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SPECIAL PRESENTATION ON CONVERGING HUMAN AND ANIMAL HEALTH EXPERTISE AND RESOURCES IN THE GLOBAL RESPONSE TO NEW AND EMERGING ZOOZOSES (AVIAN INFLUENZA AND SARS)

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SPECIAL PRESENTATION
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Thursday, 21 April 2005

Slide 1

- Thank you very much Dr Mirta Roses, Regional Director of the Pan American Health Organization, for giving me this opportunity to speak.
- I am very honoured to be able to speak in front of the Ministers of both Public Health and Agriculture from the American Region.

Slide 2

- At the beginning of 2003, as everyone still vividly remembers, SARS broke out in Asia and quickly spread around the world.
- SARS was contained in July 2003, thanks to the efforts of everyone concerned. But several months later, avian influenza broke out at an unprecedented level in Asia.
- The question, therefore, that everyone has to ask is: “Are successive outbreaks of SARS and avian influenza just a coincidence, or are there any underlying causes for these outbreaks?”
- I believe that attempting to answer this question is crucial in our joint effort to fight new emerging diseases.

Slide 3

- This slide shows the list of emerging infectious diseases from 1983 to 2003.
- You will note that globally, an average of one new infectious disease has emerged each year and that most of them are zoonoses.
- So it means that trying to answer the question of the successive outbreaks of SARS and avian influenza is, in effect, the same as trying to answer the question of whether the frequent emergence of new zoonotic diseases is coincidence or not.

Slide 4

- This is a simplified presentation of the history of infectious diseases.
- It is widely assumed that the Earth came into being 5 billion years ago, living organisms came into being about 4 billion years ago, and the rodent came into being 60 million years ago.
- Viruses came into being, maybe somewhere here, and these viruses were harboured by animals and plants.
- For example, the measles virus used to be harboured by sheep and goats.

- But it seems that the measles virus jumped from sheep and goats to humans about 8000 years ago.
- By the same token, the smallpox virus, which used to be a disease of cows and horses, jumped the species barrier and became a disease of humans 4000 years ago.
- So if scientists and journalists had been around at that time, they would have labelled measles and smallpox as new emerging zoonotic diseases.
- And recently, the HIV virus jumped from apes to humans and the lassa virus or hanta virus from rodents to humans.
- So this means that zoonoses are not only diseases of the present, but also diseases of the past.
- Since zoonotic diseases occurred in the past and are now occurring in the present, we have to assume that they will continue to occur in the future as long as there are contacts between animals and humans.
- Now, I would like to dwell on this issue a bit more by focusing on the current situation of avian influenza as a representative case of zoonotic disease.

Slide 5

- This is the avian influenza situation in Asia as of September 2004. Highlighted areas indicate the provinces where animal outbreaks occurred from January 2004 to September 2004.

Slide 6

- This slide shows confirmed human cases of avian influenza H5N1 by countries.
- Viet Nam is the country most severely affected, with 60 cases and 35 deaths.
- So far, the overall fatality rate is 66%.

Slide 7

- Why did avian influenza start in Asia?
- Of course, it is impossible to pinpoint only one factor.
- There are many factors responsible for this.
- But certainly one important factor is dense human and poultry populations living in close proximity.

Slide 8

- This shows both human population density and poultry population density.
- You will note that in Asia, in some of the European countries and in some parts of North America, population density for both humans and poultry is quite high.
- You will also note that in Africa, poultry population density is relatively sparse and that may account for lack of reported outbreaks of avian influenza in Africa.

Slide 9

- This is a closer look at the population density of both humans and poultry in Asia.
- You will note that India has a very high population density, but a less dense poultry population.
- That may be one of the reasons why India is not having serious outbreaks of avian influenza.

Slide 10

- This slide shows the relationship between poultry population density and locations where avian influenza outbreaks have occurred.
- You will note that outbreaks of avian influenza are taking place either in places with high or medium densities of poultry.
- In Europe, for example, where the poultry population density is high or medium, there have been influenza outbreaks, such as the recent occurrence in the Netherlands.
- But the situation in Europe is not as serious as in Asia.
- And one of the reasons why Europe has not had as serious a problem as Asia is that Europe has adopted more hygienic husbandry practices.

Slide 11

- This chart shows the trend of poultry production in the world. You can see that poultry production in Asia has increased most steeply, 5 times over the last 20 years.
- This also may be one of the reasons that Asia has been most severely hit.

Slide 12

- Now regarding husbandry practices in Asia, I would like to share with you my personal experience in visiting some of the backyard farms in Phnom Penh, Cambodia.
- This lady is the owner of the small-scale backyard farm that I visited, and she told me that in October of 2004 many of her chickens suddenly died.
- While I was visiting her, only a few chickens, one of which is seen in this slide, are playing around in the yard.
- She told me that most of her chickens usually move around freely, so they have had regular contact with humans and other poultry such as ducks.
- On the way back from the yard, I came across a motorcycle carrying so many chickens that I became interested in following it. We ended up in this market.
- And this lady, the owner of a market stall, is plucking the feathers of the chickens, putting her hands in the intestines and even selling the fresh blood.
- And I am sure that if the chickens were infected, she would have gotten the disease.

- And when I asked her about her knowledge of the current avian influenza problem, she said she knew nothing.
- Incidentally, we found out that this lady was the wife of the motorcycle driver we followed.
- This type of husbandry practice contributes to the outbreak of avian influenza in Asia.

Slide 13

- What we have seen so far is the background of this problem.
- Now we come to the crux of the matter: the possibility of a human influenza pandemic.
- I would like to explain why we believe that a pandemic is likely, as long as the current situation continues.
- First reason comes from a historical perspective.

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- If you look at the history of pandemics in the 20th century, we have had 3 major outbreaks.
- In 1918, there was the famous Spanish flu killing 22 million people
- Then in 1957 the Asian flu occurred, and 1 to 4 million died.
- And in 1968, Hong Kong flu killed 1 to 4 million people.
- So it means, every 30 or 40 years we have had major pandemics.
- So some people may say, the next pandemic is due.

Slide 15

- The second reason why we are concerned is that the virus has already become entrenched in Asia.

Slide 16

- The dark colour indicates provinces in Viet Nam where the outbreak of the avian influenza occurred during three separate periods of time.
- The dots indicate the human cases for these three periods.
- You can see that 16 months after the outbreak started, the virus is still circulating in Viet Nam.

Slide 17

- This slides shows cumulative human avian influenza H5N1 cases in Viet Nam for two distinct outbreaks. The first one started at the end of 2003, then the second one erupted at the end of 2004.
- You will note that second wave already outnumbered the first wave.
- And based upon our judgement, it is likely that this curve will continue to rise at least for sometime.

Slide 18

- The third reason is that the virus is very versatile and has the capacity to change from time to time.

Slide 19

- Influenza viruses have 8 segments of genes. Here different colours indicate segments from different avian influenza viruses.
- For example, the light blue indicates segments derived from the virus called H9N2.
- So it means that the virus has already undergone genetic changes within a very short period of time.
- And I would like to emphasize that for the latest human cases, those since February of this year, the clinical manifestation in infected humans has also changed compared to the previous period.

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- The clinical manifestation has changed in terms of case fatality rate (CFR). From December 2003 to March 2004, the case fatality rate was 75%.
- And from December 2004 to February 2005, CFR was 61%. But the CFR of March 2005 is down to 15%.
- This sounds like good news but that may or may not be the case. Given the presence of only mild symptoms during March, we might be missing so many real cases, which may, in turn, facilitate further transmission

Slide 21

- There are more human cases. For example, higher number of infected persons per cluster, 2 to 3 previously, now 4 to 5.
- Some cases are showing with milder symptoms.
- The virus is detected from some asymptomatic cases.
- The virus is already undergoing changes in genetic composition
- Therefore, we cannot deny the possibility that the virus has recently gained the potential for slightly higher infectivity in humans.

Slide 22

- This virus is versatile.
- We have already found this virus, H5NI, not only in chickens and ducks, but also in pigs and tigers.

Slide 23

- The fourth reason, may be one of the most important reasons, is that ducks are now behaving as silent reservoirs. This means ducks are infected but do not show symptoms; yet they can pass the virus to chickens and even humans.

Slide 24

- This is the evidence that indicates that ducks behave as silent reservoirs.
- The first piece of evidence shows that when you infect domestic ducks with H5N1 virus in laboratories, the infected ducks excrete high levels of the virus and this virus excretion lasts for a long period. But those infected ducks do not develop any symptoms. Yet, they can pass the virus to other species like chickens or humans.
- This is in sharp contrast with chickens that show symptoms. As a matter of fact, the majority of chickens die once they have become infected.
- The second piece of evidence is based upon surveys, some of which are not yet reported officially, showing almost 30% of the ducks that were tested were positive for this virus.
- And the third piece of evidence is that the virus can survive up to 6 days, at 37 centigrade, in faeces from ducks.

Slide 25

- I would like to share with you more circumstantial evidence to show that ducks are playing a role as silent reservoirs.
- The left slide shows the distribution of the chicken population and outbreaks of avian influenza.
- And the right picture shows the distribution of the duck population and avian influenza outbreaks.
- So you will note, as the right slide shows, that avian influenza outbreaks are occurring in areas where the duck population is very dense.

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- The last reason why we are concerned about a possible pandemic is that a few suspected cases of human-to-human transmission have already been reported.

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- This shows the 11 family clusters reported in Viet Nam, Cambodia and Thailand.
- And out of 11 clusters, we suspect that human-to-human transmission has occurred in 2 clusters because some of the family members never had contact with infected chickens or ducks, but they did provide very close care to the infected index case.
- Because of this history and taking into account onset dates, WHO believes that human-to-human transmission has occurred in these family clusters.

Slide 28

- It is clear that the longer the current situation persists, the greater the chance that the virus will gain the potential for efficient human-to-human transmission.
- But some people may say: "Dr Omi, compared to 1917, we have now had scientific advances, better surveillance and greater public awareness. But still, you are talking about the possibility of a human pandemic. To us you sound like an alarmist."
- Yes, you are right. Today, there are lots of positive factors compared to 1917.
- However, we have to remind ourselves that borders in Asia and elsewhere are highly porous. The cross-border movement of people, animals and goods is unprecedented.
- And what is equally troubling is that the transmission of avian influenza is focused more on small-scale farms, which makes good surveillance very difficult.

Slide 29

- Now I would like to conclude my presentation by sharing with you some recommendations for joint action by health and agriculture authorities.
- As an immediate action, I think rapid and transparent information sharing between countries, agriculture officials, health professionals and other stakeholders is crucial.
- An increase in public awareness, including among those living in backyard farms, also is very important.
- Another element involves strengthening surveillance of both humans and animals. Quick epidemiological analysis and laboratory analysis through the network is also important.

Slide 30

- And when an outbreak occurs, prompt response is crucial.
- And better preparedness for pandemics is also important. Coordinated plans of action for infection control are necessary, and vaccine development and stockpiling of antiviral drugs also are important. In addition, given the massive absenteeism a pandemic could cause, massive social disruption should be expected. Each country has to come up with contingency plans to minimize social disruption.

Slide 31

- As everyone is aware, the root cause of this infection stems from the fact that the ever-increasing demands for poultry have led to the raising and marketing of so many chickens and ducks in very unhygienic conditions. Thus, it is very important to address the root cause so that we can minimize unnecessary contact between humans and poultry.
- Therefore, in addition to immediate actions that I have just mentioned, we need to come up with mid- and long-term actions to restructure farming and market practices to address the root cause of the disease.
- The regional approach includes joint meeting of ministers of agriculture and health, the type of meeting that PAHO is having here. And I hope other regions will have similar meetings with their Ministers of Agriculture and Health.
- FAO/OIE/WHO joint strategy must be employed along the length of the production and marketing chain.
- For individual nations, a national plan must call for policy, legislation and enforcement along the length of the production and marketing chain.
- The local approach will include the improvement of farming practices, particularly in backyard farms, and the improvement of wet markets through multi-sectoral collaboration.
- Certainly, there is potential for a human pandemic. Let us work together to prevent this worse-case scenario.

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Finally, I would like to thank again Dr Mirta Roses and also the honourable Ministers of Health and Agriculture for giving me this opportunity to share our experience.

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