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CLINICIANS' KNOWLEDGE, ATTITUDES AND PRACTICES IN EAST JAKARTA AND BOGOR DISTRICT IN INDONESIA

Strategies Against Flu Emergence – DAI

Johns Hopkins University Center for Communication Programs

Centers for Disease Control

World Health Organization

University of Indonesia Center for Health Research

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ABBREVIATIONS AND ACRONYMS

AI	Avian Influenza
C-KAP	Clinicians' Knowledge, Attitudes and Practices
CDC	Centers for Disease Control
DAI	Development Alternatives, Inc.
HUS	Healthcare Utilization Survey
ILI	Influenza-like Illness
JHU-CCP	Johns Hopkins Bloomberg School of Public Health, Center for Communication Program
MOH	Ministry of Health
OTC	over-the-counter
PPK-UI	University of Indonesia Center for Health Research
SAFE	Strategies Against Flu Emergence
SARI	Severe Acute Respiratory Infection
SS	Signs and Symptoms
USAID	United States Agency for International Development
WHO	World Health Organization

BACKGROUND

Infection from H5N1, the highly pathogenic avian influenza (AI) virus, results in high case fatality rates. Indonesia has the highest number of confirmed human cases of AI and one of the highest case fatality rates in the world, standing at 83% as of May 29, 2012.[1] This high case fatality rate is widely attributed to delays in care seeking, diagnosis and initiation of treatment for respiratory disease.

Respiratory disease and influenza-like illnesses (ILIs) are extremely common in Indonesia. Experts estimate that the actual number of H5N1 cases is several times higher than the confirmed total, with many cases unidentified, misidentified, or unreported. Over 68% of all human cases of AI in Indonesia occur in the western half of Java. While H5N1 is not readily transmitted among humans, the virus is endemic in animal populations in Indonesia, raising the possibility that H5N1 could at some point evolve into a form more easily transmissible between humans, causing a pandemic that could kill millions. Direct and indirect exposure to live and domesticated birds, poultry waste, and poultry in wet markets is extremely common throughout Indonesia.

The USAID-funded Strategies Against Flu Emergence (SAFE) project is designed to reduce this risk by simultaneously working to (i) improve biosecurity practices in the poultry industry to reduce bird-bird transmission, (ii) improve hygiene and poultry handling practices among the general public to reduce bird-human transmission, and (iii) encourage rapid care seeking and faster initiation of appropriate treatment as soon as possible following the onset of symptoms of respiratory disease.

Under the umbrella of the SAFE project and in conjunction with the Atlanta and Jakarta offices of the Centers for Disease Control (CDC) and the World Health Organization (WHO) in Indonesia, a survey of clinicians' knowledge, attitudes and practices (C-KAP) was conducted in East Jakarta Municipality and Bogor District, West Java.

OBJECTIVES

The objectives of the study were:

- To determine the extent to which physicians in East Jakarta and Bogor District are knowledgeable about influenza-like illnesses (ILIs);
- To determine the extent to which physicians in East Jakarta and Bogor are knowledgeable about risk factors for H5N1 virus infection (i.e., direct contact from touching or slaughtering sick or dead poultry; indirect contact from close contact

[1] See www.who.int/influenza/human_animal_interface/H5N1_cumulative_table_archives/en/index.html

with sick or dead poultry or visiting a wet poultry market; and direct or close contact with sick human H5N1 patients); and

- To describe the clinical practices related to seasonal influenza, pandemic influenza (H1N1), and H5N1.

KEY FINDINGS

Some of the key findings of the C-KAP study were as follows:

1) Most clinicians know the main clinical features of AI. Clinicians seem to be aware of some critical differences between H5N1 and other forms of flu.

2) Considering the many potential sources of exposure to the H5N1 virus, clinicians tend to ask relatively few diagnostic questions (three or four, on average) to determine if suspected cases involved exposure, including handling of dead chickens, exposure to wild birds, and exposure to infected humans. A few doctors mentioned key questions regarding potential sources of poultry exposure at wet markets.

3) Just under two thirds of clinicians said that treatment for H5N1 should begin within one day of the onset of symptoms.

4) Less than half of clinicians surveyed said they had received official AI case management guidance. The guidance was generally received by clinicians at local health clinics (*puskesmas*) and public hospitals.

5) Receipt of *any* case management guidance information has significantly improved:
    - Clinicians' knowledge of signs and symptoms of seasonal influenza, pandemic influenza (H1N1), and H5N1;
    - Perception of severity of pandemic influenza (H1N1);
    - Likelihood of asking questions about specific exposures to H5N1 (contact with dead poultry, handling live birds at wet markets in East Jakarta, keeping poultry at home in Bogor); and
    - Likelihood of testing after learning of exposure to H5N1.

6) Greater exposure to mass media or professional resources regarding H5N1 significantly improved:
    - Clinicians' knowledge of the signs and symptoms of H5N1;
    - Perception of the severity of H5N1;
    - Likelihood of asking questions about all sources of exposure; and

- Likelihood of testing for H5N1 after learning of exposure.

7) In puskesmas, case management guidance information improved clinicians' knowledge of the signs and symptoms of H5N1, but did not improve their confidence in their own knowledge, equipment and resources available to diagnose and treat H5N1.

METHODOLOGY

Sampling Method

The study used a cross-sectional design and face-to-face interviews. The study population was licensed physicians who provide adult and/or pediatric medical care in government and private sector health facilities in East Jakarta Municipality and Bogor District. The sampling frame included general practitioners, pediatricians, internists, pulmonologists, ENTs, cardiologists and obstetricians/gynecologists. This list was constructed based on data from District Health Offices. A purposive sample of 300 physicians in each study area was proportionally allocated among general practitioners and specialist groups. A simple random sample of physicians was then drawn from the sampling frame in each group.

The recruitment and data collection process was made difficult by several factors, including physicians' lack of time, refusal by some doctors and hospitals to participate, the extended time required to obtain permission to interview some hospital-based doctors, and outdated contact information for some doctors. This meant that interviewers had to spend more time acquiring accurate and current data.

Table 1 shows the total number of physicians who were surveyed, disaggregated by district and type of physician.

Table 1: Total sample size

Type of Physician	East Jakarta	Bogor District	Total
General Practitioner	210	274	484
Specialist	29	41	70
Total	239	315	554

Instrument Development

The instrument was developed in collaboration with USAID Jakarta, the CDC offices in Atlanta and Jakarta, WHO Indonesia and SAFE.

The questionnaire was designed to measure the following:

- The number of inpatient and outpatient cases of seasonal, pandemic (H1N1) and avian (H5N1) influenza suspected, diagnosed, referred for testing or treatment, and treated;
- Knowledge of the clinical features of the three types of ILIs (common symptoms, transmission vectors);
- Knowledge of the WHO and Indonesian definitions of suspected H5N1 cases;
- Knowledge of recommended infection control practices for suspected/confirmed H5N1 patients, and respiratory specimens for H5N1 virus testing;
- Knowledge of the types of tests and procedures used for sample collection and shipping;
- Knowledge of clinical management practices, including antiviral treatment, and knowledge of where to refer a patient with ILI and suspected H5N1, including people exposed to sick and dying poultry;
- Actual clinical management of patients with ILI (outpatients) or SARI (inpatients);
- Knowledge of the risk factors for severe illness and death from seasonal, pandemic and avian influenza in Indonesia; and
- Whether physicians have ever received an influenza vaccination (including seasonal trivalent influenza vaccine or monovalent 2009 pandemic H1N1 vaccine), and whether they have received an influenza vaccination in the past year, and, if not, to assess the barriers to influenza vaccinations for physicians.

The instrument was translated into Indonesian before being pre-tested with clinicians, including both general practitioners and specialists, in December 2011.

Through a competitive procurement process, Pusat Penelitian Kesehatan Universitas Indonesia (Center for Health Research at the Faculty of Public Health, University of Indonesia, or PPK-UI) was selected as the research agency to conduct the fieldwork in East Jakarta and Bogor District.

Pre-testing of the instrument was conducted by researchers from PPK-UI at a puskesmas and a hospital in Depok, West Java. These locations and facilities were selected based on their similarity to the field sites where data collection would be conducted.

Pre-testing was designed to confirm the questionnaire wording and flow, and the time spent on each respondent, and to ensure that respondents could answer each question. The pre-testing results were then sent to all partners for input. Detailed feedback was given on the KAP pre-tests, and revisions to specific questions were suggested and addressed.

Institutional Review of Human Subjects

Prior to data collection activities, SAFE and PPK-UI obtained ethical clearance for implementing the survey from the Research Ethics Committee at the Faculty of Public Health of the University of Indonesia on December 20, 2011, and from the CDC Atlanta Institutional Review Board on March 7, 2012.

Data Collection and Data Entry Management

A three-day training program was conducted for all field personnel on January 18-20, 2012.

Data collection was conducted from March 14 to June 6, 2012. A total of 554 respondents were interviewed. The average interview time per respondent was about 30 minutes.

Data was managed using EpiData software and a double data entry procedure was implemented. Data cleaning was done before analysis. During the data cleaning process, the two data files from the double data entry process were compared. Upon any discrepancy between the two data sets, rechecking and correction was done by reviewing the hard copy of the questionnaire. Besides comparing the two files, data cleaning also involved creating a frequency distribution chart for all variables and cross tabulating related variables to check consistency.

DESCRIPTION OF SAMPLE

The characteristics of the physicians surveyed are summarized in Table 2. There were some differences in clinician characteristics between the two districts. Respondents were slightly younger on average in East Jakarta than in Bogor. Women made up more than two-thirds of the sample in East Jakarta but only half in Bogor.

Physicians in Bogor were more likely to see only outpatients, while physicians in East Jakarta were more likely to see both inpatients and outpatients. There were no significant differences by district in terms of educational level.

The for length of time spent in one's current facility was between one and four years in both districts, but on average clinicians in Bogor had spent longer in their current facility than those in East Jakarta.

Table 2: Respondent Characteristics by Survey Area (%)

Clinician characteristics	East Jakarta (n=239)	Bogor (n=315)	Total (n=554)
Gender			
Male	32.2	48.9	41.7
Female	67.8	51.1	58.3
Age category			
25-34	46.4	20.6	31.8
35-44	18.4	37.8	29.4
45-54	18.4	25.4	22.4
55-64	12.1	7.9	9.7
Over 64	3.3	2.2	2.7
Refused to answer	1.3	6.0	4.0
Educational level			
Medical school	87.9	87.0	87.4
Subspecialty	12.1	13.0	12.6
Kind of care provided			
Outpatient only	60.3	78.7	70.8
Inpatient only	4.6	0.6	2.3
Both inpatient and outpatient	35.1	20.6	26.9
Length of time in current place			
< 1 year	10.9	3.2	6.5
1-4 years	51.5	41.0	45.5
5-9 years	12.6	29.8	22.4
10-14 years	9.2	14.9	12.5
>15 years	15.1	10.2	12.3
Refused to answer	0.8	1.0	0.9
Facility type			
Puskesmas	14.6	9.5	11.7
Private practice/clinic	42.3	67.9	56.9
Public hospital	19.2	5.4	11.4
Private hospital	23.8	17.1	20.0

Overall, more than half of clinicians surveyed work in a private practice or clinic (57%). Just over two thirds of clinicians surveyed in Bogor (68%) practice in private or clinic settings. Conversely, in East Jakarta more clinicians work in puskesmas and public hospitals than do those in Bogor.

FINDINGS

Knowledge of Clinical Signs and Symptoms of Seasonal Influenza, Pandemic Influenza (H1N1) and H5N1

The most frequently mentioned symptoms of seasonal flu for both inpatients and outpatients were fever, cough, runny nose, blocked nose, sneezing, muscle aches and sore throat. Hospitalized patients were more likely than outpatients to suffer chest congestion, shortness of breath, and nausea or vomiting (see Table 3).

Clinicians in Bogor were more likely than those in East Jakarta to recognize shortness of breath and chest congestion, nausea and diarrhea as inpatient features of seasonal flu, but less likely to mention some of the more minor symptoms like a blocked nose, headache or loss of appetite. They were also more likely to mention a runny nose, earache and diarrhea as outpatient symptoms.

The most frequently mentioned symptoms of pandemic H1N1 flu for both inpatients and outpatients were fever, cough, chest congestion, muscle aches, runny nose, blocked nose, sore throat, and sneezing. Hospitalized patients were more likely than outpatients to suffer shortness of breath, chest congestion, and nausea or vomiting.

Clinicians in Bogor were more likely to mention shortness of breath as both an inpatient and outpatient symptom, while clinicians in East Jakarta were more likely to mention fever, cough and a sore throat as both inpatient and outpatient symptoms.

Table 3: Recall of clinical symptoms of influenza by type of patient (outpatient and inpatient) (%)

Clinical features	Seasonal Flu (n=554)		H1N1 (n=554)		H5N1 (n=554)	
	OUT	IN	OUT	IN	OUT	IN
Short breath	7.2	**23.6**	**19.5**	**33.4**	**39.0**	**54.3**
Congestion	18.6	**50.2**	52.3	63.9	73.3	79.8
Fever	96.2	94.8	**86.3**	**84.5**	90.8	90.1
Cough	85.4	80.3	**66.1**	**63.9**	73.5	**72.2**
Muscle ache	50.5	48.7	52.5	52.0	54.0	53.4
Sore throat	48.4	48.4	**40.3**	**39.9**	**42.4**	**43.0**
Blocked nose	64.3	**58.1**	**42.4**	**41.7**	**45.7**	**44.0**
Runny nose	**74.7**	67.5	49.5	47.8	54.7	50.7
Sneezing	58.1	50.5	**36.3**	**33.9**	37.9	**36.5**
Earache	**4.9**	6.5	4.3	5.6	**6.9**	**6.9**
Rash	2.2	2.5	**5.4**	**5.8**	**5.1**	**5.6**

Nausea	4.9	**12.8**	**10.3**	15.9	**13.2**	**17.3**
Diarrhea	**2.0**	**7.0**	4.7	9.6	**5.6**	**9.2**
Headache	14.6	**7.6**	5.8	5.2	5.2	4.2
Weakness	**3.4**	**2.2**	2.0	2.2	**2.5**	**2.3**
Low appetite	2.0	**4.0**	0.9	1.4	0.4	1.3
Other	4.2	**12.6**	**9.6**	9.7	1.6	2.2
Pneumonia	-	-	-	-	**1.3**	**1.1**
Fainting	-	-	-	-	1.4	0.9
Contact with birds	-	-	-	-	1.6	2.2
Note: Red indicates a significant difference between East Jakarta and Bogor						

Clinicians seemed to be aware of some critical differences between H5N1 and other forms of flu. For example, they were more likely to associate the acute symptoms of shortness of breath and chest congestion with avian flu than with seasonal or H1N1 flu.

The most frequently mentioned symptoms of avian influenza for both inpatients and outpatients were fever, chest congestion, and coughing. Also mentioned were muscle aches, runny nose, shortness of breath, blocked nose, sore throat and sneezing. Symptoms for hospitalized patients were more likely to include shortness of breath and chest congestion. Respondents in East Jakarta were more likely to mention sore throat and blocked nose, while those in Bogor were more likely to mention difficulty breathing and nausea or vomiting.

Knowledge of Recommended Antiviral Treatment for H5N1

Consistent with WHO guidelines, the most commonly recommended antiviral treatment mentioned by clinicians was Oseltamivir, while a small percentage recommended Zanamivir. However, nearly 30% of clinicians did not know or could not remember the recommended antiviral treatment.

Table 4: Knowledge of recommended antiviral for H5N1 (%)

	East Jakarta (n=239)	Bogor (n=315)	Total (n=554)
Oseltamivir	64.4	63.9	63.9
Zanamivir	3.8	2.9	2.9
Other	2.1	3.4	3.4
Don't know	29.7	29.8	29.8

Awareness of Risk Factors Associated with H5N1

There are many potential sources of exposure to the H5N1 virus. Clinicians asked patients various questions to determine if the person presenting symptoms of avian influenza had had contact with potential sources of H5N1. Table 5 shows the questions asked by clinicians.

Table 5: Awareness of AI risk factors by district (%)

Type of contact in past 7 days	East Jakarta (n=239)	Bogor (n=315)	Total (n=554)
Handled dead chickens	52.7	63.8	**59.0**
Cared for avian flu patient	49.0	57.8	**54.0**
Exposed to wild birds/feces	43.5	59.4	**52.5**
Handled live birds at wet market	32.6	44.1	**39.2**
Ate raw poultry products	28.9	43.5	**37.2**
Handled meat at wet market	19.7	28.3	**24.5**
Slaughtered chickens	18.8	23.5	21.5
Visited traditional market	11.3	22.5	**17.7**
Ate cooked chicken	12.1	17.1	15.0
Bought meat at traditional market	7.1	18.7	**13.7**
Contact with suddenly dead birds	18.4	7.9	**12.5**
Been in wet market	1.7	14.0	**8.7**
Contact with poultry	10.0	5.7	7.6
Ate cooked eggs	6.3	8.6	7.6
Travel from high risk area	9.2	4.8	**6.7**
Keep poultry at home	7.1	2.2	**4.3**

Note: Red indicates a significant difference between East Jakarta and Bogor

The most common diagnostic questions that clinicians asked patients suspected to have been exposed to the H5N1 virus were:

- Have you handled dead chickens in the past 7 days (59%)?
- Have you been exposed to wild birds or wild bird feces near the home in the past 7 days (53%)?
- Have you handled live (39%) or slaughtered (25%) birds at a wet market in the past 7 days?
- Have you eaten raw poultry products in the past 7 days (37%)?

Even though the risk of human-human transmission is low, more than half clinicians (54%) said they asked suspected patients about contact with another suspected bird flu patient in the past 7 days.

Clinicians in Bogor asked a significantly greater number of diagnostic questions on average than clinicians in East Jakarta. In each case, clinicians in Bogor asked the questions slightly more frequently than did clinicians in East Jakarta. This suggests greater sensitivity to or concern about AI in Bogor.

Clinicians' Practices on Seasonal Influenza, Pandemic Influenza (H1N1) and H5N1

Diagnosis, Treatment and Testing of Seasonal Influenza

Over 90% of clinicians reported ever having diagnosed seasonal influenza in outpatients (512 clinicians) while fewer than one in 10 (46 clinicians) had ever diagnosed a case of seasonal flu that involved hospitalization. The most commonly recommended treatment for seasonal flu was an over-the-counter (OTC) prescription or symptomatic medication, with a slightly lower number of these treatments for hospitalized cases. A little less than half of the clinicians had recommend antibiotics for outpatients, rising to over 60% for inpatients. Vitamin therapy was also fairly common, especially for inpatients in Bogor. Very few clinicians recommended antiviral treatment for seasonal flu (See Table 6).

Clinicians at puskesmas and in private practice were more likely than those in public or private hospitals to prescribe OTC or symptomatic medication to outpatients. Clinicians in public hospitals were more likely to prescribe antivirals to outpatients, while clinicians in private practice/clinics were more likely to prescribe antivirals to inpatients. Clinicians at puskesmas were less likely than other clinicians to prescribe antibiotics for outpatients, with a figure of only 28%.

Table 6: Diagnosis and recommended treatment for seasonal influenza by district & type of patient

	East Jakarta (n=239)		Bogor (n=315)		Total (n=554)	
	OUT	**IN**	**OUT**	**IN**	**OUT**	**IN**
Ever made diagnosis	90.8	10.5	93.7	6.7	92.4	8.3
Usual treatment recommended						
No treatment	0.5	0.0	0.7	0.0	0.6	0.0
OTC/symptomatic meds	93.5	88.0	91.5	81.0	92.4	84.8
Antiviral	5.1	4.0	1.7	4.8	**3.1**	4.3
Antibiotic	47.0	64.0	45.1	66.7	45.9	65.2

Vitamins	18.0	16.7	23.1	57.1	21.0	**35.6**
Other	5.1	16.0	3.1	9.5	3.9	13.0

Note: Red indicates a significant difference between East Jakarta and Bogor.

Overall, about 17% of hospitalized seasonal flu cases were tested to determine the nature of the illness, compared to 2.3% of outpatient cases. The most common tests ordered were a nasal or throat swab, a blood test, and an ILI test or the rapid influenza diagnostic test.

Clinicians were most likely not to order a test because they considered it to be unnecessary, unavailable, or too expensive. Expense was more of an issue for treating hospitalized patients in Bogor than in East Jakarta. Availability was more of an issue for both inpatients and outpatients in Bogor, while a perceived lack of need was more prevalent in East Jakarta.

To reduce the likelihood of spreading the influenza virus to others, a number of preventive measures were recommended. The most common measures prescribed by clinicians for both outpatients and hospitalized patients were face masks, covering the mouth and nose when sneezing or coughing, and frequent hand washing with soap. Clinicians in Bogor were more likely than clinicians in East Jakarta to recommend hand washing with soap and social distancing.

Diagnosis, Treatment and Testing for H1N1

Due to the small number of cases involved, actual numbers rather than percentages are used to tabulate recommended treatments (Table 7).

Table 7: Diagnosis and recommended treatment for pandemic influenza (H1N1) by district & type of patient

	East Jakarta (n=239)		Bogor (n=315)		Total (n=554)	
	OUT	**IN**	**OUT**	**IN**	**OUT**	**IN**
Ever made diagnosis	3.3%	0.3%	0.3%	0.0%	1.6%	0.2%
Usual treatment recommendation						
No treatment	0/8	0/1	1/1	-	1/9	0/1
OTC /symptomatic meds	5/8	1/1	0/1	-	5/9	1/1
Antiviral	2/8	1/1	0/1	-	2/9	1/1
Antibiotic	4/8	1/1	0/1	-	4/9	1/1
Vitamins	3/8	0/1	0/1	-	3/9	0/1
Other	0/8	0/1	1/1	-	1/9	0/1

Clinicians reported diagnosing very few cases of H1N1. Out of a total of 10 clinicians, nine diagnosed outpatient cases and only one of these was in Bogor. As was the case for seasonal flu, the most commonly recommended treatment for H1N1 flu was an OTC medication for fever and pain. In just under half of the cases, clinicians said they recommended antibiotics for outpatients, while a third recommended vitamin therapy. Antiviral treatment was recommended by three clinicians.

Of the 10 clinicians who diagnosed in- and out- patient pandemic influenza, six ordered testing (including the hospitalized case). None of the clinicians in Bogor ordered testing. The tests ordered included an RT-PCR, a blood test, and an ILI test. Clinicians were most likely not to order a test because it was unavailable or else they thought it was unnecessary.

The most common measures recommended by clinicians for both outpatients and hospitalized patients were using a facemask, covering the mouth and nose when sneezing or coughing, and social distancing (limiting interaction with others).

Diagnosis, Treatment and Testing for H5N1

Only 3.8% of clinicians indicated that they had ever made a clinical diagnosis of suspected H5N1 infection for an outpatient (21 clinicians) and just 1.3% for an inpatient (7 clinicians). Of these, 10 clinicians prescribed antiviral treatment, 16 referred to a designated hospital, six referred to a hospital and 10 reported to the health authorities, including to the MOH, district and provincial health offices.

Table 8: Clinical diagnosis and recommended treatment for avian influenza (H5N1) by district & type of patient

	East Jakarta (n=239)		Bogor (n=315)		Total (n=554)	
	OUT	IN	OUT	IN	OUT	IN
Ever made diagnosis of suspected H5N1	3.8%	1.7%	3.8%	1.0%	3.8%	1.3%
Case management						
Prescribed antivirals	1/9	3/4	5/12	1/3	6/21	4/7
Referred to designated hospital	7/9	1/4	6/12	1/3	13/21	3/7
Referred to hospital	1/9	0/4	4/12	1/3	5/21	1/7
Contacted district health office	0/9	2/4	3/12	3/3	3/21	5/7
Contacted provincial health office	0/9	1/4	0/12	0/3	0/21	1/7
Contacted MOH	0/9	1/4	0/12	0/3	0/21	1/7
Reasons for not prescribing antivirals						
Not effective	2/8	0/1	0/7	0/2	2/15	0/3
Only works if started within 24 hours	0/8	0/1	1/7	0/2	1/15	0/3
Only works if started within 48 hours	0/8	0/1	0/7	0/2	0/15	0/3
Not available at my facility	2/8	0/1	3/7	0/2	5/15	0/3

Only available at H5N1 hospitals	1/8	0/1	4/7	1/2	5/12	1/3

There were a total of 28 clinicians ever having diagnosed suspected cases of H5N1 during the previous year. Of these, only 10 clinicians ordered testing. The most common tests ordered were a throat swab, a sputum test, or a blood test. Other tests included a nasal or nasopharyngeal swab, an endotracheal aspirate test, and a pleural fluid test. Clinicians were most likely not to order a test of it was only available at an H5N1 referral hospital, and not at their own facility.

Even though human-human transmission of the H5N1 virus is very rare, clinicians recommended a number of preventive measures to their patients with suspected H5N1 infections. The most common measures that clinicians recommended for both outpatients and hospitalized patients were the use of a face mask in public, avoiding close contact with healthy people and staying away from crowded or public areas, and covering the mouth and nose when sneezing or coughing.

Even though human-human transmission of the H5N1 virus is very rare, clinicians themselves employed a number of preventive measures when handling patients suspected of having avian influenza. Clinicians most often wore a surgical mask, gloves and gown, and fitted the patient with a mask. Other precautions included placing the patient in isolation or in a single patient room, and minimizing contact with the patient. These precautions tended to be employed proportionally more often with hospitalized patients.

Self-Vaccination for Seasonal and Pandemic Influenza

Self-vaccination for seasonal and pandemic influenza is not common among clinicians. Overall, only about 1 in 10 clinicians reported having a recent vaccination against influenza. Clinicians in Bogor were more likely than those in East Jakarta to have received a flu vaccine of some kind within the past year (see Table 9).

In both districts, the seasonal trivalent influenza vaccine was the most common, being used by over 80% of those who had been vaccinated.

The common explanation given by clinicians for not taking a vaccine was that it was not considered important. More clinicians in East Jakarta expressed this view than those in Bogor. Clinicians in Bogor were more likely cite lack of availability or lack of interest as reasons for not taking either vaccine.

Table 9: Clinicians' own use of vaccinations for seasonal and pandemic influenza by district			
	East Jakarta (n=239)	**Bogor (n=315)**	**Total (n=554)**
Received any flu vaccination in past 12 months	7.5 (n=18)	13.3 (n=42)	10.8 (n=60)
Kind of flu vaccine received			
Seasonal trivalent vaccine	83.3	81.0	81.7
2009 pandemic H1N1 vaccine	0	2.4	1.7
Other	0	2.4	1.7
Why did not receive vaccine	(n=221)	(n=273)	(n=494)
Not available	9.5	30.0	20.9
Not interested	19.0	34.1	27.3
Not important	70.1	37.7	52.2
Too expensive	10.9	10.3	10.5
Other	5.0	3.7	4.3

Media Use and Exposure about H5N1

AI information sources

Overall, clinicians cited seminars/workshops, television, the internet, newspapers and medical journals as their main sources of information about avian influenza.

Clinicians in Bogor were more likely than those in East Jakarta to cite television, radio, the internet, educational lectures and seminars/workshops as their main sources of health information.

Table 10: Main Sources of Avian Flu Information			
Media channel	**East Jakarta (n=239)**	**Bogor (n=315)**	**Total (n=554)**
TV	51.5	64.1	**58.7**
Radio	5.0	14.9	**10.7**
Newspaper	28.5	50.5	**41.0**
Pamphlet/Brochure	13.4	16.5	15.2
Poster	12.6	12.4	12.5
Internet Website	46.4	63.8	**56.3**

Email	3.8	4.4	4.2
Lecture/course	5.4	10.2	**8.1**
Seminar/workshop	56.1	70.2	**64.1**
MOH materials	25.9	30.8	28.7
Medical book	20.9	18.4	19.5
Medical journal	39.3	39.7	39.5
Colleague	17.2	22.5	20.2

Overall, clinicians cited seminars and workshops as their most reliable source of AI information.

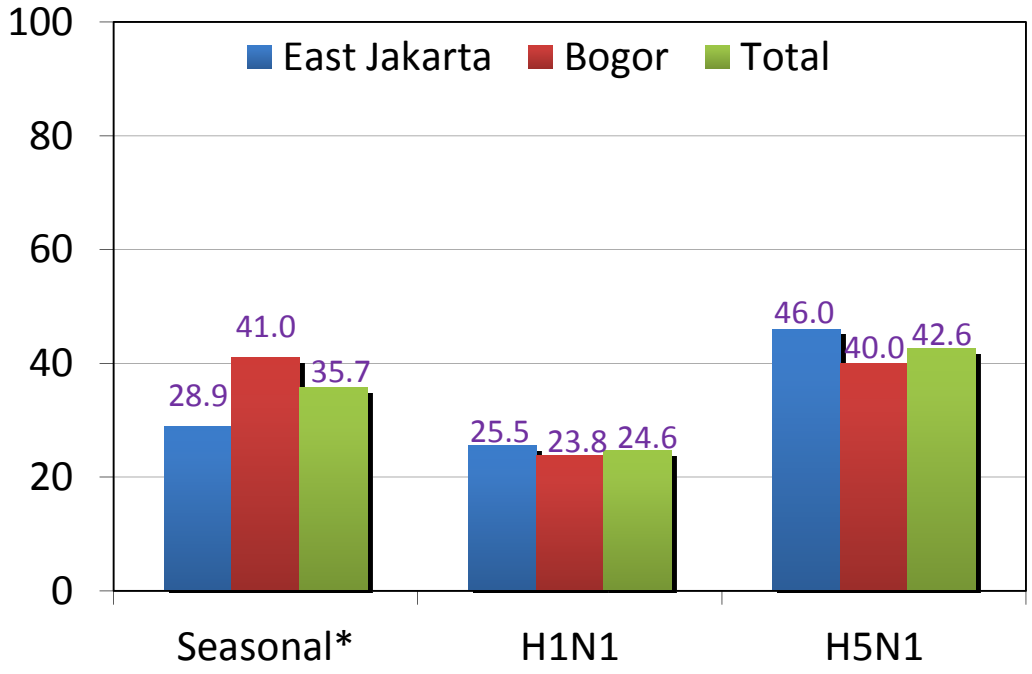
Clinicians in Bogor were more likely than those in East Jakarta to say they relied on television and the Internet, while clinicians in East Jakarta were more likely to say they relied on seminars and workshops, MOH materials, and medical journals.

Receipt of Case Management Guidance

Clinicians were more likely to have received guidance about case management for avian influenza than for seasonal or pandemic influenza. They were least likely to say they had received guidance on pandemic flu (H1N1).

Clinicians in Bogor were more likely than those in East Jakarta to say they had received case management guidance about seasonal influenza. Otherwise, there were no differences by district.

Figure 1: Percent of clinicians receiving guidance by type of influenza and district



* indicates a significant difference between East Jakarta and Bogor

Source of case management guidance

Overall, clinicians were most likely to have received guidance about case management for seasonal influenza from a professional medical association, followed by MOH print materials, then medical journals. They were least likely to cite provincial and district health offices as information sources.

Clinicians in Bogor were more likely than those in East Jakarta to cite a medical association as a source, while those in East Jakarta were more likely to cite MOH print materials.

As for H1N1 case management, clinicians were most likely to mention district and provincial health offices as their source of guidance. The MOH and medical conferences were also cited as sources, as well as a variety of "other" sources, including contacts at certain hospitals, clinics and universities.

Clinicians were most likely to mention district and provincial health offices as sources of guidance on H5N1 case management, followed by the MOH, then medical conferences. A variety of "other" sources were also mentioned, mostly consisting of contacts at certain hospitals and universities.

Clinicians in Bogor were more likely than those in East Jakarta to cite the district health office as a source, while those in East Jakarta were more likely to cite the provincial health office and "other" contacts.

Influence of Information Source on Clinicians' Knowledge, Attitudes and Practices

A variety of factors were considered for possible influences on clinicians' knowledge and diagnostic behaviors. Guidance and other information sources (professional resources, media) emerged most often as factors having a significant effect on these outcomes.

Impact of case management guidance

Receiving guidance on case management from the MOH tended to improve knowledge of the signs and symptoms for each type of flu (seasonal influenza, pandemic influenza, and H5N1), but only increased perceptions of risk in the case of pandemic influenza (H1N1). Significantly more clinicians who had received *any* guidance on case management knew all of the correct outpatient signs of seasonal flu and H5N1 than clinicians who had received no guidance (see Table 11).

Where multiple sources of guidance were available, clinicians were significantly more capable of naming all of the correct symptoms for outpatients and inpatients for seasonal influenza and H5N1 (data not shown), and significantly more likely to believe that pandemic influenza could be fatal and could cause pneumonia.

However, receiving guidance did not significantly impact risk perceptions for H5N1 (which were already high among both groups of clinicians) or seasonal influenza (which both groups perceived to present a lower risk than other types of flu).

Table 11: Percentage of clinicians receiving any guidance who know the signs and symptoms or have correct risk perceptions, by type of flu and by district

	East Jakarta (n=239)	Bogor (n=315)	Total (n=554)
SEASONAL INFLUENZA			
Knows all outpatient SS	50.7	47.3	48.4*
Knows all inpatient SS	48.1	50.7	49.0
Believes it is potentially fatal	82.6	87.6	85.9
Believes it can cause pneumonia	87.0	82.2	83.8

PANDEMIC H1N1 FLU			
Knows all outpatient SS	54.1*	38.7*	45.6
Knows all inpatient SS	57.4*	32.0*	43.4*
Believes it is potentially fatal	98.7	95.1*	97.1*
Believes it can cause pneumonia	100.0	100.0	100.0
H5N1 AVIAN INFLUENZA			
Knows all outpatient SS (except pneumonia)	16.4	23.8	20.3*
Knows all inpatient SS (except pneumonia)	22.7	27.8	25.4*
Believes it is potentially fatal	100.0	100.0	100.0
Believes it can cause pneumonia	98.2	100.0	99.2

Notes:
SS = signs and symptoms
* Significantly greater than for clinicians who did not receive guidance

The number of questions that clinicians asked about H5N1 exposure did not increase after receiving guidance, but questions about the duration of symptoms were more likely among clinicians who had received case management guidance. The questions that clinicians receiving guidance asked about specific exposures differed by district. In East Jakarta, clinicians receiving guidance were more likely to ask about handling live birds at wet markets and contact with dead poultry. In Bogor, clinicians asked questions about keeping poultry in the home.

Clinicians reported that receiving guidance significantly increased the self-likelihood that they would test patients for H5N1, but only if they determined that the patient had been potentially exposed in certain ways. Overall, clinicians who had received guidance were more likely to test patients who had handled dead chicken or eaten raw poultry (Table 12). They also correctly refrained from testing patients who had reported eating cooked chicken, which the guidance does not identify as a risk factor for H5N1. These associations were also observed with clinicians exposed a greater variety of sources of guidance.

Table 12: Likelihood of ordering H5N1 tests, by exposure to *any* guidance and by district	**East Jakarta (n=239)**	**Bogor (n=315)**	**Total (n=554)**
Reported likelihood of testing patients for H5N1 after learning of exposure (in past 7 days) *(mean, 1=very unlikely, 3=neutral, 5=very likely)*			
Handled dead chicken	4.95	4.90	4.93*
Cared for H5N1 patient	4.86	4.86	4.86
Exposed to wild birds/feces	4.85	4.79	4.82
Slaughtered chicken	4.60	4.40	4.49
Eaten raw poultry	4.88*	4.79	4.83*
Been to wet market	4.11	4.03	4.07
Handled live birds at wet market	4.83*	4.54	4.67
Handled slaughtered birds at wet market	4.58	4.64	4.61
Visited traditional live bird market	4.36	4.36	4.34
Eaten cooked chicken	3.41	3.52**	3.08**
Eaten cooked eggs	3.04	2.74	2.89

Notes:

* Reported greater likelihood of testing after receiving guidance, compared to clinicians who received no guidance.

** Reported lower likelihood of testing after receiving guidance, compared to clinicians who received no guidance.

For all strains of influenza, clinicians had greater confidence in their knowledge about diagnosis and treatment than in the adequacy of their equipment and resources (Table 13). Clinicians' confidence was generally high for seasonal influenza (i.e., about 95% of clinicians were confident about their ability to diagnose and treat), but lower in respect of both diagnosis (59.6% for H1N1, 62.7% for H5N1) and treatment (38.2% for H1N1, 39.4% for H5N1) for other forms of influenza. Guidance did not increase confidence in the adequacy of equipment and resources for *diagnosing* H5N1, but did improve perceptions that equipment and resources were adequate for *treating* it.

Table 13: Perceived adequacy of knowledge and resources, by exposure to *any* guidance, by type of influenza, and by district	East Jakarta (n=239)	Bogor (n=315)	Total (n=554)
SEASONAL INFLUENZA			
Sufficient knowledge for diagnosis (%)	93.8	97.1	94.9
Sufficient knowledge for treatment (%)	97.1	94.6	95.5
Adequate equipment and resources for diagnosis (%)	95.7	69.8	78.8
Adequate equipment and resources for treatment (%)	95.7	74.4	81.8
PANDEMIC H1N1 INFLUENZA			
Sufficient knowledge for diagnosis (%)	54.1*	64.0*	59.6*
Sufficient knowledge for treatment (%)	32.8*	42.7*	38.2*
Adequate equipment and resources for diagnosis (%)	29.5*	13.3*	20.6*
Adequate equipment and resources for treatment (%)	29.5*	9.3*	18.4*
H5N1 AVIAN INFLUENZA			
Sufficient knowledge for diagnosis (%)	61.8*	63.5*	62.7*
Sufficient knowledge for treatment (%)	34.6*	43.7*	39.4*
Adequate equipment and resources for diagnosis (%)	22.7*	6.4	14.0
Adequate equipment and resources for treatment (%)	17.3*	3.2	9.8*
* Significantly higher than for clinicians who did not receive guidance.			

Exposure to mass media and professional resources about H5N1

Besides receiving official guidance from MOH, clinicians are also exposed to other sources of information about H5N1, including the print and broadcast media (newspapers, television, and radio), workshops and seminars, and medical journals. These sources appear to be useful in informing clinicians' knowledge and testing behaviors. As noted earlier in this report, seminars and workshops are the most frequently-cited sources of this information, followed by television, the Internet, newspapers, and medical journals. Clinicians who knew all the signs and symptoms of H5N1, including the characteristic breathing/tightness of chest symptom, cited a significantly higher number of these information sources than clinicians who could not list all symptoms. Similarly, clinicians who were aware that H5N1 is potentially fatal reported a significantly higher number of other sources of information.

Clinicians who received information about H5N1 from more sources also asked about a larger number of potential sources of exposure (known as "diagnostic effort"). Overall, clinicians reporting a large number of information sources were significantly more likely to ask about each potential type of exposure, with the exception of fairly common questions

(i.e., whether patients had cared for someone with H5N1, had contact with dead poultry, or had contact with any poultry) (see Table 14). The role of these H5N1 information sources in increasing the likelihood of asking about exposures was especially evident in Bogor.

In both East Jakarta and Bogor, receiving H5N1 information from a higher number of other professional resources and the media had a greater impact on testing for a larger variety of exposures than did receiving guidance. Such clinicians were more confident in the adequacy of their knowledge for diagnosing and treating H1N1 and H5N1 (data not shown).

Table 14: Diagnostic effort by number of media sources of AI information and by district	**East Jakarta (n=239)**	**Bogor (n=315)**	**Total (n=554)**
Number of* other *sources among clinicians who asked about past 7 days of exposure (mean):			
Handled dead chicken (%)	3.45	4.69*	4.21*
Cared for H5N1 patient (%)	3.32	4.70	4.16
Exposed to wild birds/feces (%)	3.60*	4.78*	4.35*
Slaughtered chicken (%)	3.69	6.15*	5.22*
Eaten raw poultry (%)	3.42	5.03*	4.50*
Been to wet market (%)	3.25	5.43*	5.25*
Handled live birds at wet market(%)	3.62*	4.94*	4.47*
Handled slaughtered birds at wet market	3.77*	5.64*	5.00*
Visited traditional live bird market	4.19*	5.80*	5.34*
Bought poultry meat at traditional market	3.76	5.72*	5.29*
Eaten cooked chicken(%)	3.38	5.5*	4.75*
Eaten cooked eggs (%)	3.47	4.96*	4.43*
Contact with dead poultry (%)	3.43	3.52	3.46
Contact with poultry (%)	3.25	4.00	3.57
Keep poultry in the home (%)	2.41*	2.71	2.50*
Duration of symptoms (%)	2.89*	3.00*	2.93*
Travel from high-risk area (%)	3.00	3.20	3.08*
Other questions (%)	3.13	3.00*	3.08*

* Significantly greater than for clinicians who did not receive guidance.

Impact of Case Management Guidance on Clinicians in Puskesmas

Clinicians in smaller healthcare facilities (puskesmas and to some extent private clinics) appeared to benefit from case management guidance for seasonal influenza, pandemic influenza (H1N1) and avian influenza (H5N1) compared to clinicians who did not receive

such information, whereas guidance did not impact clinicians' knowledge or attitudes significantly in other facilities.

In puskesmas, clinicians who received guidance had significantly greater knowledge of seasonal influenza and H1N1 symptoms, and clinicians in both puskesmas and private clinics were significantly more aware that H1N1 could be potentially fatal, than other clinicians in similar facilities who had not received such information

Alternately, clinicians in puskesmas who received case management guidance on H5N1 from a greater number of professional resources and media sources reported that they had confidence in ability to treat H5N1, both based on their own knowledge and their assessment of the adequacy of equipment and resources for treatment. These professional and media sources of information benefit clinicians' knowledge and attitudes about H5N1 in puskesmas, private clinics, and private hospitals. Clinicians in government hospitals were the only group not to differ in their knowledge of signs and symptoms, or attitudes about the potential severity of H5N1, based on number of information sources they reported. Clinicians in puskesmas who knew signs and symptoms of H5N1 reported the highest number of professional or media information sources compared to other facility types (Table 15).

Table 15: Mean number of professional or media resources among clinicians who do and do not know signs of H5N1 and believe it can be severe, by facility type

	Puskes-mas (n=65)	Private clinic (n=315)	Govern-ment hospital (n=63)	Private hospital (n=111)	Total (n=554)
H5N1 AVIAN INFLUENZA: Mean # of professional or media resources among clinicians who…					
Know all outpatient SS	6.50*	4.57*	4.69	4.64*	4.87*
Do not know all outpatient SS	3.78	3.60	3.62	3.37	3.58
Know all inpatient SS	6.79*	4.49*	4.21	4.63*	4.71*
Do not know all inpatient SS	3.71	3.55	3.69	3.34	3.54
Believes it is potentially fatal	4.37	3.77	3.92	3.67*	3.84*
Does not believe it is potentially fatal	n/a	2.00	2.00	1.00	1.67
Believes it can cause pneumonia	4.37	3.77	3.92	3.67*	3.84
Does not believe it can cause pneumonia	n/a	2.00	2.00	1.00	2.72

*Significantly different mean number of sources between clinicians with and without knowledge/beliefs.

In summary, the C-KAP findings reveal that providing clinicians with guidance influences:

- Accurate recall of signs and symptoms of seasonal influenza, H1N1, and H5N1 for outpatients;
- Accurate recall of signs and symptoms of H1N1 and H5N1 for inpatients;
- Perceptions that H1N1 can be fatal;
- The likelihood of asking about certain exposures to H5N1; and
- The likelihood of performing tests after learning about a variety of exposures.

Exposure to a greater number of information sources is beneficial for:

- Accurate recall of signs and symptoms of seasonal influenza, H1N1 and H5N1;
- Perceptions that seasonal flu and H1N1 can be fatal;
- Perceptions that H1N1 can cause pneumonia;
- The likelihood of asking about certain exposures to H5N1; and
- The likelihood of testing for H5N1 after learning about certain exposures (in East Jakarta but not Bogor).

CONCLUSIONS AND RECOMMENDATIONS

Reducing mortality rates associated with H5N1 infections in Indonesia will require a combination of supply side and demand side strategies.

The Healthcare Utilization Survey (HUS), which was a companion study to the C-KAP survey, indicated some knowledge gaps among the public concerning differences between influenza types, risk factors (in particular, the high level of exposure to potential H5N1 sources in wet markets), and the most critical signs to look for that should trigger immediate care seeking.

The C-KAP survey found some similar gaps in knowledge among physicians, particularly concerning the risk factors. Relatively few clinicians ask the correct diagnostic questions about the most likely sources of potential exposure to the H5N1 virus, even though they are set out in the MOH and WHO case definition for suspected H5N1. Clinicians also appear to be overly concerned about human-human transmission, emphasizing the use of face masks and avoiding contact with infected patients, whereas this type of transmission method is rare. These gaps in knowledge and priorities can largely be remedied through improved communication and information dissemination.

Improving dissemination of case management information across public and private sectors

Less than half of clinicians surveyed said they had received official AI case management guidance. Even fewer said they had received guidance on seasonal or H1N1 influenza. Access to case management guidelines could be enhanced by broadening the mix of channels through which information about H5N1 is disseminated, particularly by utilizing clinicians' seminars and other professional resources, as well as media channels.

Improving clinician confidence and ensuring availability of supplies and equipment for H5N1 diagnoses and treatment

The vast majority of clinicians believe that they already have sufficient knowledge to diagnose H5N1. However, many of them state that they do not have sufficient confidence or do not consistently have available the resources (supplies and equipment) they need to properly diagnose and treat a patient. Further analysis of the reasons for this perception could help address and improve H5N1 diagnoses and treatment.

Recognizing poultry risk factors for H5N1 early detection

Considering the many potential sources of exposure to the H5N1 virus, clinicians tend to ask relatively few diagnostic questions (three or four, on average) to determine whether suspected cases involved exposure to H5N1. Clinicians" questions cover the handling of dead chickens, exposure to wild birds, and exposure to infected humans. Clinicians do not appear to recognize exposure at wet markets as a potential risk. Education and training can be used to emphasize that clinicians" diagnostic questions should also cover exposure at traditional wet markets.