



**Report on Wilton Park Conference WPS 06/19:
INTERNATIONAL COLLABORATION ON PLANNING FOR PANDEMICS
Thursday 2 – Sunday 5 March 2006**

EXECUTIVE SUMMARY

The conference, the first of a series of upcoming Wilton Park conferences, focused on the challenge of avian influenza, both for poultry and for people, and either as an epidemic (within a nation) or a pandemic (as a global problem). From a veterinary perspective, the pandemic is already evident, with the virus having impacted animals in 33 countries, including 20 new countries in the first two months of 2006. From a human perspective, there has been no (or very infrequent) human-to-human spread of the new virus so far. Thus we are at present confronted with an animal disease, with significant health implications for humanity. Accordingly, those who work in animal and human health need to collaborate much more closely than is normally the practice.

The great danger is that because the virus is entirely new, every person in the world is vulnerable. If the virus does change genetically into a form in which there is sustained human-to-human transmission, millions could be killed. However, there is a window of opportunity to prepare global and national public health systems for an avian influenza pandemic. No one can know when (or if) such a pandemic will occur, but we face an immediate challenge to develop our priorities locally, nationally and internationally to face avian influenza AI. Even if this pandemic in humans is averted, the planning for it will be valuable in any later pandemic, that is sure to come some time.

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THE CHALLENGE OF AVIAN INFLUENZA

1. Currently AI is present in wild birds and poultry in 33 countries, having spread to 20 new countries in the first two months of 2006. Furthermore, at the time of the conference, the virus had crossed the species barrier on numerous occasions to infect more than 174 people in 7 countries, causing 94 deaths. As no virus of the H5 sub-type has ever circulated widely in humans, vulnerability to infection with a pandemic H5 strain is universal.

2. Given the high morbidity and high mortality associated with AI, there is genuine cause for concern as to how the disease will develop in wild birds, poultry and domestic waterfowl; and in other mammals, as well as humans. Infection in mammals is worrying as it allows the avian virus to adapt to the different environment that they offer, more similar to that of humans. Pigs can harbour the virus without a severe effect on them, so enhancing the opportunity for viral evolution. However, AI has not been transmitted in a sustained fashion from human to human. Meanwhile, the disease is being spread rapidly, either by wild birds as they migrate, or by the movement of domestic poultry, as they shed the virus. The causal relationships are complex, but it may well be that there is a reservoir of infection in wild birds that has been passed to poultry, who are then further infecting wild birds. Alternatively, intensive poultry farming may itself be providing the conditions that create AI, while small backyard poultry are passing AI to their human carers and consumers.

3. Humans have a primeval fear of epidemic and pandemic disease. Pandemics have in the past killed between one quarter and one half of the world's population. As a new disease emerges, we don't know enough about what it is or how it spreads. No single institution can deal with the new disease, so we are using a patchwork of capacities around the world to try to create effective national and international responses. Too often we try to set up new systems, yet we should seek out where the gaps are in existing systems and fill those gaps.

4. Happily, for the first time in history there is a window of opportunity to prepare for a pandemic. Our central concern should be not simply to confront AI but to put in

place an international public health system that can deal with any kind of pandemic. Since 1996 there have been some 15 different viruses that have threatened humanity. Furthermore, as the last pandemic was 37 years ago, we need to develop a coherent strategy before the next pandemic begins. Effective pandemic control will require: strong national public health systems and capacity; specific preparedness for key priority disease threats (e.g. diagnostics, containment measures, therapies, vaccines); and an effective international partnership for co-ordinated alert and response.

DEVELOPING A REALISTIC STRATEGY

5. The building blocks for effective national, regional and international plans will inevitably require a multi-sector response that seeks to understand AI as a highly complex infectious disease with interlinked animal and human manifestations. While this is a scientific and biomedical challenge, there is also a challenge in the context of governance. Unfortunately, some national governments have been overwhelmed by too many assessments. Some integrated country plans are not ready, so priority actions cannot start. Effective co-ordination has often not yet taken place between donors and governments. In many countries, there is insufficient expertise and lack of resources which has led to slow policy formulation and implementation.

6. Because of these difficulties, a number of actions are necessary at the national level. National co-ordinating units need to integrate the differing health and agricultural needs. Short, medium and long-term priorities need to be set; and new programmes need to be formulated, implemented and assessed. This will not be easy, but it should be possible given extensive pooling of experience, sharing of databases and sharing of best practice on communications campaigns. Co-ordinated multi-donor funding is going to be essential, because the greatest protection against AI for any country will be for every country and regional and international agency to try to contain AI at its source wherever in the world that may be. This priority will be hard for governments to adopt due to the demand for scarce resources to be devoted to their own populations. There is a strong case, however, that its adoption would be in the enlightened self-interest of each country involved.

THE UNITED NATIONS AND THE FOUR SISTERS

7. Stopping AI at its source requires proactive prevention and containment, as well as extensive financial and human investment. The United Nations itself, in its many manifestations, is often a catalyst and facilitator, but rarely a donor. Tackling the task of encouraging co-ordination within countries, between countries, and among agencies are “the four sisters”- the World Health Organisation (WHO), the Food and Agricultural Organisation (FAO), the Organisation for Animal Health (OIE) and the World Bank.

8. The Department of Epidemic and Pandemic Alert Response within the World Health Organisation (WHO) has proposed five key strategic actions: reduce human exposure to H5N1; strengthen the early warning system; intensify rapid containment operations; build capacity to cope with a pandemic; and co-ordinate global science and research including acceleration of vaccine development and expansion of production capacity. What is essential is sustained and effective global scientific co-ordination and knowledge management in a highly interdisciplinary manner. In the context of human health, WHO with its vast array of programmes and offices throughout the world is a key organisation, while FAO has an important role especially in food safety and security.

9. In the context of animal health, both OIE and the Animal Health Service of FAO, which work together closely, have been stressing that a high viral load in animals will lead to a higher risk of reassortment of the current H5N1 virus into a new virus capable of sustained human-to-human transmission. Already, the avian pandemic has now spread across Asia and reached Europe and Africa. This recent spread has been by a new, but remarkably stable, strain that first appeared in migrating birds near Quinhai Lake in central China. Good tools to combat the pandemic exist, but these must be significantly improved. A key to curbing the disease spreading among poultry is to develop a stronger veterinary service, but if individual nations are unable or unwilling to make the necessary investment in veterinary services and surveillance the consequences could be disastrous. In the light of the failure of many countries to face this veterinary challenge fully, there is now greater worry about a possible human pandemic.

10. Technical people can establish guidelines and principles of what should happen, but whether the proposed actions actually happen depends on decisions by leaders at national level. In the short term, the need is for urgent support for surveillance of and response to animal disease, improved bio-security and handling of sick birds, urgent upgrading of public health systems (including laboratories) and increased global supply and access to human antivirals and vaccines. In the long term, radical reforms are required in the poultry sector, veterinary systems and public health systems. The emerging issues are intensely political and involve significant questions of equity among nations and among different groups of people within each nation. The key challenge is for the international community to maintain solidarity, while harmonizing a multiplicity of funding sources.

11. If a human pandemic does occur, it is going to be very difficult indeed to assure access to food, keep systems of trade going, and ensure the survival of effective patterns of banking, fuel, utilities and security, while maintaining human rights. The dangers of economic and social collapse in specific countries, and in interactions among nations are real. Although \$1.9 billion was pledged at a UN-sponsored conference in Beijing in January 2006, much of that funding is loans, and many of the pledges still need to be turned into actual donations.

AI IN ASIA

12. The current confrontation with AI began and continues in Southeast Asia. There are significant conflicts - between industrial interests and health, between household farming and export-driven industry, between the need for transparency and the desire to keep secret information that is not favourable to the image of a country. Remarkably, both Vietnam and Thailand have been able to eradicate AI from both their human and animal populations during the last few months, enabling them to obtain WHO certificates of freedom from AI. Last year few "experts" would have predicted such an outcome in the two countries with the largest number of AI related deaths, (56 of the 74 reported in the three years from 2003 to 2005). Success has only been achieved by extensive culling (i.e. killing) of millions of poultry, draconian government initiatives and effective public education campaigns.

While some might claim that AI was presently being confronted by a combination of cover-up and culling, such a cynical judgment would not be justified in view of the genuine efforts that are taking place to strengthen surveillance, research and development, village health workers and regional and international collaboration.

13. The experience of Hong Kong with the Severe Acute Respiratory Syndrome (SARS) epidemic in 2003 provided helpful knowledge about how to contain future pandemics. It should be noted that SARS is a disease in which symptoms appear several days before a person becomes a carrier, so that isolation and contact tracing are challenging but possible. In contrast, a person with AI can infect others before the person shows any visible symptoms of the illness, so isolation and contact tracing are far more difficult than with SARS. Nevertheless, much of the experience with SARS is relevant to containing AI, especially in the context of the size of area that should be subject to geographical targeting in giving antiviral prophylaxis to humans, while either culling or vaccinating poultry.

14. In Hong Kong, AI surveillance systems have been developed both for humans and for wild birds and poultry. For humans, statutory notifications are required for H5, H7 and H9 strains of AI; laboratory facilities have been expanded significantly; and there is extensive surveillance in place at both public and private GPs, hospitals, elderly homes and childcare centres. At the same time, thousands of samples are being taken for AI surveillance from local farms, imported poultry, retail and wholesale markets, pet birds, park birds and wild birds. The fact that SARS spread initially in a public hospital and that 23 per cent of all SARS cases in Hong Kong were healthcare workers has focused attention on the importance of hospital procedures and hygiene, as well as the protection of health workers. The discharge of elderly hospital patients to long-term care facilities also proved problematic because such discharges spread the SARS virus. Therefore, Hong Kong hospitals have vastly increased the number of their isolation beds, while changing their ventilation design and bed spacing, as well as stockpiling antiviral drugs.

15. The question of whether quarantine is going to work when confronted with a pandemic has been carefully considered in Hong Kong. There is significant public

support for quarantine, because of scientific evidence, public concern about the spread of the disease, and media attention on the need for quarantine. However, there is some uncertainty on quarantine effectiveness because of the possible infringement of civil liberties, stigmatisation of those quarantined, driving people underground, and the question of how long to sustain a quarantine. Balancing the two sides of the argument requires study of the legal basis of quarantine, the care provided at home and in various facilities, the enforcement procedures, a viable communication strategy, and the determination of an appropriate discontinuation point for any quarantines.

16. Although the answers are not fully known, there is enough understanding about pandemics to pose key questions: To what extent can pharmacological and non-pharmacological measures slow the progression of a pandemic? Can we detect the first cases early enough? What are the best possible measures of infection control to prevent amplification of AI in healthcare facilities? Can effective contact tracing and quarantines be implemented with sufficient legal justification, public support and relevant logistics? Are exit and entry screening at airports and borders worth the resources? Are real-time systems (with people who know how to use them) available to report information at the majority of healthcare facilities? What can be done to educate the public about the impossibility of a health authority “controlling” a flu pandemic?

AI IN EUROPE

17. The European experience of AI is greater than many realise, because there were large outbreaks of highly pathogenic A1 (although not H5N1) in Italy in 1999/2000 and in the Netherlands, Belgium and Germany in 2003. Extensive use was made of the emergency legal powers of the European Commission to enable member states to have a sound legal base on which to tackle AI. As a result of this earlier experience, member states are now required by the European Union (EU) to identify AI high risk areas, to prevent contact between wild and domestic species, and to put in place early detection and prompt reporting of AI. These required actions on surveillance and bio-security have also been linked to explicit disease

control measures, including a 3 kilometre protection zone and a 10 KM surveillance zone around any place where infected birds or poultry have been found. Furthermore, legislation is being harmonised on animal health and food safety throughout the member states of the EU; and the importance of creating trust among the national laboratories has been recognised.

18. While some stress how slow Europe has been to respond to the threat of AI, others point to how much is being done. Whether one considers the proverbial glass as half-full or half-empty, it is clear that Europe now views AI as a major challenge for the veterinary authorities and for the poultry sector. There is a realistic awareness that in both the short (and probably also medium) term the problem can only be contained, but not eliminated. However, it is hoped that a concerted effort to limit the spread of AI in poultry farms will reduce significantly the risk for public health. These hopes are certainly warranted, but whether they will be fulfilled may depend upon what is done throughout the world to improve national AI plans and regional co-operation.

PANDEMIC PREPAREDNESS PLANS

19. Plans have now been prepared by 144 countries, but unfortunately many of these plans are little more than paper because integrated responses have not been developed or tested, either within different government departments or among nations. As noted above in the context of developing a realistic strategy, the at times conflicting perspectives of departments of health and agriculture need to be resolved before there can be an effective national plan. Throughout the world there is a need to develop surge capacity (the ability to face the sudden development of AI in either wild birds, poultry, other animals, especially pigs and carnivores, or humans in a particular country).

20. How national plans should be improved is a matter largely for each country, because they will develop, own and implement their own plans. International and regional groups can and should provide both technical and financial assistance. Four key principles to consider in developing national plans are: to build up existing

national systems, seeking outside advice, but not relying on outside agencies to eliminate AI; improve partnerships between animal and public health personnel and agencies, actively seeking cross-communication and cross-fertilisation; seek long-term sustainability for animal and public health programmes; and invest not only in preventing AI, but also in improving public health systems.

21. The Asian experience in improving national plans offers considerable wisdom for countries now being confronted with AI. For example, the Integrated Communicable Disease Information System established by the Centre for Health Protection in Hong Kong is an impressive model of how to deal with a highly complex public health threat. The work in Hong Kong is also very advanced on surge capacity - in laboratories, public hospitals, service prioritisation, designated clinics, medical manpower, the private medical sector and community reserves, antiviral stockpiles, command structures, information technology support, communication mechanisms, and research on treatment options.

22. Other Asian countries have also developed distinctive measures. In Vietnam the Deputy Prime Minister took the lead, in a country where more than 90 per cent of poultry are household, outdoor and scavenging chickens and ducks. Some 43 million chickens and ducks were culled in 3 months from among the 220 million poultry and 60 million waterfowl. Out of this experience an overall programme of restructuring the poultry industry for the period 2006-2010 has been adopted that includes a ban on keeping poultry in urban areas, as well as the requirement that poultry in small holdings must be kept in sheds or confined in fenced areas separate from human dwellings.

23. Both Vietnam and Thailand, like Hong Kong, have been declared free of AI. In Thailand, there are 800,000 village health volunteers who deal with numerous public health issues in the villages, including the rapid detection of AI in poultry. In Cambodia, Village Animal Health Workers have been selected and trained to underline the risk for both animal and human health and to convince people to be aware of this risk and to report suspected cases immediately.

IMPROVING REGIONAL CO-OPERATION

24. There are a number of operational regional (rather than global) partnerships, which include the Association of Southeast Asian Nations (ASEAN), the Asian Development Bank (ADB) and the Asian Research Partnership on Pandemic Influenza. These three quite distinct organisations are each heavily involved in trying to combat AI. Both ASEAN + 3 Emerging Infectious Diseases Programme and ASEAN Highly Pathogenic Avian Influenza (HPAI) Task Force have launched major co-ordinating programmes that seek to network and share experiences among key people in a large number of countries. The regional framework for controlling and eradicating HPAI covers eight strategic areas: disease surveillance and alert system; containment measures; stamping out policy and strategic vaccination; diagnostic capabilities; establishment of disease-free zones for recovery of export capacity; information sharing; emergency preparedness plans; and public awareness and communication. Current concerns include changing mindsets in farming and poultry management practices, promoting inter-sectoral co-ordination and planning on pandemic hazards at national and regional levels, and seeking equitable access for antivirals and vaccines.

25. ADB reports have set out three major unknowns in considering the economic impact of an AI pandemic—the magnitude and duration of the pandemic, the psychological impact resulting in loss of consumer and investor confidence; and the supply side effects, resulting from shrinkage in the work force. To a considerable extent, public policy responses will determine the extent of the economic impact on Asia, but the basic ADB research suggests that an AI pandemic could reduce Asia's growth rate to virtually zero. Unfortunately, in a severe AI outbreak there is a danger that the health systems of most countries would be overwhelmed.

26. The newest and smallest of these three regional partners, the Asian Research Partnership on Pandemic Influenza was launched in Singapore in 2005 in association with the International Development Research Centre (IDRC) in Ottawa. The central aim is to encourage a grass roots initiative in which a number of Southeast Asian work together in defining research questions, aware that 80 per

cent of all human emerging diseases are zoonoses, that is, they originate in animals. The current focus is on regional collaborative research on the impact of poultry vaccination, as well as on the environmental background and ecological conditions that promote or limit disease outbreak, such as wetlands and farming systems.

CURRENT PRIORITIES IN FACING AI

27. In a rapidly developing pandemic, it is extremely difficult to identify immediate priorities; and this decision making process will differ at the global, regional, national and local level. Perhaps it is helpful to identify briefly four key areas - two linked to humans and two to animals: vaccination for animals; compensation for loss of poultry; antivirals for humans; and vaccination for humans. Each of these areas is a matter of controversy with conflicting views.

28. **Vaccination for animals:** Controversy in this area is very heated because those in favour of vaccinating animals and those opposed are each convinced they are right. The World Organisation for Animal Health (OIE) supports “the use of vaccination if appropriate,” but there is no agreement on what is the meaning of “appropriate.” Large vaccination campaigns have been launched in several Asian countries, especially China and Vietnam, and the European Union has also agreed pilot programmes in the Netherlands and France. The main attraction of vaccination is the saving of animal lives and the avoidance of unnecessary culling of animals that are not infected. However, once an animal (often a chicken) is vaccinated it may carry the virus without showing any symptoms of being ill; and such an animal may pass on the virus to both other animals and humans. There is then the danger that controlling an animal outbreak of AI might be more difficult because some infected animals would not show symptoms. There are extensive research investigations going on to tackle these issues, especially in terms of identifying those vaccinated animals that are carrying the virus. One possibly viable approach is to vaccinate all poultry in a “ring fence” around a particular outbreak, with some infected animals and others being killed, but the bulk of the poultry in the “ring fence” surviving, after being vaccinated. A further consideration is that many countries will not accept vaccinated poultry, so if an exporting country chose to vaccinate all its poultry, the export market

would immediately be severely diminished, as only cooked chicken could be exported. Alternatively, if all countries decided to vaccinate, and those poultry that were vaccinated and had AI could be identified, then it might be possible to re-establish an export market in frozen, uncooked chicken. Although occasional vaccination of wild birds might take place for research purposes, extensive vaccinations of wild birds are not logistically feasible.

29. **Compensation for loss of poultry:** How much to offer farmers for their diseased poultry is not yet clear. If too high a sum is declared, too many healthy poultry will be presented for compensation, requiring extensive testing. On the other hand, if considerably less than the commercial value of the poultry is offered by a national government, then farmers will not readily bring forward their sick poultry. Somewhere between 50 per cent to 75 per cent of the value of poultry is viewed as possible, but there are certain situations such as in Thailand with its 13 million fighting cocks for which the Government cannot offer full compensation. In many countries, the funds are simply not available for significant compensation. Such a global policy would be valuable in mitigating the impact of AI in poultry, containing outbreaks as quickly as possible.

30. **Antivirals for humans:** The WHO has advised that “stockpiling drugs in advance is presently the only way to ensure that sufficient supplies are available at the time of a pandemic;” and global, regional and national stockpiles are now operational. However, the capacity of pharmaceutical firms to produce antivirals is subject to a long time scale so surge production is not an option. Whether or not those firms with patents will permit other manufactures to make the relevant drugs, as well as the conditions and financial arrangements attached to such arrangements has been a subject of much debate. A further issue (linked to costs and expiry dates) is the question of whether the bulk raw material or finished product should be considered in supply planning.

31. Attention has focused on the oseltamivir produced and marketed as Tamiflu by Roche. Many North American and European countries have placed orders to protect their populations. Roche has donated a total of five million treatments to the

WHO, three as a rapid response stockpile and two as a regional stockpile, but there is still a need for further discussion on how to provide those countries where the pandemic does begin with sufficient supplies, especially because those countries who hold large antiviral stocks have not indicated a willingness to share their stockpiles; and the wealthy countries have already placed orders for oseltamivir for many years to come. In order to further increase the ability for governments to stockpile antivirals for a pandemic Roche has scaled up the production of Tamiflu to 400 million treatments annually by the end of 2006 and granted sub-licenses to 3 generic companies for the manufacture of oseltamivir primarily for the developing world.

32. Experience in China, Vietnam and Turkey confirms that Tamiflu is less effective if not taken within 48 hours of the onset of AI. Moreover, taking Tamiflu for prophylactic purposes when there has been no exposure to AI is inappropriate and might seriously compromise the later effectiveness of the drug for that person. There is the further problem that currently available stocks of Tamiflu are too limited to enable health workers to take the drug for long periods of time.

33. **Vaccination for humans:** There is presently no vaccine for AI. There are vaccines for “ordinary” seasonal flu that are produced and used each year for the current genetic variants of the virus, but these will be no direct defence against AI. However, people who work with poultry should be protected against seasonal flu to reduce the simultaneous infection with AI that would allow genetic reassortment between the two viruses and hence a greater risk to the general population. Because viruses are constantly changing, the precise virus that may attack the human population will need to be identified fully before reliable production of the necessary vaccine can begin. At present, a vaccine for the current genetic variant of H5N1 can be made but it is unlikely to be effective against the variant of any pandemic in humans. Therefore, it is essential that national, regional and international laboratories work together closely to identify any mutations that are occurring in the H5N1 (or any other) AI virus.

34. “Bench work” in the lab is an essential step in confronting an AI pandemic. Once a new virus has been identified, an estimate of three to six months is the minimum time that would be required to develop a new vaccine, using the existing techniques where the vaccine is produced by incubated eggs. It was noted that the supply of eggs could be jeopardised by AI. Potential methods for more rapid production, on a cellular or molecular basis, are being investigated and doing this should be a top priority. Clearly, a vaccine will not be available for the first wave of an AI pandemic; and there is the further possibility (hopefully unlikely) that there might be further changes in the virus which would necessitate the development of a new vaccine.

35. There is also another important research priority--to identify the lowest possible level of antigen (i.e. the protein of the virus that stimulates the body's immune system to produce antibodies) that would be effective in combating AI, because the lower the level of antigen used for each patient the greater the number of treatments that could be produced. In view of the extensive research and development necessary to produce a new human vaccine, it is clear that if the present H5N1 virus does change genetically into a form in which there is extensive human-to-human transmission, a vaccine will not be immediately available.

EDUCATING THE PUBLIC

36. Many of the more than 20 presentations at this conference focused on issues linked to educating the public. In the midst of the need to integrate veterinary and human health perspectives, there is a further challenge: to communicate to the wider public, as well as to specific groups of key workers, what behaviour is appropriate and inappropriate in the face of either an animal and/or a human AI pandemic.

37. As long as the current pandemic is confined to poultry, it is largely animals rather than humans that are threatened with illness and death. Only poultry workers and those who come into direct contact with diseased poultry and wild birds are under threat. There is a question about whether some poultry (especially if

vaccinated) or other animals (such as some wild birds, pigs and cats) can become important carriers of AI without showing symptoms of the disease. If this does prove to be a reality, the problem of containing AI in the animal reservoir is going to be extremely difficult.

38. Nevertheless, people do need to understand that at the present time AI is essentially an animal disease that threatens animals, not humans who have minimal contact with animals. It is also entirely safe to eat well cooked chicken, especially from countries where there has been minimal experience of AI in poultry or where AI has been brought under control. Understanding these basic facts widely is a major educational priority because AI in animals is likely to be a worldwide phenomenon for years to come.

39. Educating the public about both the dangers of human AI, as well as how to avoid it, is an even greater challenge than understanding the intricacies of how AI is affecting the animals of the world. Certain principles are clear: everyone is at risk; good hygiene is essential; unnecessary travel and attendance at social gatherings should be severely restricted. However, even these basic principles need to be interpreted with common sense, avoiding both ignorance and panic. We need to learn to wash our hands, as well as clean door handles and taps, far more carefully. Our attitude to travel, especially the confined space inherent in air travel, will have to change, even though this would have drastic economic implications for airlines in particular and the world economy in general.

40. Should a person feel ill and suspect AI is the cause, then the sensible, indeed the only ethically acceptable practice, is to stay home. Voluntary quarantine is the best possible action to conserve one's own energy and to prevent spreading AI more widely. Having made the decision to stay home, the person experiencing AI should know how to obtain and take antivirals (if they are available, and which might be delivered by post!) twice a day for 5 days. If the condition worsens, then possible hospitalisation will need to be considered (if sufficient beds are available in isolation wards).

41. Communicating these perspectives in national educational campaigns has already begun, with some governments already poised to deliver leaflets by post door-to-door and mount sustained information campaigns in the public media. However, there are a number of issues on which democratic governments can not order people as to what should be done. If, or when, a human pandemic does strike, it will move in recurring waves, so local communities and individuals will need to decide how to respond. Although government guidelines would be given, many local decisions would need to be made quickly, for instance about when to close schools and universities.

42. This question of closing schools is of particular significance because recent research suggests that children may spread AI as readily as other infectious diseases. Since there will be no vaccines immediately available for AI, the disease would spread rapidly. Understandably, even if schools did not close, parents in many areas would keep their children at home and stay at home with them. It is debatable whether many essential services (including health services, public utilities and the “just-in-time” supply chain network, especially food delivery) could be maintained. For example, in the United Kingdom 50% of health workers have school-age children, so if a significant number of those workers chose to stay at home with their children (whether or not the schools were closed) the effectiveness of the health services would be seriously compromised.

43. There would be further national decisions to be taken on exit and entry screening at airports and borders, the wearing of facemasks, and which gatherings to cancel. Developing extensive national public education campaigns is an essential part of effective pandemic planning, but no educational campaign can change the reality that humanity is going to face if the AI virus mutates into a form that empowers sustained human-to-human transmission.

EQUITY

44. A central issue is equity. How should limited antivirals (and later, vaccines) be distributed within a country, and yet more seriously, to non-manufacturing poorer

countries who have limited facilities to produce antivirals and vaccines? This pharmaceutical conundrum is heightened by the fact that the crucial information about the make-up of the AI virus is likely to be obtained first by laboratories in the developing world, who are then being asked to pass on this information immediately to laboratories in the wealthy world who will rush to do further work to develop a vaccine. Furthermore, within the laboratories of the wealthy world, there is a disturbing concern to delay the open publication availability of data until scientific papers have been published in scientific journals.

45. Many poor countries who have supplied the information that will save millions of lives in rich countries could find that when this life or death international jostling ceases, they have a very limited supply of vaccine. Building the capacity of both antiviral and vaccine manufacturing capability has to be based on increasing government resources committed to such manufacturing. Also, pharmaceutical firms themselves must face important issues of corporate responsibility in terms of how they balance profits and human lives in the context of actual sales allocations, advance orders, licensing and especially pricing.

46. Questions of equity concern more than the production of antivirals and vaccines. In the midst of the interaction of corporate guidelines, national laws, regional co-operation and international covenants, questions about maintaining human rights, natural justice and altruism will inevitably arise. The uses of wealth, the dangers of poverty, the research/production/distribution of antivirals and vaccines, as well as intensive poultry farming, backyard farms and the killing of animals, will all come under close scrutiny in the preparation for and possible experience of an AI pandemic.

47. However complex issues surrounding equity are resolved, the reality is that the animal AI pandemic is already upon us. It has posed a great challenge to the veterinary, poultry, ornithological and farming communities. Two hundred million or more poultry and wild birds have already died or been killed, and the appropriateness of vaccination has still to be resolved. There is a possibility that high viral load in animals might lead to a higher risk of reassortment in a pandemic

virus. Therefore, it is essential both for animal and human health to contain the current animal AI pandemic.

CONCLUSIONS

48. Confronting AI will be a long haul, with no shortcuts. Although funds might be available, each country needs to get its own act together, integrating health and non-health perspectives. Significantly, there is a real opportunity to raise the generic capacity of national, regional and international public health systems, not only for AI but for all diseases. It is essential to build and use an integrated communicable disease information system, modelled on Hong Kong's experience, but gathering global data to guide global policy. The media could be used for public education, but we need first for the media to understand the scientific background to AI and what can and can not be done in pandemic planning. In effect, we are selling health with a message that matters.

49. In seeking international solidarity and avoiding "me first" behaviour, we should consider what international architecture is necessary to make this solidarity possible in the pre-pandemic period on the one level, and during a pandemic on the other hand. On the technical side, more rapid research and development is essential to create the necessary vaccines for both animals and humans, and produce them on the huge scale that will be needed. A crucial issue is determining priorities in the context of equity, both within and among nations. The very idea of a "national infrastructure" as a priority for allocation of scarce antivirals and vaccines may prove to be impractical because of the complexity and difficulty of targeting specific groups of individuals. Regional and international training exercises could be helpful in order to confront major social and political problems. The integration of pandemic preparedness plans is essential (both within individual countries, among neighbouring countries and with regional and international agencies) if optimum collaboration is to be achieved before and during a pandemic outbreak.

50. Many countries will wish to revise their national plans, as further information and funds became available. While international agencies could express good will and offer technical and funding support, when the pandemic begins each country will

be on its own, so the importance of national security, rather than cost effectiveness, might become paramount. We will need to work closely with other countries, especially those on our borders.

51. There are large gaps in knowledge, with a significant absence of data in some fields, so effective leadership and support for operational research is essential to fill these knowledge gaps. No country was fully prepared for AI, and we should admit this openly in a spirit of transparency.

52. Arguably, health security should be an even higher priority than national security? A human pandemic appears increasingly likely because viruses mutate so readily. The comment of Edgar Marcuse of the University of Washington School of Medicine has been widely reported: “The pandemic clock is ticking - we just don’t know what time it is.” With the recent increase in the rate of spread of AI the total population of the virus in the world has grown dramatically, and with it the opportunity for mutation and evolution. However, it is impossible to predict definitively if or when an AI human pandemic will begin. It is possible that the genetic change for human to human transmission will not occur; it is also quite likely that mutation will lead to a less lethal virus. If a human AI pandemic does begin, the number of human deaths will depend on the virulence of the new virus, as well as how prepared we are.

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March 2006

Wilton Park Reports are brief summaries of the main points and conclusions of a conference. The reports reflect rapporteurs’ personal interpretations of the proceedings – as such they do not constitute any institutional policy of Wilton Park or of the organisations associated with the conference, and nor do they necessarily represent the views of rapporteurs.