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Avian Influenza H5N1: Getting Our Ducks in a Row

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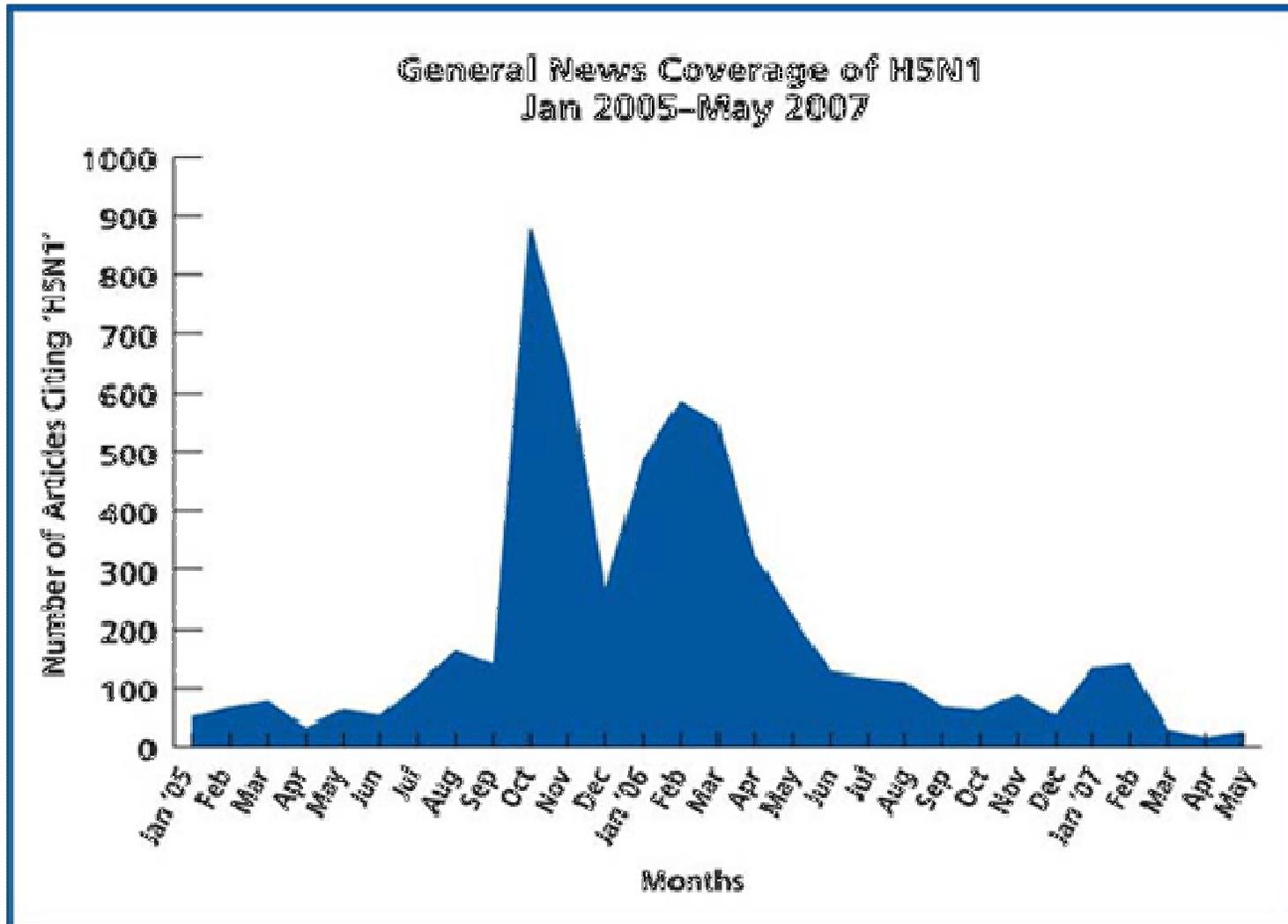
Avian Influenza and its Global Implications





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Media – “Pandemic Fatigue”



Source: NexisLexis (Published in CIDRAP Business Source *Weekly Briefing*)



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Wall Street Journal Online

- AVIAN FLU: PREVENTING A PANDEMIC
- **Avian Flu News Tracker**
October 2, 2007 10:07 p.m.
- *Note to Readers: The Avian Flu News Tracker has been placed on hiatus. It may be revived if the pace of events warrants. The Wall Street Journal Online continues to update the H5N1 map, the full list of fatalities with case histories, and the Avian Flu news page, which covers major developments world-wide. Please write to newseditors@wsj.com. All times EST.*



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Which public are we addressing?

1. Some are completely unaware.
2. Some are aware, but haven't really become interested yet.
3. Some have given the issue real consideration, and now they're digesting what they have learned.
4. Some are suffering from pandemic fatigue. They were interested; now they're not.
5. Some looked at the issue and decided we were wrong. They think H5N1 is a foolish distraction from more serious risks.
6. Some have decided we're right. They've even taken some pandemic preparedness steps.
7. Some are active pandemic preppers and key information sources themselves for their neighbors and coworkers.



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Epidemiology



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Type A Influenza

- Human disease historically been caused by three subtypes of Haemagglutinin (H1, H2, H3) and two subtypes of Neuraminidase (N1 and N2)
- All known subtypes of influenza A can be found in birds, but only subtypes H5 and H7 have caused severe outbreaks of disease in birds
- World Organization for Animal Health (OIE) based in Paris, France, mandates that all H5 and H7 strains of influenza virus in birds are notifiable avian influenza (May 2005)



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Overview of the Current Situation

As of 9 December 2007:

- H5N1 detected in birds in 46 countries
 - *5,876 official poultry outbreaks reported to OIE*
 - *more than 200 million birds have died or been culled to control the disease*
 - *affected countries in Asia, Europe, Near East, Africa*

- H5N1 detected in humans in 12 countries
 - *total of 337 cases and 207 deaths reported by WHO*
 - *average of 5-9 new cases per month*
 - *fatality rate = 61%*



Current WHO phase of pandemic alert

Inter-pandemic phase New virus in animals, no human cases	Low risk of human cases	1
	Higher risk of human cases	2
Pandemic alert New virus causes human cases	No or very limited human-to-human transmission	3
	Evidence of increased human-to-human transmission	4
	Evidence of significant human-to-human transmission	5
Pandemic	Efficient and sustained human-to-human transmission	6

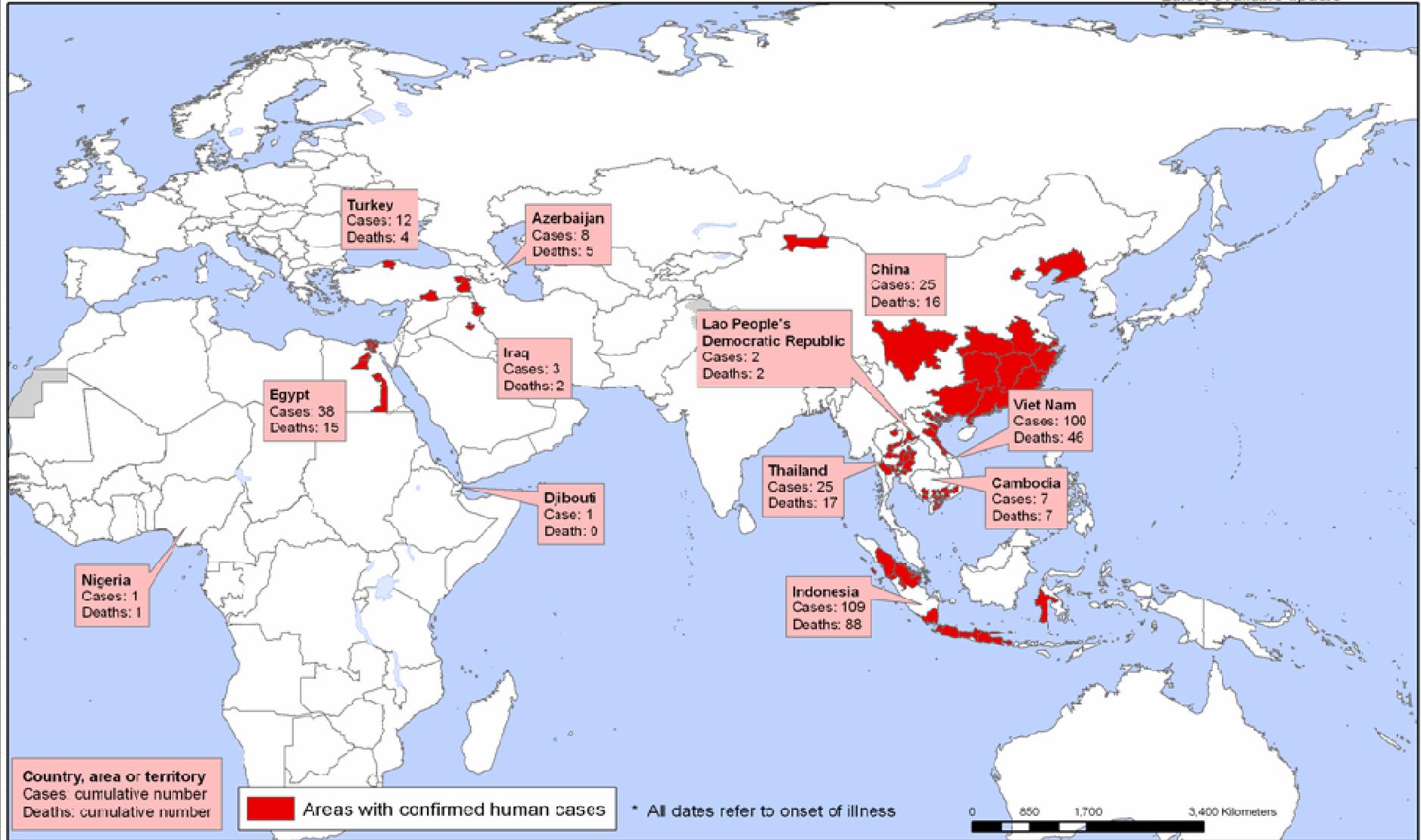


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Confirmed human cases since 2003

Status as of 17 October 2007
Latest available update

Areas with confirmed human cases of H5N1 avian influenza since 2003 *



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

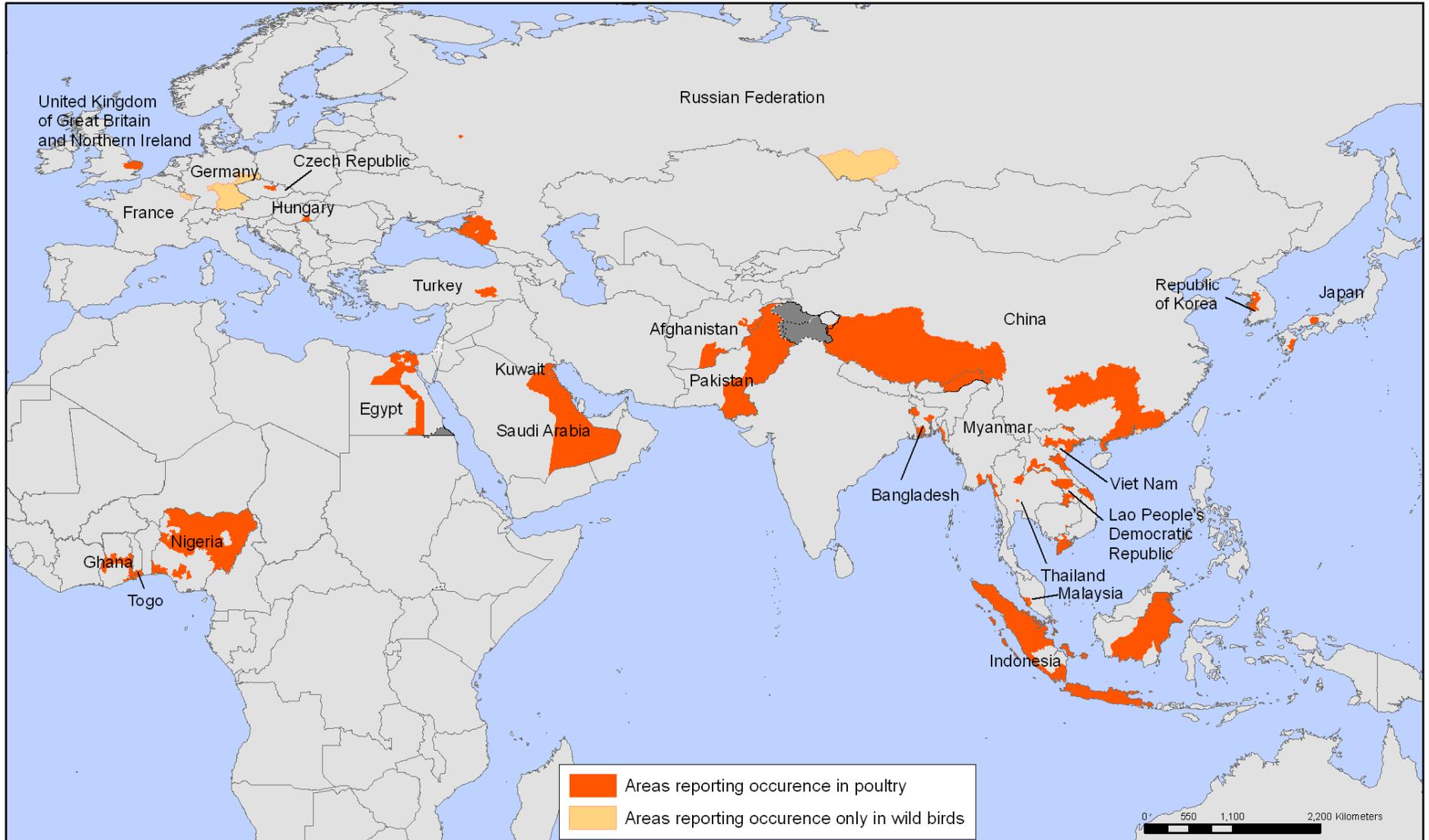
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Confirmed Bird outbreaks in 2007

Areas reporting confirmed occurrence of H5N1 avian influenza in poultry and wild birds between January and June 2007



World Health Organization

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Data Source: World Organisation for Animal Health (OIE) and national governments

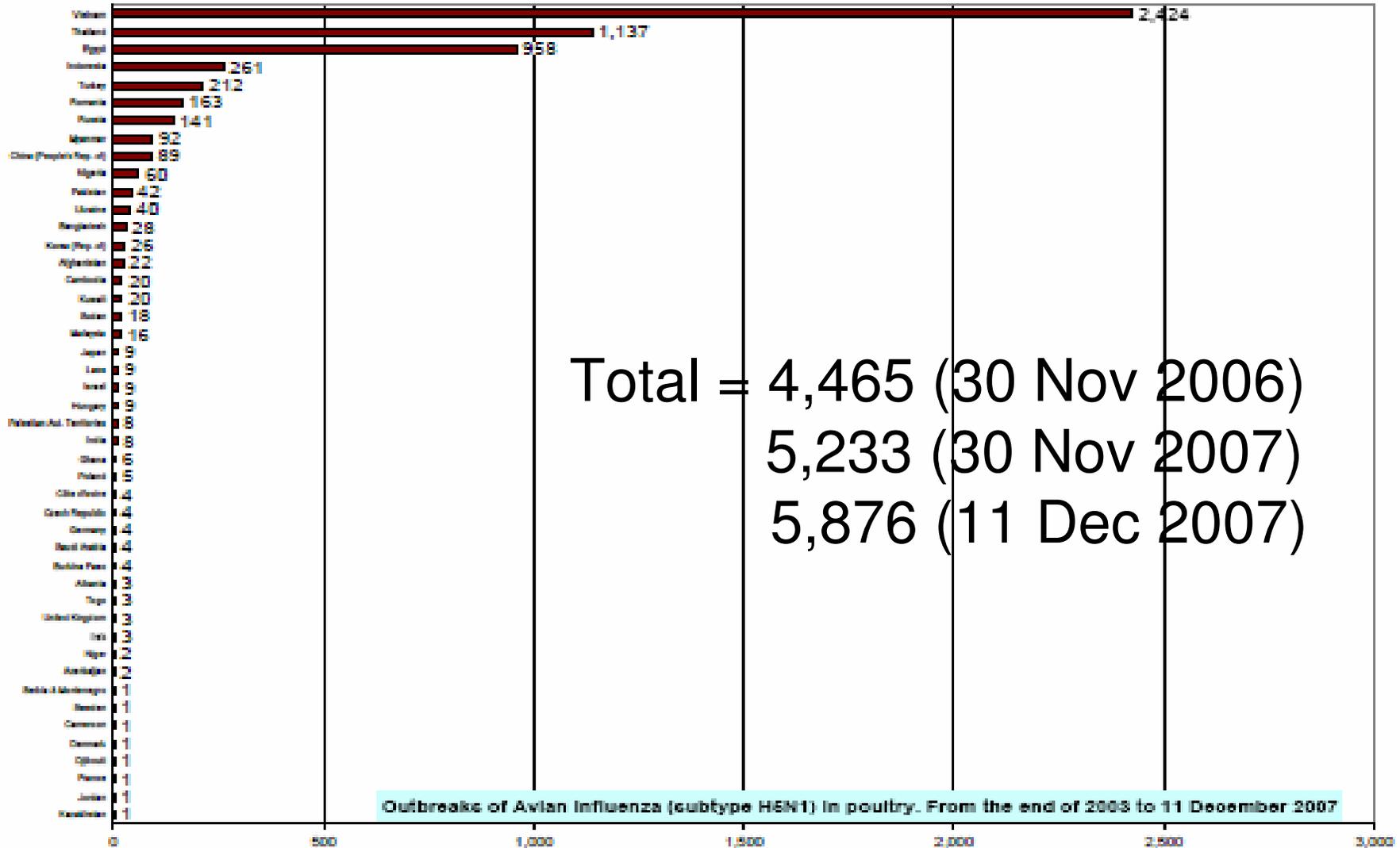
Map Production: Public Health Mapping and GIS

Communicable Diseases (CDS) World Health Organization



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H5N1 outbreaks in poultry (11 December 2007)



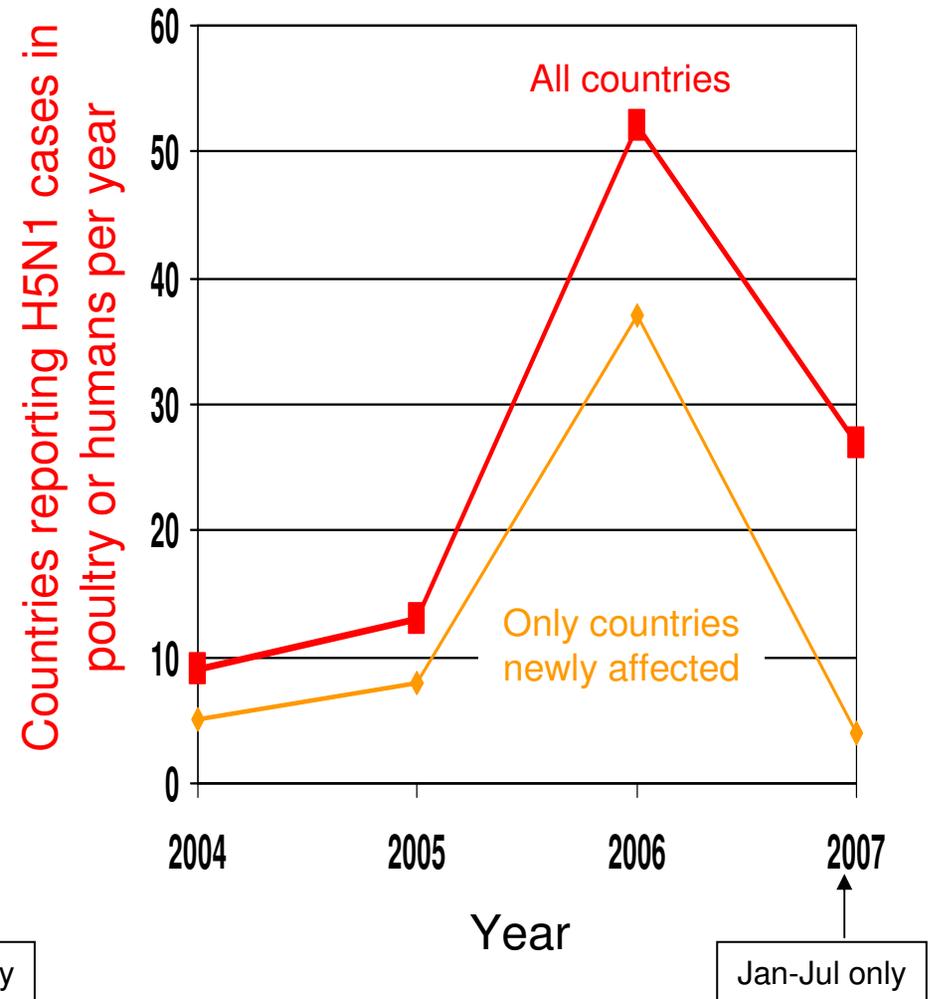
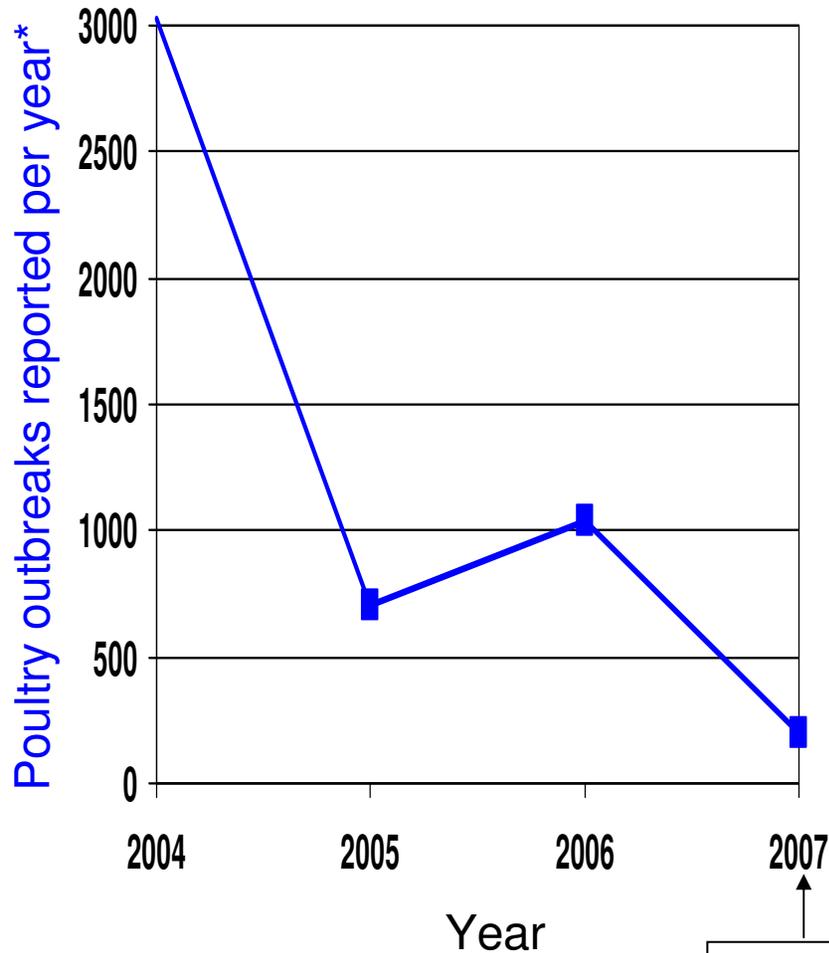
Source: http://www.oie.int/download/AVIAN%20INFLUENZA/Graph%20HPAI/graphs%20HPAI%2011_12_2007.pdf



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Reported Poultry Outbreaks Decreased Even Though Number of Countries Increased

Note: could be due to decreased reporting



Data from FAO, OIE, and WHO.

* Data only from 14 countries which account for ~95% of all reported poultry outbreaks between 2003 and 2007.



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H5N1 Burden Concentrated in 15 Countries

Countries* =

- Afghanistan
- Bangladesh
- Burma
- Cambodia
- China
- Egypt
- Indonesia
- Kuwait
- Nigeria
- Pakistan
- Russia
- South Korea
- Thailand
- Turkey
- Vietnam

These 15 countries account for:

- 94% of poultry outbreaks since Dec 2003
- 89% of poultry outbreaks in 2007
- 75% of poultry died/culled in 2007
- 93% of human cases since Dec 2003
- 96% of human cases in 2007

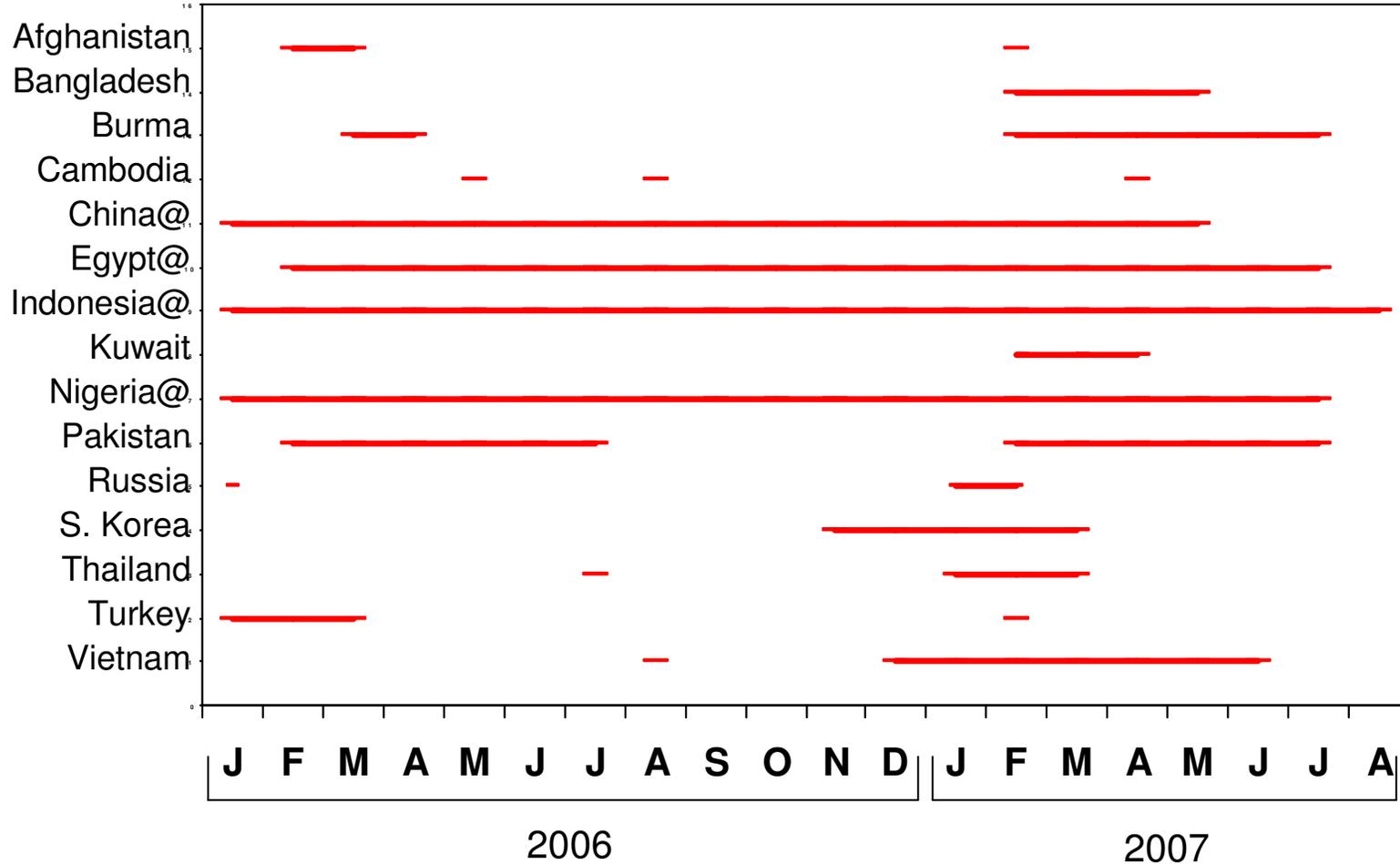
Source: OIE and WHO reports. *All countries have had at least 20 poultry outbreaks since Dec 2003 and at least 1 poultry outbreak or human case in 2007.



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Four Countries (@) with Nearly Continuous H5N1 Transmission from Aug 06-Aug 07

Only shown are countries with 20 or more poultry outbreaks since Dec 2003

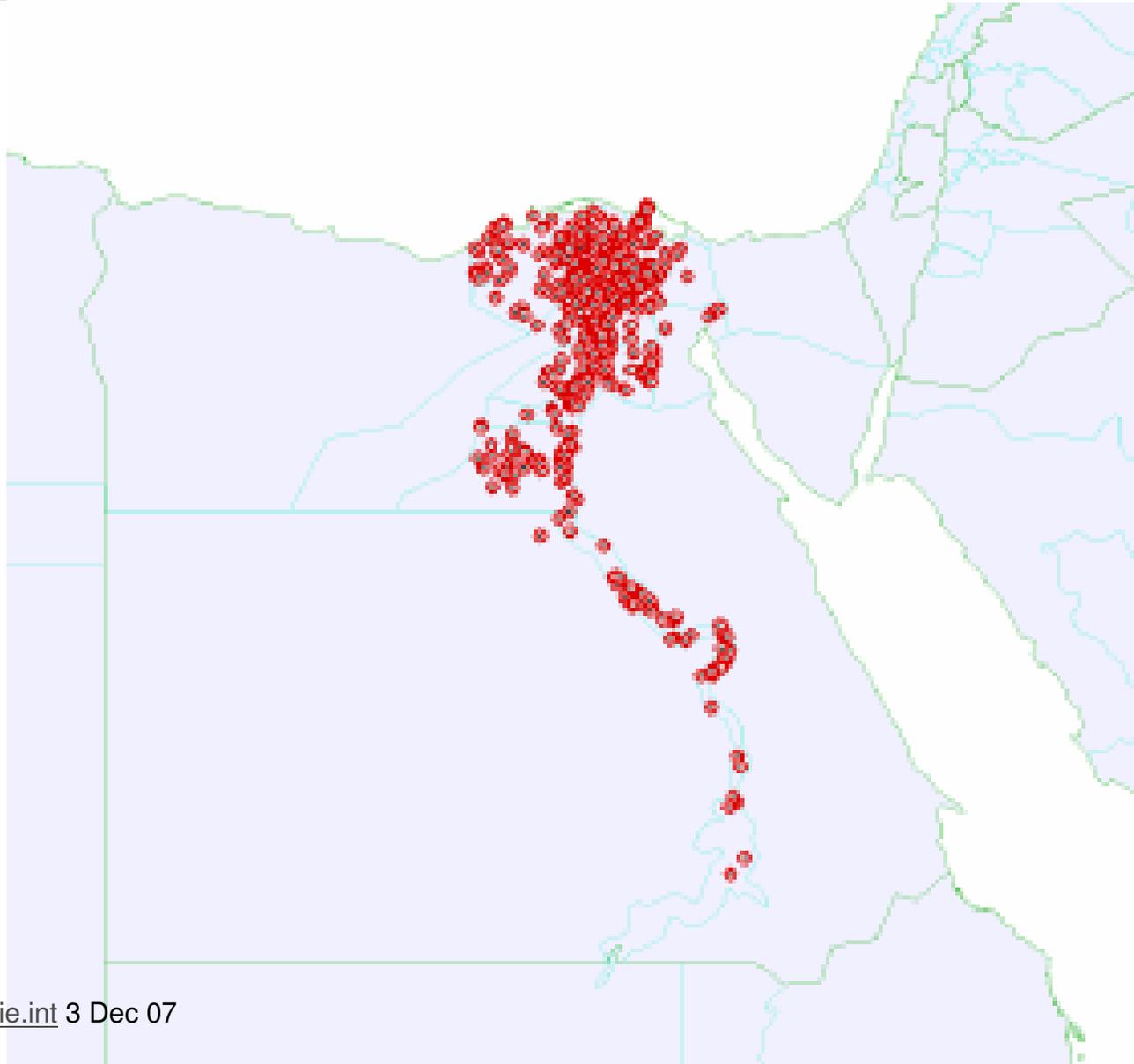


Source: OIE (and WHO) reports. Number of months = months between first outbreak and most recent outbreak (or human case) even if outbreaks not reported each month. * Bangladesh has not officially reported since May. ** No official data on Nigeria, except Jan 07 human case; assumed to be all 7 months of 2007 since AI is endemic. *** Vietnam's outbreaks have run from Aug 06-Jun 07.



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Egypt – Feb 2006 to Nov 2007



Source: www.oie.int 3 Dec 07



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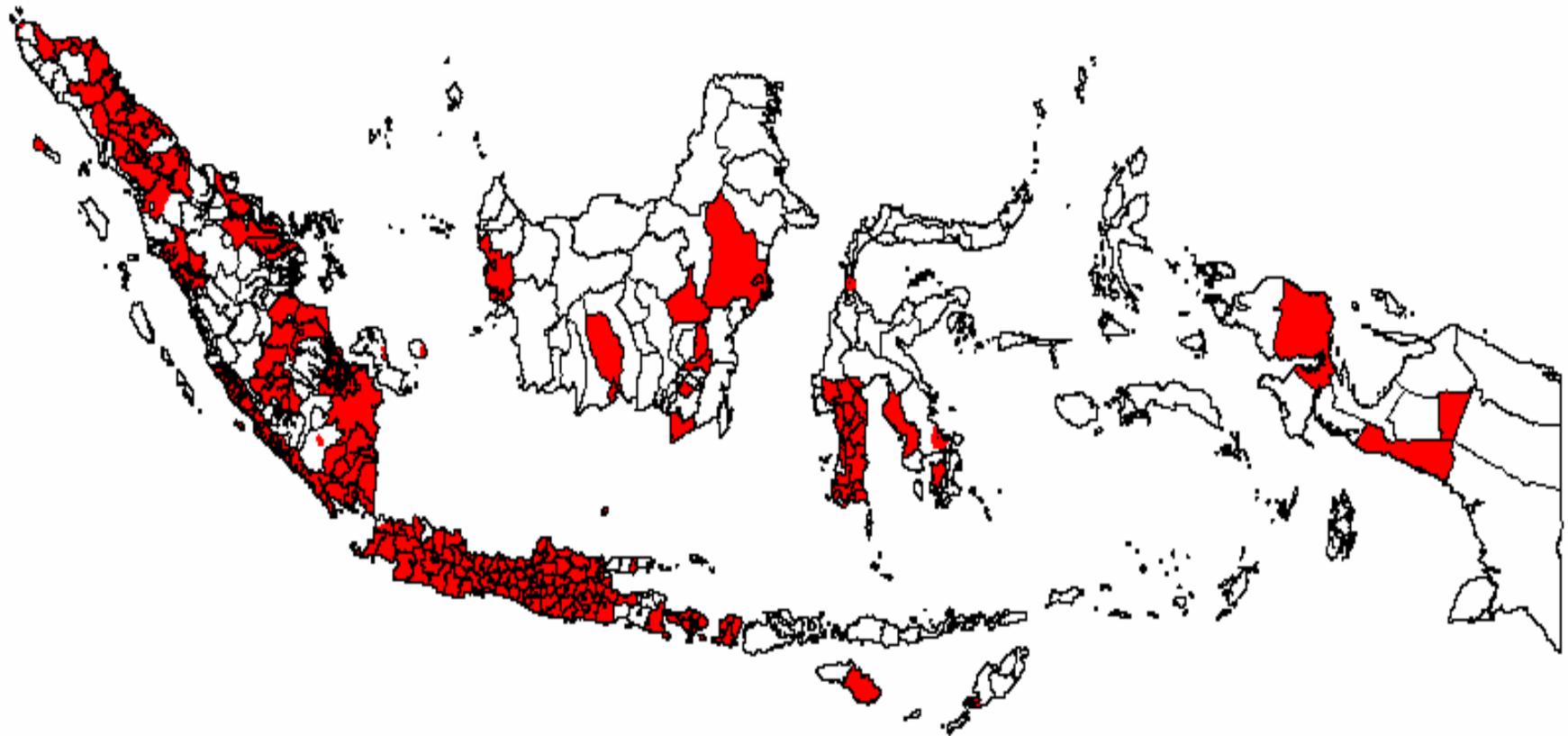
Egypt - Integrated Detailed Implementation Plan

<u>Main Actors</u>		<u>Linkages</u>				
MoHP	MoE		NAMRU 3		Private	
CHL	MoLD		CLEVB		confirmed linkage	
MALR	WB		WHO		++ potential linkage	
FAO	EU		UNICEF		subject to mid-annum review	
Upper cell color: Directly responsible					Circled cell: linked to	
Lower cell color: Supporting the responsible body						



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Indonesia H5N1 HPAI Cases



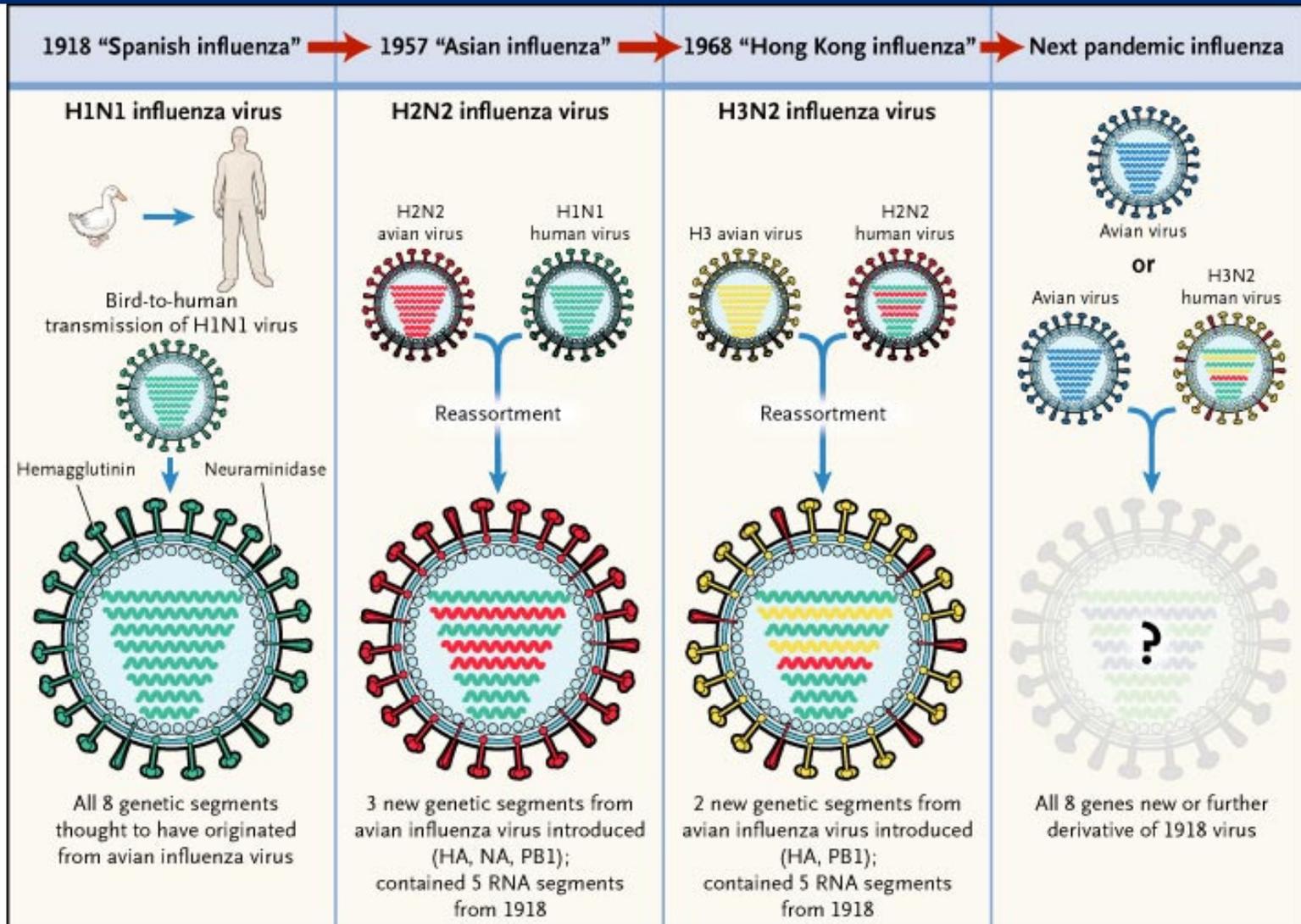
AI confirmed in 30/33 Provinces; 216/444 Districts

Source: GOI and FAO Indonesia



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The Two Mechanisms whereby Pandemic Influenza Originates



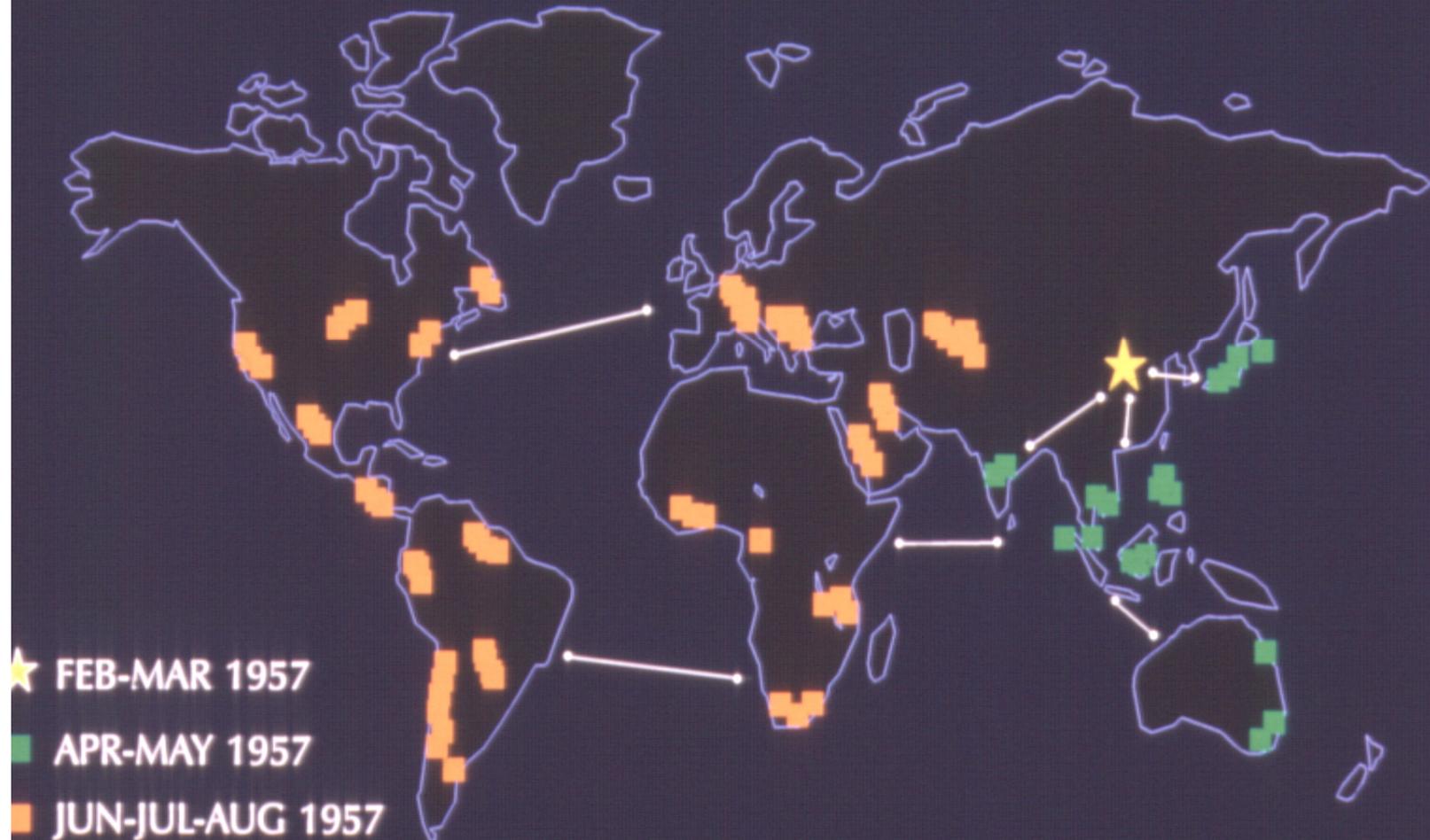
The **NEW ENGLAND**
JOURNAL of MEDICINE



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1957 – Global Spread 4 months

SPREAD OF H2N2 INFLUENZA IN 1957 "ASIAN FLU"





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Initial Human H5N1 Cases Closely Follow Animal Outbreaks In Most Countries

Country	1st animal outbreak started*	1st human case (onset of symptoms)*	Time lag (months)	Total animal outbreaks	Total human cases*
Azerbaijan	Jan 2006	Feb 2006	1	2	8
Cambodia	Feb 2004	Jan 2005	11	18	6
China/HK	Mar 1997	May 1997	2	1	18
China	Feb 2004	Nov 2003	0	89	21
Djibouti	Apr 2006	Apr 2006	0	1	1
Egypt	Feb 2006	Mar 2006	1	40	15
Indonesia	Feb 2004	Jul 2005	17	216	72
Iraq	Jan 2006	Jan 2006	0	3	3
Thailand	Dec 2003	Jan 2004	1	1,080	25
Turkey	Oct 2005	Jan 2006	3	176	12
Vietnam	Dec 2003	Dec 2003	0	2,315	93



Mean = 3.3 months
Median = 1 month

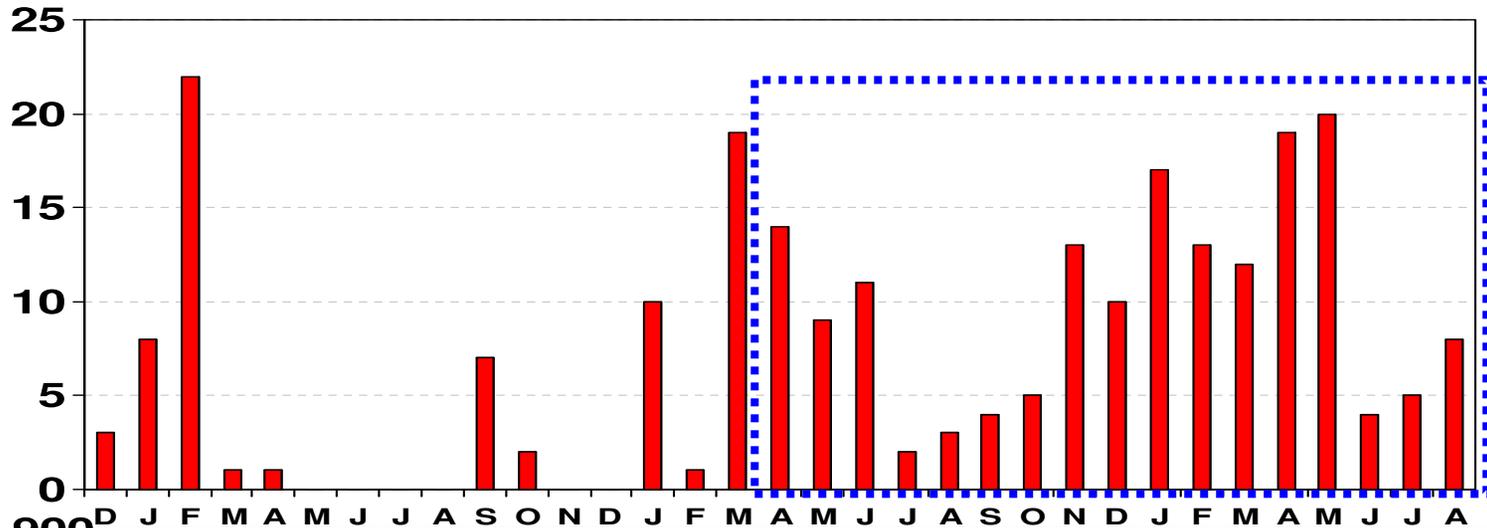
Data from WHO and OIE



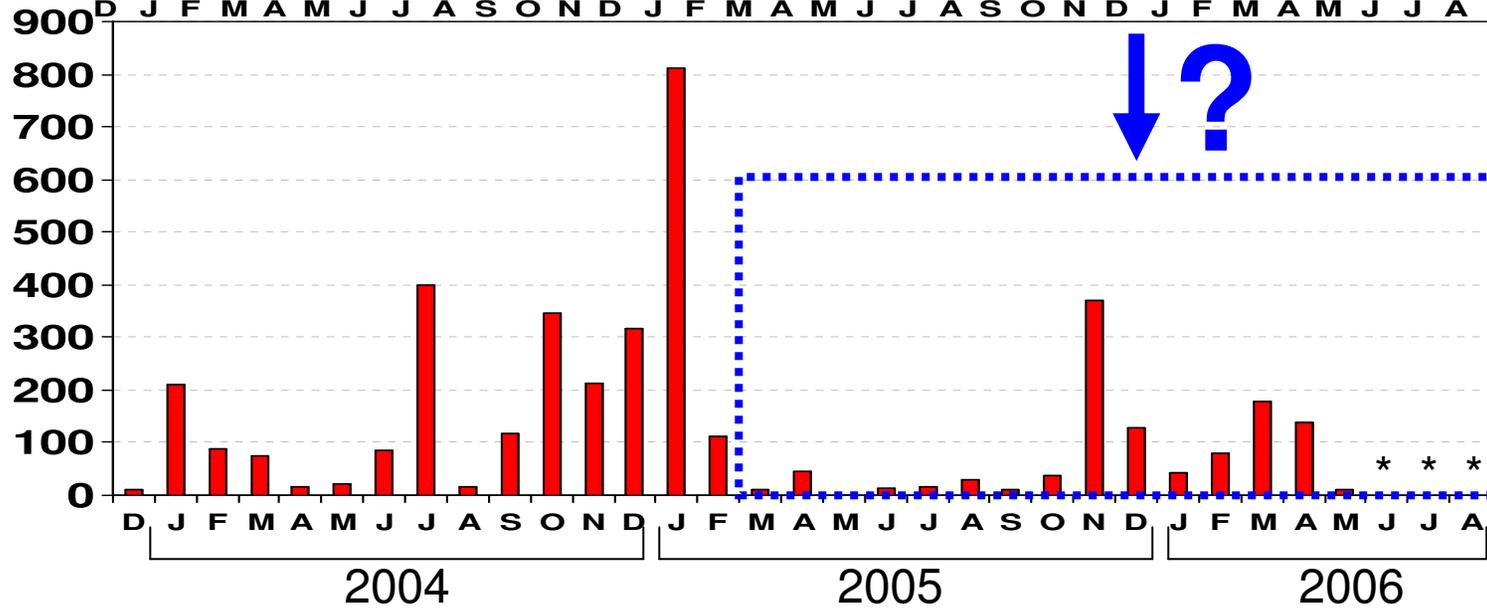
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Human Case Reports Not Always Preceded by Animal Outbreak Reports

Monthly H5N1 human cases & deaths



Monthly H5N1 outbreaks in animals

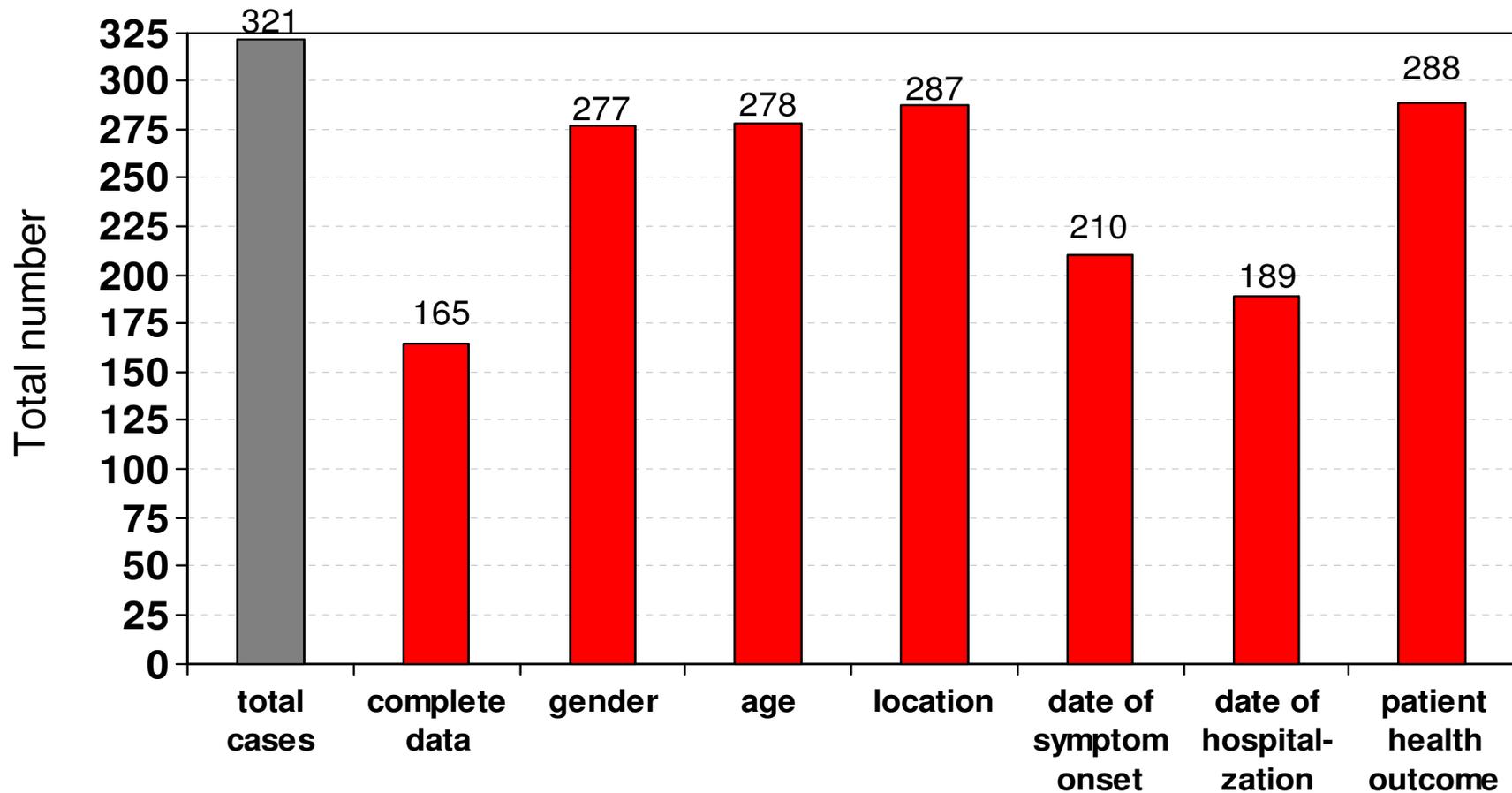


* No data



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Overall, Reporting of Human Cases Often Not Complete...



Lab-confirmed H5N1 cases in humans reported to WHO as of 16 August 2007.



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Summary – An Opportunity for a One Medicine Approach

- A quick analysis of available data reveals
 - Lot of missing data
 - Need to develop local level registration and reporting systems, containing both veterinary and medical data
 - Need standardized approaches and forms, and translated for ease of use



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Surveillance & Response



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Participatory Disease Surveillance and Response

Participatory Disease Surveillance [PDS] and Response [PDR]

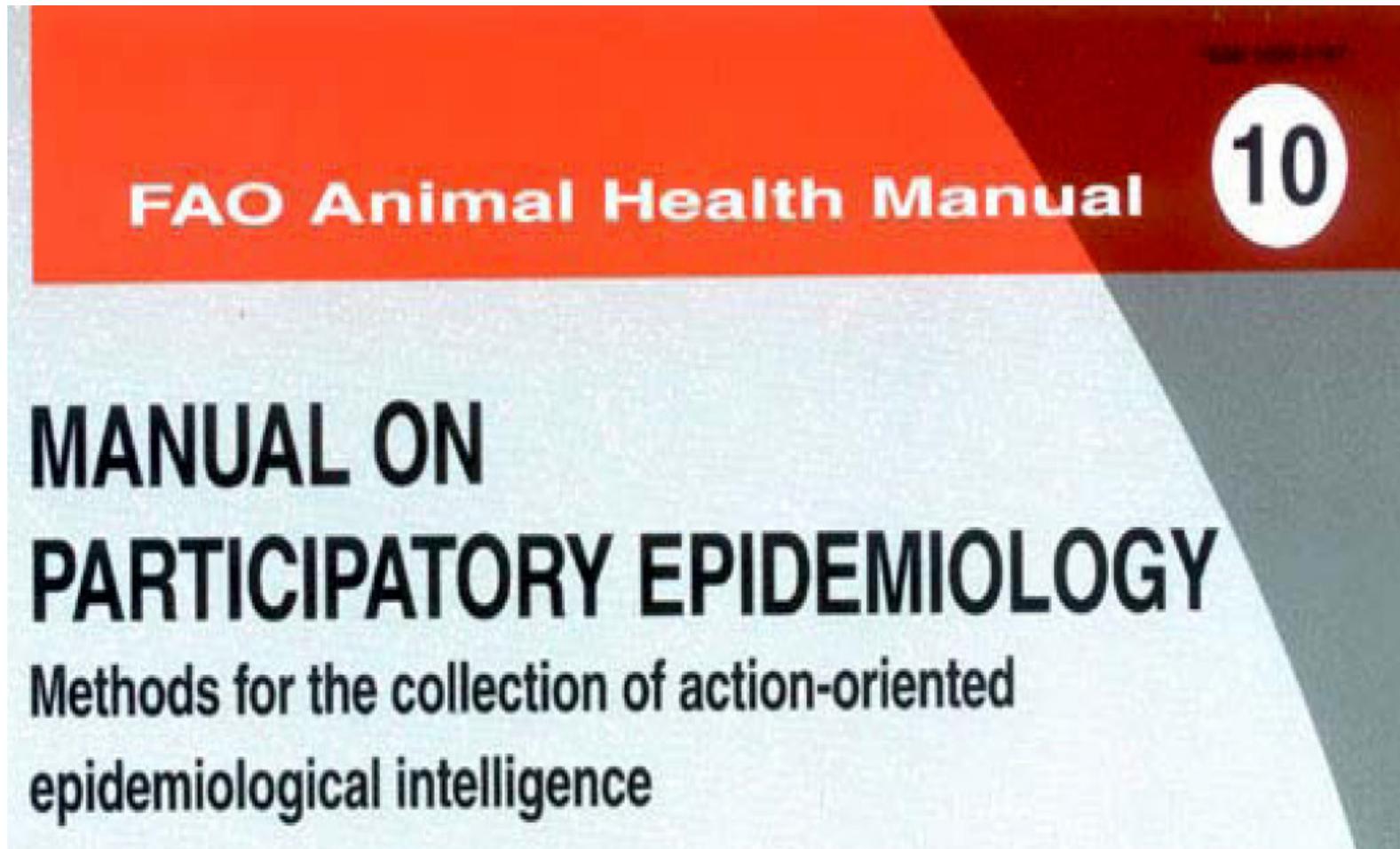
are methods to enhance disease surveillance for the collection of rapid, decision-oriented intelligence on where disease outbreaks are occurring.

Timely identification of outbreaks permits a rapid targeted response to suppress or eradicate the incidence of disease.



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FAO Manual – Participatory Epidemiology



<http://www.participatoryepidemiology.info/TrainingMaterials.html>



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Influenza Type A Antigen Positive





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Participatory Disease Surveillance - Indonesia

- Animal health officers teams in 160 districts
- Average of 2 outbreaks per district per week (8%)
- Integrate with animal and human health surveillance teams and community-based activities
- Created an evidence-based avian influenza surveillance and control program that is providing the first high quality reporting of animal outbreaks and better implementation of recommended control measures to protect human health
- Nov 06 – trained 30 people from WHO



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Participatory Disease Surveillance - Sudan





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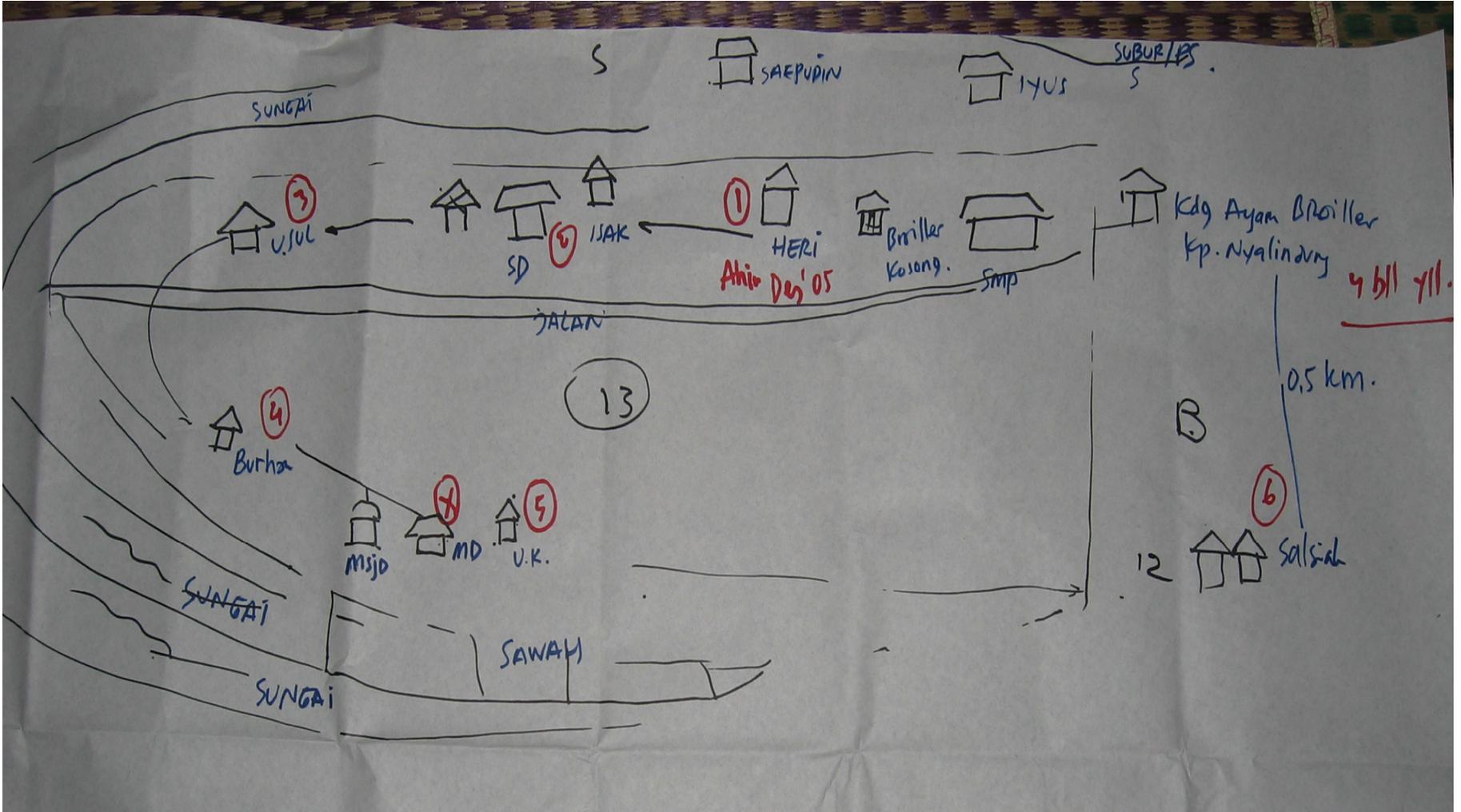
Community Mapping





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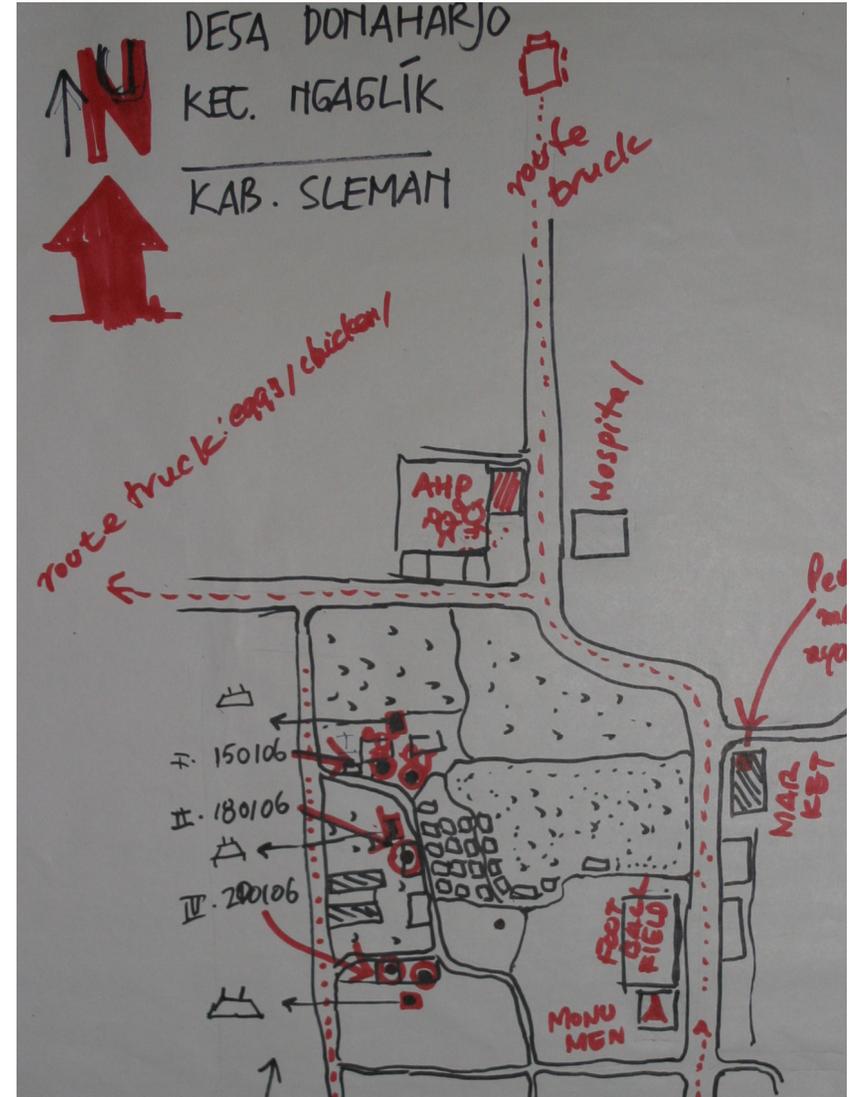
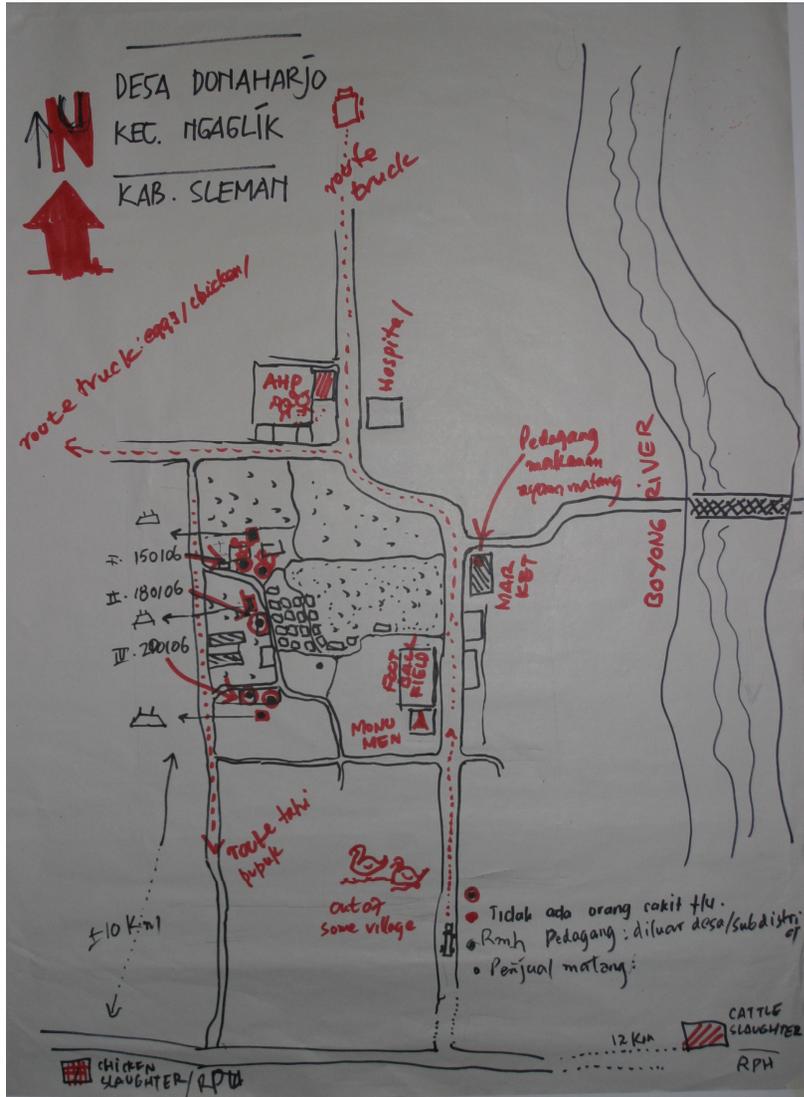
Mapping in the rural Indonesian PDS Context





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Mapping in the peri-urban Indonesian PDS Context

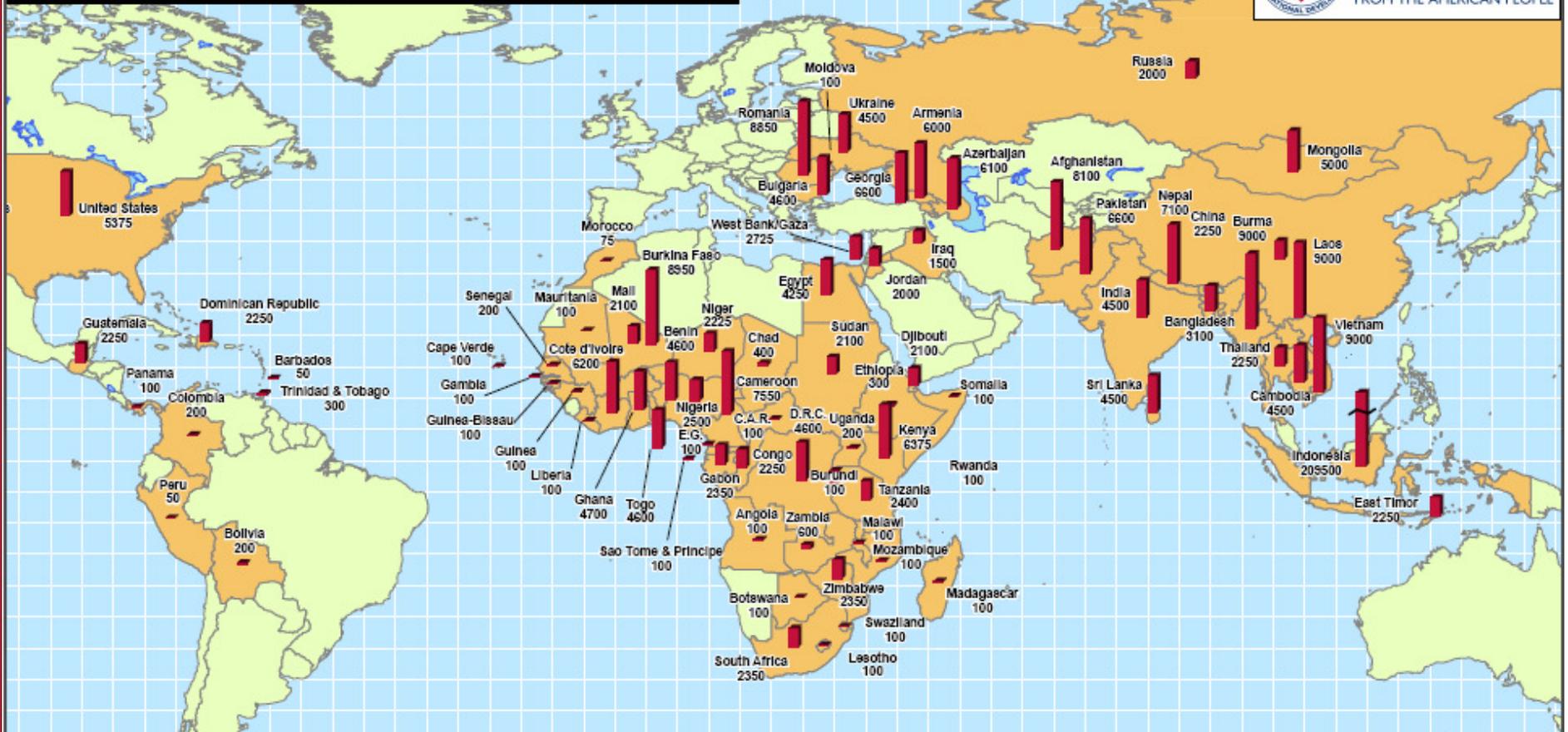




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PPE Distribution – Nov 07

AVIAN INFLUENZA COMMODITY DISTRIBUTION: TOTAL, 2006-2007



425,125 Total PPE Kits Shipped ■ **JAN-06 to SEPT-07**
 Current as of 11-01-07. Produced for review by the United States Agency for International Development. Map was prepared by the USAID | DELIVER PROJECT.



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PPE kit unpacked



PPE kit in use*



* Snow not included



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Tracheal Samples





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Cloacal Samples





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Personal Protection





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Employees of Stewart & Holmes Wholesale Drug Co. Seattle, 1918

Courtesy of Grace Loudon Mc Adam





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N95 Respirator Donning in Post-Hurricane New Orleans

- Evaluated correct use of N95 mask
- For mold remediation
- Interviewed 538 participants
- Only 129 (24%) demonstrated proper use.
- Errors included nose clip not tightened (71%) and straps incorrectly placed (52%); 22% put on the respirator upside down.
- Need for training considered in planning for influenza epidemics and disasters.
- Source: Cummings et al., EID, Volume 13, Number 5, May 2007





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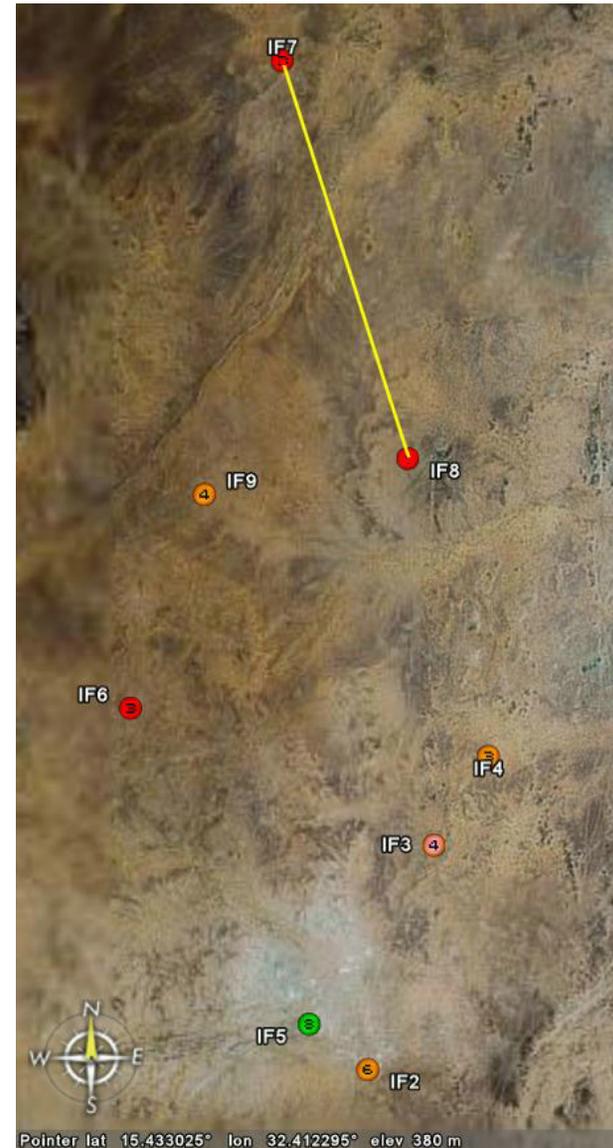
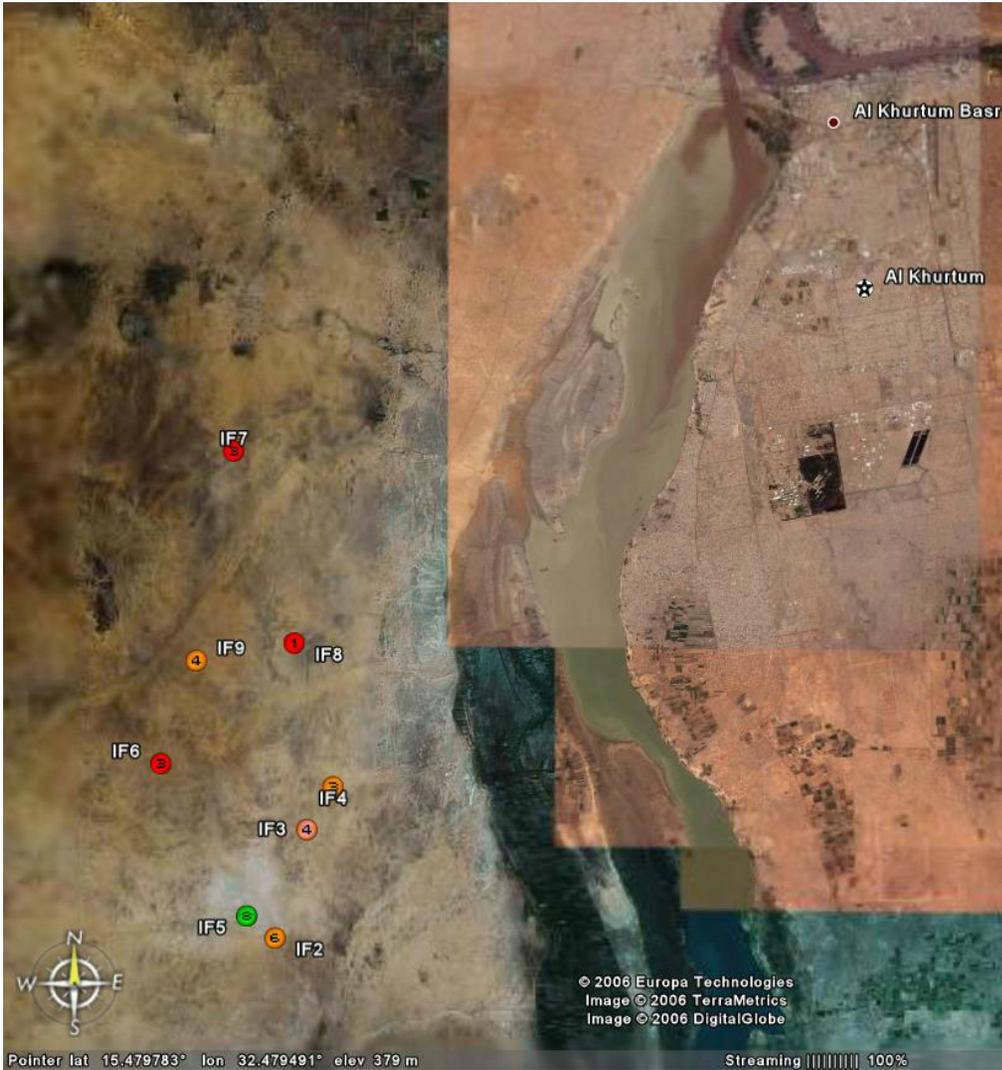
Mapping outbreaks and resources





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Effective Response





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Egypt – Caging poultry and separation of species





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Standardized Protocols - Hospitals



Source: Tim Uyeki/Ray Arthur, CDC



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Standardized Protocols - Farms





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Standardized Protocols - Laboratories





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Engage All Stakeholders





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Poverty: A driver of disease?



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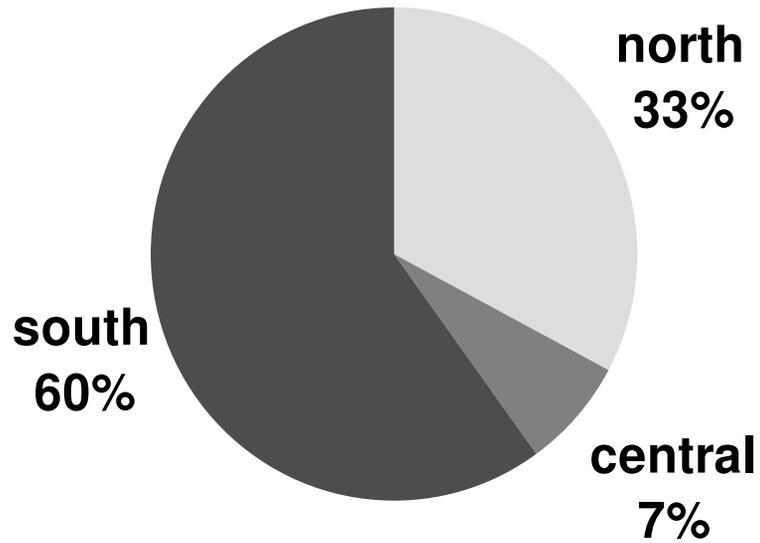
World's Poorest People

- Main victims of this disease - lack resources, little voice
- Live with their poultry – safe from predators and theft
- Familiar with dead and dying chickens
- Keep only a few birds in their backyards
- Chickens are ‘coins’ in the bank – female income, food, school fees, medicines
- Chicken and eggs vital sources of protein
- Value chickens for more than their market value
- Many communications are written in English
- Balance public health and poverty reduction strategies



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Distribution of Poultry Outbreaks by Location (Dec 06-Nov 07)



(n=106)



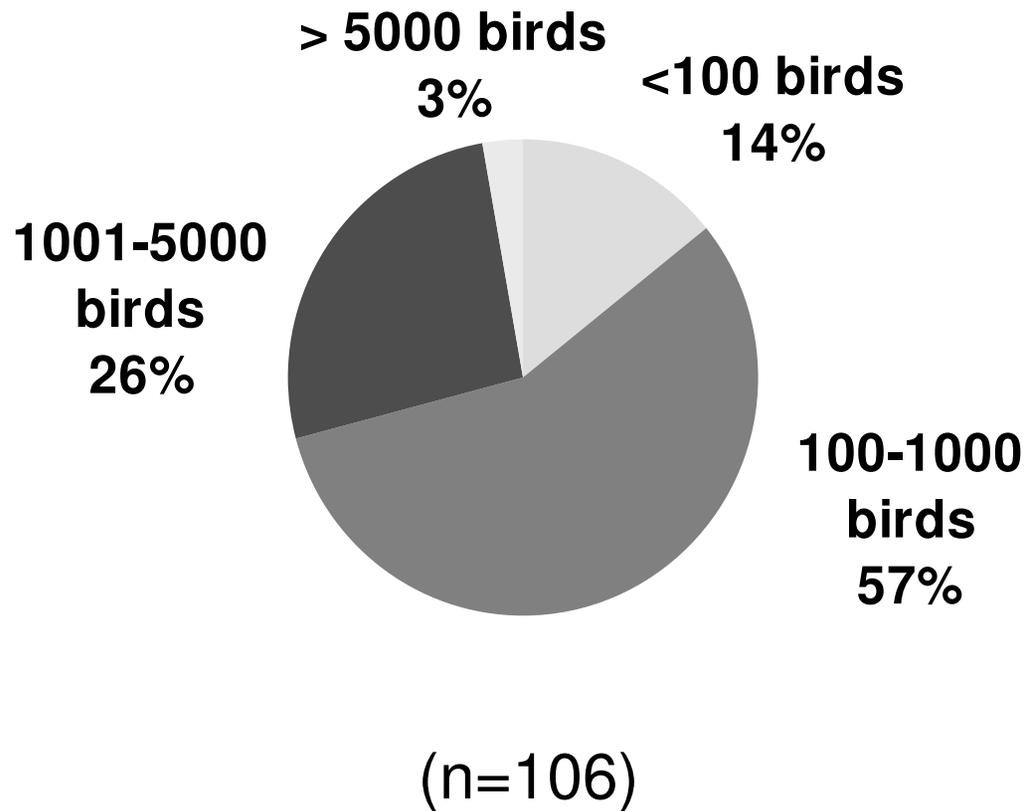
- = poultry outbreak
- ★ = human case

Data from reports submitted to OIE and WHO between Dec 2006 and November 2007.



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Distribution of Poultry Outbreaks by “Farm” Size (Dec 06-Nov 07)



Data from reports submitted to OIE between Dec 2006 and November 2007.

- **Could trigger a pandemic similar to 1918-19**
- But the world is different:
 - 6.6 billion inhabitants (only 1.5 billion in 1917)
 - Rapid spread via jet travel
 - Few stockpiles due to “just in time” economies
- No specific antiviral treatments developed
- No vaccine (seasonal vaccine NOT protective)



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Global Population Growth

People, Pigs and Poultry in China

	1968	2004	Increase
People	790 million	1.3 billion	1.7x
Pigs	5.2 million	508 million	98X
Poultry	12.3 million	13 billion	1057X



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Public Health Actions



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Public Health – We Need Solutions

1. Outdated legislation – surveillance, emergency response, movement restrictions, funding
 2. Improve synergy – between regulators, public sector, private sector
 3. Operational budgets – insufficient for rapid, sustained and multiple responses
 4. Limited training programs and opportunities create networks, common curriculum
 5. Laboratory capacity – networks, linkages, communication
- Need to involve all Ministries, Departments and Private Sector



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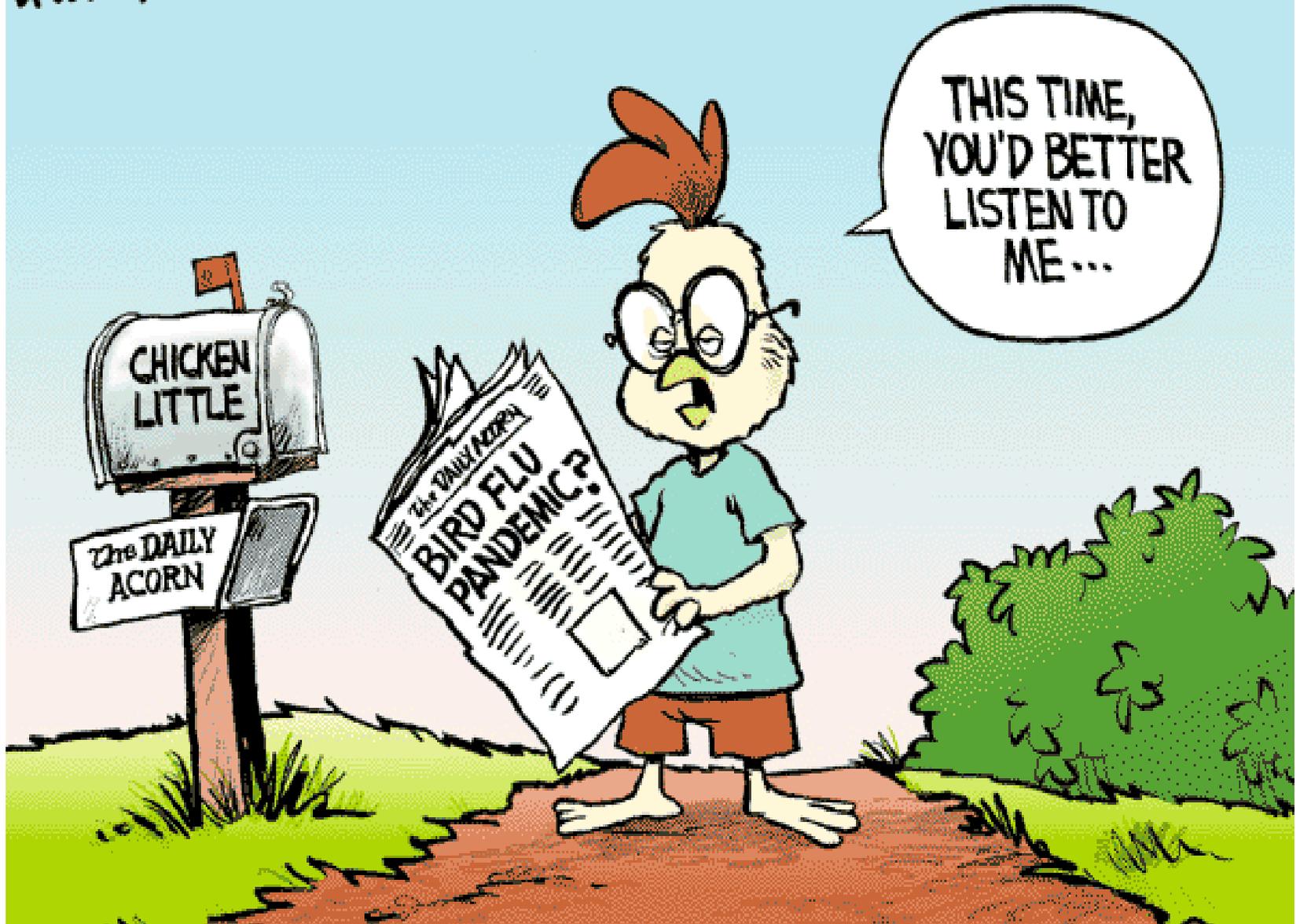
Public Health – Transformational Moment

- We have a “transformational moment” to directly address the causes that give rise to avian influenza and other emergent diseases.
- By integrating and coordinating both animal and human health sectors, we have the chance to simultaneously save lives and secure livelihoods.



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BRACKINS RICHMOND TIMES DISPATCH
10/05





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Additional Resources

For more information and regular updates on
USAID's response to this threat,
visit www.usaid.gov and click on "Avian Influenza Response"

For more information and resources related to pandemic flu,
visit www.pandemicflu.gov