Keynote Address

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Health and Civilization "Challenges to fight infectious diseases in Asia"

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Good morning, ladies and gentlemen. I would like to express my sincere gratitude to the Director-General Mr. Hirai of the Bureau of Social Welfare and Public Health and all the people from Tokyo Metropolitan Government, for inviting me to this very important conference.

As introduced, I used to be a member of the Health and Medical Bureau of the Tokyo Metropolitan Government some 30 years ago.

Before that, I was studying at the Jichi Medical School and received a scholarship from the Tokyo government, so I owe a lot to them. Today, I am very happy to see the people from the Tokyo government again, and I feel like I have come back home.

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Today, I would like to give a lecture from a broader picture, under the theme of "health and civilization," about infectious diseases in Asian regions. It may not directly relate to your day-to-day work, but because this is a conference on a network for infectious disease, I would like to focus on those in Asian regions. At the same time, because the theme is a fairly large one, I would also like to cover other diseases and illness. At the end of my discussion, I would like to conclude with remarks on three of my private proposals about the way we should live in this era.

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This chart is taken from a book by an epidemiologist named Thomas McMichael. It shows that in the prehistoric era, when people were hunters and gatherers, the population density was quite low, so infectious disease rarely spread from people to people. Therefore, there were no epidemics in those eras.

However, these people started to settle into agrarian villages. Once that happened, diseases that we are aware of, such as smallpox and measles started occurring. This shows the typical example of human activities or human behavior creating a civilization or a disease. Settling into agrarian villages happened in many places throughout the world, creating civilizations such as Mesopotamia civilization and Chinese civilization. After that came the second wave, in the course of interchange among such civilizations. Diseases like smallpox traveled from Europe to Asia, or via the Silk Road.

There is one particularly interesting example, pestilence or Black Death occurred in the 6th Century in Europe. In fact, in the 14th century, this pestilence reached a peak and it is said that during this period, 30% of the population in Europe and 50% of the population in China died.

What happened as a result of such massive deaths is that it caused the downfall of Christian

power, which in those times had a great influence on various aspects of people's lives in Europe. It is said that this resulted in the Renaissance movement, both directly and indirectly. This is an example of an outbreak of a disease changing people's lives.

The third wave came in the Age of Geographical Discovery, when inter-civilization occurred across the seas. For example, diseases like smallpox crossed the ocean to America with the voyagers, or diseases like syphilis that was originally native in America went to Europe. Malaria and yellow fever were also native to Africa, but they also spread to Europe. In the past, it was mainly the disease that was transmitted. Now, in the first part of my presentation today, I would like to talk about whether we are now facing the fourth wave, and if so, what are the characteristics and what is actually happening.

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As for the fourth wave in the 21st century, as to what happened or characteristics of a civilization, the perspectives are as follows.

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Firstly, "globalization." I guess this does not need further explanation. It means the rapid transmission of people, goods and information.

Secondly, "population increase and urbanization." Actually, this conference held in this giant city today is one of the results of this trend.

Thirdly, "consuming society." In the past, people were consuming in order to survive, but now, people are consuming for the sake of consuming something. In other words, consumption itself has become an objective, creating an enormous consuming society.

And lastly, "pervasiveness of science and technology, and over-dependence on them." It is true that we are enjoying various benefits of science and technology. For example, mobile phone came out about ten years ago, but now you can hear them ringing even in rural areas of Africa.

I think these four could be the characteristics of civilization today in the fourth wave of the 21st century.

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Now let us consider diseases for a while.

Many of you must refresh your memory that back in November 2002 there was an outbreak of SARS in Guangdong Province, China. Thanks to the tremendous efforts by those involved, SARS was pretty much brought under control in July 2003. A few months later, towards the end of 2003, we had bird flu or avian influenza, with possible dangers of mass epidemic among humans. Are all these events coincidences or is there an underlying inevitability? I believe this is an issue you must all address as experts of infectious diseases.

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This shows the emergence of new infectious diseases found every year from 1957 to 2003, but if you look at it globally, surprisingly enough, there is an emergence of a new disease every year. I think this is astonishing. Of course, some infections die without any notable outbreak, while some become global issues like SARS. Furthermore, it is highly noted that most of these are what you call zoonotic diseases, or animal-derived diseases.

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Now, let's go back to the earlier question. The consecutive occurrence of SARS and avian influenza, are they coincidental? They are both originally zoonoses. So, the question of whether

the occurrence of SARS and avian influenza was coincidental can be replaced by a more universal question, such as whether zoonotic infections are coincidental. This is an important issue to consider.

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Next, let's take a look at the history of viral infection. This diagram may be overly simplified for experts like you, but it is deliberately simplified for this discussion. Suppose that the Earth was created about 4.6 billion years ago. Then there was the beginning of life, and mice and other kinds of animals emerged somewhere around this age. Although it cannot be determined precisely, viruses and microorganisms emerged at least well before humans were born. It is believed that viruses infected various animals even before humans came to existence.

For instance, it is said that measles was transmitted to humans from sheep or goats around 8,000 years ago. A little later, smallpox probably used to be infectious among cows or horses only, transmitted to humans some 4,000 years ago. HIV was the same way.

If there were mass communication media around those days 4,000 or 8,000 years ago, these diseases must have made headline news as emerging infectious diseases, and should be called zoonoses. These diseases were certainly newly emerged and zoonoses back then.

We get the impression that zoonoses and emerging infectious diseases occurred just recently, but in fact there were these kinds of infectious diseases from way before. It is just that the frequent occurrence of such diseases increased significantly due to the current civilization such as globalization.

Therefore, as long as the aforementioned four characteristics of this civilization continue, this trend will never stop. Rather, it is reasonable to think that the occurrence of emerging infectious diseases and zoonoses would continue in the future.

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Today, I would like to focus a little on avian influenza, which is one of the hottest topics in zoonoses.

I think it is important to consider why the outbreak of avian influenza and SARS as well, occurred in Asia, and not in Africa.

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The answer to the question, "Why Asia?" is complicated and it is impossible to explain everything in a single answer. However, it can be said that at least it is not completely unrelated to the population problem. This shows the world's population and this shows the density of poultries and birds around the world. As you can see in Asia and in parts of Europe, there are areas where population density is both high for poultry and human. In fact, while population density is high in Africa, the density for birds is not so high. Although there could be many other reasons, this could be one reason why there is no outbreak of avian influenza in Africa.

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Now, let's take a closer look at Asia. This is the population density in Asia, and this is for birds in Asia. As you can see, the populations are both very high. On the other hand, in India population density is high but poultry's is relatively low. As explained before with Africa, this may be one of the reasons why avian influenza is not reported much in India.

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Next, we would like to see the area of outbreaks of avian influenza. This shows where the

outbreaks occurred – it is dotted here. The green shows the poultry density. Naturally, places of avian influenza are within these areas where population density is high, or at least at a moderately high level.

As I explained before, in some parts of Europe, population density is high for both human and bird. However, compared to Asia, the frequent occurrence of bird influenza is lower in Europe, if not zero. This is probably because the method of raising birds and poultries is more hygienic in Europe than in Asia. That means Europe's system is safer against the epidemic, whereas in Asia, humans and poultry are still in close contact, causing more frequent infections. So, one of the reasons why the occurrence of avian influenza is lower in Europe than Asia may be that the way poultry is raised is more advanced in Europe.

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Another aspect is the amount of meat production in Asia. This is also very important. Chicken is shown at the top, and this is the production or you can call it consumption, in 2002. It shows that the chicken consumption in Asia increased five times in twenty years from 1980. There is no other area where production increased as rapidly as this. It means that there is a corresponding amount of consumption and the actual situation is that in order to meet this demand, there were various kinds of strain on the raising method.

Now let me wander slightly off the topic. This is my personal adventure story. This February in Ho Chi Minh City, Vietnam, WHO, FAO and OIE jointly held a meeting on avian influenza. Around that time, the first human case of avian influenza was reported in Cambodia. I was originally scheduled to come back to Manila, but when I heard the report, I changed my schedule and flew to Cambodia.

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This is a photo taken in Cambodia. I planned to stay one day in Cambodia, meet the Prime Minister and the Health Minister to discuss avian influenza, and go back to Manila. But on the morning I was scheduled to go back, the flight was at 10:00 in the morning, and I had some time before that. So, without telling the government, because I did not want to trouble the government, as they would make preparations. Without mentioning my intention, I asked whether there is a farm near Phnom Penh, the capital of Cambodia. The answer was yes, so I went there with the driver of WHO and a few other people.

This is the farm that I visited. This lady on the farm said that recently, about three months ago, there were dozens of chickens and ducks in the yard. She said that they all died suddenly, and when we went there, there were only a few of them left. This was one of the few left. Because I had to catch a plane, I was not able to stay there very long, so I thanked her and left. On the way back to the airport, on this paved main street, there was a bike in front of us; I do not know if you can see it properly, a motorcycle carrying live birds. This was pure coincidence, and although I knew I had to catch a plane, it was a really good opportunity. So I decided it did not matter if I missed the plane. You can see the flag of WHO here, where we were. This was a bit risky, but we drove up to the rider of the motorcycle and asked where he was going. He answered that he was going to the market. There was about 40 minutes left. I asked him how far it was, and he said that it was about five kilometers, so I asked the driver to follow this man. Although we started from a paved road, the road became more deserted, and I had to get out of the car and walk the final stage. This is the market that we arrived at. It was an open market, selling vegetables, fish, and various

things. And this lady, without wearing gloves, pulls the feathers out of the bird with her hand, and puts her finger into the bird's anus, holding the intestines. You can see fresh blood here. And people were buying these chickens.

In other words, if these birds were infected, the disease would be transmitted to them. I asked this lady, "There is an outbreak of a disease called avian influenza in Thailand, Vietnam, and other countries. Did you know that?" She said she did not know at all.

This story was in Cambodia, but I believe there are similar situations in many other places in Asia as well. When I was about to go home, the man who was riding the motorcycle came over. The man and this lady turned out to be a married couple. Now, this shows where the difficulty of the problem lies.

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Maybe you have all already heard this, but I keep saying that there is a danger that avian flu will be transmitted to humans, and will be a major outbreak involving all of mankind. I hear some people criticizing me that I am inciting unnecessary fear among people. However, let me give you five major reasons.

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The first reason is "historical facts." I am sure you are all aware of this, but the flu pandemic occurs periodically, like Spanish flu in 1918, Asian flu in 1957, and Hong Kong flu in 1968. There is an occurrence about every 30 or 40 years. Mathematically speaking, it is about time the next one occurs.

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The second reason is the "localization and expansion of virus in Asia." This is the state of avian influenza occurrence in Vietnam. There is a slight difference in the covered period, from December 2004 to March next year, from July 2004 to October, and from December 2004 to March next year. However, you can see from the evidence here that although location is slightly changing, the outbreak continued to occur since December 2003, and has localized.

Also, the period is divided into two phases. The one shown in light blue is from December 2003 to March 2005, and the one shown in yellow is after that period to now. It shows that the disease not only localized but is also gradually spreading to Russia and Kazakhstan.

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The third factor is the "increase in cases of transmission to humans and suspected cases of human-to-human transmission." This shows the total number of infected people in Vietnam, Cambodia, and Thailand. Here is the period from December 2003, and then there was an interval before starting in late 2004 to come this way again. It is possible it will come this way again. What I wanted to say is that, the peak was relatively low last year, but this year has increased. Just talking about Vietnam alone, the total for the first half of this year exceeded last year's total.

These are the human cases, and most of them were transmitted from infected birds. There are only three possible cases of human-to-human transmission. Even so, the number of cases is increasing not only for transmission from poultry to humans but also for human-to-human cases.

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The fourth factor is the "mutation of virus itself." The avian flu virus is very unstable, very easy to mutate and therefore difficult to predict. The virus changes frequently depending on the infected body, such as various kinds of birds, goose and others, which all have slightly different genes.

However, it was recently found that the genes are combined in various different ways and occurring in a very short period. At the same time, mutation is found for a single gene as well. In other words, the mixing of two different things are combining into one, and at the same time, mutation within the single gene is occurring. This virus changes very rapidly and significantly within a short period. It is clear that this is an unstable virus that is prone to change, at least at the laboratory level.

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Actually, it is not only at the laboratory level, but there are already evidence found in fields. You may already know this, but in May in Qingdao, China, influenza was found among migrant birds, killing more than 6,000. Usually migrant birds, as they migrate, fly with viruses but they themselves do not have the disease. However, in this case they died, which shows a change from the virological change I explained before. What was already proven in the laboratory is actually occurring in the fields.

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The Qingdao province I explained before is around here, and from various evidences, we can assume that the disease is spreading via birds' migrating route.

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The fifth reason, which is also important, is the latent infection amongst waterfowl such as ducks. In the case of chickens, when they are infected, most of them show symptoms and die. However with ducks, that is not necessarily the case. This is proven only at the laboratory level, but according to experiments, when ducks are infected with virus, a large amount of virus is excreted. The excretion period is also long. For example in Thailand, it was found out that about 30% of the ducks were positive for H5N1. Experiments show that this virus survives in the duck feces for more than six days. If they show symptoms, then you can see that they are infected, but actually they are spreading the disease without anybody knowing. This makes the problem even more difficult.

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I will show you one of the evidences supporting this. This shows the chicken population density and this is for ducks. This is where the density is highest for chicken. But in reality, avian flu occurs in this area so they do not completely correspond. However, with ducks, this point is within the area where the density is high, so the correlation is stronger than that for chickens.

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In this context, WHO is telling various nations and cities to be prepared because there is the possibility there may be a major outbreak globally. Of course, we are not saying that it is sure to occur, but it can happen anytime. When I say this, some people criticize me as being an alarmist such as "you are inciting unnecessary fear", or "you are warning over excessively." Well, it is true that the outbreak may never occur, but as a person in charge of this region in WHO, I think this data should be disclosed. However, there are some people in mass media, and even in the government, say that I am exaggerating. Well, I partly understand what they say.

That is because the current situation is largely different from the Spanish flu outbreak back in 1918. We have more advanced treatment skills, including diagnostic technology and vaccine. So one of the reasons is that we cannot say it will become like the past.

The second reason is that although we do have

some difficulties with surveillance, conditions are much better compared to 1918 because we have Internet, mobile phones, and faxes, so people say that you do not have to worry as much. That is also true.

The third reason they give is the experience from SARS. They say that we learnt how to cope with this kind of situation from SARS, so it is saying too much that one must prepare for the crisis that may not occur at all. They do have a point. However, at the same time, as I have just showed, humans move but birds are also moving at a scale incomparable to before. Actually there are no longer borders in Asian regions. If you think about it, I fear that the worst aspects surpass the better ones I mentioned before.

Another point of concern is, as I told in my personal experience, avian influenza is found in the small farms. While we do have experiences with SARS, that was basically a disease in metropolitan areas. It was an urban disease that may spread in large hospitals. On the other hand, avian influenza is basically a rural disease, which may breakout in regions without enough human resources or established systems. That is why you cannot feel reassured with only experiences from SARS. With SARS, only the Health Department in the Ministry of Health of each country was in charge. However, with avian influenza, the situation is different. Of course the Ministry of Health is involved but so is the Ministry of Agriculture, and those people may not have the same level of experience as those in the Health Ministry.

I cannot say which country but when I have opportunities to talk to government officials, people in the Ministry of Health have a real sense of the crisis, but those in the Ministry of Agriculture do not feel the urgency. They can understand in their heads what we say, but they cannot feel it in their hearts. That is because they do not have the experience. Needless to say, I personally never want to see a global pandemic happen. However, if they ask me whether there is a possibility, I must say, "yes" from the reasons mentioned here. There are adverse opinions, as I just explained, so I have to talk about this.

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We have come this far so is it possible to prevent the pandemic? I keep saying this, but we have to look at the situation from two sides. From one side, there is still a way to prevent the pandemic; we can do it, if we try. Trying as hard as we can but at the same time, from the other view, let's be prepared for the worst. It is called a two-pronged approach. We definitely need this kind of two-sided strategy. If we take measures from one side only, it will always fail and become horrific later.

As for measures to be taken urgently to cope with avian influenza, we can say "prompt and transparent information sharing" and "enhancement of surveillance of human and animals." It is necessary to implement epidemiological and virological surveys using institute networks.

Another measure that should be taken is "measures to prevent the transmission to humans." It is important to slaughter poultry during the epidemic. I think you have already seen cases of killing birds in the infected regions, but about two years ago, WHO were saying that it is sufficient if you killed poultries. That is because we did not know about the latent infections of ducks in those days. After we found out, we realized that killing poultry is required but insufficient.

The second is immunization for birds. I am not talking about immunization for humans but for poultries and birds, which is inevitable in certain places. Well, we have many people from the

Bureau of Social Welfare and Public Health from Tokyo government, but it is unnecessary in Japan.

That is because the system is very well established in Japan and if a case occurs, there is a system to report and cope with it, and there is also compensation. There are many countries where these measures cannot be taken. Not only can they not take the measures but as I mentioned before, there are countries where viruses are already localized. So under certain conditions, immunization for poultries is inevitable. Is there someone attending this conference from Vietnam today?

Oh, I did not mean to ask you anything, but I wanted to mention that Vietnam is currently taking firm resolve to begin immunizing birds. As a representative for WHO, I want to praise this action. Of course, the immunization should be carried out properly or it would be counterproductive. If surveillance is imperfect or the quality of vaccine is bad, it will have adverse effects. So you have to fulfill certain conditions, but once these are satisfied, it will be great. We are very happy to hear that Vietnam has been implementing this in the past few months. Although it may still be difficult even after taking these measures, it is certain you will lose the fight if you do not do anything.

There is also the "improvement in sanitary conditions in poultry." This is in fact very difficult. This disease used to be seen in both urban and rural areas, such as in Thailand. But now it is mostly under control in urban areas because usually, the poultry business in urban areas is a large business, and they have money and resources to reduce the possibility of the disease being transmitted from bird to human. There are various measures they can take, for instance, they can wear gloves, or they can separate chickens from ducks. That is why occurrence is becoming much less in large-scale poultry operations in urban areas.

However, in the rural areas, as I showed in the photograph, they have very limited resources. Most of the human cases now occur in such rural areas. Poultry farming methods have to improve no matter what, especially among the average farmer in these rural areas but it is extremely difficult. It may be possible in countries like Japan, but in developing nations, and especially in the rural areas, it is difficult. For instance, you may think it is easy to make a fence separating chickens from ducks but it is very difficult to actually separate them because they are always living together. Therefore, I think this cannot be done without support from the international community.

At the same time, "thorough preparation against the pandemic" is important. I think people in the Tokyo Metropolitan Government are already considering this, but how to store vaccines and anti-virus agents strategically is an extremely important issue.

Then, how much money do we need to avoid this? I believe we need an additional 25 billion dollars. That is the amount necessary to avoid the pandemic, but once the pandemic occurs, the amount will be incomparable to this.

If pandemic really occurs, the damage would be 100 times, or maybe 1,000 times greater than this. Therefore, early investment is always fairly effective. Although I cannot say this out loud, we are now asking Europe, US and Japan for help. They have yet to make commitments but they are considering this issue very seriously. I am planning to hold a donor conference by the end of this year, in some countries in Asia, where people from Vietnam, Thailand and other member states can attend and address this problem.

[Slide No. 3 1]

I was talking about civilization and disease, and

then went on to avian influenza, so I have not mentioned much about SARS. If you talk about the relationship between civilization and SARS, if SARS was to occur in Guangdong Province in China in the 19th century, then 99 out of 100, this would have ended as an endemic disease in China. I think it would never have developed into such a large problem. Maybe a few people killed but it would have ended there.

However, in current era, due to "globalization," the disease went as far as Toronto in just a few months. So, if you look at the relation to civilization, although I mentioned previously about the pervasiveness of technology and science, and placed too much confidence on them, SARS certainly "took advantage" of a blind belief in the state-of-the-art medical technology. That is, I am certain that there are doctors, nurses or hygienists here, and the situation is the same in Japan and in other countries, but most of the doctors now are quite specialized in their narrow fields, such as cardiac surgery. Everyone is specialized and there are not many people still studying infectious or communicative diseases in universities. They are all studying molecular biology and we now have very few people trained for public health.

When we were in the midst of SARS in January, February and March 2000, the situation was already severe so we recruited many infectious disease specialists from all over the world, and dispatched them to various affected countries. However, after we dispatched them, we instantly ran out of these specialists. We had to ask the same person to go many times. It was pretty surprising. The number of specialists is already very limited. It is happening in Japan and although the US has the largest number of specialists, it is limited even in the Center for Diseases Control (CDC). In the end, we always run out of people to send.

They are dispatched to the midst of the SARS outbreak, with the disease agent still unknown, so of course they go armed, but under extreme mental pressure. They become exhausted after going. That is why it is difficult to ask them to go for about a month, come back and then go immediately to another place. But we had no choice but to ask them. This shows the lack of human resources, not of specialists from laboratories of infectious diseases, but epidemiologists who can actually work in the fields.

The situation is the same in Japan. As I have repeatedly said, infectious disease will never decrease. In that context, I hope more young doctors become interested in this area. With surgery, you can help only one person at a time, but if you become an expert in infectious diseases, your contribution can be beneficial for everybody on Earth. I got a bit sidetracked here.

The last point is "advancement in medical technology can be a factor of the spreading." This is also related to the second factor, over-dependence on technology and science. Actually, WHO does not know why SARS spread at such speeds inside a hospital. We can think up of many causes, such as the flow of people was not smooth, or outpatients mixed with SARS patients. However, one of the main reasons was endotracheal intubation. To insert a tube in the trachea to help a patient breathe is artificial respiration's latest technology.

However, when you cannot insert this tube successfully in the first try, the patient will choke. This was actually the reason the disease did not die in the early stage. In other words, if artificial respiration was not implemented, the disease may not have spread. However, nowadays in large hospital, tubes are usually inserted to patients who have difficulty in breathing, so the disease spreads. Therefore, you cannot explain if you only look at the disease. It is necessary to discuss the

problem in a broad context in relations between civilization, technology and disease.

[Slide No. 3 2]

I have talked about avian influenza and SARS, but most other diseases are also related to civilization, or the way in which people live. I will only explain this briefly, but with AIDS for example, it is related to urbanization and the development of mines and highways. It is the same with Ebola hemorrhagic fever. Tuberculosis is also related strongly to the urbanization of developing nations, where sanitary conditions in rapidly developing slums are of very poor quality. In developed nations like Japan, tuberculosis is more related to the aging society. Finally, the "drug-resistant bacteria," which you may all know, is where the overuse of drugs makes bacteria more resistant to drugs. So this is in a way, a man-made disease.

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I will now move on to the topic of civilization and disease. And here, I will talk not only about infectious diseases, but also about noninfectious diseases. This is a noninfectious disease, or we can say "disease burden". Maybe some of you in the public health area have heard of the term "DALY," which stands for "Disability-Adjusted Life Year," as written here. In other words, this is to consider the burden from diseases, not only to view death, but also that of quality of life. If you are suffering from a disease, that means you are affected in terms of quality of life as a result, mentally or physically, and that could also be a burden on society. So, DALY is an index to show how the disease is being a burden on a society. This is basically for developing nations, but infectious disease and baby delivery operations will decrease by this much in 2020, compared to 1990, even in the developing nations.

On the other hand, mental health problems, which accounted for only 9% in 1990, increased by this much. Lifestyle-related diseases also increased rapidly, so mental health problems and lifestyle-related diseases will account for about half the burden from diseases by 2020, even in developing nations. These are characteristic of the 21st century.

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Now, this vertical axis is the number of fatalities per 100,000 people. On the left shows 1993 to 1997, and on the right, 1998 to 2002. As you can see, over a very short period, the death rate rose quite substantially. Normally, this only happens when there is a war or a natural disaster. My question for everyone is what could be the cause here?

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Actually, this was due to suicides in Japan. In Japan, with the difficult economy, unemployment is quite high. Therefore, unfortunately, we can easily explain there are so many suicides. If we look at a wider perspective, for example, countries in the South Pacific like Marshall Islands and Samoa, you may think that these countries are utopia but suicide is on the rise. On the other hand, take Finland in Europe; I have been there once, which is a welfare-oriented nation but even there, the number of suicides is growing.

If suicide is the problem only in Japan, we might explain everything is due to economic factors, and we can say that suicides will decrease if the economy improved. However, Asia is one of the regions where suicide rate is the highest. This trend was already apparent in 1999, when I took this post at the WHO. Therefore, immediately after I took office, I invited psychiatrists, psychologists, cultural anthropologists, and sociologists and epidemiologists, and other experts

from all over the world, to discuss why the suicide problem has become so grim, not only in Japan, but especially in Asia.

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They are experts, so they all looked at it from their points of expertise. Though their opinions were slightly different, they had something in common: lack of connectedness. They say that we can find this loss of the connected feeling in various parts of the society. For example, with families, which are the base of any society, family ties are breaking down. In the community, we are lacking something, like a feeling of togetherness. At the workplace, unemployment is a typical case where the lack of connectedness occurs. You can see it actually spreading to every corner of society. It was the common view by all the experts that this is the underlying basis is the reason why suicides are increasing.

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Now, I am going to deviate from the topic of healthcare a little here, but I want to talk about civilization. Everyone says that this is the "era of consumers," and not the "era of producers." However, although science and technology, medical science, and every other aspects of life have progressed, consumers are not necessarily satisfied with the level of medical services received. There could be various reasons. According to this report in the US, only about 55% of the patients are diagnosed and treated properly. That means the remaining 45% of the patients are not getting proper treatments. There is another report from the UK, indicating that 10% of patients have experienced some kind of human errors. This is a malpractice issue. I have mentioned about over-dependence on civilization, but this kind of thing is happening now.

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Here is a publication by OECD. It is a result of a survey on the patients' degree of satisfaction with the health care they receive, shown by countries. The horizontal axis is medical expenditure, showing how much money is spent per capita. The vertical axis shows the satisfaction level of patients. While the US spends the most amongst the nations in terms of health care expenditure per capita, the degree of satisfaction among patients is quite low. Japan is not spending as much as the US, but satisfaction levels are also very low. However, some of the countries in Europe are spending less or about the same as Japan, but enjoy higher patient satisfaction. That means there is something that cannot be satisfied with money. As there are many Japanese people attending here today, I think this data will be particularly helpful.

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Why are patients unsatisfied with medical service, in spite of developments of medical technology, checkups, and all sorts of instruments such as CT scans? There could be hundreds of reasons, but from a civilization point of view, there is one fundamental reason behind this. That is because healthcare, medical care and health care science have all been developed more or less into biological methodology or biomedical approach, especially in this modern era.

There are three characteristics to the biomedical approach. One is reductionism. This approach is that there is a human being and the body, and all the problems can be solved if you divide the body into organs, such as stomach or intestines, and then to tissues, then to cells, DNA, and so on until it becomes smaller and smaller.

The second characteristic is the idea that a disease always has one cause, and the disease and cause should always correspond.

The third characteristic is that in the biological method, it employs only the methods for research, experiment and study in which the objectives can be grasped objectively, quantitatively or qualitatively. Moreover, it only studies the phenomena that are suitable to those methods. In other words, only methods such as looking through the microscope, counting numbers, or objective analysis were used, and only phenomena suitable to those methods were being studied. In contrast, phenomena that cannot be measured objectively were not studied. And there was double selectivity; the first selection was methods, and the other on objectives.

Because the biomedical approach took a focused and selective method, it made an amazing contribution to medical progress, such as microbiology, histology and anatomy. The current studies in DNA and biotechnologies are the same. Therefore, it contributed greatly to medical science.

However, because of the three characteristics I just mentioned, there were pros but also cons, potentially and autogenously. As I pointed out, only those that can be observed quantitatively and qualitatively were studied, in a quantitative and qualitative manner, and areas that are unsuitable for these methods were all excluded as a subject for research. For example, psychological experiences of patients when they become ill. The patients feel anxious or fear diseases and conflicts they might have, will not appear on the results for cholesterol checkup. These factors had not been subject to study so medical students do not learn them. Because they are not learnt, they are ignored. Medical science by nature does not pay attention to these factors, so even if patients go to doctors and have their cholesterol measured, they will naturally feel dissatisfied.

Another is the over-reliance on the validity of science. Because characteristics of biomedical approach are powerful weapons, there was overconfidence that this approach could solve all sorts of problems. I am not saying that biomedical approach is not good. What I want to emphasize here is that we must be aware that the biomedical approach has some limitations. How we treat these matters out of its range should be the greatest challenge for science and technology in the 21st century.

[Slide No. 40]

Now, I have been talking for quite a while trying to explain what this fourth wave is all about. Now it should be obvious without me explaining, that there is a correlation between diseases and events. In this fourth wave, there are four events such as globalization and others. In terms of diseases, up until the third wave, it was mainly infectious diseases. In the fourth wave, non-communicable diseases, such as psychological problems and lifestyle-related diseases will become the major problem, but at the same time there is concern about infectious diseases pandemic.

I have not prepared a slide for this, but it seems I have some time left, so let me deviate from the theme again. There is another interesting data. According to the Japanese scholar who is studying diseases from the perspective of civilization history, there is a law of one quarter. This means that a major disease in a certain era kills one quarter of the entire population. Major diseases will change from time to time, such as pestilence and tuberculosis, but as I explained before, pestilence killed 30% of the population, for instance. Roughly speaking but the results in the past show that major diseases usually result in the death of a quarter of the population, about 25% or 30%.

In this fourth wave, under the usual state where there is no pandemic of infectious diseases, as I explained with DALY, lifestyle-related diseases such as diabetes and cardiac infarction,

accounts for about one forth of death. However, the rate has already been surpassed in Japan. Therefore, if there is no pandemic of infectious diseases, the greatest disease in the 21st Century will definitely be lifestyle-related and psychological diseases. However, this is a double burden for us, because a pandemic of infectious diseases may happen as well. This double burden might be the unique characteristics of the fourth wave.

[Slide No. 41]

To summarize what I have explained so far, let's think to what health hazards, such as diseases, humans have created for themselves from the beginning of the human race to today. How much they have tormented themselves, creating their own problems. This is only a personal hypothesis and nobody can really prove the degree of human involvement in health damages, but I think it will show this kind of curve.

Even at the beginning of the human race, it would be impossible that involvement by humans was zero percent. For example, in the first table that I had shown, I said that the first infectious diseases occurred because people settled and the population density increased. Infectious disease occurs depending on the increase in population density. If population density remains low, then even if the disease occurs, it does not develop into a major epidemic. When I said if SARS had occurred in the 19th Century, it would not have resulted in an epidemic, I meant this. There are two factors in determining the extent a disease spreads, namely the strength of the pathogenicity and human contact.

In such terms, by humans settling, they were involved in the emergence of diseases. So there has never been zero percent involvement. However, imagine leprosy in the times of the Old Testament and patients with tuberculosis, you can see that humans were also the victims of nature. I think the involvement of humans was quite small at first.

However, with civilization progressing, a very ironic thing happened, whereby humans suffered from something they made themselves. Man-made diseases increased. One typical example is lifestyle-related disease. People walk less because their life became more convenient. Avian influenza occurred because people started to eat chicken. It is the same with BSE. Cows are plant-eating animals, so they used to eat grass only. However, by giving them mince mutton, it resulted in the development of prion. These are all man-made diseases, rebounding to humans like a boomerang. The major trend of this era is that human involvement in diseases is gradually increasing. From a historic perspective, I think it makes this kind of curve.

[Slide No. 42]

Then if that is the case and civilization by the humans is creating diseases, what should we do? Giving up civilization and returning to primitive times is impossible from a practical standpoint. Therefore, based on the premise that we cannot go back to those times, I want to present my personal views as a basis for discussion. This is essentially an issue on how we humans live. I would like to conclude this lecture by explaining three points from this perspective.

[Slide No. 43]

The first point is preparation towards health risks that may keep increasing in the future. As I mentioned, emerging diseases and zoonotic infections can increase, but will never decrease. Therefore, for as long as the current civilization continues, we must be prepared whether we like it or not.

To that end, we must be careful that different

species, such as humans and birds, or birds and other species, do not interact more than necessary. It is very important to coexist peacefully.

In addition, there is no border for virus, microbes and bacteria. As they do not need passports, international cooperation is a matter of course and definitely necessary. I guess this is one of the reasons why many people from Asian large cities are attending today.

Also, we have to balance between individual rights and public benefits. Individual rights are becoming increasingly stronger not only in Japan but in many other countries as well. However, because there are no vaccines or medicine for new infectious diseases, if such was to occur, we only have old countermeasures from the 19th century to cope, such as isolation, tracking those who had contact with patients, and so on. That is just what we did with SARS, so the individual's freedom has to be restricted to a certain extent. Of course it is not an unconditional restriction, and individual's rights and privacy would be assured, but in order to prevent the disease from spreading further, it is inevitable to restrict individuals to a certain extent. So this means that reasonable checks and balance for individualism is necessary.

Especially in Japan, ideas like individualism and individual rights were introduced suddenly after the war, but before that, the mentality was to sacrifice oneself for the country. As I looked at how the people in Japan responded to the SARS outbreak, the impression was that it was too oriented to individualism. It does not mean that personal information should be unnecessarily disclosed but we must have balanced responses.

[Slide No. 4 4]

The second point is about establishing a new type of connectedness. I explained that there is a lack of connectedness behind mental health problems and suicides. Many of the audience here today is Japanese, so I will speak about a Japanese situation. During the Great Hanshin and Awaji Earthquake, there were impressive activities by the volunteers in Japan. Many people who are usually not interested in volunteering went to Kobe, and helped without any compensation. What that means is that in Asia and in Japan, there are many people who are willing and eager to do something good.

However, because communities are no longer functioning in Japan now, there is no system for those willing and the needs of people unless a disaster like earthquakes occurs. Of course there are political and administrative systems. The people from Tokyo government and other city governments attending today are doing their best but what they can do is a limited. Although they can draw some needs and willingness, most of them will be left out. Furthermore, because communities are weakening, it is becoming a serious problem trying to gather those willingness.

Now we are in the middle of an election in Japan, but we have one only once in few years. In this complicated and rapidly changing society, people have various needs , which cannot be entirely addressed with an election that comes only once in several years. In order to cope with this , I think it is essential to establish a new type of connectedness. Why "new"? Because we can no longer return to the rural society we had in the past. Rural societies are too cloistered, and it has an extremely old-fashioned system for monitoring each other. People became stifled and that is why they escaped to cities. Because of such history, it is unrealistic to go back to rural society. I think we need to establish a new way of interaction.

In establishing this new form of connectedness, I think the general public, especially elderly citizens, is very important. In an aging society like Japan, there are many elderly people who are retired, but who are willing and have experience.

However, those retired do not have a community they are affiliated to, because in Japan, regional communities are disappearing and people are connected only by their workplaces.

Of course scholars, NGOs, NPOs and companies are also important. Government bodies, Bureau of Social Welfare and Public Health of the Tokyo Metropolitan Government, and city administrators are also important. How can we draw new relationships among people on issues that are not governed by administration and politics? I cannot picture it myself, but we have technologies like the Internet, so we can set up a common forum to match the needs of modern age. It does not have to be a system. It can be software or a network, but it is important that we make something like that.

Considering technology advances, the community is too weak, especially in Japan, compared with other society. I have visited many different countries and I now live in the Philippines where there is a system called barangay, with communities among neighbors are still functioning well. Another factor, which is not a matter of whether it is good or bad, but they have Christianity firmly rooted into the society. While the Philippines have these two factors, Japan has neither. Viewed from outside, this lack of community is a major disadvantage for Japan. I believe that most of Japan's current weaknesses stem from here. Therefore, this can be said of other countries as well, but Japan in particular, as we have many Japanese audiences here today, common forum based on a new relationship is inevitable.

So, what exactly is a common forum? Firstly, it discusses issues from a higher dimension, not necessarily adhering to the status quo. Because competition is becoming fierce in the market economy, every sector is forced to become very shortsighted. Governments are also discussing the problems of today and tomorrow. It is the same with the ministries. Tokyo Metropolitan Government is too, and I do not know whether Governor Ishihara is going to get angry if results are not shown immediately, but it is becoming almost impossible to see matters long-term. All the politicians and administrators are becoming shortsighted, so it will be important and necessary, to establish a common forum where people who are free from the market economy to discuss issues from a long perspective.

Next, it will be necessary to pursue problems that are neglected in the existing system.

Also to create a place for social contributions and something to live for. There is a great deal of energy among volunteers in Japan, especially among young people, as we witnessed in the Hanshin-Awaji earthquake. However, there is no system to utilize that power. Organizations are too rigid, and it is a society where you have to be from a good school in order to exercise your power. Such society viewed from abroad seems very peculiar so it is essential to create a place for social contributions and something to live for.

We can also have a social movement, in terms of supplementing the excellent political and administrative systems already established. You cannot expect these things from the central government. I think you all have a rather important role as a leader in your local governments. The advantage of local governments is that they are closer to their districts and they have public health centers. I do hope that social movements begin from these local governments.

I believe that these movements will not only provide effective measures to cope with health hazards, but will also revitalize society, including Japanese society, that is now becoming introverted.

[Slide No. 4 5]

Finally, I would like to make a few remarks about the empowerment of individuals. Even when involved in common forum activities, I think ultimately that it will come back to human issues. As this is a new problem, nobody yet has a solution. Seen that way, it is necessary for people to have knowledge or skill but that is not enough. Ethics and willingness are also necessary. So total power as a whole, or you can call it human power, would be necessary.

At the same time, although this may sound kind of contradictory, I believe we also need to respect individuality and diversity. I think this is especially important in this difficult society.

And finally, although this might sound tough to anybody, I guess we all need the courage to say, "No" when necessary in this existing society. We cannot entrust everything to organizations, because it is possible that an organization may sometimes go in the wrong direction, so as an individual, we must have strong ethics or sense of responsibility to sometimes do away with already established points or to oppose authorities. At any rate, ultimately organizations are comprised of humans. I believe that this kind of human power is important in terms of human and civilization, in order for us in the future to be not crushed under the civilization we built.

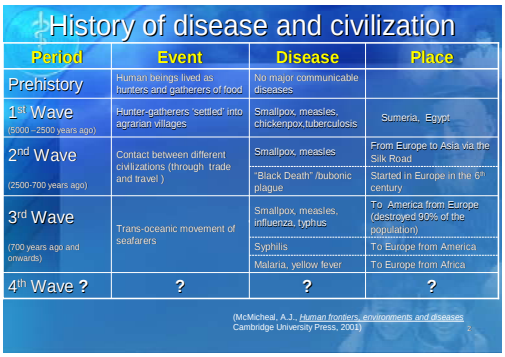
Although I spent a lot of time expressing my personal views, I hope that this may have been of some help to you.

Thank you very much for your attention. (Applause)

*This is a translated document from Japanese.

Keynote Address：
Health and Civilization “Challenge to fight infectious diseases in Asia”

【Slide No.1】



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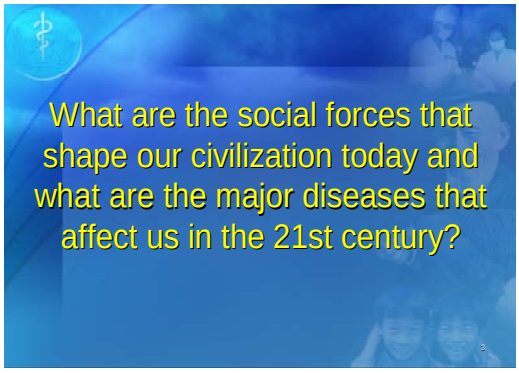

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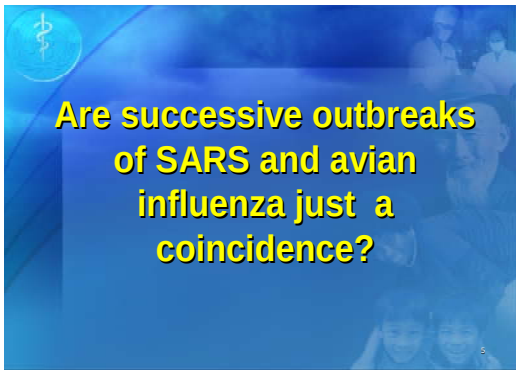

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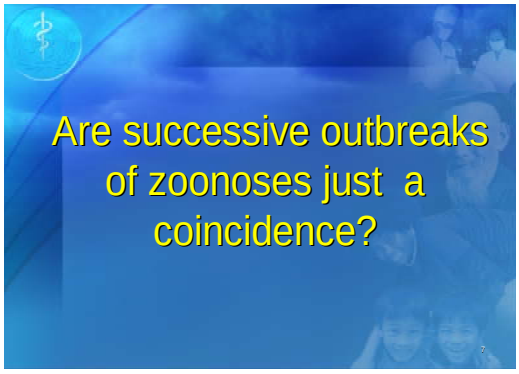

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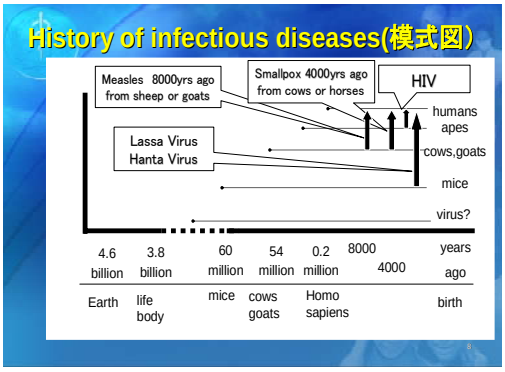

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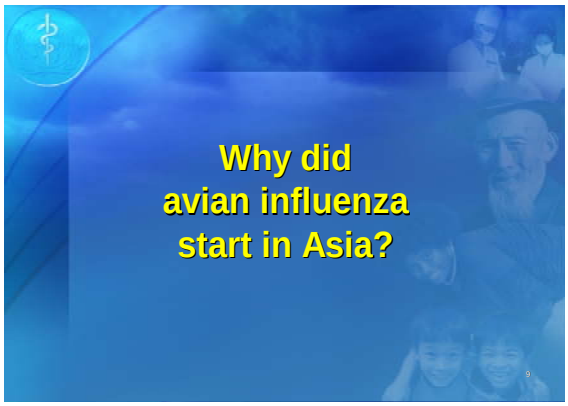

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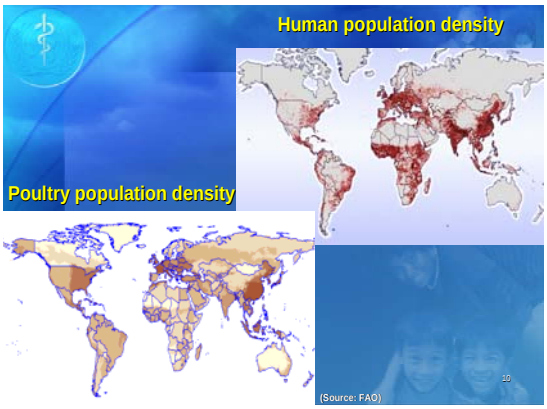

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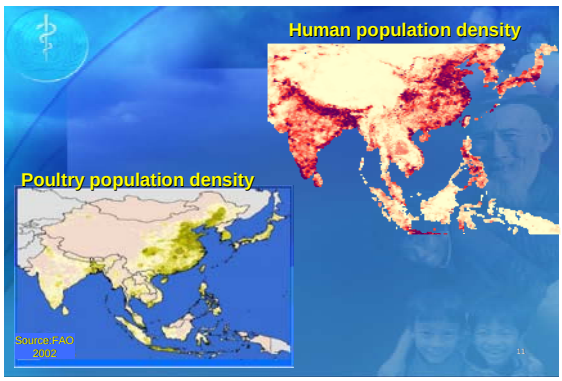

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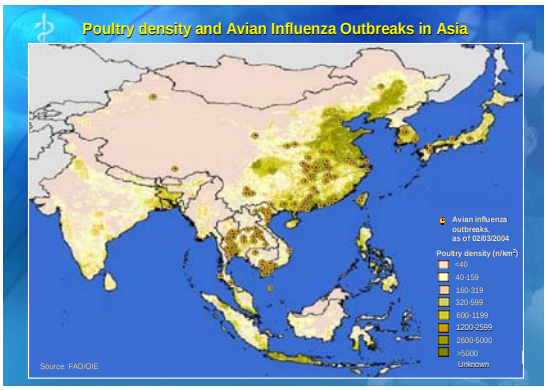

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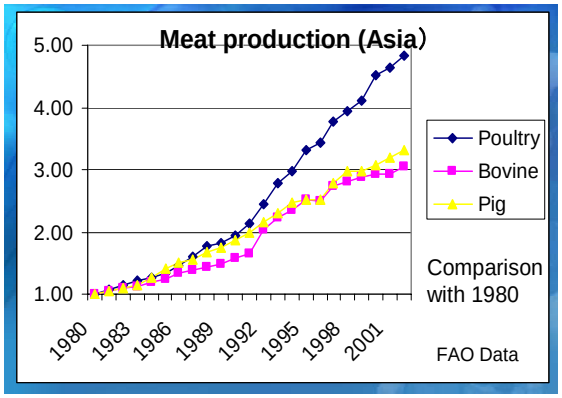

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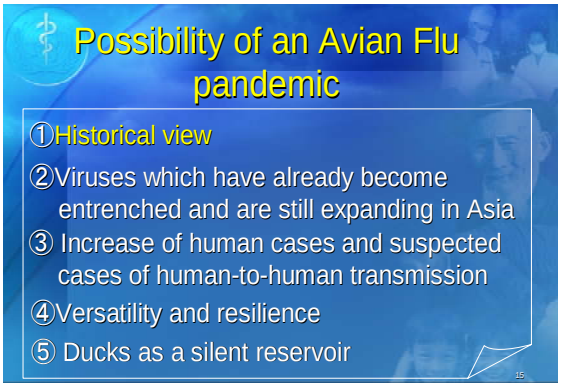

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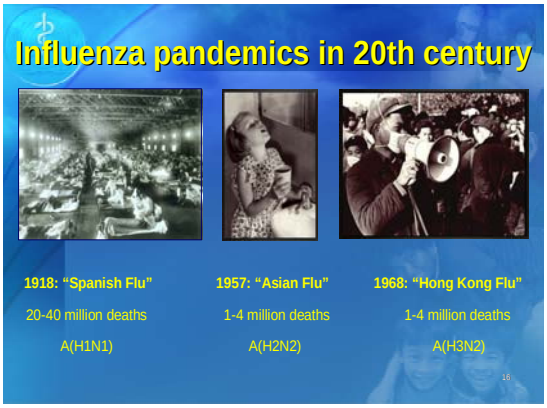
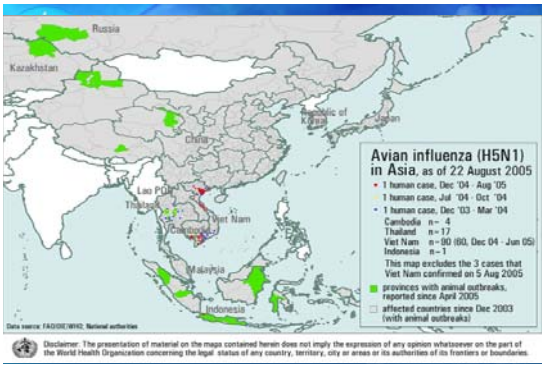


【Slide No.16】

Possibility of an Avian Flu pandemic

①Historical view
②Viruses which have already become entrenched and are still expanding in Asia
③ Increase of human cases and suspected cases of human-to-human transmission
④Versatility and resilience
⑤ Ducks as a silent reservoir

【Slide No.17】



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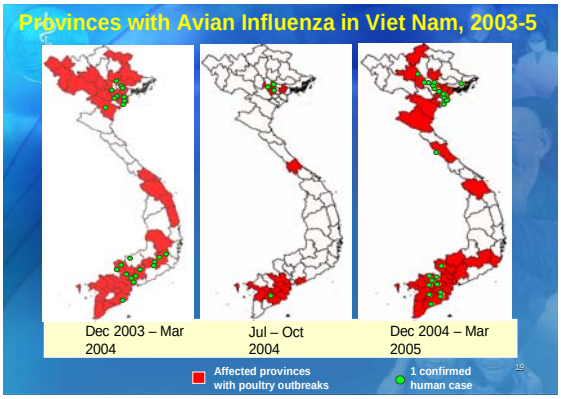


【Slide No.19】

Possibility of an Avian Flu pandemic

①Historical view
②Viruses which have already become entrenched and are still expanding in Asia
③ Increase of human cases and suspected cases of human-to-human transmission
④Versatility and resilience
⑤ Ducks as a silent reservoir

【Slide No.20】

Possibility of an Avian Flu pandemic

①Historical view
②Viruses which have already become entrenched and are still expanding in Asia
③ Increase of human cases and suspected cases of human-to-human transmission
④Versatility and resilience
⑤ Ducks as a silent reservoir

【Slide No.21】

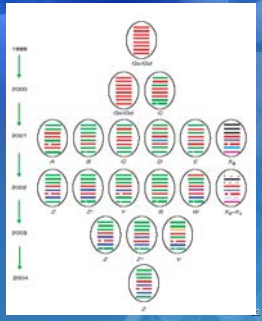
Possibility of an Avian Flu pandemic

①Historical view
②Viruses which have already become entrenched and are still expanding in Asia
③ Increase of human cases and suspected cases of human-to-human transmission
④Versatility and resilience
⑤ Ducks as a silent reservoir

【Slide No.22】

Capacity to change over time

- Genetic analyses have shown that the virus has changed significantly since 1999.

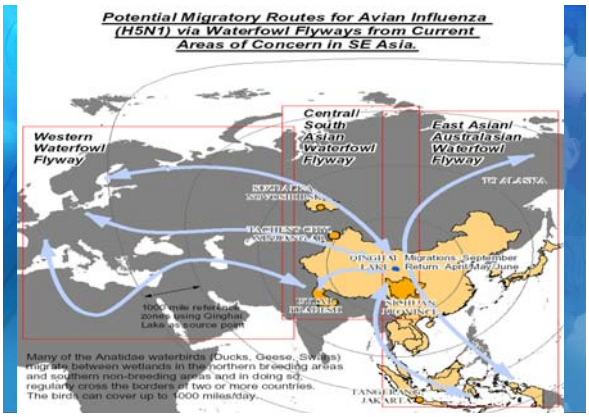


【Slide No.23】

Recent developments in the region

- **21 May 2005**: MoA, PR China reports an outbreak of H5N1 in wild birds in Qinghai Province
  - Location described as an important rendezvous of migratory birds on one of their Asia-Europe routes
  - In a press conference on May, the Ministry of Agriculture "Up to May 26 a total of over 1,000 birds have been found dead"
- **June 08 2005**: MoA, PR China reports an outbreak of H5N1 in domestic geese in Xinjiang Province
  - Total number of deaths 460 died, 13457 birds destroyed
  - ***Large scale deaths of wild migratory waterfowl due to H5N1 is highly unusual***

【Slide No24】



【Slide No.25】

Possibility of an Avian Flu pandemic

①Historical view

②Viruses which have already become entrenched and are still expanding in Asia

③ Increase of human cases and suspected cases of human-to-human transmission

④Versatility and resilience

⑤ Ducks as a silent reservoir

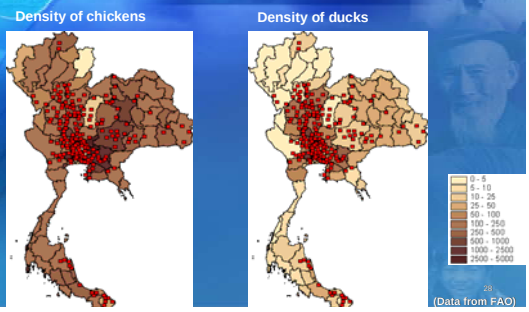
【Slide No.26】

Evidence for ducks as silent reservoirs

1. **Experimentally infected domestic ducks**
   - High level of virus excretion ($10^{3.5}$ - 10^{5})
   - Long duration of virus excretion (11-17 days)
   - No symptoms or death (sharp contrast with chickens)
2. **High prevalence in domestic ducks**
   - ~30 % positive
3. **Environmental stability**
   - Survive up to 6 days at 37 ºC in faeces from ducks

【Slide No.27】

Outbreak of avian influenza



【Slide No.28】

Advances since earlier pandemics...

- Scientific advances in diagnosis, vaccines and medical care
- Better surveillance
- Awareness better after SARS

However ...

- Borders in Asia and elsewhere are highly porous
- Cross border movement of people, animals and goods is unprecedented
- Outbreaks in small-scale farms make surveillance more difficult

【Slide No.29】

Could the Pandemic be avoided?

Immediate actions are needed

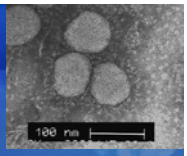
- ✓ Rapid and transparent information sharing
  - Between countries and between agriculture, health sectors
- ✓ Strengthen the surveillance of both human and animals
- ✓ Prompt response to small outbreaks
  - Culling
  - Vaccination to the poultry
  - Better animal husbandry practice
- ✓ Better preparedness for pandemic

UN asked for additional $USD 250 million to fight Avi flu,for animal husbandry practice or technical assistance in July 2005

【Slide No.30】

SARS

In the light of Civilization



- Globalization
- Too much reliance on medical technology
- Medical technology itself was one of the main factors for prevalence

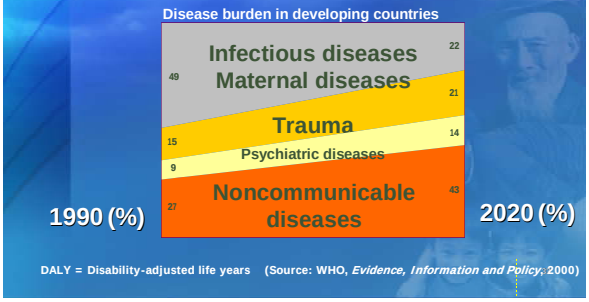
【Slide No.31】

Other infectious diseases

·AIDS	-Mining and highway -Urbanization
·Ebola Virus	-Deforestation -Unsanitary medical treatment
·Tuberculosis	- Urbanization in developing country -Ageing in developed country
·Drug resistant bacteria	- Overuse of antibiotics

【Slide No.32】

2. Increase in noncommunicable diseases



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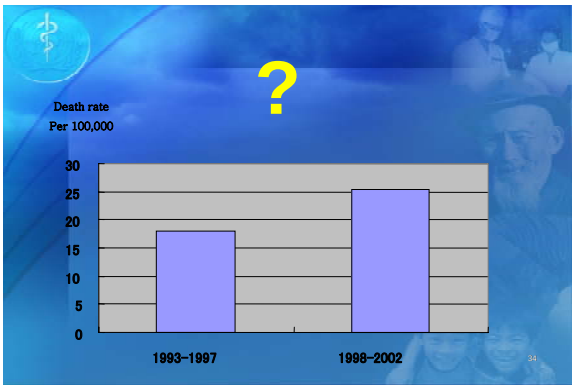

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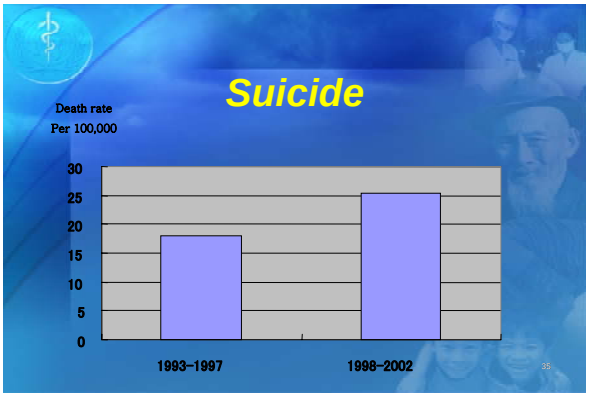

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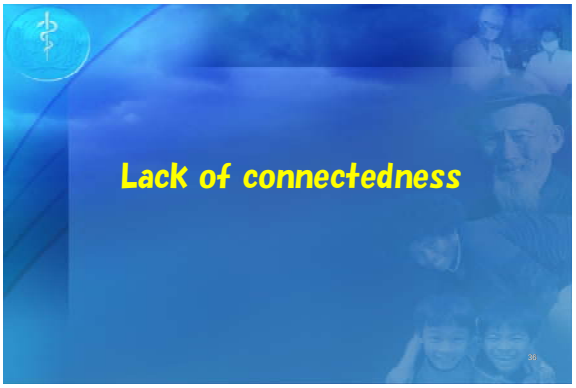

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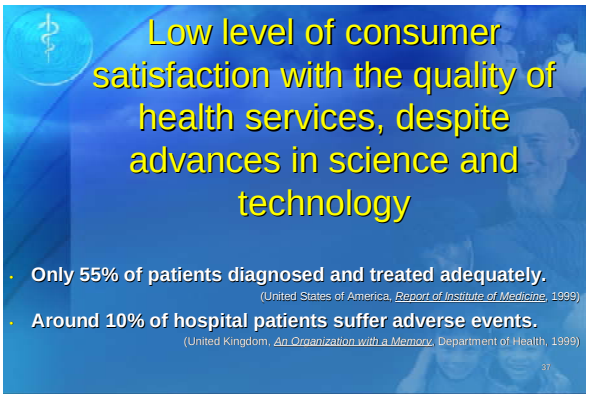

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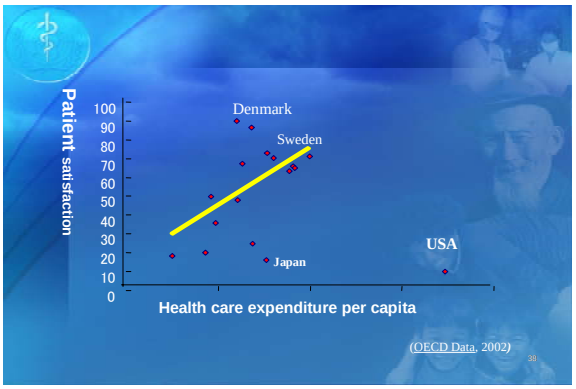

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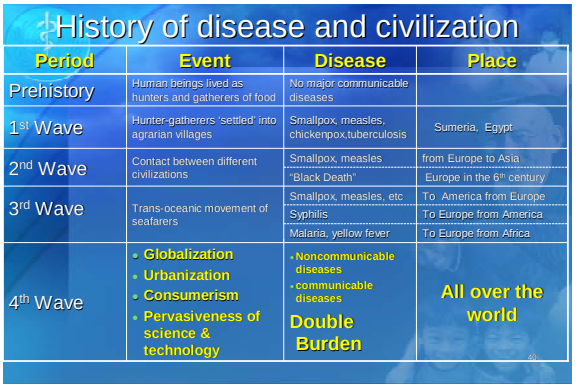
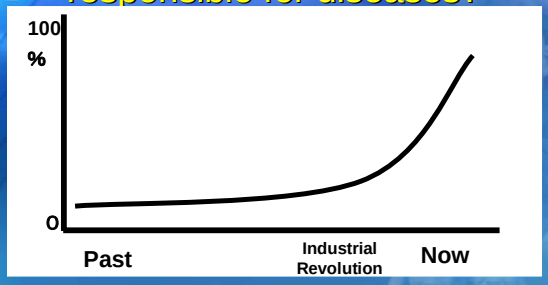
【Slide No.39】



Period	Event	Disease	Place
Prehistory	Human beings lived as hunters and gatherers of food	No major communicable diseases	
1st Wave	Hunter-gatherers 'settled' into agrarian villages	Smallpox, measles, chickenpox,tuberculosis	Sumeria, Egypt
2nd Wave	Contact between different civilizations	Smallpox, measles	from Europe to Asia
		"Black Death"	Europe in the 6th century
3rd Wave	Trans-oceanic movement of seafarers	Smallpox, measles, etc	To America from Europe
		Syphilis	To Europe from America
		Malaria, yellow fever	To Europe from Africa
4th Wave	• Globalization • Urbanization • Consumerism • Pervasiveness of science & technology	• Noncommunicable diseases • communicable diseases Double Burden	All over the world

【Slide No.40】

To what extent are human beings responsible for diseases?



【Slide No.41】

Many diseases are accelerated by civilization itself

Issue of philosophy or lifestyle of human beings

My personal point of view

1.・・・・・・・
2.・・・・・・・
3.・・・・・・・

【Slide No.42】

1. Preparations for a health crisis

- Redefine the ways in which humans co-exist with other species.
- Strengthen cross-boundary cooperation.
- Balance between individual interests and public health

【Slide No.43】

2. Reconstruction of connectedness in society

Build up a "common forum" which includes representatives of civil society, the aged, scholars, NGOs, private companies and public organizations

- Discuss issues based on long-term vision
- Take up various issues which are being neglected by existing organizations
- Stimulate the idea of social contribution or love of life
- Build up a social movement in each community
- Do not only respond effectively to a health crisis, but also revitalize the community

【Slide No.44】

3. Empowerment of individuals

- Acquire knowledge, skill and wisdom as a tool to fight new predicaments
- Nurture good emotions, which allow individuality and diversity
- Build up strong ethics with which the one is never moved by atmosphere or the one throws existent values, if necessary.

【Slide No.45】