현안리포트 05-042

The Potential Impacts of Avian Flu on Korean Exports and Korean Overseas Businesses

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요 약

2003년 말 이래로 동남아지역을 중심으로 돌발하고 있는 조류독감(AI)은 세계보건기구(WHO)의 공식보도에 따르면, 2005년 11월17일 시점까지 약 130여건의 인간전염 및 67여명의 사상자를 속출하면서 전 세계적 확산의 우려를 점차 증폭 시키고 있다.

조류독감의 확산은 돌발지역의 인명과 동물의 생명 손실 및 소비와 생산의 위축에서 오는 경제적 손해 뿐 아니라 상품 및 서비스를 매개로 한 국제무역, 해외투자와 그 밖의 여행자 왕래 등을 통해서 타 지역에도 경제적 영향을 미칠 수 있을 것으로 보인다.

지금까지의 조류독감 발생의 주 돌발국가들인 인도네시아, 베트남, 태국 및 캄보디아에 대한 우리의 수출 및 투자동향 등을 점검한 결과 인과적인 관련성은 부재한 듯 보이며, 따라서 우리 기업에게 미치는 경제적 파장도 현시점 까지는 크지 않는 것으로 평가된다.

그러나 조류독감의 확산은 계속되고 있으며 관련사항에 대한 국내외적 여론반응의 증폭 및 최근 우리의 주요 무역대상국가인 중국에서의 조류독감 돌발과 인간전염은 동 이슈의 경제적 현안성을 지속시키고 있다.

우려 및 공포심의 확산은 사태를 개선시키는 데에 도움이 되지 않으며, 따라서 현 시점에서 가장 중요한 사항은 조류독감의 확산과 인명 및 경제적 피해를 최소하기 위한 국가적 및 기업적 차원의 효과적인 대응대책의 수립과 국가간의 정보교류와 기술적, 경제적 협력방안인 듯 하다.

Contents

1. Introduction

The recent outbreak of bird flu, specifically avian influenza H5N1, has already killed more than 60 people in Asia and is spreading to Europe and North America. It is far too early to consider that it might be the beginning of an epidemic influenza crisis similar to the 1918 outbreak. Apart from the losses of human and animal lives, the avian flu however might have significant economic consequences according to its scope and the futures's spread. The biggest concern is that the flu might have a negative effect on the economic growth in the affected regions and international trade.

Korea is an open economy, which is vulnerable to international economic shocks. This report aims to examines the potential impact of avian flu on Korean overseas businesses. It is, at this moment, not possible to predict the further development tendency of the avian influenza exactly, since there are simply too many unknowns.[1] [2] Nevertheless, it is a very important step to project the future's situation and prepare a suitable strategy. On the basis of this position, likely scenarios will be assessed in the second chapter, whereby this report seeks for the most possible one. In the third chapter, the trade effects of avian flu on Korean overseas business will be examined on the basis of the most likely scenario and

1) Theoretically, even viruses of low pathogenicity can, after circulation for sometimes short periods in a poultry population, mutate into highly pathogenic viruses.

2) This is the reason why the pandemic cannot be easily modeled.

according to the experience of previous flu outbreaks. In the fourth chapter, the determinants of trade effects will be approached. The fifth chapter will be the conclusion.

2. Scenarios

In this chapter, two scenarios are distinguished: the first case is linked with an efficient and sustained transmission of the H5N1 virus from person to person ("the extreme case"), resulting in a global influenza pandemic. The second scenario is a transfer of the flu influenza from animal to animal and very limitedly from animal/human to human ("the mild case").

2.1 "The Extreme Case"

In this case, it is expected that the economy in general will be stagnated. First of all, the losses of human and animal lives will damage the poultry business and the businesses where the infected and the dead were employed. A more crucial factor of economic stagnation will be however the psychological impacts of the mass, "panic" that will reduce consumption and production dramatically, which will therefore have a negative impact on economic growth (see figure 1).

The "SARS"[3] crisis (2003), which is comparable to the "extreme case" to some degree, led to an immediate economic loss of maybe two per cent of the East Asian regional GDP in the second quarter of 2003, even though only about 800 people

3) Severe Acute Respiratory Syndrome.

ultimately died from it.[4)]

<Figure 1: The Demand and Supply Shocks of Avian Flu>

Demand Side	- the Loss of Consumer Confidence - the Change of Consumption Pattern
Supply Side	- the Loss of Work Place - Workplace Absenteeism

In comparison to "SARS", avian flu is however no longer just an Asian phenomena, but global one. Therefore, it is fair to assume that the immediate shock during the avian flu epidemic will be much larger than that of SARS.

For example, the Asian Development Bank (ADB) assesses a loss of US$113.4 billion[5)] in Asian GDP alone, the equivalent of 2.6 GDP percentage points,[6)] if 0.5 per cent of

4) Brahmbhatt (2005), p. 3.

5) The estimated reduction of US$99.2 billion due to demand shock and US$ 14.2 billion in the face of supply shock.

6) The estimated reduction of 2.3 per cent according to demand shock and 0.3 per cent, resulted from supply shock.

Asian people (i.e. 30 million Asians) die of the disease and the relevant psychological impact will effect demand seriously for only two quarters.[7] In the case of more severe demand effect for four quarters, the ADB assumes a reduction of US$296.9 billion, around 6.8 percentage points of GDP, probably leading to a global recession and contracting global trade of goods and services by 14 per cent worth US$2,500 billion.

There is still no official approach to detremine the economic costs of avian flu on a global scale. Judging from the SARS case and the approach of ADB, the cut in Korean economic growth and Korean overseas business could not be avoided, whereby the scope of economic damage depends on the severity of the pandemic and the vulnerability of the Korean economy to external shocks.

However, the "extreme case" is doubtful, though the flu outbreak is ongoing and therefore the World Health Organization (WHO) does not completely excludes the global epidemic. Because countries and international communities more and more endeavor to prevent the global influenza crisis, it is estimated that the human-to-human transmission would keep it under control to a large degree, even if it lasts for a while and could be a serious problem in some regions.

2.2 "The Mild Case"

A more realistic option is likely to be the relatively "mild

7) The further assumptions are that the flu lasts one year and is relatively well spread out through the year.

case", in which the transmission from animal to animal or from animal/person to person still presents social-economic risk factors, but to a limited degree.

At first glance, this stage might be comparable to the "AIDS" epidemic. At the beginning of the outbreak of AIDS, a global human epidemic was feared. 20 years later, the risk still exists and AIDS is a real serious problem in some regions like Sub-Sahara Africa. However, preventive measures have so far achieved a success in many other regions and a global human crisis seems to be beyond reality.[8)]

The economic impacts of the mild case, above all, will be likely to occur at the micro-economic level, whereby they can be divided into direct & indirect and positive & negative impacts.

The direct affected will be first of all on the poultry businesses (like farmers, poultry traders, breeding farms etc.) in the countries with flu outbreaks, while bearing direct costs because of the losses of poultry.

Some other businesses would be influenced indirectly from a decline or an increase in demand. The first group of the indirectly affected is made up of domestic losers and winners in the regions with the outbreaks of avian flu. The potential losers are sectors associated with poultry as input (e.g. food industries), distribution and service channels (like

8) The prevention of AIDS from global pandemic seems to be owed to a relatively moderate price of antiretroviral drugs to treat AIDS.

bird meat restaurants, travel agencies for domestic travels and hotels), transport businesses (bus, train, subway etc.), life insurance companies, employers in, and domestic business partners of the relevant industries.[9] In turn, the winners, if any, would be some domestic pharmaceutical companies producing antiviral drugs or other medications, manufacturers of safety articles, and employers[10] in these businesses.

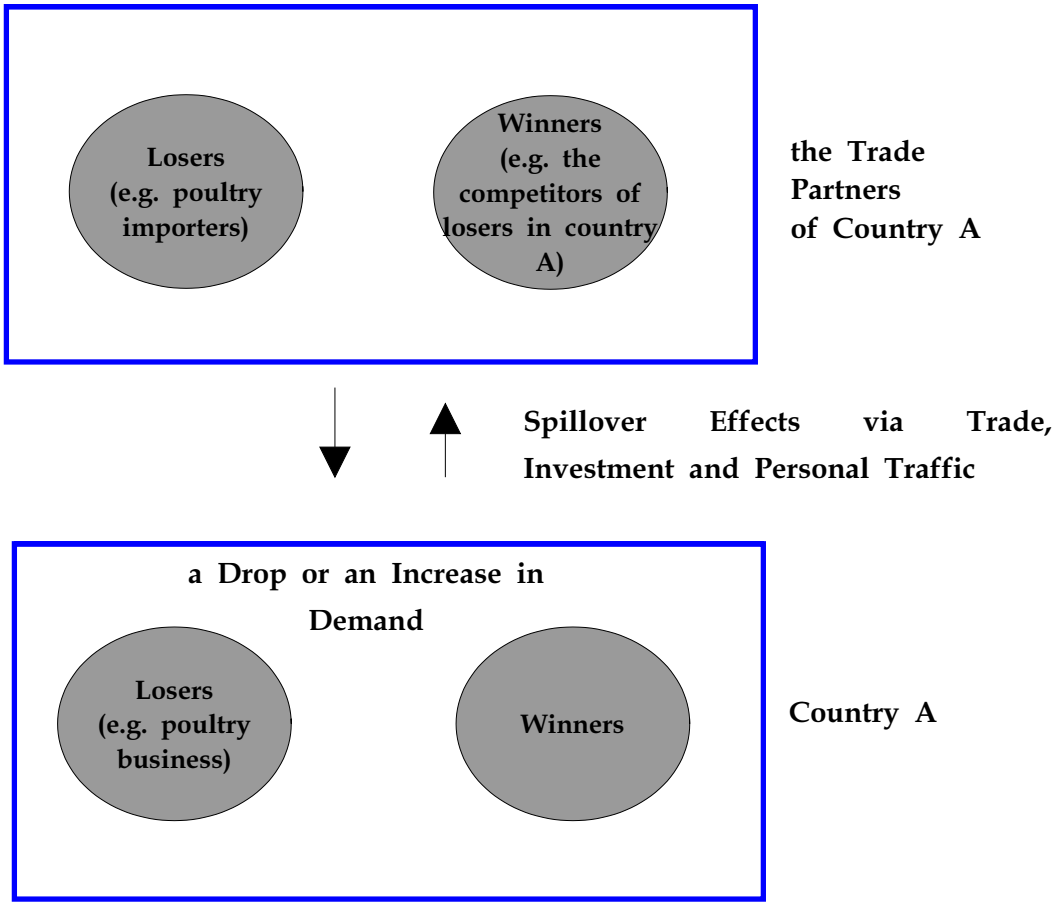
The second group of the indirectly affected is in association with a hiatus in or a profit from trade and travel. The potential losers are foreign poultry importers[11], foreign tourism into the affected regions, foreign businessmen and investors in the affected regions in terms of the (directly or indirectly) affected articles (e.g. food). At the same time, the potential winners are, as substitutive suppliers, foreign competitors of the domestic losers like poultry exporters, manufacturers of food and safety articles, and pharmaceutical companies producing poultry vaccines or other medications.

9) Some people could try to avoid face-to-face interactions because of infection, which would result in the reduction of demand for service sectors such as tourism, mass transportation, retail sales, hotels and restaurants.

10) E.g. workers for culling and cleanup, surveillance and diagnosis.

11) Whether foreign poultry importers are potential losers seems to be a little controversial, if they find substitutive trade partners easily.

<Figure 2: The Interactions of the Sectors Affected by Avian Flu>



Outbreak of Avian Flu in the Territory of Country A

3. The Trade Effects of an Outbreak of the Avian Flu on Korean International Trade, 2004-September 2005

In line with the "mild case", the potential impact of the avian flu on Korean exports and other business abroad are based on the assumption that the animal-to-animal/human transmission continues to occur, but to a limited degree. Accordingly, the hitherto trade performance of Korean business since the first outbreak of avian flu in 2004 provides a benchmark against the future's level of trade effects in this paper.

According to WHO, the countries that have been affected most by the avian flu are Indonesia, Vietnam, Thailand and Cambodia (see table 1).[12] [13] Therefore, the analysis focuses on Korean business interaction with these countries, which are differentiated in this paper in the following three areas: demand in products, investments and tourism.

12) According to Brahmhatt (2005), the losses of poultry in Vietnam and Thailand, for instance, were equal to 15-20% of their stocks of poultry in 2003, before the epidemic.

13) The analysis in this paper is mainly based on the "official" announcement of WHO, which includes the case of the outbreak of avian flu until November 17 2005. The cases of China (2 cases and 1 dead), announced officially by WHO on November 16 2005 are not considered in this paper due to a shortage of time. In addition, the potential economic impact of China's cases could be seen only in the future.

<Table 1: Cumulative Number of Confirmed Human Cases of Avian Flu in Indonesia, Vietnam, Thailand and Cambodia>

Date of Onset	Indonesia		Vietnam		Thailand		Cambodia		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
26.12.03 - 10.0304	0	0	23	16	12	8	0	0	35	24
19.07.04 - 08.10.04	0	0	4	4	5	4	0	0	9	8
16.12.04 - until 9.11.2005	11	7	65	22	4	1	4	4	84	34
Total	**11**	**7**	**92**	**42**	**21**	**13**	**4**	**4**	**128**	**66**

* Total number of cases includes that of deaths;

* Cases mentioned here are only those that are laboratory-confirmed.

Source: World Health Organization (WHO) (reported on November 17 2005);

3.1 Demand for Korean Products

Indonesia, Vietnam, Thailand, and Cambodia represent altogether the export markets of small scale for Korean products. For example, Indonesia is the 9th biggest object importer of Korean goods in 2005 (January-September), whereas Vietnam, Thailand, and Cambodia are the 17th, the 18th and the 83th biggest trade partner in the same year. In focus on the years, 2004 and 2005, it is however still not to be seen at the level of total exports that the outbreaks of avian flu have systematically influenced Korean exports to the relevant countries.

<Table 2: Shares of Korean Exports to Four Selected Countries in Total>

(%)

	2000	2001	2002	2003	2004	2005*
Indonesia	2.03	2.18	1.94	1.74	1.45	1.81
Vietnam	0.98	1.15	1.38	1.32	1.28	1.26
Thailand	1.17	1.23	1.44	1.3	1.28	1.25
Cambodia	0.06	0.07	0.07	0.05	0.05	0.05
Total	**4.24**	**4.63**	**4.83**	**4.41**	**4.06**	**4.37**

Source: World Trade Atlas (WTA)

*: until September 2005

According to the "mild case", it was above mentioned that some foreign products could get an increased/decreased demand in countries with the outbreaks of avian flu (see chapter 2,2). In this regard, there might be however very few Korean products, the exports of which could have profited from demand increase in Indonesia, Vietnam, Thailand and Cambodia during the outbreaks of the avian flu. In terms of live poultry[14], for instance, Korean exports to the relevant countries have not been officially observed especially from 2004. This is due to the fact that the export of poultry is a marginal factor for Korean export business. Further, it could be interpreted that the outbreaks of the avian flu have so far not significantly affected the change in poultry demand in the relevant four countries.

14) fouls, ducks, geese, turkeys, guinea fowls.

<Table 3: The Export Tendency of Live Poultry by Korea>

	Year	Value (US$)	Increase Rate (%)
Indonesia	2001	27,156	-
	2002	-	-100.0
Vietnam	2002	36,208	-
	2003	35,546	-1.8
	2004	-	-100.0
Thailand	2002	95,364	-
	2003	15,750	-83.5
	2004	-	-100.0

* This table is made on the basis of HSK item;

** With regard to Cambodia, there does not exist any data;

Source: Korea International Trade Association (KITA)

3.2 Korean Investments in Indonesia, Vietnam, Thailand and Cambodia

Among the 24,907 cases and about 44 billion US dollar of Korean overseas investments,[15] those in Indonesia, Vietnam, Thailand and Cambodia represent a value of more than 3 billion US dollar with 1,676 cases. As seen in table 4, the recent Korean investments in these countries are largely on the increase. As for Indonesia, Korean investments in 2004 decreased radically from the point of the sum invested totally, but are recovering this year, in which avian flu has broken out in Indonesia. Whether avian flu affects Korean businesses in Indonesia will however seem to be seen only in the coming

15) Cf. the main recipient countries of Korean overseas investments are China and the United States. These two countries occupy almost a half of the total value of Korean overseas investments.

years. In the case of Vietnam, in which the avian flu has broken out at the most, Korean investments have been steadily increasing.

<Table 4: Recent Korean Investments in Indonesia, Viet Nam, Thailand and Cambodia>

	2000		2001		2002		2003		2004		2005**	
	Case	Sum*	Case	Sum	Case	Sum	Case	Sum	Case	Sum	Case	Sum
Indonesia	50	74,75	50	-351,00	49	65,39	27	60,12	**45**	25,56	57	39,12
Viet Nam	28	33,36	45	36,25	95	111,03	93	131,87	107	159,34	108	172,63
Thailand	15	15,67	15	28,89	28	19,39	40	28,88	38	38,03	29	26,58
Cambodia	6	3,51	4	5,43	8	2,42	9	9,67	7	12,67	19	19,08

*: thousand US dollar

**: until September 2005

The figures in this table are net investment cases and sums.

Source: Korea Eximbank

At the sector level, first of all agriculture, retail and wholesale, Hotels and restaurants, and services are likely to come into question for trade effects. As seen in table 5, the systematic interrelationship between Korean investments and avian flu cannot be found also at the sector level.

<Table 5: Korean Investments in the selected Indonesian Sectors>

		2000		2001		2002		2003		2004		2005**	
		Cases	Sum*	Cases	Sum	Cases	Sum	Cases	Sum	Cases	Sum	Cases	Sum
Agriculture, Wood and Fishery	ID	-1	27	2	32	-1	-75	0	28	1	4	1	12
	VA	0	0	1	32	0	14	3	38	3	67	2	1,05
	TH	0	0	0	0	2	45	-1	-23	0	0	0	0
	CA	1	10	-1	-10	0	0	0	0	0	0	0	0
Retail and wholesale	ID	3	1,50	1	2,69	2	57	4	41	7	4,17	9	3,15
	VA	2	4	0	13	1	1,05	0	0	4	46	2	3,21
	TH	3	21	0	0	1	3	1	4	0	-1,15	4	1,46
	CA	1	60	1	1,08	0	39	1	53	-1	54	1	58
Hotels and Restaurants	ID	0	0	0	0	0	0	0	0	0	0	1	34
	VA	0	6	0	2	0	0	1	10	1	9	1	1,00
	TH	0	0	0	0	0	0	0	0	0	0	2	32
	CA	0	0	1	32	2	55	0	0	0	0	1	17
Services	ID	9	2,36	6	72	7	68	3	1,20	5	1,61	9	1,83
	VA	1	58	4	21	4	97	5	1,67	9	5,89	10	7,67
	TH	2	93	4	35	4	1,19	5	1,12	8	3,77	5	2,72
	CA	2	33	1	8	3	1,56	3	1,85	3	49	7	3,74

ID: Indonesia, VA: Vietnam, TH: Thailand, CA: Cambodia;

*: thousand US dollar;

**: until September 2005;

The figures in this table are net investment cases and sums;

Source: Korea Eximbank

3.3 Korean Tourism

Tourism is one of the typical service industries that can react to external economic shocks immediately. This reaction however does not appear to have occurred so far, with Korean visitor numbers (including those of business arrivals etc.) in Indonesia, Vietnam, Thailand and Cambodia continuing to grow significantly in 2004 and so far in 2005[16] (see table 6).

16) Cf. As seen in table 6, Korean tourist numbers in 2005 are counted until September and expected to increase further by the end of the year.

<Table 6: Korean Visitors in Indonesia, Vietnam, Thailand and Cambodia>

	2000	2001	2002	2003	2004	2005*
Indonesia	61,954	92,580	110,848	105,267	124,828	103,551
Vietnam	42,536	60,498	90,885	112,673	203,300	198,677
Thailand	351,113	446,886	581,514	575,154	754,093	461,077
Cambodia	2,046	2,839	3,894	4,801	7,213	23,874
four countries in total	457,649	602,803	787,141	797,895	1,089,434	787,179
total	5,508,242	6,084,476	7,123,407	7,086,133	8,825,585	7,654,818

**: until September 2005;

Source: Korea Tourism Organization (KNOT)

3.4 Assessments

In fact, international trade is influenced by the interactions of many factors, and not only by avian flu. If the flu influenza however were to experience a significant external shock, Korean exports and Korean overseas businesses could be affected.

The analysis in this chapter began with the assumption of the realistic and relatively mild case. On this basis, the analysis has implied that avian flu in Indonesia, Vietnam, Thailand and Cambodia has hardly affected Korean business until now. This is possibly due to the fact that poultry and associated sectors cover a very small share of Korean exports and Korean business abroad. Due to the focus on the short period and the immediate impact, the economic damages of avian flu, in addition, have been restricted so far to poultry business, resulted from the losses of animals, the reduction of

consumer demand and trade bans.

4. The Determinants of Trade Effects

To what extent the future's economic and trade effects of avian flu will occur is a complex issue, where the following determinants play a role:

- One of the most crucial factors for economic impacts is the reaction of markets. If consumers, investors and suppliers have a tendency to overreact, the economic impact could be exacerbated. In this regard, media plays an important role. On the one hand, it pays public attention to the risks of flu outbreaks, so that public awareness can increase. On the other hand, the media could be all too eager to make headlines and cause unnecessary panic, which could have significant social-economic implications.

- The adaptability of people to a shocking situation, prevention measures (including epidemic monitoring, emergency contingency plans etc.) and medical care are other crucial factors to avoid global epidemic and to minimize economic losses. In this regard, several countries have already begun to provide their own countervailing strategies and to stockpile anti-viral vaccines. However, these measures are still not far enough even to master the mild case.

- The sufficient supply of anti-viral vaccines[17] can lesson

17) A prominent example of these anti-viral vaccines is "Tamiflu", which was first developed by Gilead, the US biotech group, in 1996 and licensed to Roche, the Swiss pharmaceutical group.

the human impact and reduce the risks of global epidemic ultimately. However, the availability of vaccines is so far limited because of insufficient production capacity, and the monopolistic position of producers. According to what extent vaccine producers allow other pharmaceutical companies to produce anti-viral vaccines, the current imbalance between demand and supply could be improved.

- If the mild case only continues to occur, it is a key point, how important the affected country is for Korean business abroad. If this trade partner takes an important position for Korean exports and Korean investments, economic losses could be significantly caused, because some Korean businesses like e.g. those of machinery/plants or building projects would hesitate to do their activities in the relevant trade partner country. In this regard, it is noticeable that the news about recent outbreaks of avian flu among poultry[18] and the confirmation of the first human death[19] in November 2005 in China, one of the most powerful state in international trade, has been leading to the increasing concerns of China's trade partners about the shrinkage of trade relations with China.

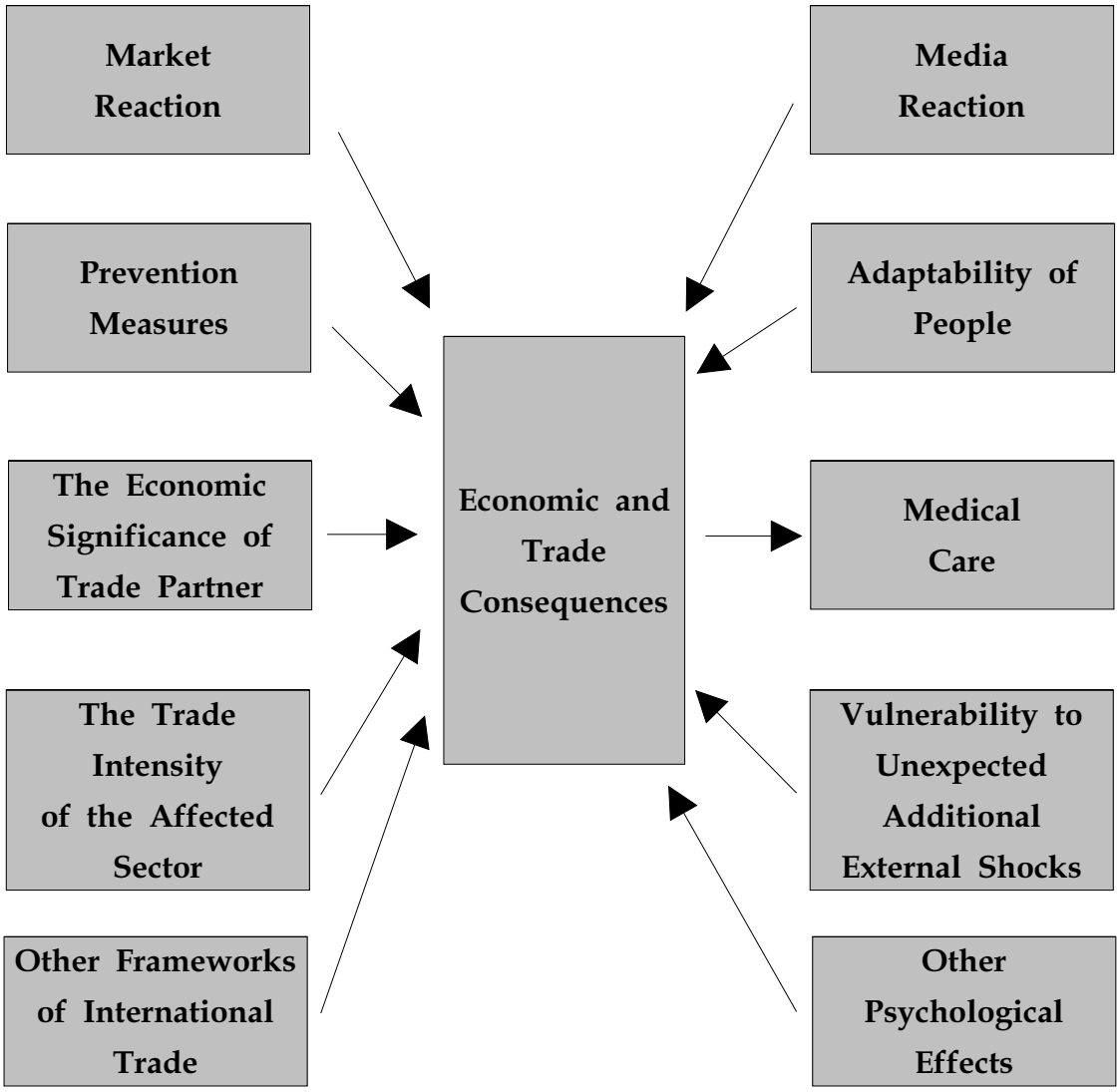
- Depending on countries and situations, negative spillover effects could occur in the way that demand not only in poultry from countries with flu outbreaks, but also in all other animal products and associated services (like tourism) or

18) In China, there have already been 11 outbreaks of bird flu in chickens and ducks over October 2005 nationwide.

19) On November 16 2005, China's Ministry of Health confirmed its first three human cases of bird flu, in which two deads (on October 17 and November 10) are registered, but one of them is doubted by World Health Organization.

from all other countries in the region of the affected country (from our point: Asia). In this connection, the trade intensity of the affected sectors however will be likely to play a role in economic damages.

<Figure 3: The Determinants of the Economic and Trade Consequences of Avian Flu>



- The framework of the crucial factors of international trade can also influence the scope of the economic effects of avian flu. These economic factors are for example oil price, exchange rate of foreign currency, the change of the environment of important trade partners, the results of international trade negotiations etc.

- Further, the vulnerability of trade partners to unexpected additional external shocks like natural disasters (e.g. hurricane) can play a part in the economic consequences of avian flu as well.

5. Conclusion: Lessons we learned and we suggest

This paper examined the possible impacts of avian flu on the Korean international trade business. As the analysis showed, there might not have been significant Korean business losses and benefits at least in four major countries with flu outbreaks in 2004-September 2005.

However, the outbreak is ongoing, which makes an estimation about economic consequences extremely difficult. Accordingly, there exist the signs of the seriousness of the treat, especially because Asian countries threatened by the avian flu have vast poultry flocks and a close contact with people. To make matters worse, some of these countries are migration routes for wild fowl, which might be spreading the virus.

What have we learned from the hitherto experiences of flu outbreak and what should we further do? The most important steps are appropriate and timely public response and effective international co-operations.

Domestically, the government should prepare effective nationwide preventative measures against the flu outbreak. This is very important since the macro-economic consequences have to be as little as possible. In this regard, the government first should provide the public with more sufficient information about the risks of avian flu and effective prevention methods. If necessary, financial and logistical supports for poultry business and associated input factors are likely to be helpful to counter the effects of bird flu outbreaks. Further, the government needs to be more active to provide its citizens with anti-viral vaccines. This can helpful especially to dampen the mass panic.

The crisis of avian flu is not a matter of some countries, but a global problem, to which all countries are vulnerable. Therefore, controlling the crisis is a global public good, and international co-operations[20] in the frame of the co-ordination of activities (such as research ones) and the share of transparent and accurate information are crucial steps for governments to keep this global public good. In addition, support measures should be provided for countries, which find themselves confronted with the flu crisis, but do not enable to cope with it suitably due to the shortage of financial sources

20) At the beginning of this November, United Nations Secretary-General Kofi Annan already called on international co-operation to make immediate preparations for a possible pandemic of bird flu.

and technical know-hows. This is not only the way to blockade the spread of flu outbreak into our territory. These countries are a right part of our export markets, the economic damages of which can jeopardize our exports and prevent us from making overseas businesses through investments.

The appropriate position of private sectors like industries is likely to be "business-as-usual". The avian flu is surely a possible business risk like a high oil price, the revaluation of Korean Won or other external business challenges. In the case of thorough preparation to cope with this risk and more careful attention to the flu spread, we will keep the economic consequences of avian flu on our overseas businesses under control.

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http://www.who.int/csr/disease/avian_influenza/country/cases_table_2005_11_17/en/index.html

Appendix

Situation in 2005 by World Health Organization (WHO) - Avian Influenza

Source: http://www.who.int/csr/disease/avian_influenza/country/en/index.html

1. China and Indonesia (17 November 2005)

China: The Ministry of Health in China has confirmed the country's first two human cases of infection with the H5N1 avian influenza virus. The first case is a 9-year-old boy from the southern province of Hunan. He was hospitalized with respiratory symptoms on 17 October and has since returned home, fully recovered. The second case is a 24-year old woman who worked as a poultry farmer in the south-eastern province of Anhui. She developed symptoms on 1 November, was hospitalized with severe pneumonia on 7 November, and died on 10 November. Testing was conducted by the Chinese Centre for Disease Control and Prevention in Beijing. An additional two possible human cases have been investigated in Hunan Province. The first is the boy's 12-year-old sister. She was hospitalized on 16 October and died the following day of severe bilateral pneumonia and acute respiratory distress syndrome. Samples from the girl are inadequate for testing, and the cause of her death will probably never be known with certainty. Although evidence pointing to H5N1 infection is considered substantial by Chinese experts, WHO reports only laboratory-confirmed cases. The additional case under investigation in Hunan is a 36-year-old schoolteacher. He was hospitalized with pneumonia on 24 October. Definitive test results are pending. A WHO team with expertise in virology and laboratory diagnosis has collaborated with national experts in the investigation of the cases in Hunan. Surveillance for human cases in China intensified over the past month following a recurrence of highly pathogenic H5N1 avian influenza in poultry. Since 19 October, China has reported 11

fresh outbreaks of the disease in six provinces, from Liaoning in the northeast of the country to Xinjiang in the far west. Hunan and Anhui – the two provinces with confirmed cases – are among the recently affected provinces.

Indonesia: The Ministry of Health in Indonesia has today confirmed a further two cases of human infection with the H5N1 avian influenza virus. Both cases were fatal. The first newly confirmed case was a 16-year-old girl from Jakarta. She developed symptoms on 4 November, was hospitalized on 6 November, and died on 8 November. The second case was a 20-year-old woman from Jakarta. She developed symptoms on 5 November, was hospitalized on 9 November, and died on 12 November. Both cases were confirmed by a WHO reference laboratory in Hong Kong. Field investigations are under way. The newly confirmed cases bring the total in Indonesia to 11. Of these, 7 have been fatal.

2. Thailand (14 November 2005)

The Ministry of Public Health in Thailand has confirmed a further case of human infection with H5N1 avian influenza. The case is an 18-month-old boy from a suburb of Bangkok. He developed symptoms on 1 November and was hospitalized on 5 November. He remains in good condition. This is the fourth laboratory-confirmed case in Thailand this year. Since January 2004, Thailand has reported 21 cases, of which 13 were fatal.

3. Vietnam (9 November 2005)

The Ministry of Health in Vietnam has confirmed a further case of human infection with H5N1 avian influenza. The case occurred in a 35-year-old man from Hanoi who was hospitalized with respiratory symptoms on 26 October and died on 29 October. This is the first confirmed case in Vietnam since late July of this year. Since mid-December 2004, Vietnam has reported 65 cases, of which 22 were fatal. The newly confirmed case coincides with a recurrence of outbreaks in poultry.

4. Indonesia (7 November 2005)

The Ministry of Health in Indonesia has confirmed two additional cases of human infection with H5N1 avian influenza. The first newly confirmed case was a 19-year-old woman from Tangerang, near Jakarta, who developed symptoms on 19 October, was admitted to hospital on 26 October, and died on 28 October. The second case is her 8-year-old brother. He developed symptoms on 25 October and remains hospitalized in good condition. Field investigation has found evidence of sick and dying chickens in the residential area of the 8-year-old. His 19-year-old sister is known to have visited this area. Final results from an ongoing Ministry of Agriculture investigation are pending. To date, Indonesia has confirmed 9 cases of human H5N1 infection of which 5 have been fatal.

5. Thailand (01 November 2005)

The Ministry of Public Health in Thailand has confirmed an additional case of human infection with H5N1 avian influenza. The patient, a 50-year-old woman from Bangkok, developed symptoms on 26 October and was hospitalized on 29 October. She remains hospitalized in satisfactory condition. On 23 October, the patient visited her husband in Nonthaburi Province, north of Bangkok, where backyard chickens had begun to die a few days earlier. Field investigations have not found any indications of respiratory illness in close contacts of the patient. The woman is the third confirmed case reported in Thailand in the past month. These cases coincide with a recurrence of confirmed H5 outbreaks in poultry in 6 provinces, most of which are in the central part of the country, and point to the need to remain on high alert for the occurrence of human cases in all countries experiencing outbreaks in poultry. Since the start of the outbreaks in Asia, Thailand has confirmed 20 cases, of which 13 have been fatal.

6. Thailand/Indonesia (20 October 2005)

The Ministry of Public Health in Thailand has today confirmed

its first case of human infection with H5N1 avian influenza since 08 October of last year. The patient, a 48-year old man from Kanchanaburi Province, developed symptoms on 13 October, was hospitalized on 17 October, and died on 19 October. Authorities have linked his infection to close contact with diseased poultry during slaughter. Poultry outbreaks in several Kanchanaburi villages were reported earlier this month. Samples from the patient will be sent for further analysis at a WHO reference laboratory. The man's 7-year-old son developed respiratory symptoms on 16 October. He had assisted his father with defeathering of the diseased birds. Test results on the child, who is presently hospitalized, are pending. Since the start of the outbreaks in Asia, Thailand has confirmed 18 cases, of which 13 have been fatal.

7. Europe (13 October 2005)

Tests conducted by the World Organisation for Animal Health (OIE) have today confirmed the presence of highly pathogenic H5N1 avian influenza in samples taken from domestic birds in Turkey. In Romania, investigations of recent poultry deaths have, to date, identified the H5 subtype of avian influenza virus. Further testing is under way to determine the strain and whether the virus is highly pathogenic. Authorities in the two countries have undertaken control measures as recommended by OIE and FAO. WHO is sending diagnostic reagents and other supplies to support testing in national laboratories. Viruses from both outbreaks have been sent for further analysis to the Central Veterinary Laboratory Agency-Weybridge (UK), which is an OIE/FAO reference laboratory. Viruses are also being sent to WHO reference laboratories for comparison with human H5N1 isolates from Asia.

Public health implications: The spread of H5N1 to poultry in new areas is of concern as it increases opportunities for further human cases to occur. However, all evidence to date indicates that the H5N1 virus does not spread easily from birds to infect humans. WHO advises countries experiencing outbreaks in poultry to follow certain precautions, particularly during culling operations, and to monitor persons with a possible exposure

history for fever or respiratory symptoms. The early symptoms of H5N1 infection mimic those of many other common respiratory illnesses, meaning that false alarms are likely. The WHO level of pandemic alert remains unchanged at phase 3: a virus new to humans is causing infections, but does not spread easily from one person to another. WHO continues to recommend that travellers to areas experiencing outbreaks of highly pathogenic H5N1 in poultry should avoid contact with live animal markets and poultry farms. Large amounts of the virus are known to be excreted in the droppings from infected birds. Populations in affected countries are advised to avoid contact with dead migratory birds or wild birds showing signs of disease. Direct contact with infected poultry, or surfaces and objects contaminated by their droppings, is considered the main route of human infection. Exposure risk is considered highest during slaughter, defeathering, butchering, and preparation of poultry for cooking. There is no evidence that properly cooked poultry or poultry products can be a source of infection.
Countries located along migratory routes need to be vigilant for signs of disease in wild and domestic birds. Recent events make it likely that some migratory birds are now implicated in the direct spread of the H5N1 virus in its highly pathogenic form.

8. Indonesia (10 October 2005)

The Ministry of Health in Indonesia has confirmed another human case of H5N1 avian influenza. The patient, a 21-year-old man from Lampung, Sumatra, developed symptoms on 20 September and was hospitalized on 24 September. He remains hospitalized in a stable condition. Confirmatory testing was conducted at a WHO reference laboratory in Hong Kong. Initial investigation has revealed that the man had direct exposure to diseased and dying chickens in his household shortly before the onset of illness. Contact tracing and field investigations are under way and samples have been taken to determine whether family members and other close contacts may have been infected. The man is the fifth laboratory-confirmed case of H5N1 infection in Indonesia. Three

out of the five cases were fatal.

9. Indonesia (29 September 2005)

The Ministry of Health in Indonesia has today confirmed another fatal human case of H5N1 avian influenza. The patient, a 27-year-old woman from Jakarta, developed symptoms on 17 September, was hospitalized on 19 September, and died on 26 September. Confirmatory testing was conducted at a WHO reference laboratory in Hong Kong. Initial investigation has revealed that the woman had direct contact with diseased and dying chickens in her household shortly before the onset of illness. The woman is the fourth laboratory-confirmed case of H5N1 infection in Indonesia. Three of these cases were fatal. As a result of intensified surveillance and heightened public concern, growing numbers of people with respiratory symptoms or possible exposure to the virus are being admitted to hospital for observation and, when appropriate, treatment. Until a conclusive diagnosis is made, these patients are classified by the Ministry of Health as suspect cases. While many do not have symptoms compatible with a diagnosis of H5N1 infection, screening of patient samples is being undertaken in national laboratories as part of efforts to ensure that no new cases are missed. Laboratory testing to confirm human infection with H5N1 avian influenza is technically difficult; some tests produce inconclusive or unreliable results. To ensure a reliable assessment of the situation in Indonesia, authorities are, after initial screening, continuing to send samples from people considered likely to have H5N1 infection to WHO reference laboratories for diagnostic confirmation. According to FAO, highly pathogenic H5N1 avian influenza is now endemic in poultry in many parts of Indonesia. As influenza virus activity in Indonesia may increase during the wet season, from November to April, human exposure to animal virus could be greater during the coming months. Further sporadic human cases can be anticipated.

10. Indoensia (22 September 2005)

The Ministry of Health in Indonesia has today confirmed a further human case of highly pathogenic H5N1 avian influenza. The case, in an 8-year-old boy, was confirmed as positive for H5N1 infection by a WHO reference laboratory in Hong Kong. The boy remains in hospital for observation and treatment. Current investigations in Indonesia have produced no evidence that the H5N1 virus is spreading easily from person to person.

Background on avian influenza in Indonesia**:** Since mid-2003, Indonesia has experienced outbreaks of avian influenza in its poultry population. Prior to the new case announced today, two human cases of H5N1 infection in Indonesia have been laboratory confirmed, one in July and another in September. All three cases have been investigated by the Indonesia health authorities, with WHO support, and searches for further cases have been conducted. As investigations have produced no evidence that the H5N1 virus is spreading easily from person to person, WHO has not raised its current level of pandemic alert. WHO will, however, continue to monitor the situation closely. Given the experience of other H5N1 affected countries in Asia, the detection of further human cases in Indonesia or elsewhere would not be surprising. Laboratory confirmation of cases in Indonesia has led to heightened public concern, intensified surveillance for further cases, and strengthened government commitment to contain the disease. As a result, several patients with respiratory symptoms and a history of possible exposure to the avian virus are being evaluated as part of ongoing surveillance efforts. Samples from these patients have also been sent for analysis by the WHO reference laboratory in Hong Kong.

Overall assessment: In all affected countries, most human cases of H5N1 infection have been linked to contact with poultry. In a few instances, limited human-to-human transmission of the virus may have occurred following close contact with a patient during the acute phase of illness. In all known instances, such transmission has been limited and has not led to larger outbreaks in the general community, indicating that the virus does not spread easily among people at this time. WHO has

sent all countries a document outlining recommended strategic actions for responding to the avian influenza pandemic threat. Recommended actions aim to strengthen national preparedness, reduce opportunities for a pandemic virus to emerge, improve the early warning system, and accelerate vaccine development.

11. Vietnam (19 September 2005)

The Ministry of Health in Vietnam has retrospectively confirmed an additional fatal case of H5N1 infection that dates back to July. The case, in a 35-year-old male farmer from Ben Tre Province, developed symptoms on 25 July and died on 31 July. The newly confirmed case brings the total in Vietnam since mid-December 2004 to 64 cases, of which 21 were fatal.

12. Indonesia (16 September 2005)

The Ministry of Health in Indonesia has today confirmed a fatal case of human infection with H5N1 avian influenza. The case occurred in a 37-year-old woman who resided in Jakarta. She developed symptoms on 31 August, was hospitalized on 6 September, and died on 10 September. The positive test results were received from a WHO reference laboratory in Hong Kong. The government has launched investigations, assisted by WHO, aimed at identifying the source of the woman's infection and tracing her close contacts, including family members, neighbours, and hospital staff engaged in her treatment. The woman lived in an area with multiple opportunities for exposure to chickens and ducks. No recent poultry deaths have been reported in the area. Poultry samples have been taken by agriculture authorities as part of the ongoing investigation. This is the country's second laboratory-confirmed case. In July 2005, a cluster of 3 deaths in one family was investigated. H5N1 infection was confirmed in the 38-year-old father but laboratory test results for his two daughters did not meet criteria for acute H5N1 infections. WHO reports only laboratory-confirmed cases. Investigation of the July family cluster was unable to determine the source of exposure. Testing and monitoring of more than 300 close contacts failed to detect any further cases.

13. (18 August 2005)

Beginning in late July 2005, official reports to the OIE from government authorities indicate that the H5N1 virus has expanded its geographical range. Both Russia and Kazakhstan reported outbreaks of avian influenza in poultry in late July, and confirmed H5N1 as the causative agent in early August. Deaths in migratory birds, infected with the virus, have also been reported. Outbreaks in both countries have been attributed to contact between domestic birds and wild waterfowl via shared water sources. These are the first outbreaks of highly pathogenic H5N1 avian influenza recorded in the two countries. Both countries were previously considered free of the virus. Since the initial reports, the Russian H5N1 outbreak in poultry, which has remained confined to Siberia, has spread progressively westward to affect 6 administrative regions. In Kazakhstan, several villages bordering the initial outbreak site in Siberia are now known to have experienced disease in poultry. To date, outbreaks in the two countries have involved some large farms as well as small backyard flocks, with close to 120,000 birds dead or destroyed in Russia and more than 9,000 affected in Kazakhstan. In early August, Mongolia issued an emergency report following the death of 89 migratory birds at two lakes in the northern part of the country. Avian influenza virus type A has been identified as the cause, but the virus strain has not yet been determined. Samples have been shared with WHO reference laboratories and are currently being investigated. Also in early August, an outbreak of H5N1 in poultry was detected in Tibet, China. In all of these recent outbreaks, authorities have announced control measures in line with FAO and OIE recommendations for highly pathogenic avian influenza. To date, no human cases have been detected, vigilance is high, and rumours are being investigated by local authorities. The outbreaks in Russia and Kazakhstan provide evidence that H5N1 viruses have spread beyond their initial focus in south-east Asian countries, where outbreaks are now known to have begun in mid-2003. Despite aggressive control efforts, FAO has warned that the H5N1 virus continues to be

detected in many parts of Viet Nam and Indonesia and in some parts of Cambodia, China, Thailand, and possibly also Laos. The south-east Asian outbreaks, which have resulted in the death or destruction of more than 150 million birds, have had severe consequences for agriculture and most especially for the many rural farmers who depend on small backyard flocks for income and food. Human cases, most of which have been linked to direct contact with diseased or dead poultry in rural areas, have been confirmed in four countries: Vietnam, Thailand, Cambodia, and Indonesia. Only a few instances of limited human-to-human transmission have been recorded. Poultry outbreaks of H5N1 avian influenza in Japan, Malaysia, and the Republic of Korea were successfully controlled. WHO fully agrees with FAO and OIE that control of avian influenza infection in wild bird populations is not feasible and should not be attempted. Wild waterfowl have been known for some time to be the natural reservoir of all influenza A viruses. Migratory birds can carry these viruses, in their low pathogenic form, over long distances, but do not usually develop signs of illness and only rarely die of the disease. The instances in which highly pathogenic avian influenza viruses have been detected in migratory birds are likewise rare, and the role of these birds in the spread of highly pathogenic avian influenza remains poorly understood. Very large die-offs of migratory birds from avian influenza, such as the one detected at the end of April at Qinghai Lake in central China, in which more than 6,000 birds died, are considered unusual. Research published in July indicates that H5N1 viruses in that outbreak are similar to viruses that have been circulating in south-east Asia for the last two years. Analyses of viruses from the Russian outbreak, recently published on the OIE website, show apparent similarity to viruses isolated from migratory birds during the Qinghai Lake outbreak. Specimens from the Mongolian outbreak in migratory birds should also prove useful in shedding light on these recent developments. Monitoring the spread and evolution of avian H5N1 viruses in birds and rapidly comparing these results with previously characterized H5N1 viruses is an essential activity for assessing the risk of pandemic influenza.

Implications for human health: The poultry outbreaks in Russia and Kazakhstan are caused by a virus that has repeatedly demonstrated its ability, in outbreaks in Hong Kong in 1997, in Hong Kong in 2003, and in south-east Asia since early 2004, to cross the species barrier to infect humans, causing severe disease with high fatality. A similar risk of human cases exists in areas newly affected with H5N1 disease in poultry. Experience in south-east Asia indicates that human cases of infection are rare, and that the virus does not transmit easily from poultry to humans. To date, the majority of human cases have occurred in rural areas. Most, but not all, human cases have been linked to direct exposure to dead or diseased poultry, notably during slaughtering, defeathering, and food preparation. No cases have been confirmed in poultry workers or cullers. No cases have been linked to the consumption of properly cooked poultry meat or eggs. Factors relating to poultry densities and farming systems seen in different countries may also influence the risk that human cases will occur. During a 2003 outbreak of highly pathogenic avian influenza, caused by the H7N7 strain, in the Netherlands, more than 80 cases of conjunctivitis were detected in poultry workers, cullers, and their close contacts, and one veterinarian died. That event, which was contained following the destruction of around 30 million poultry, underscores the need for newly affected countries to follow FAO/OIE/WHO recommended precautions when undertaking control measures in affected farms.

Pandemic risk assessment: The possible spread of H5N1 avian influenza to poultry in additional countries cannot be ruled out. WHO recommends heightened surveillance for outbreaks in poultry and die-offs in migratory birds, and rapid introduction of containment measures, as recommended by FAO and OIE. Heightened vigilance for cases of respiratory disease in persons with a history of exposure to infected poultry is also recommended in countries with known poultry outbreaks. The provision of clinical specimens and viruses, from humans and animals, to WHO and OIE/FAO reference laboratories allows studies that contribute to the assessment of pandemic risk and helps ensure that work towards vaccine development stays on

course. The expanding geographical presence of the virus is of concern as it creates further opportunities for human exposure. Each additional human case increases opportunities for the virus to improve its transmissibility, through either adaptive mutation or reassortment. The emergence of an H5N1 strain that is readily transmitted among humans would mark the start of a pandemic.

14. Vietnam (5 August 2005)

The Ministry of Health in Vietnam has today confirmed an additional three cases of human infection with H5N1 avian influenza. One case was reported in Ha Tay Province, one in Tra Vinh Province, and one in Ho Chi Minh City. The patients from Tra Vinh and Ho Chi Minh City died. The newly confirmed cases bring the total in Viet Nam since mid-December 2004 to 63 cases, of which 20 were fatal.

15. Indonesia (29 July 2005)

Laboratory evidence now shows that the 8-year-old girl from Tangerang, Banten Province, is a probable avian influenza A/H5 case, based on analysis of serological samples. Two WHO Reference Laboratories at the University of Hong Kong and the Centers for Disease Control and Prevention USA, detected high positive rising microneutralisation titres specific for H5N1 in 2 samples taken 3 days apart. She was the daughter of the confirmed case reported previously. Laboratory results for the 1-year-old daughter are still pending. Genotyping of the PCR-amplified isolate from the confirmed case shows high homogeneity with other H5N1 isolates from poultry in Java, and no evidence of reassortment. Extensive epidemiological and environmental studies are ongoing around this family cluster. The Minister of Agriculture stated that laboratory results detected H5-infected bird faeces in a bird cage opposite side of the road of the family's house; cloacal and throat swabs of the pet bird inside the cage were negative for H5. This is the first, and, thus far, the only, indication of a possible source of exposure. Other environmental sampling was

negative. The Ministry of Health is continuing to monitor over 300 contacts. None of the contacts have shown any symptoms to date. Seroprevalence results are still pending. Surveillance has been intensified in affected areas and throughout the country. Forty-four referral hospitals have been identified and are being prepared to receive possible cases. Health education campaigns are being conducted nationwide. The government has reinforced coordination between relevant government bodies, including the Ministries of Health and Agriculture, and is monitoring the situation in close collaboration with the World Health Organization.

16. Indonesia (21 July 2005)

The Ministry of Health in Indonesia reported that a 38-year-old father who died on 12 July was the country's first laboratory-confirmed H5N1 positive human case of avian influenza. His two daughters also died of severe pneumonia illness compatible with H5N1 infection, but laboratory confirmation is not yet available. Limited samples were available from the 8-year-old daughter who died on 14 July, and the 1-year-old daughter who died on 9 July. The 8-year-old became ill with fever, diarrhoea, then cough, on 24 June. She was brought to Siloam Gleneagles Hospital, Tangerang, on 28 June, where she died with respiratory distress 20 days after onset. The 1-year-old became ill on 29 June with fever, diarrhoea, then cough, finally respiratory distress, and died 10 days after onset. The father became ill on 2 July with fever, mild cold, then cough and was taken to the same hospital on 7 July where he died 10 days after onset. Samples from the 38-year-old tested positive for avian influenza H5N1 virus by the WHO H5 reference laboratories at the Department of Microbiology, University of Hong Kong, and the Centers for Disease Control and Prevention, Atlanta USA. Samples from the two children are undergoing testing. The remaining four residents of the house (two members of the family and two household workers) remain healthy and show no symptoms to date. The Ministry of Health is closely following over 300 contacts, including health-care workers,

family members, school and office colleagues and neighbours. None of these contacts has shown any symptoms to date. An investigation is currently underway with team members from Indonesia's Ministry of Health, Ministry of Agriculture, United States Naval Medical Research Unit 2, and WHO to identify potential sources of the infection. Serum samples have been collected from contacts of the cases, starting from the family and neighbours, health-care workers, while any possible poultry contact is being investigated (e.g. market sellers, retail food outlets, pet birds). Environmental and veterinary sampling is being carried out by the Ministry of Agriculture. Health education to hospital and other health-care workers has been continuing since January 2004, when avian influenza was first reported in Indonesia. The Ministry of Health, working with WHO has carried out seminars and workshops to strengthen surveillance of influenza-like illness, outbreak investigation, and appropriate isolation and barrier nursing. Stockpiling of personal protective equipment to protect health and veterinary workers, and procurement of antivirals for treatment and prophylaxis, as appropriate, is continuing. Information has been provided to assist the community with general health precautions, including frequent hand-washing, avoiding contact with sick animals, and safe and hygienic handling and cooking of poultry.

17. Vietnam (30 June 2005)

At the request of the Ministry of Health, WHO sent a team of international experts to Viet Nam last week to assess laboratory and epidemiological data on recent cases and determine whether the present level of pandemic alert should be increased. Team members were drawn from institutes in Australia, Canada, Hong Kong SAR, Japan, the United Kingdom, and the United States of America having extensive experience in the testing of avian influenza viruses in human clinical specimens. The team completed its work on Wednesday and submitted its preliminary findings to the government. The team found no laboratory evidence suggesting that human infections are occurring with greater frequency or that the virus

is spreading readily among humans. The current level of pandemic alert, which has been in effect since January 2004, remains unchanged. Some reports now circulating suggest that WHO has downgraded its assessment of the pandemic threat. These reports are unfounded. The experts were specifically asked to search for evidence that could substantiate concerns raised first at a WHO consultation of international experts held at the beginning of May in Manila. That consultation considered suggestive findings, largely based on epidemiological observations, that the H5N1 virus had changed its behaviour in ways consistent with an improved, though not yet efficient, ability to spread directly from one human to another. The specific epidemiological observations considered included milder disease across a broader age spectrum and a growing number of clusters of cases, closely related in time and place. More recently, testing of clinical specimens by international experts working in Viet Nam provided further suggestive evidence of more widespread infection with the virus, raising the possibility of community-acquired infection. These findings have not been confirmed by the present investigative team. Firm evidence of improved transmissibility would be grounds for moving to a higher level of pandemic alert. Because of the huge consequences of such a change, WHO is following a cautious approach that combines heightened vigilance for new cases with immediate international verification of any suggestive findings. Because the detection of H5N1 in clinical specimens is technically challenging and prone to errors, members of the investigative team took sophisticated laboratory equipment with them to Hanoi for on-site testing. Tests were performed using WHO-approved reagents and primers. While these first results are reassuring, further retesting of clinical specimens will continue over the next few weeks to provide the most reliable possible foundation for risk assessment.

18. Vietnam (28 June 2005)

The Ministry of Health in Vietnam has confirmed an additional case of human infection with H5N1 avian influenza. The case occurred in the northern province of Ha Tay in May 2005. The newly confirmed case brings the total, in Viet Nam, since

mid-December 2004 to 60 cases, of which 18 were fatal. Four patients are undergoing treatment at a hospital in Hanoi.

19. Vietnam (17 June 2005)
The Ministry of Health in Vietnam has today confirmed that between 1 to 17 June, 4 cases of human infection with H5N1 avian influenza were reported. Two of the patients are from Hanoi and one is from the nearby province of Hai Duong. The fourth patient is from the central province of Nghe An. All 4 of the patients are alive. At present, a total of 7 patients are being treated for H5N1 avian influenza at a hospital in Hanoi. These newly confirmed cases bring the total, in Viet Nam, since mid-December 2004 to 59 cases, of which 18 were fatal.

20. Vietnam (16 June 2005)
WHO is aware of media reports that six additional patients infected with H5N1 avian influenza are undergoing treatment in a Hanoi hospital and that a health care worker at the same hospital may also be infected. While these reports have not yet been officially confirmed by national authorities, they appear to be accurate. WHO is seeking confirmation and further information from the Ministry of Health.

21. Vietnam (14 June 2005)
The Ministry of Health in Vietnam has confirmed an additional 3 human cases of infection with H5N1 avian influenza. The cases were detected during the last two weeks of May. All three patients are from Hanoi and remain alive. No further data about these cases have been provided. The newly confirmed cases bring the total, in Viet Nam, since mid-December 2004 to 55 cases. Of these patients, 18 have died and three are currently undergoing treatment at a hospital in Hanoi.

22. Vietnam (8 June 2005)
The Ministry of Health in Vietnam has confirmed an additional 3 human cases of infection with H5N1 avian influenza. The most recently detected case was reported on 26 April. In the same communication, an additional death from the disease was

confirmed. No further data about these cases have been provided. The newly confirmed cases bring the total, in Vietnam, since mid-December 2004 to 52 cases. Of these patients, 18 have died and two are currently being treated in hospital.

23. (19 May 2005)
WHO is updating its table showing cumulative numbers of human cases of H5N1 avian influenza broken down according to phases in the outbreak, which began in December 2003. Numbers for Vietnam, where the vast majority of recent cases have occurred, have been amended in line with case counts provided by the Ministry of Health during late April and May. Since the third wave of infection began in Vietnam in mid-December 2004, 49 cases have been reported. Of these cases, 17 were fatal. The most recent case was reported to the ministry on 17 April. WHO has asked the Ministry of Health in Vietnam to supplement the numbers with data on individual cases. Rapid field investigation of new cases, especially when these occur in clusters, remains essential to assess possible changes in transmission patterns that could indicate improved pandemic potential of the virus. Since January 2004, when human cases of H5N1 avian influenza were first reported in the current outbreak, 97 cases and 53 deaths have been reported in Vietnam, Thailand and Cambodia. Vietnam, with 76 cases and 37 deaths, has been the most severely affected country, followed by Thailand, with 17 cases and 12 deaths, and Cambodia, with 4 cases and 4 deaths.

24. Cambodia (4 May 2005)
The Ministry of Health in Cambodia confirmed today that a 20-year-old woman from Kampot province who died on 19 April in a hospital in Vietnam, was the country's fourth reported case of avian influenza. The woman, a secondary school student, was from Kompong Trach district in Kampot province, the same district as the first case reported from Cambodia in February. Samples taken from the woman tested positive for avian influenza A/H5 virus by the Pasteur Institute in Ho Chi Minh City, Vietnam. Staff from the

Ministry of Health, Cambodia conducted active case finding in the village where the woman attended school and also provided education sessions to the students at the school. The Ministry of Agriculture are conducting an investigation into poultry deaths in the area of the school.

25. Vietnam (14 April 2005)

The Ministry of Health in Vietnam has provided WHO with official confirmation of an additional eight human cases of H5N1 avian influenza. Two of the cases were recently detected, between 2 and 8 April, in Hung Yen and Ha Tay Provinces, respectively. Both patients are alive. The other six cases are thought to have been detected prior to 2 April. WHO is seeking further details from the authorities on this six cases. The Ministry of Health has reported to WHO that 41 cases from 18 cities and provinces have been detected in Vietnam since mid-December 2004. Of these cases, 16 have died and six remain under treatment.

26. Cambodia (12 April 2005)

The Ministry of Health in Cambodia confirmed that an 8-year-old girl from Kampot province who died on 7 April, was the country's third case of avian influenza. The girl became ill with a fever on the 29th March. Her condition deteriorated rapidly on 7 April, when she was taken to a district referral hospital and then transferred to Kuntha Bopha Hospital in Phnom Penh, where she died. Samples from the girl tested positive for avian influenza H5N1 virus at the Pasteur Institute, Phnom Penh. A field investigation was conducted immediately, with team members from the Ministry of Health, Ministry of Agriculture, WHO, Pasteur Institute and FAO. Poultry deaths occurred in this village in February, but no poultry deaths occurred in the two weeks prior to the girl's onset of symptoms. Human-to-human transmission as a source of the girl's infection appears unlikely, as none of her known contacts were sick with similar symptoms before she became ill. Investigations as to the source of the girl's infection are continuing. Samples were collected from four close contacts who cared for her at the village and nine medical contacts

from Kampot and Phnom Penh. All have tested negative for the H5N1 virus. The public education campaign in Banteay Meas and neighbouring districts is continuing. The recent funding from international donors will be crucial in helping Cambodia control this disease.

27. Vietnam (4 April 2005)

The Ministry of Health in Vietnam has confirmed five additional cases of human infection with the H5 subtype of avian influenza virus. All five cases are in a family from the northern port city of Haiphong. The cluster includes the 35-year-old father, the 33-year-old mother, and their three daughters, aged 13 years, 10 years, and 4 months. All cases in this family were hospitalized on 22 March and remain under care. Since mid-December 2004, Vietnam has reported 33 cases of H5N1 avian influenza. Of these cases, 15 have been fatal.

28. The Democratic People's Republic of Korea (30 March 2005)

On 27 March, state media in the Democratic People's Republic of Korea officially reported the country's first outbreak of avian influenza in poultry. To date, outbreaks involving large numbers of poultry have been reported at commercial poultry farms, including one in Pyongyang Province. Mass culling has been undertaken by the authorities in an effort to prevent further spread. No human cases have been reported to date. Government officials have assured WHO that all measures are being undertaken to prevent transmission to humans and to detect human cases, should they occur. The WHO country office in Pyongyang has offered direct assistance to the Ministry of Public Health in strengthening surveillance and diagnostic capacity for the detection of possible human cases. WHO has offered to send oseltamivir, an antiviral drug that can be used prophylactically, to reduce the risk of human infection and disease, as well as therapeutically. The WHO country office has further offered to supply personal protective equipment for poultry cullers. WHO is this week despatching test kits to support laboratory diagnosis of H5-subtype avian influenza in humans. Further assistance has been offered in the

form of training of local staff in laboratory diagnosis and surveillance. In monitoring the outbreak, WHO staff in Pyongyang are working closely with the FAO local and regional offices, which are also offering specialized expertise.

29. Vietnam and Cambodia (29 March 2005)

Vietnam: The Ministry of Health in Vietnam has confirmed three additional cases of human infection with H5N1 avian influenza. The cases concern a 5-year-old boy from the central province of Quang Binh, a 17-year-old girl from the northern province of Nam Dinh, and a 40-year-old woman from the northern province of Quang Ninh. The 17-year-old girl has died. An earlier case has also been confirmed. These recently confirmed cases bring the total in Vietnam since mid-December to 28. WHO is aware of reports of suspected H5 avian influenza infection in five members of a family who are presently hospitalized in the northern port city of Haiphong. These cases, which include the parents and their three young daughters, are undergoing further investigation following initial tests indicating infection with the H5 subtype of avian influenza. Reports indicate outbreaks of avian influenza in poultry in the vicinity. Field investigation of this family cluster is under way. The current outbreak of human cases in Viet Nam has included several clusters, mostly in family members, of cases closely related in time and place. Thorough investigation of all such clusters is essential to determine possible changes in the behaviour of the virus and thus support assessment of the risk of an influenza pandemic. There is currently no evidence that the H5N1 virus is spreading easily from person to person. Rapid sharing with WHO of viruses from recent clusters of cases has become increasingly important. Analysis can determine whether any significant changes in the virus have taken place and provide further support for risk assessment. Several media reports have recently covered rumours of a large outbreak of influenza-like illness in Quang Binh Province. The outbreak is presently under investigation by provincial and central health authorities. Samples have been taken for testing, and WHO is awaiting the

results. The number of cases with influenza-like illness appears much smaller than initially reported by the media.
Cambodia: The Ministry of Health in Cambodia has today confirmed the country's second human case of avian influenza. The 28-year-old man, from Kampot Province, developed symptoms on 17 March and was hospitalized in Phnom Penh on 21 March. He died on 22 March. The same day, laboratory tests by the Pasteur Institute in Phnom Penh confirmed that the man was infected with H5 avian influenza virus. The Cambodian government immediately launched an investigation to search for possible additional cases and identify possible sources of exposure to the virus. The investigation team, which is continuing its work in Kampot Province, includes Cambodian Ministry of Health and Ministry of Agricultural officials joined by staff from the WHO country office and the Pasteur Institute in Phnom Penh. FAO is assisting the investigation of animal disease. Numerous deaths among chickens in the area have been reported and samples taken from sick chickens have tested positive for avian influenza. The results from the investigation indicate the deceased man had contact with sick poultry. An 18 year-old boy initially identified as an additional suspected case has tested negative for the avian influenza virus. Samples taken from twenty seven other people, including family contacts of the confirmed case and Phnom Penh medical staff involved in his care, have all tested negative for H5 avian influenza infection. Results from a further six people from Kampot Province have also tested negative for H5 influenza virus. Cambodia's previous case, a 25-year-old woman who died in late January, was also from Kampot Province but lived in another district. The majority of poultry in Cambodia are raised in small backyard flocks in rural areas, making surveillance for outbreaks especially challenging. A campaign to educate rural populations about the dangers of contact with dead or diseased poultry is being undertaken by the government, with support from WHO.

30. Vietnam (11 March 2005)
The Ministry of Health in Vietnam has today confirmed an additional 10 cases of human infection with H5N1 avian

influenza. Today's report is an official notification to WHO of some recent cases, whose infection was detected in March, combined with retrospective notification of older cases, some of which date back to late January. Of these newly reported cases, three have been fatal. This notification of cases follows new reporting procedures established within the Ministry of Health in collaboration with WHO staff in Hanoi. Today's official report brings the total number of laboratory-confirmed cases in Viet Nam, detected since mid-December 2004, to 24. Of these, 13 have been fatal. Pending further information from the Ministry of Health, WHO will issue details showing dates of onset, outcome, and province for all 24 cases in tabular form. Full information on new cases, including those that may be closely related in time and place, is critical to ongoing assessment of the pandemic risk posed by the H5N1 virus. Rapid field investigation of each new case is essential to ensure timely detection of clusters of cases occurring in family members or health care workers. Such cases can provide the first signal that the virus is altering its behaviour in human populations and thus alert authorities to the need to intervene quickly.

Total human cases (all countries) since January 2004: The first human cases of H5N1 infection, linked to poultry outbreaks in parts of Asia that have been ongoing since December 2003, were reported in January 2004 in Vietnam and Thailand. Since then, altogether 69 cases have been reported, of which 46 were fatal. Human cases have occurred in three phases: from January through March 2004 (35 cases, 24 deaths), from August through October 2004 (9 cases, 8 deaths), and from December 2004 to the present (25 cases, 14 deaths). In the present phase, the total includes a single case in Cambodia, which was fatal, in addition to those in Viet Nam.

31. Vietnam (7 March 2005)

The Ministry of Health in Vietnam has confirmed an additional four cases of human infection with H5N1 avian influenza. Details about these four cases are as follows:

- A 21-year-old man from Thai Binh Province. He developed symptoms on 14 February and was admitted to hospital

on 20 February.

- His 14-year-old sister, also from Thai Binh Province. She developed symptoms on 21 February and was hospitalized the following day.
- A 69-year-old man, also from Thai Binh Province. He developed symptoms on 19 February, was admitted to hospital the same day, and died on 23 February.
- A 35-year-old woman from Hanoi. She developed symptoms on 18 February and was hospitalized on 24 February.

WHO continues to work closely with the Vietnamese Ministry of Health to further investigate additional cases which may have occurred since 2 February. WHO will update its cumulative list of confirmed cases accordingly. Earlier this year, staff from WHO, Japan's National Institute of Infectious Diseases in Tokyo, and Centers for Disease Control and Prevention, Atlanta, Georgia, USA, began working with health authorities in Vietnam to improve the sensitivity and reliability of laboratory diagnostic tests. This activity, which aimed to upgrade laboratory capacity and included a training component, involved the retesting in Tokyo of specimens from several persons initially classified in Vietnam in January as negative for H5N1 infection. Retesting detected H5N1 in specimens from seven persons. WHO is awaiting further details about these cases, including outcomes. Upon receipt of this information, WHO will also include these cases in the cumulative total for Vietnam. One additional case in Vietnam, dating back to February 2004, has been identified retrospectively from specimens stored as part of a study of encephalitis. H5N1 infection, which was not considered in the diagnosis of this fatal case, was identified in November 2004 when specimens were submitted to a battery of tests. Specimens collected from other patients in this study are now being systematically tested for possible H5N1 infection. Information on new cases is of greatest concern and WHO continues to gather as much data as possible on each new case. Such data are urgently needed at a time when many countries are intensifying their pandemic preparedness activities.

32. Cambodia (9 February 2005)

33. Vietnam and Cambodia (2 February 2005)

First Cambodian human case of infection with A/H5 avian influenza: The Ministry of Health in Vietnam has today reported one further laboratory confirmed case of human infection with H5 avian influenza. The 25-year-old woman was from Kampot Province in Cambodia, where she developed respiratory symptoms on 21 January 2005. She sought medical care in neighbouring Viet Nam on 27 January and died in Kien Giang Provincial hospital in Vietnam on 30 January. Tests undertaken at the Pasteur Institute, Ho Chi Minh City, Viet Nam on 1 February were positive for influenza A/H5. She is the first human case of H5 infection reported from Cambodia. A joint mission of the Cambodian Ministries of Health and of Agriculture and of WHO is in Kampot Province, investigating the circumstances surrounding this case.

Cases under investigation in Viet Nam: Three more people are reported to have died of H5N1 avian influenza in Vietnam. Among them, figure the 13-year-old and 10-year-old girls announced previously.Both children resided in different southern provinces. The third death occurred on 27 January in a man in his 30's from the northern province of Phu Tho. If confirmed by the Ministry of Health, these latest three cases will bring the total number of human H5N1 cases in Vietnam, excluding the case from Cambodia reported above, identified since mid-December to thirteen. Twelve of these cases have been fatal.

34. Vietnam (28 January 2005)

WHO has received reports that laboratory tests undertaken in Vietnam have confirmed two further cases of human infection with H5N1. WHO is seeking confirmation from the Ministry of Health. The first newly detected case is a 10-year-old girl from the southern province of Long An. She developed symptoms on 13 January, was hospitalized on 20 January, and is presently in critical condition. The second case is a 13-year-old girl from Dong Thap Province, also in the south. She developed symptoms on 20 January and was hospitalized on 22 January.

She is also critically ill. The child from Dong Thap Province is the daughter of a confirmed case announced previously. The 35-year-old mother developed symptoms on 14 January and died on 21 January. WHO understands that Vietnamese authorities are launching investigations into this newly detected family cluster. The investigation will explore possible sources of exposure and look for signs of illness in family members, other close contacts, and the general community. In view of the six-day interval between dates of symptom onset in the mother and her child, limited human-to-human transmission, as seen during similar events in the past, cannot be ruled out at this stage. All such clusters of cases, closely related in place and time, require urgent investigation to determine whether the epidemiological behaviour of the virus might be changing in ways that could favour the onset of a pandemic. If confirmed by the Ministry of Health, these latest two cases will bring the total in Viet Nam reported since mid-December to twelve. To date, nine of these cases have been fatal. WHO is again emphasizing the need for family members caring for H5N1 patients to follow recommended protective measures. Since human cases of H5N1 were first reported in January 2004, no cases have been reported in health care workers or in professionals undertaking culling activities. Their continued adherence to recommended protective measures is equally important.

35. Vietnam (26 January 2005)

The Ministry of Health in Vietnam has today reported two further laboratory confirmed cases of human infection with H5N1 avian influenza in Vietnam. The first newly reported case is a 35-year-old woman from the southern province of Dong Thap. She developed symptoms on 14 January, was admitted to hospital on 20 January, and died the following day. The second newly reported case is a 17-year-old boy from the southern province of Bac Lieu. He was hospitalized on 10 January and died on 14 January. These additional cases bring the total in Vietnam since mid-December to ten. Nine of these cases were fatal.

The recent family cluster in northern Vietnam: As announced

previously, a family cluster in northern Vietnam has been the focus of intense investigation. The cluster involves three brothers. Of these, Vietnamese authorities have identified influenza A H5 infection in two: a 46-year-old man and his 42-year old brother. The older brother developed symptoms on 26 December and died on 9 January. The younger brother was hospitalized with respiratory symptoms on 12 January and has now fully recovered. He is known to have provided bedside care for his older brother during a period of critical illness. The source of infection for the two brothers remains undetermined and investigations are ongoing. The third brother, aged 36 years, was hospitalized for observation only, did not develop symptoms, and remains in good health. Results of tests, conducted as part of the investigation, are pending. Clinical specimens for the two confirmed cases are being sent to a WHO collaborating centre for further characterization. Surveillance for further cases among health care workers, other family members, and residents in both communities where the brothers lived has so far found no evidence of additional cases. If limited human-to-human transmission has occurred, all evidence at this stage suggests that the chain of transmission ended after a single person was infected.

Preventing transmission during care by family members: Further sporadic human cases and occasional family clusters can be expected considering the current spread of outbreaks of highly pathogenic H5N1 avian influenza in poultry in some Asian countries. Experience to date indicates that possible human-to-human transmission has occurred mainly during prolonged close contact of a family member with a patient who was critically ill. WHO has issued guidance on the precautions that can be taken in health care facilities to minimize opportunities for transmission of H5N1 infection from patients to close contacts, including health care workers and family members. Rapid detection and investigation of clusters of H5N1 cases, closely related in time and place, are key surveillance activities that can provide an early alert to possible changes in the transmissibility of the virus.

36. Vietnam (21 January 2005)

Laboratory results have confirmed avian influenza infection (H5 virus subtype) in two brothers in the northern part of Viet Nam. The first case, a 46-year-old resident of Thai Binh Province, developed symptoms on 1 January. He died on 9 January. His 42-year-old brother, a resident of Hanoi, developed symptoms on 10 January, nine days after his brother fell ill. He remains hospitalized in Hanoi and is recovering. He is known to have provided bedside care for his brother, who was treated at the same hospital in Hanoi. The investigation surrounding the new cases is considering two hypotheses. The first one includes the possibility that the 42-year-old man may have acquired his infection directly from his brother. All evidence to date suggests that isolated instances of limited, unsustained human-to-human transmission can be expected from avian influenza viruses in humans. Their occurrence does not call for any change in the present level of pandemic alert. Intensified surveillance for respiratory symptoms in close contacts of the two men has been initiated in both Thai Binh Province and Hanoi and it is reassuring that no cases of respiratory illness have so far been detected among these people. Health authorities in Viet Nam have launched an immediate investigation of the source of infection in the two brothers. WHO staff in that country are being kept closely informed. The second hypothesis is focusing on a possible direct source of poultry-to-human transmission. Preliminary findings point to a family meal in which a dish containing raw duck blood and raw organs was served. Public health officials in Viet Nam have repeatedly advised against the consumption of dishes made with fresh duck blood or with raw or inadequately cooked poultry products. As a precautionary measure, similar culinary practices involving dishes containing raw poultry parts or organs should be avoided in all countries experiencing outbreaks of highly pathogenic H5N1 avian influenza in poultry. To date, most human cases linked to contact with poultry are thought to have acquired their infection following exposure to dead or diseased birds around households. Evidence suggests that particularly risky exposure occurs during the slaughter, defeathering, and preparation of

poultry for cooking. Proper cooking destroys the H5N1 virus. In general, WHO recommends that poultry should be cooked until all parts reach an internal temperature of 70°C. No cases of H5N1 infection have been linked to the consumption of thoroughly cooked poultry and egg products.
Avian influenza: food safety issues: Media reports that a third 35-year-old brother has been hospitalized have not been confirmed. These latest two cases bring the total in Vietnam since mid-December 2004 to eight. Of these, seven have died. The 18-year-old woman from Tien Giang Province, announced previously, died on 19 January.

37. Vietnam (19 January 2005)
WHO is aware of reports of a new laboratory-confirmed case of influenza A/H5 infection in a 42 year-old man from Hanoi. The patient is alive but his older brother, a 45 year-old man from Thai Binh province, fell ill in early January and subsequently died of a respiratory illness. Laboratory tests on the deceased man are reportedly negative for influenza A/H5. WHO is seeking confirmation from the Ministry of Health. The Ministry of Health is conducting epidemiological investigations into these cases and WHO will keep in close contact with the Ministry of Health over the progress and findings of these investigations.

38. Vietnam (14 January 2005)
WHO has received informal reports of two additional cases of H5N1 infection in Vietnam. The cases are an 18-year-old woman from Hau Giang Province and a 35-year-old woman from Tra Vinh Province. The 18-year-old woman was hospitalized on 1 January and died on 10 January. The 35-year old woman was hospitalized on 9 January and remains in critical condition. Both patients are from provinces in the southern part of the country, where poultry outbreaks have been reported since the beginning of December. If confirmed, these latest human cases will bring the total in Viet Nam, since mid-December 2004, to six. Of these, four have died.

39. Vietnam (6 January 2005)

WHO has received reports of laboratory tests conducted in Ho Chi Minh City, Vietnam, indicating two new human cases of infection with avian influenza. Both patients have died. Initial tests have identified the H5 subtype of avian influenza virus. Further testing is under way. The first patient was a 6-year-old boy from the southern province of Dong Thap. He died on 30 December. The second patient was a 9-year-old boy from Tra Vinh Province, also located in the southern part of the country. He was hospitalized on 2 January and died on 4 January. The additional recent case in Vietnam, reported in late December, remains hospitalized in critical condition. All three of these most recent cases have occurred in the southern part of the country, where poultry outbreaks have been recurring since December of last year. Close contacts of these cases are being monitored for any signs of illness. Health authorities in Vietnam, supported by WHO staff, have undertaken several measures to strengthen case detection. Avian influenza viruses become more active when temperatures turn cooler. Activities associated with the approach of the Lunar New Year festivities in early February may also increase the risk of further human cases.

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