SVP) Surveillance

1. Case definition:
  - Sudden onset of fever  $> 38^{\circ}\text{C}$ , AND
  - Difficulty in breathing, AND
  - Chest radiograph findings compatible with viral pneumonia, AND
  - No alternative diagnosis, such as bacterial pneumonia
2. Method
  - Hospital based in all provinces
  - Immediate reporting required
  - Investigation of cases by public health authorities within 48 hours of report
  - RT-PCR testing for influenza viruses by regional public health laboratories within 48 hours of notification

54 of 64 provinces  
reported SVP cases

Jan.2006-April 2008

(N=418)





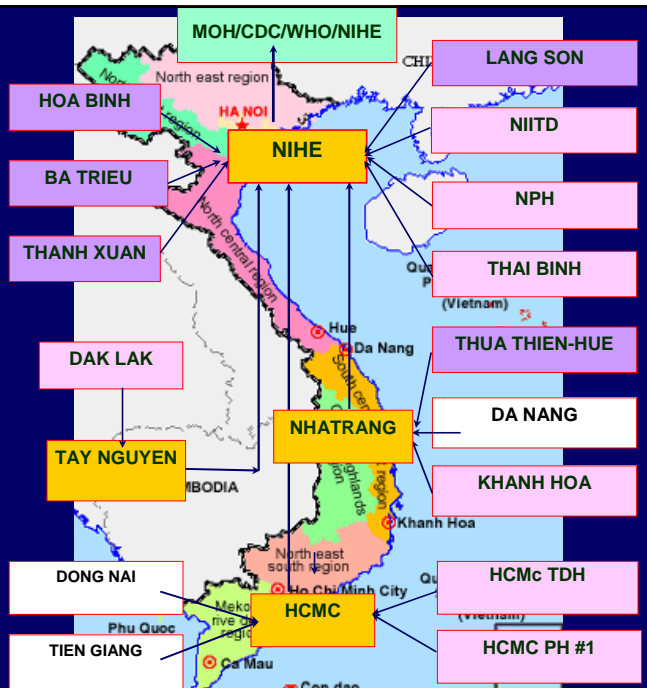
## Influenza virus causes of SVP

Type/Subtype	Number cases	Percent Positive
<b>A/H5</b>	<b>13</b>	<b>3.1</b>
<b>A/H3</b>	<b>6</b>	<b>1.4</b>
<b>A/H1</b>	<b>6</b>	<b>1.4</b>
<b>B</b>	<b>3</b>	<b>0.7</b>
Total positive	28	6.7

N=418

National Influenza  
Sentinel  
Surveillance 2006-  
2007

Organizational  
network of 4  
regional public  
health laboratories  
and 15 sentinel  
sites



## RISK FACTORS FOR INFECTION

A case-control study in Vietnam 2004 have shown the risk factors for H5N1 infection:

- Direct contact to ill/dead poultry 7 days prior to onset (OR=31.0, 95%CI: 3.4 - 1050).
- Having ill/dead poultry in household 7 days prior to onset (OR=7.4; 95%CI: 2.7 – 59.0)
- Lack of an indoor water source (matched OR 6.46, 95% CI 1.20–34.81,  $p = 0.03$ ).
- Factors not significantly associated with infection:
  - raising healthy poultry,
  - preparing healthy poultry for consumption,
  - exposure to persons with an acute respiratory illness.

## Epidemiological Characteristics of H5N1 cases in 2007-2008 (n=13)

- Gender :
  - Male: 76.9%
  - Female: 23.1%
- Age:
  - Max: 40
  - Min: 4
  - Mean: 23,2 (+/-2.6)
- Occupation
  - Children: 7,6% (1/13)
  - Student: 15,3% (2/13)
  - Farmer: 61,5% (8/13)
  - Civil servant: 15,3% (2/13)

## Epidemiological Characteristics of H5N1 cases in 2007-2008 (n=13)

- Occupational exposure
  - Cleaning cage/farm, slaughtering poultry: 3/13
  - Working at A/H5 influenza labs: 0/13
  - Working at health facilities: 0/13

## Epidemiological Characteristics of H5N1 cases in 2007-2008 (n=13)

- Animal exposures
  - Slaughtering, direct contact: 53% (7/13), in which:
    - 3/7: Healthy poultry
    - 3/7: sick/dead poultry
    - 1/7: unknown
  - Involved in culling poultry: 0
  - Eating poultry and its products: 69% (9/13)
    - 3/7: Healthy poultry
    - 4/7: sick/dead poultry
    - 2/7: unknown

*No evidences that patients ate raw poultry blood or half-done products*

## Epidemiological Characteristics of H5N1 cases in 2007-2008 (n=13)

- Animal exposures
  - Raising poultry near house: 9/13
    - 4/9: Healthy poultry
    - 5/9: Sick or dead poultry
  - Raising pigs/exposure to pig within 1m
    - 3/13: yes
    - 10/13: no
  - Visiting poultry cages within 6 weeks before onset:
    - 1/13: yes
    - 10/13: no
    - 2/13: unknown

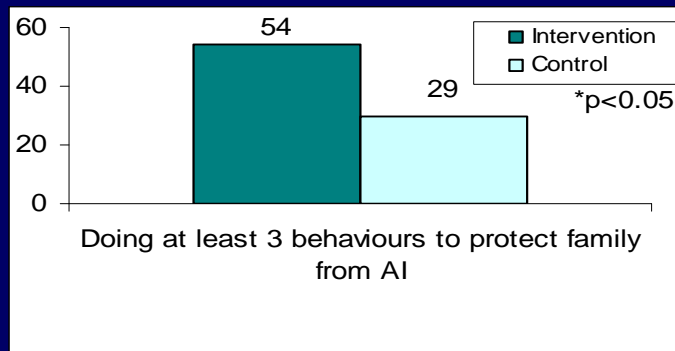
## Average Timelines

- Average time (days) from onset to:
  - CHC: 2,6 (Std:0,9)
  - District hospital: 3,5 (Std:0,5)
  - Provincial hospital: 4,5 (Std:0,5)
  - Central hospital: 5,6 (Std:0,3)
  - Date of testing for H5: 7,6 (Std: 0,7)
  - Test result releasing: 9,6 (Std:0,7)

## Practices

Project of "Community based active surveillance model on AI"  
implemented by Care International in Vietnam

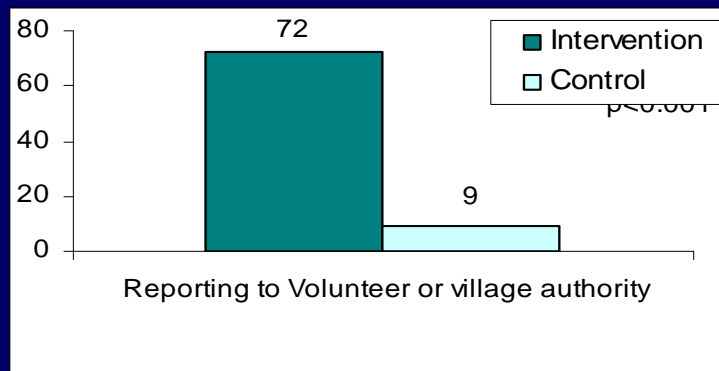
Percentage of doing at least 3 behaviours to  
protect family from AI



## Practices

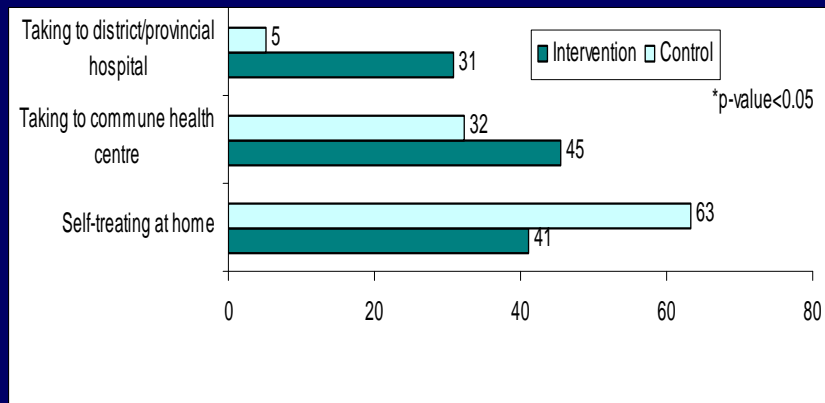
Project of "Community based active surveillance model on AI"  
implemented by Care International in Vietnam

Percentage of households reporting of  
sudden death of poultry



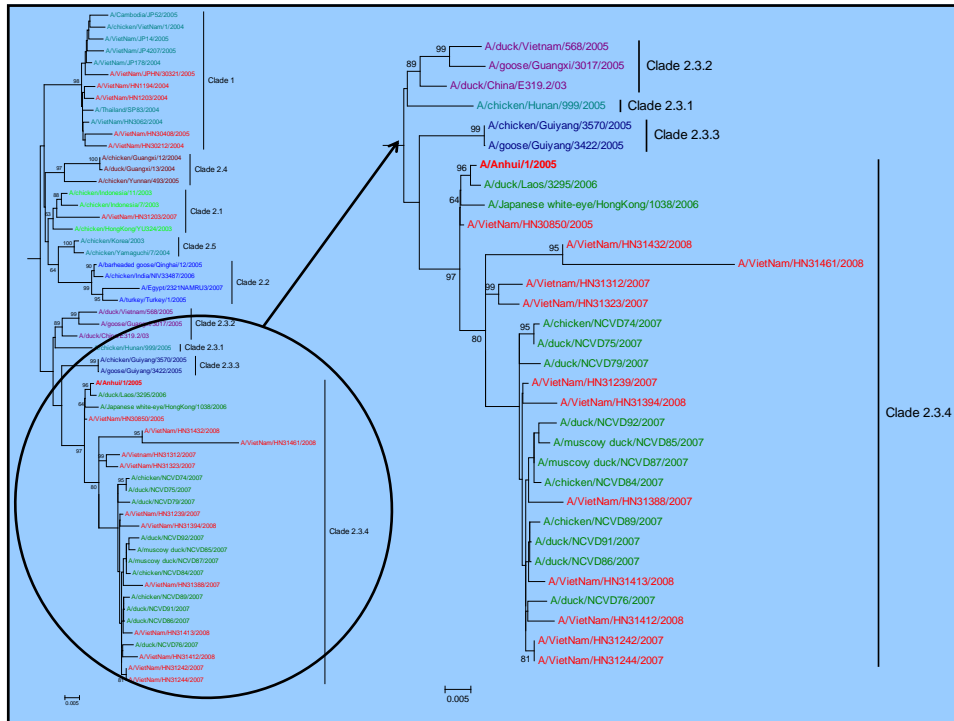
## Percentage of seeking help for people in family catching a flu over the past 2 years

Project of "Community based active surveillance model on AI" implemented by Care International in Vietnam



## EVOLUTION OF H5N1 VIRUSES IN VIETNAM

- In 2007-2008, H5N1 clade 2.3.4 viruses replaced clade 1 viruses in northern Vietnam and human isolates have high homology to contemporary poultry isolates.
- Mutations on NA protein have been recognized at position 117V (clade 2.3.4 viruses, 2007-2008), which is associated with reduced susceptibility to oseltamivir and is unrelated to treatment.
- The new mutation (I117V) was also found in poultry isolates,
- No mutations in the M2 gene were found conferring amantadine resistance.



## SUMMARY

1. Cases were reported sporadically and in scattered provinces
2. Majority of human cases have exposure history to infected poultry.
2. Epidemics occurred mainly in wet and cold seasons (winter and spring)
3. Genetic factors may play a very important role in susceptibility to the virus among family-clusters.
4. Clade 1 viruses are currently being replaced by clade 2.3 viruses in poultry and humans.
5. No evidence of human to human transmission is available.

# LESSONS LEARNED IN HPAI PREVENTION AND CONTROL IN VIETNAM

## LESSONS LEARNED

- 1. Highest political commitment: Strong leadership of the Government.**
- 2. Establishment of multi-sectoral Steering Committees for control and prevention of avian and human influenza at all levels, from central to communal level.**
- 3. Good collaboration between MARD, MOH, other ministries and mass organizations to develop and implement “Integrated Operational Program for Avian and Human Influenza (OPI)”**  
*Role of Poultry Vaccination: contributing in reducing epidemics among poultry and H5N1 human cases*



## **LESSONS LEARNED**

- 4. The well developed health care system including curative care and preventive medicine system from central to local level, which implemented prevention activities, surveillance and early detection, care and treatment**
- 5. Timely sharing information and mobilizing support from international organizations and other Governments**

## **CHALLENGES**

- 1. New and emerging disease: lack of knowledge about viral behaviors, pathogenicity, transmission mechanism, treatment**
- 2. Virus maintain among ducks as asymptomatic hosts**
- 3. Poultry raising system is not appropriate: back-yards in household, small farms**
- 4. Poor recognition and reporting of suspected HPAI in poultry. Human case identifications mostly occurred before reports of disease in poultry.**
- 5. Low awareness and high risk behaviors of handling and eating sick poultry/their products**
- 6. Collaboration between human and animal health sectors not yet strong enough, especially at local level**
- 7. Lack of capacity and resources for active surveillance and research**

## RECOMMENDATIONS

1. **Avian Influenza should be considered as a combined agricultural, major public health, economic and social threat.**
2. **Strengthen epidemiological, virological and clinical surveillance and researches for better assessment of AI situation with the more concrete collaboration mechanism between animal and human health sectors, at all levels.**
3. **Increase capability to study pathogenicity, transmissibility, and antiviral susceptibility of HPAI virus.**
4. **Develop and implement integrated operational program for avian and human influenza**
5. **Develop regional and global multi-sectoral collaboration on surveillance, researches and responses**

**Thank you  
for your attention**