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HEALTHCARE UTILIZATION SURVEY 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
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
PPK-UI	University of Indonesia Center for Health Research
PPS	Probability Proportionate to Size
RT	Rukun Tetangga (subdivision of neighborhood ward)
RW	Rukun Warga (neighborhood ward)
SAFE	Strategies Against Flu Emergence
SARI	Severe Acute Respiratory Infection
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 and experts estimate that the actual number of H5N1 cases is several times higher than the confirmed total with many cases unidentified, misidentified, or unreported. The western half of Java accounts for more than 68% of all human cases of AI in Indonesia. 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 community-based household survey was conducted in East Jakarta Municipality and in Bogor District, West Java.

OBJECTIVES

The Healthcare Utilization Survey (HUS) was designed to generate estimates of the seasonal influenza disease burden and to determine the proportion of people with ILI that seek care, their understanding of the signs and symptoms that indicate the need for care, and decision-making about when and where to seek care for respiratory illness. The HUS findings will be used in conjunction with enhanced surveillance data collected in a separate study by CDC Jakarta to develop disease burden estimates for

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

seasonal influenza among East Jakarta residents who present as outpatients with ILI or as hospitalized patients with SARI (for example, pneumonia).[2]

The HUS survey also aims to understand perceptions about exposure to birds and of the risk of H5N1 transmission. The survey findings will be used to inform preventive education strategies at the community level, which aim to reduce bird-human transmission of the H5N1 virus and reduce delays in seeking care that can lead to unnecessarily high mortality rates.

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 HUS fieldwork in East Jakarta Municipality and Bogor District.

KEY FINDINGS

There were six key findings of the HUS study.

1. Individuals frequently do not seek care at a healthcare facility when they have a fever or cough, or suffer difficulty breathing, even if they are aware that they need immediate treatment for these symptoms.

2. Households express a preference for self-treatment for respiratory symptoms using over-the counter medications from pharmacies or giving medicines and fluids at home.

3. Routine contact with birds in the home can diminish perceptions of risk, leading to a lower likelihood of seeking care for potential symptoms of avian influenza (AI).

4. Households with the highest exposure (i.e., those allowing poultry to roam freely indoors) demonstrated:

    - Weaker beliefs in the need for immediate treatment for respiratory symptoms,
    - Lower self-efficacy in seeking medical care when needed,
    - Lower self-efficacy in protecting themselves and their families from AI,
    - Less knowledge of the sources of exposure, and
    - Greater likelihood of using traditional remedies instead of healthcare facilities.

5. High self-efficacy about seeking care when needed is influenced by:

    - Greater knowledge of the exposure routes of AI, and
    - Higher perception of the severity of AI.

[2] CDC Atlanta provided these calculations; analysis is in progress.

6. Shorter waiting time before seeking care is influenced by:
    - Greater knowledge of the exposure routes of AI, and
    - Higher self-efficacy about seeking care when needed.

METHODOLOGY

Data collection was accomplished through face-to-face surveys of households in East Jakarta Municipality and in Bogor District, West Java. The survey was administered primarily in the Indonesian language (translated from English). About 60% of the interviews in Bogor were conducted in Sundanese, which is the primary language used there.

Study Sites

The study was conducted in East Jakarta Municipality in DKI Jakarta (the national capital), and Bogor District in West Java. In East Jakarta, the study sites consisted of seven sub-districts (Matraman, Pulogadung, Duren Sawit, Kramat Jati, Pasar Rebo, Ciracas and Makasar) where enhanced surveillance sites monitored by CDC Jakarta are located. These surveillance sites include community health centers (*puskesmas*) in Matraman, Pulogadung, Duren Sawit and Kramat Jati, and six municipal hospitals (Persahabatan, Budi Asih, Pasar Rebo, Harapan Bunda, Islam Pondok Kopi and Haji Pondok Gede).

In Bogor District, seven sub-districts were randomly selected, namely Cijeruk, Cileungsi, Gunung Putri, Citeureup, Ciampea, Cibinong and Rancabungur.

Sampling Method

To estimate the proportion of East Jakarta residents who had been hospitalized for respiratory illness in the previous 12 months, SAFE and CDC reviewed the literature for similar estimates in different international settings (including Kenya,[3] Thailand,[4] and Guatemala[5]), and spoke to experts conducting similar activities in Bangladesh and El Salvador. Estimates varied from site to site, and a conservative estimate of 0.7% was selected.

To estimate the proportion of East Jakarta residents who had been hospitalized for respiratory illness (Step 1), SAFE and CDC looked at pneumonia reports posted on the provincial health office website, which details the number of pneumonia cases (used as a surrogate for respiratory illness) admitted to each hospital in the district.

[3] See Breiman RF, Olack B, Shultz A, Roder S, Kimani K, Feikin DR, et al., "Healthcare-use for major infectious disease syndromes in an informal settlement in Nairobi, Kenya." *J Health Popul Nutr*. 2011 Apr; 29(2):123-33.

[4] See Chamany S, Burapat C, Wannachaiwong Y, Limpakarnjanarat K, Premsri N, Zell ER, et al., "Assessing the sensitivity of surveillance for pneumonia in rural Thailand." S*outheast Asian J Trop Med Public Health*. 2008 May; 39(3):549-56. See also Jordan HT, Prapasiri P, Areerat P, Anand S, Clague B, Sutthirattana S, et al., "A comparison of population-based pneumonia surveillance and health-seeking behavior in two provinces in rural Thailand." *Int J Infect Dis.* [Comparative Study]. 2009 May; 13(3):355-61.

[5] See Lindblade KA, Johnson AJ, Arvelo W, Zhang X, Jordan HT, Reyes L, et al., "Low usage of government healthcare facilities for acute respiratory infections in Guatemala: implications for influenza surveillance." *BMC Public Health*. 2011 Nov 24; 11(1):885.

The data indicated that 67% of hospitalized pneumonia cases in East Jakarta in the previous 12 months were hospitalized at one of the study sites.

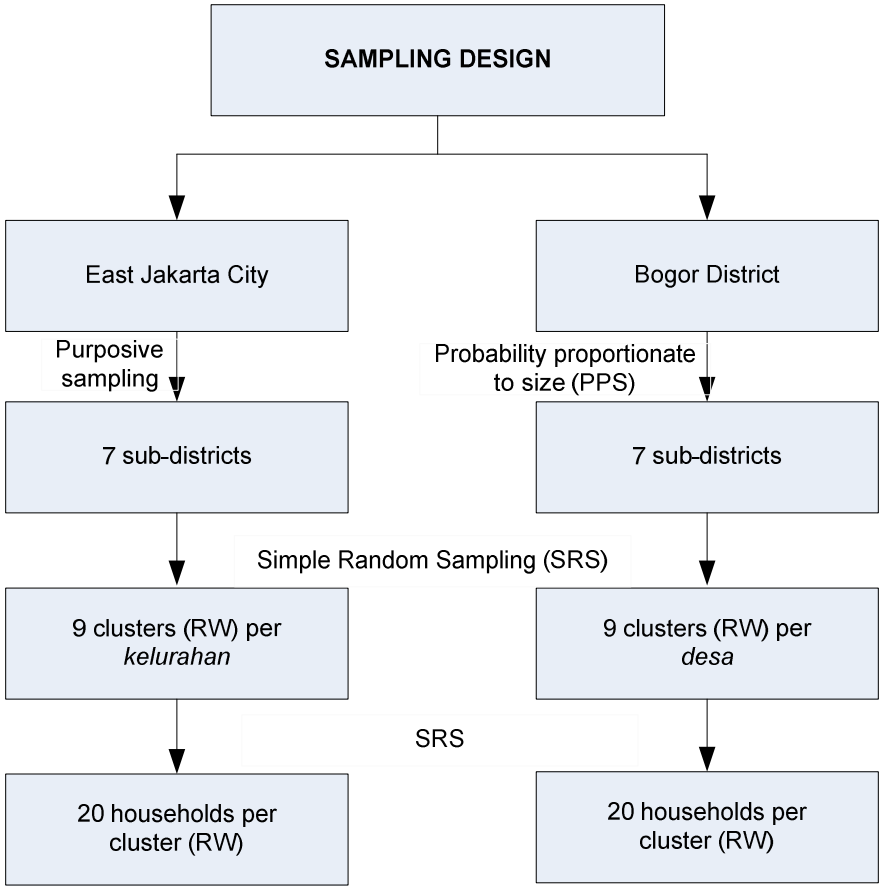
From this information, it was estimated that approximately 0.44% of the residents of East Jakarta had been hospitalized for respiratory illness at one of the study sites (i.e., 67% of 0.7%).

To ensure that the study could detect a prevalence level of at least 0.4% (i.e., expected SARI cases hospitalized in these facilities) and up to 0.7% (the highest value found for SARI cases hospitalized in one of these facilities) with an alpha of 0.05 and power of 0.85, survey data would be needed from 4,997 people

Based on data from the most recent Indonesia Demographic and Health Survey (2007), which indicated an average household size of approximately four, a sample of at least 1,250 households was required.

The resulting sample design is summarized in Figure 1.

Figure 1. HUS sampling design for East Jakarta and Bogor District



In each selected RW (neighborhood ward), a list of households was obtained from the head of the RW or RT (ward subdivision). Lists were validated and adjusted according to field conditions.

In each household, the interviewer asked to speak with the person who was most knowledgeable about the health condition of household members or was the main caregiver for household members.

Instrument Development

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

The questionnaire was designed to measure the following:

- frequency of influenza-like illness in the previous two weeks,
- proportion of cases of ILI where people sought care at a healthcare facility,
- frequency of SARI cases (among all members of selected households) in the previous 12 months,
- proportion of SARI cases admitted to any hospital or an enhanced surveillance hospital,
- knowledge of risk factors for human infection with H5N1 virus, including both direct contact with sick or dead poultry and indirect exposure (e.g., from visiting a wet poultry market – commonly referred to as a traditional or live bird market),
- knowledge about human illness with H5N1 virus and healthcare-seeking behavior for family members with ILI and exposure to sick and dying poultry,
- exposure to poultry, including the slaughtering of sick or dying poultry, through animal husbandry practices (for residents who keep live birds), through visits to wet poultry markets and other indirect sources of contact, and through food handling practices with emphasis on handling and preparation of poultry products, and
- media habits, information sources, and exposure to messages related to AI.

The instrument was translated into Indonesian before being pre-tested with sample households in the Cities of Depok and Bogor in December 2011.

Pre-testing of the instrument was conducted by PPK-UI researchers in Cimanggis sub-district in Depok City and North Bogor sub-district in Bogor City. These two areas were selected based on their similarity to the field sites where data collection was to be conducted, but neither site was used in the study.

Pre-testing was designed to confirm the wording, flow and time spent with 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 obtained from the HUS pre-tests, including suggested revisions to certain questions.

Institutional Review of Human Subjects

Prior to data collection activities, SAFE and PPK-UI obtained ethical clearance for survey implementation from the Research Ethics Committee at PPK-UI on December 21, 2011 and from the CDC Atlanta Institutional Review Board on February 8, 2012.

Data Collection Management

A three-day training program for field personnel, including field coordinators and interviewers, was conducted on January 24-26, 2012. It was attended by 32 interviewers, four field coordinators, SAFE and CDC Jakarta staff, and researchers from PPK-UI.

Data collection was conducted from February 8 to March 1, 2012. In total, 2,520 respondents were interviewed (1,260 respondents in each region). These households contained a total of 11,328 residents – 5,535 in East Jakarta and 5,793 in West Java, with mean household sizes of 4.4 and 4.6, respectively.

An average of 12% of the households approached refused to participate (19% in East Jakarta Municipality and 4% in Bogor District). Average interview time per respondent was 45 minutes.

Once all completed questionnaires had been checked and edited, field coordinators randomly selected 5% (n=120) of the questionnaires for spot-checking. They revisited the respondents and interviewed them again on key questions, either on the same day or the day after the original interview. The field coordinators identified no major issues or discrepancies.

Data Entry Management

Questionnaires were double entered into a database using Epi-Data software. When discrepancies were found, the data were crosschecked against the original questionnaires.

The final dataset contained two weighting variables: population weight and normalized weight. Different methods were applied to obtain the weight values in East Jakarta and Bogor, in line with the sampling design used in each area.

In East Jakarta, the calculation of weights took into account the selection of sub-districts and households in each RW (both using the simple random sampling method).

In Bogor, the calculation of weights took into account only the selection of households in the RW, since the selection of sub-districts was proportional to the population size in each sub-district (Probability Proportionate to Size (PPS) method).

Where the population weight was used, the weighted proportion reflected the proportion of the total population (N=7,100,632), while the normalized weight reflected the proportion of the total sample (N=2,520). The proportion should be identical whichever weighting method is applied.

The normalized weight was used in the statistical analyses.

DESCRIPTION OF SAMPLE

Demographics

Bogor District is more rural than East Jakarta, and the demographic characteristics of respondents reflect this difference (see Table 1).

Table 1. Household characteristics

	East Jakarta (n=5535)	Bogor (n=5793)	Total (n=11328)
Gender			
Male	49.1	51.3	50.5
Female	50.9	48.7	49.5
Age category			
Under 5	8.3	9.9	9.3
5-14	17.0	22.0	20.3
15-49	54.2	54.7	54.5
Over 50	20.5	13.3	15.8
Marital status			
Single	46.8	49.8	48.7
Married	47.4	45.8	46.3
Divorced	0.8	1.1	1.0
Widowed	4.6	3.2	3.7
Separated	0.5	0.1	0.2
Highest education achieved			
No school	12.1	17.1	15.4
Some primary	12.8	21.6	18.5
Completed primary	12.9	28.1	22.7
Completed lower secondary	14.5	14.7	14.8
Completed upper secondary	35.0	14.6	21.8
Academy	5.2	1.3	2.7
University	7.1	2.6	4.2

Households in East Jakarta were older on average, with fewer members under 14 and more over 50, compared to Bogor. East Jakarta's residents were generally better educated than those in Bogor. Household ownership of physical amenities such as color televisions, motorcycles or automobiles, and washing machines, was used as a proxy for socioeconomic status. Ownership of particular amenities, as well as the total number of household possessions, was higher in East Jakarta than in Bogor (data not shown).

The member of each household who was most knowledgeable about the health of the other family members was interviewed for this study. More than three quarters of respondents were female, with an average age of 45 in East Jakarta and 40 in Bogor District. Over 80% of respondents were married. In East Jakarta, 43% of respondents had completed high school at least, compared to 20% in Bogor District.

Hospitalization, Acute Illness and Mortality

Of the entire sample, only 14.9% reported a household member having been hospitalized in the past year. More households in East Jakarta (16.6%) reported a hospitalized member than did households in Bogor (12.5%). The vast majority of hospitalizations were single visits, with only 1% reporting a household member with multiple hospitalizations.

Acute illness that included a fever, cough, chest pains, and/or difficulty breathing or shortness of breath was fairly common in households in the study area. About 27% reported that someone in the household had seen a healthcare provider due to acute illness in the past two weeks. The symptoms that prompted care seeking were predominantly fevers (40%) and coughs (38%). Around 3% mentioned chest pains or difficulty breathing. In about a third of cases, the provider had diagnosed the condition as seasonal flu but almost never performed a test to confirm diagnosis. No confirmed diagnoses of AI were reported in the entire sample.

The households surveyed reported a total of 89 deaths in the past 12 months, equivalent to 3.5% of all households reporting one or more deaths. In only seven cases (less than 0.1%) had the deceased experienced avian influenza-like symptoms, including pneumonia (based on self-reporting). None of the households with multiple deaths reported the symptoms of the deceased being the same.

Of the deceased, 49% were hospitalized within 30 days prior to their death. Of those hospitalized, 95% had sought some other care before being admitted to the hospital.

FINDINGS

Knowledge and Risk Perception

Nearly all respondents (97.2%) said they had heard of AI, but not all of them were aware that people could be infected (84.4%). Specific knowledge about how AI is transmitted was superficial. When asked to list possible exposure routes, approximately half (47%) recalled that it was transmitted through contact with sick birds, and a third (31%) cited general contact with poultry. A relatively small proportion (13%) said infection was possible through contact with dead chickens. No other mode of transmission was cited by more than 10% of the respondents, although residents in East Jakarta were significantly more likely to mention contact with live chickens and their feces at a wet market, and consuming undercooked eggs.

Recognition of difficulty breathing as a characteristic of AI was very low. Only about 15% of the sample associated difficulty breathing with AI. However, when prompted, they were more likely to correctly identify difficulty breathing and chest congestion as symptoms of AI rather than seasonal influenza. Respondents were more likely to associate coughs, nasal congestion, and sneezing with seasonal influenza. Households did perceive AI to be a more serious illness than seasonal influenza, reporting the risk of death from AI as over twice that of seasonal influenza.

Perceived likelihood of becoming infected with AI was higher among households that sought care in less than 48 hours for fevers and coughs, although this was not significantly different from those who waited longer. Despite not being significant, this higher perception of risk of infection among rapid care seekers supports related findings (see Table 6) that risk perceptions could drive rapid care seeking.

Households where someone had been previously hospitalized with AI-like symptoms were *less* confident about their ability to protect themselves and their families from AI, perhaps because they have experienced acute illness directly and realize that infection is possible.

Care-Seeking Attitudes and Behaviors

Care seeking is defined in this analysis as visiting a healthcare facility (a hospital, clinic or puskesmas, or a doctor, male nurse or midwife at an unspecified facility). Among healthcare facilities, village and sub-district puskesmas were the first choice for healthcare for over half of respondents, with private clinics being preferred by another third of respondents (see Table 2). There was no difference in popularity between public and private hospitals, but these were the first choices of care of a minority of respondents (approximately 15% for each). A quarter of females cited midwives as their preferred source of care.

Table 2. Type of services used by households

	East Jakarta (n=1260)		Bogor (n=1260)		Total (n=2520)	
	Men	Women	Men	Women	Men	Women
Preferred source of services						
Public hospital	27.0	25.2	9.6	8.6	15.6	14.7
Private hospital	17.8	18.6	14.7	15.6	15.8	16.7
Sub-district puskesmas	25.9	31.5	26.3	28.7	26.2	29.8
Village hospital	27.2	32.2	23.1	30.4	24.6	31.0
Other government clinic	1.8	0.9	0.6	0.8	1.1	0.8
Private clinic	44.3	44.3	30.9	30.9	35.8	35.8
Pharmacy/shop	14.2	11.8	9.6	13.9	17.0	13.2
Traditional healer/dukun	7.9	6.0	4.1	6.7	5.5	6.5
Midwife	2.4	12.2	9.5	30.3	6.9	23.7
Doctor (unspecified facility)	12.8	10.6	21.1	15.7	18.0	13.8
Male nurse (unspecified facility)	0.7	0.6	7.1	4.9	4.7	3.3
Never seek care	0.4	0.2	1.9	0.9	1.3	0.7

Perceived quality, accessibility, and cost were the primary reasons for choosing a particular facility. Respondents in East Jakarta were significantly more likely to select the facility based on the perceived quality of medicine (half of respondents there gave this reason, compared to 28% in Bogor). Waiting time was significantly more important to respondents in East Jakarta (4.1%) than to those in Bogor (0.5%).

Respondents were confident that their healthcare provider could provide proper care for AI (a mean score of 3.76, where 0=disagree and 5=agree with a statement that the healthcare provider was competent). The vast majority (70%) of households reported no barriers to seeking care at a healthcare facility.

However, despite identifying healthcare facilities, perceiving few barriers, and expressing confidence in healthcare providers in case of AI symptoms, many households still declined to seek care for ILI symptoms, including acute symptoms that characterize AI. Among households where a member had suddenly fallen ill with ILI symptoms, more than half chose to self-treat at home or use over-the-counter remedies from a pharmacy. Over 40% chose to self-treat even when the symptoms included shortness of breath.

To explore care-seeking norms, researchers asked what should be done in cases of fever plus cough, and fever, cough plus difficulty breathing. Respondents were more likely to say they should seek care immediately from the puskesmas or doctor if the more severe symptoms occurred. This was true for both themselves and their family members.

There was some evidence of preference for early self-treatment (i.e., giving medicines or fluids at home, seeking a remedy from a pharmacy or *dukun* – a traditional healer), particularly when the symptoms were less severe. A small proportion of the sample had heard of Tamiflu (12.7%), the trade name for the antiviral oseltamivir. Among these respondents, only 30% thought it would be effective.

Time before seeking care was significantly associated with socioeconomic status; having fewer household goods was associated with significantly longer delays in seeking care (Table 3). Respondents who waited 48 hours or longer to seek care either had slightly lower levels of education or were the most educated (i.e., university graduates), but these results only approached significance (p=0.06). Residents of East Jakarta were more likely to seek care within 48 hours of symptoms occurring (85.9%) than residents of Bogor (78.5%), though this difference was not significant.

Table 3. Demographic differences in delays in seeking care for fever/cough

	Sought care <48 hours (n=136)	Sought care >48 hours (n=30)	p
Age (mean)	39.7	44.6	-
Education			
None	6.3	4.4	0.06
Some primary school	11.2	32.5	
Primary school	29.0	37.6	
Junior high school	20.3	8.0	
High school	22.5	10.3	
Academy	7.0	0.0	
University	3.8	7.1	
Number of household goods (mean)	10.3	8.7	0.05
District			
East Jakarta (% within district)	85.9	14.1	-
Bogor (% within district)	78.5	21.5	

There were significant geographic differences in reasons for choosing not to seek care for fever and cough. When asked why care was not sought for fever, cough and difficulty breathing, the largest proportion of respondents (approximately half) said that they did not think the patient was sick enough to need professional care (see Table 4). Two reasons for not seeking care varied by region. In East Jakarta, more respondents in symptomatic households chose to treat the patient at home (28.7%), compared with about 6% in Bogor. When treatment was not sought, more households

in Bogor reported that this was because they could not afford care at a facility (15.7%), compared with only 6% in East Jakarta.

Table 4. Reasons for not seeking care for fever/cough

	E. Jakarta (%)	Bogor (%)	p
Reasons for not seeking care at a facility for fever/cough (n=228)			
Did not feel they were sick enough	54.6	45.5	-
Received care at home	28.7	5.6	<0.001
Felt patient was getting better on their own	22.4	17.2	-
Too expensive (can't afford)	5.5	15.7	0.03
Didn't have the time	2.9	1.8	-
No transportation	0.0	3.1	-
Too far to travel	1.8	2.4	-
Patient is too old to seek care	1.4	0.0	-
Work wouldn't allow it	0.9	0.0	-
Nobody to take care of children	0.0	0.0	-

Determinants of Rapid Care Seeking for Avian Influenza

Perceived Severity of AI. When respondents did seek care for a fever or cough, this was usually done quickly. Nearly a quarter of respondents (22.7%) reported waiting less than a day, and an additional 60% sought care within two days (see Table 5). A greater proportion in Bogor delayed seeking care (20.8%, compared with 14% in East Jakarta). Reasons for delaying seeking care were perceptions of low risks (i.e., it is a common illness, and not serious), while a higher perceived risk led to seeking care more quickly (i.e., illness was thought to be dangerous) as did care-seeking norms (i.e., it was deemed important to seek care).

Previous Experience with Symptoms. Previous experience with acute symptoms, especially when combined with urbanicity, determined attitudes about rapid care seeking. Experiencing sudden onset of fever and coughing significantly predicted respondents' recognition of the need for immediate care. Overall, households that had previous experience with sudden fever and coughing were more likely to say that it was best to seek immediate care, compared to households with no previous experience of these symptoms. Mean scores were higher in Bogor than in East Jakarta. Households in East Jakarta that had never experienced sudden fever and coughing were the *least* likely to agree that it was best to seek immediate care for these symptoms (mean=3.86 on a scale of 0 to 5, where 0=completely disagree and

5=completely agree), whereas households in Bogor that experienced sudden fever and coughing were *most* likely to say it was best to seek immediate treatment (mean=4.23).

Table 5. Reasons for not seeking care for fever/cough

	East Jakarta (n=46)	Bogor (n=145)	Total (n=166)
How long did you wait?			
Less than one day	24.8	21.9	**22.7**
One to two days	61.2	56.7	**60.0**
Three to four days	13.4	19.8	18.0
More than four days	0.6	1.2	1.1
Why did you wait *more than* two days?			
Did not think it was a serious illness	31.5	31.7	31.6
Thought it was a common illness	31.2	23.3	25.1
Why did you wait *less than* 2 days?			
Thought it was a dangerous disease	19.7	45.6	**37.7**
Feel it is important to go to facility	63.5	40.6	**47.6**
Other reasons for waiting more than two days (open response)			
Tried home/over-the-counter treatment first; illness did not respond after 2-3 days (n=6)			
Waiting until they had enough money (n=4)			
Logistics (transportation, availability) (n=3)			
Patient was too young (<6 months old) (n=1)			

Recall of AI Messages. Greater recall of messages about AI significantly predicted the likelihood of seeking care quickly in the event of sudden fever, cough, or difficulty breathing. Television and social networks were the primary sources of information about AI. Of those who recalled messages about AI, hygiene and self-protective behaviors were mentioned by over half of respondents (57.2%) followed by burying dead poultry (34.9%). Hearing news reports about AI was reported by about a quarter of the respondents.

Self-Efficacy in Seeking Care. If a household member developed fever, sore throat and difficulty breathing, respondents reported significantly higher likelihood of seeking care among those who have high self-efficacy about seeking care.

Self-efficacy in seeking care when needed was significantly affected by several factors, particularly in Bogor. Bogor residents who expressed greater confidence in their ability to seek care both recognized the severity of AI and knew more about the potential

routes of exposure. People of lower household wealth (as measured by number of possessions) had lower levels of self-efficacy in seeking care.

High-Risk Poultry-Keeping Practices. Although there were no significant differences in the occurrence of AI by potential sources of exposure, there were significant variations in knowledge of AI, risk perception, and care-seeking outcomes among households with different poultry-keeping practices. These relationships often remained when controlling for indicators of socioeconomic status (i.e., educational level, wealth as indicated by total household goods and district). While household wealth influences the likelihood of protective behaviors such as poultry-keeping practices and care seeking, but it does not appear to be the only factor affecting care seeking.

Although not significant, households that waited more than 48 hours to seek care after experiencing sudden fever or cough correctly identified AI symptoms more often than households that sought care in less than 48 hours and also had a stronger belief that recovery from AI is possible with rapid treatment (see Table 6). That these households did *not* seek treatment within the recommended 48 hours delete space suggests that they were overly confident about their ability to identify and treat AI, and had decided that their episodes of fever/cough were not a major concern.

Table 6. Knowledge of symptoms and risk perceptions among households seeking care for sudden fever/cough, by delay in seeking care

	Sought care <48 hours (n=136)	Sought care >48 hours (n=30)	p
Knowledge of AI Symptoms			
Mention fever OR cough as AI symptoms (%)	59.4	75.0	-
Mention fever AND cough as AI symptoms (%)	12.9	23.6	-
Mention fever, cough OR difficulty breathing as AI symptoms (%)	78.8	87.8	-
Risk Perception			
Perceived likelihood of death from AI if infected (mean; 0=highly unlikely, 5=highly likely)	3.76	3.77	-
Perceived likelihood of self/family being infected with AI (mean; 0=highly unlikely, 5=highly likely)	1.95	1.87	-
Belief that recovery from AI is possible with rapid treatment (mean; 0=strongly disagree, 5=strongly agree)	3.42	3.95	-

In this sample, educational levels and number of household goods were lower among households that owned chickens (the most common type of poultry raised among this sample) compared to households without chickens ($p<0.001$), as well as among those that allowed poultry to roam freely indoors versus other households that did not allow free indoor roaming of their poultry ($p<0.001$). Socioeconomic status did not vary significantly between households that kept poultry in the household (including caged birds) and those that kept poultry outside the house.

Among households that raised chickens, respondents were less likely to say they would seek care for fever, cough or difficulty breathing even if the patient had been in recent contact with birds or been to the wet market. They were *more* likely to say they would wait longer to seek care. However, none of these differences was significant after controlling for socioeconomic status.

Further analysis was conducted among households with poultry. Significant differences were found in risk perception, depending on poultry-keeping practices, and regardless of socioeconomic status.

Among all households with poultry (n=617), those that kept their poultry inside were less likely to seek care for a fever or cough than those that kept their poultry outside, even when controlling for wealth, education, and district ($p=0.03$).Nearly 16% households keeping poultry indoors (15.8%) sought care when a household member had a fever or cough, compared to 45.2% of households keeping poultry outside the home.

These associations were particularly strong in households where poultry were allowed to roam freely inside the household, instead of being caged. These households account for around 30% of all households with poultry. Those who allowed poultry to roam inside the home were:

- Less knowledgeable about some sources of exposure (data not shown),
- Less likely to believe that immediate care seeking for a fever or cough was necessary (see Table 7),
- Less likely to believe they could protect their family and seek necessary care (see Table 7), and
- More likely to rely on traditional treatment (data not shown).

Households that allowed indoor roaming of poultry had significantly weaker belief in the need for immediate treatment for a fever or cough, and were significantly less confident that they could seek treatment when needed. Although the majority of respondents in both groups directly cared for their poultry and therefore had some degree of direct contact (68% with indoor roaming, 77% with no indoor roaming (not shown)), those in households with indoor roaming had lower confidence that they could protect their household from AI (see Table 7). Poultry owners were more likely

to express confidence that they could seek care when needed compared to non-poultry owners, while those who allow poultry to roam indoors were less confident about seeking care and knowing when to seek care.

Table 7. Differences in risk perception and self-efficacy among poultry-owning households, by whether they allow indoor roaming or

	Allow Poultry to Roam Indoors (n=156)	No Indoor Roaming (n=458)	p
Risk Perception/Self-Efficacy (0=completely disagree; 5=completely agree)			
Belief that immediate treatment is necessary for fever/cough (mean)	3.82	4.13	0.02
Confidence in protecting self/family from AI (mean)	3.25	3.68	0.02
Confidence in seeking medical care when needed (mean)	3.61	3.97	<0.001

Households that were observed by the researcher to have poultry in the house were more confident than other groups in their ability to recover from AI if brought to the puskesmas quickly. But they were less confident about self-protection, suggesting that they did not think there was much they could do in terms of self-protection, preferring to rely on rapid treatment if they became infected. This group was also more likely to rely on traditional remedies (odds ratio of 17.6, p=0.01, compared to other poultry owners) and less likely to seek any care at all.

CONCLUSIONS AND RECOMMENDATIONS

Changing Reliance on Self-Treatment

The most common responses to sudden onset of fever, cough and tightness of breath were to obtain drugs from the pharmacy (22% overall), medicate and give fluids at home (19% overall, 38% in East Jakarta), or visit a private clinic (16% overall, 22% in East Jakarta). The data suggests a need to discourage over-reliance on self-treatment and encourage appropriate responses to acute events.

The majority of the households sampled (70%) did not feel they faced barriers in obtaining care, but the few who did identify specific barriers mentioned access hours and cost of services. More than half of the sample reported using private clinics and

private hospitals because they perceived they would provide access to quality care (Table 2), suggesting that promoting sources of quality care for respiratory illness may encourage use of healthcare facilities.

Recognizing Exposure Potential

Routine daily exposure to birds is a fact of life in Indonesia, with almost universal exposure to wet market risks among urban households. Most exposures to birds are not considered distinctive or noteworthy, so complacency about the risks associated with birds is common.

As limiting exposure to birds is not feasible, an efficacy-based strategy framed around "living safely with birds" may increase symptom recognition and care seeking. Flagging certain types of exposure (e.g., handling live or slaughtered birds at the wet market) as requiring vigilance could prompt recall and therefore care seeking. Patients should be educated to mention these distinctive types of exposure when seeking care, alongside a complimentary strategy to educate providers to ask about these distinctive types of exposure when seeing clients with respiratory illness.

Urban/Rural Variations in Strategy

A number of differences between East Jakarta and Bogor emerged in terms of risk factors and care-seeking behavior. An important messaging focus in East Jakarta should be on risks associated with potential exposure to AI in wet markets, which Jakarta residents rely on for their poultry products. In rural areas like Bogor District, false confidence may stem from constant exposure to birds and greater exposure to outbreaks, which most people survive.

Raising Awareness of Care-Seeking Recommendations

General knowledge of AI was high, but knowledge of specific identifying symptoms (i.e., shortness of breath, tightness in chest) was limited. Messaging that highlights symptoms of concern, combined with potential exposure in the past seven days, is recommended. Patients do not need extensive education about biomedical distinctions. Instead, messaging should focus on a few "differences that make a difference". Emphasizing a single symptom may not be best, particularly since acute symptoms often appear later in the illness when treatment may be too late.

Those who perceived AI infection as a serious illness and felt confident in their ability to seek care did so more quickly. Among those who sought care for acute respiratory symptoms, 82% reported seeking care within 48 hours of the onset of illness. Of these individuals, half (and two thirds in East Jakarta) said they sought care because they felt it was important to go to a healthcare facility. This response suggests the need for a

norms-based strategy stressing that the responsible thing to do is to seek care within 48 hours after symptoms occur.

Using Trusted Sources of Information

Television has the greatest reach and the highest reliability and usefulness rating as a source of information, and it was the most commonly reported source of information on both avian flu and seasonal flu. Interpersonal channels (doctors, neighbors, community cadres) also play a role in the flow of health information. This suggests a mutually reinforcing strategy involving the use of television to inform, to model positive behaviors, and to catalyze community-level discussion about "safe living with birds".

Television can be used to convey messages on:

- Particular types of higher-risk exposures to birds as transmission pathways
- Distinctive symptoms requiring rapid care seeking
- Inadequacy of self-treatment as a first response
- Two days (48 hours) as the critical response time period
- Encouraging rapid care seeking as "the right thing to do" (social norm)
- Modeling care seeking within 48 hours if symptoms begin to develop
- Encouraging interpersonal communication and social support at the community level

Community media, interpersonal outreach, and signage can be used to:

- Provide reminders at clinics and wet markets about particular higher-risk types of bird exposure
- Provide details about effective behaviors to "live safely with birds"
- Encourage client-provider communication about bird exposures and symptoms of AI

Messages should strive for the highest possible reach with care-seeking messages, taking advantage of the powerful combination of "threat" and "efficacy". Messages can emphasize how deadly AI can be if treatment is not sought promptly after symptoms begin, and emphasize the many ways that people can be exposed to the H5N1 virus, given how common exposure to birds is in Indonesian daily life. Additionally, using an efficacy-based strategy can build confidence in the ability to seek care quickly. This combined approach would aim to address determinants of rapid care seeking for AI symptoms and would ultimately increase the proportion of symptomatic individuals who seek care for potential AI infection.