

Chapter 1

The international response to avian influenza: Science, policy and politics

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[a] Introduction

On 11 June 2008 another outbreak of highly pathogenic avian influenza (H5N1) was reported in Hong Kong – the site of the first reported human deaths from this virus in 1997. Media reports portrayed the possibility of a major catastrophe. Anxious citizens stopped eating chicken. With China hosting the Olympics in a matter of weeks, concerns were raised in the highest circles about the consequences of an outbreak – for world profile and for business. Politicians wanted firm action. On 20 June, officials proposed a package of US\$128 million for market restructuring which would put the small-scale poultry sector and wet markets out of business. Traders rejected the proposal, and many consumers argued that the alternative frozen supermarket chickens are not what they want. Others argued that attempts at regulating imports and banning wet markets are futile. Informal, unregulated trade abounds, and with South China being a known, if poorly reported, hot spot of avian influenza virus circulation, the chances of keeping Hong Kong free of the disease are very small indeed. Yet, sceptics argued that the proposed measures were more about political grandstanding and public relations than sensible, science-based control policies. The net consequences for farmers', traders' and poorer consumers' livelihoods will be negative, they argued, with only the well-connected large suppliers and supermarkets benefiting. But, given the fears around viral mutation into a form capable of efficient human-to-human transmission, others conclude that precaution, even if drastic, is the most appropriate route.¹

Less than a year later, swine flu hit the media headlines. Again an influenza virus – this time H1N1 – was threatening human health, and there was the potential for a major human pandemic. On 30 April 2009, Britons woke up to the headlines 'Swine flu: the whole of humanity is under threat'.² Reporting the warnings of Margaret Chan, the Director General of the Geneva-based World Health Organization (WHO), the media had a field day. Outbreaks in Mexico, and an apparently high mortality rate, were causing grave concern. The suspected origins were pigs, although an intriguing debate ensued about the naming of the virus with the World Organization for Animal Health (OIE), and the Chief Veterinarian of the UN's Food and Agriculture Organization (FAO) arguing that swine flu was the wrong name because the virus affecting humans and had not been isolated in pigs.³ Subsequent genomics work showed incontrovertibly the association, and that the virus was a combination of North American and Eurasian pig viruses, combined with avian and human viral strains, however (Garten et al, 2009). Others pointed out that inadequate surveillance of animals, and poor coordination between human and animal public health authorities, was probably a large part of the reason for the lack of understanding about the emergence of the virus, and the slow response to the potential threat in Mexico (see: Anon, 2009; Butler, 2009 and Neumann et al, 2009). The politics of naming and blaming dominated the debate. In Egypt for example the authorities attempted to cull all pigs in the country, even though there had been no outbreak detected. Here politics and religion dominated science and public health concerns, and the global panic about swine flu was used for other ends. Through air travel in particular, this potentially deadly viral cocktail began to spread across the world, and in the coming weeks the WHO raised the alert levels, with an official 'phase 6' pandemic announced on 11 June 2009.⁴ Pandemic preparedness plans designed in response to the avian influenza threat had been dusted off and implemented. A huge mobilization of resources took place. Fortunately, human mortality levels outside Mexico were low, and the pandemic was mild with a low impact to date (Fraser et al, 2009). Although many pointed to the scare tactics employed by the media and complaints were made about a

disproportionate response, others observed that the risks were and are real. And in particular the potential for further genetic reassortment of the virus, mixing with strains of the bird flu virus, H5N1, remains a real concern.⁵ This may not have been the long-expected 'big one', but it had been, many commentators argued, an important precursor of something far more serious.

These examples highlight the complex trade-offs involved in policy processes around diseases that affect humans and that emerge from animals (zoonoses). These are intensely political, pitting different interests and groups of actors against each other. Public image, business interests and poor people's livelihoods are all involved in a complex mix. And the science often is so uncertain that firm decisions based on exact predictions and precise measures are impossible. Judgements – normally political judgements – are made, and these are necessarily highly contextual. Media pressure, political effectiveness, implementation capacity and geopolitical positioning all come into the picture.

Thus, in order to understand the politics of the international policy response to avian influenza – and indeed any other similar disease - we must explore an intersecting story of virus genetics, ecology and epidemiology with economic, political and policy machinations in a variety of places – from Hong Kong to Washington, to Jakarta, Cairo, Rome and London. This book offers one, necessarily partial and incomplete, view of the story of the avian influenza response over the last decade – and particularly the last few years when over \$2 billion of public funds have been mobilized. It focuses on the interaction of the international and national responses – in particular on Cambodia, Vietnam, Indonesia and Thailand – and asks how resilient is the disease surveillance and response system that has been built for avian influenza or indeed other emerging diseases?

Why is this story important? In particular it is because the avian influenza story is seen by many as a 'dress rehearsal' for a major pandemic emerging from a zoonotic disease, whereby a combination of viral genetic change and ecological circumstance results in transmission of a new disease among humans, with devastating consequences. The A(H1N1) swine flu outbreaks in 2009 rang major alarm bells. Was this going to be a major pandemic with massive human mortalities? Pandemic response systems swung into action, emergency committees were established, contingency plans unfolded, stockpiles of drugs were created, and, as discussed above, the media went bezerk. But such fears are not without foundation. The 1918 human influenza pandemic killed at least 50 - 100 million people globally.⁶ Estimates for future pandemics vary widely, but a simple calculation sees three times that number given the world's increased population.⁷ And we are of course in the midst of the catastrophic pandemic of HIV/AIDS which had its origins as a zoonosis, and which, for a range of reasons, was not spotted early enough and spread widely. Between 1940 and 2004 over 300 new infectious diseases emerged, some 60 per cent of which were zoonoses from animals.⁸ That a pandemic influenza strain has not yet emerged from the H5N1 virus currently circulating, or from some combination of H5N1 and A(H1N1) - at least at the time of writing this book - is no reason for complacency. A serious influenza pandemic will happen, it is argued convincingly - some time, somewhere - and we had better be ready for it. For this reason, exploring the successes and failures of the avian influenza response to date is a crucially important task.

The avian influenza response story is especially fascinating because it offers insights into some wider dilemmas surrounding animal health, production and trade, public health, emergency responses and long-term development, and their intersection with the global governance of health. As with many high-profile policy debates, there are multiple, competing policy formulae and diverse, sometimes conflicting, intervention responses. There is a vast range of actors, associated with numerous networks, often cutting across sectoral boundaries, public/private divides and local, national and global settings. Avian influenza has caused a massive mobilization of public funds, involving numerous agencies and resulting in countless initiatives, programmes and projects. Yet there has also been often remarkable collaboration across what had previously been deep organizational and professional divides. There has also been a range of organizational innovation and experimentation. These offer important insights into what to do – and indeed what not to do – in the future. In particular, this book explores the potentials of what has been dubbed a 'One World,

One Health' approach,⁹ where human, animal and ecosystem health are integrated, through combined surveillance and response strategies.

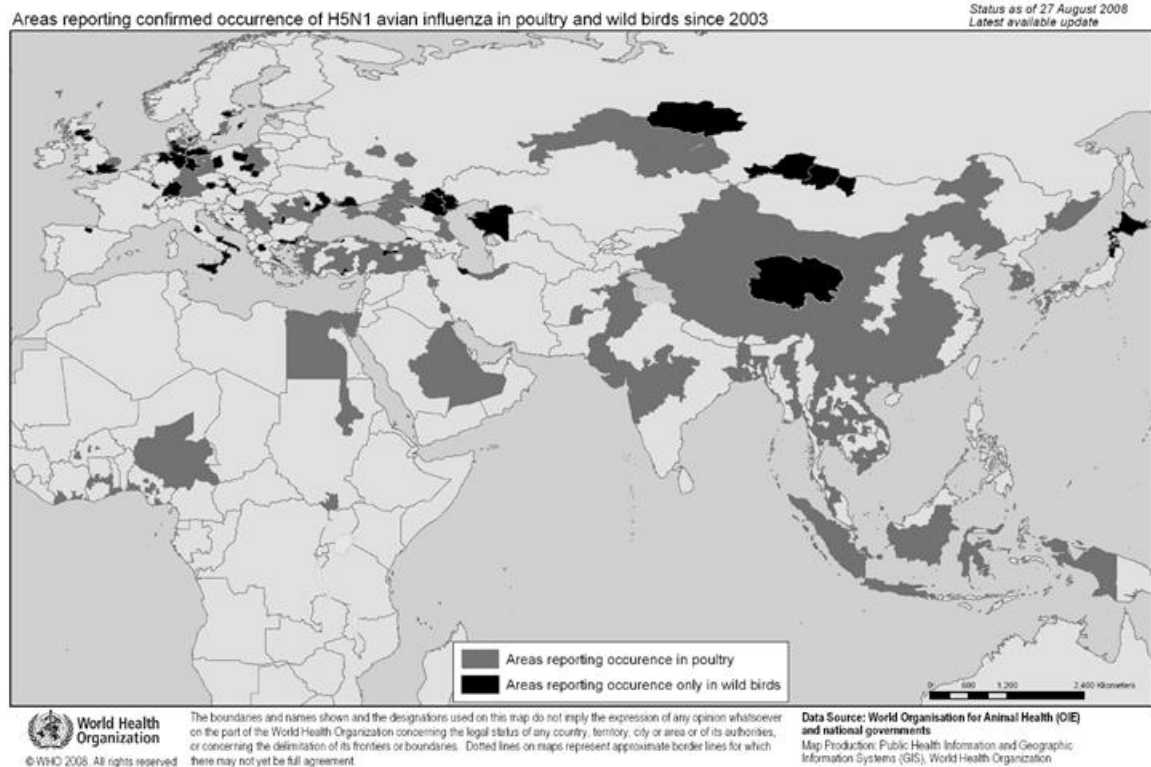
The avian influenza response thus offers some important perspectives on some of the big issues of the moment. These include, for example, how to respond to uncertain threats which have transnational implications; how to cut across the emergency-development divide, making sure crises result in longer-term responses as well as dealing with immediate needs; how to balance interests and priorities between assuring health and safety as well as sustainable livelihoods; how to operate effectively in a complex multilateral system, within and beyond the UN; what a commitment to 'security' in health and livelihoods really means in practice; and much, much more.

These are of course all massive, and highly contentious, issues, and this book will not provide any neat and tidy answers. What it aims to do instead is, through an analytical lens which looks at the politics of policy processes, shed light on these issues, sharpening the questions raised and the trade-offs implied. For, as the title of this chapter suggests, it is at the intersections of science and politics where key insights into policy are uncovered, and it is in this, often disguised, arena where some of the most important indicators as to future actions and options are found. As the global avian influenza response moves towards a bigger, overarching One World, One Health agenda proposed at the December 2007 Delhi inter-ministerial meeting and elaborated at the 2008 Sharm El-Sheikh international ministerial conference and the 2009 consultation in Winnipeg, these issues become even more pertinent. The book therefore asks: given the lessons of the international avian influenza response to date, what should be the features of an effective, equitable, accountable and resilient response infrastructure at international, national and local levels – both for avian influenza and other emerging infectious diseases? In essence, what should a One World, One Health initiative look like in practice?

[a]The international response

There has now been more than a decade of experience since the Hong Kong avian influenza H5N1 outbreak of 1997 when 18 people were infected and six died. Since 2003 262 people are reported to have died from infection with this virus across the world, with mortalities highly concentrated in a few countries, mostly in South East Asia.¹⁰ The avian virus has spread across most of Asia and Europe, with regular, usually seasonally-defined, outbreaks in poultry. In some countries – and the list varies, but always includes Indonesia, China and Egypt – the disease has become endemic among bird populations. In response to these outbreaks hundreds of millions of poultry have been culled, affecting the livelihoods and businesses of millions.¹¹ Thus, while a major human pandemic has thankfully not occurred as a result of the spread of H5N1, the disease and the consequences of the resulting policy interventions have been far reaching and, in certain contexts for certain people, dramatic. Figure 1.1 offers a map of the spread of the virus across the world.

Figure 1.1 Confirmed occurrence of H5N1 in poultry and wild birds since 2003



The H5N1 avian influenza virus – introduced in more detail in the section below - has thus had a substantial impact. How then has a miniscule virus, made up of a few strands of RNA and a protein coating which might, or might not, have a devastating impact on human populations, influenced policy and practice globally? Appendix 1 shows two timelines stretching over the period since 1997, with a number of key moments identified.

As the timelines show, biological, economic and policy processes are mutually intertwined, co-constructing the response. Epidemiological processes of spread – through wild birds, trade or poor market hygiene – are influenced by policies which result in mass culls of poultry, banning wet markets or imposing import regulations. In different settings these measures may restrict spread – or actually increase it, as they drive activities underground. What has happened in practice is highly dependent on the way different contexts affect this interplay between biology, economic interests and policy. In some parts of the world – notably in Europe, but also in Thailand, Hong Kong, and, for a time, Vietnam – policies have influenced disease incidence and spread in ways that have seen intermittent outbreaks being controlled and managed increasingly effectively. In other places, this has not been the case, and the disease has become endemic, with regular outbreaks occurring, and little likelihood of eliminating the virus.¹² In terms of the global policy response, it is the former context – of controlled virus and stamping out of intermittent outbreaks – that has dominated thinking and practice, while the latter context – of an endemic disease situation – has been largely ignored, or denied.

Concerns in many quarters rose as the disease spread from isolated outbreaks in South East Asia – first to central Asia, then to Europe and Africa. The speech by US President George Bush in September 2005 to the United Nations indicated strongly that the US was taking this very seriously.¹³ In the post 9/11 world where threats to US homeland security could arise from terrorism and infectious disease – and potentially deadly combinations of the two – the spectre of a major pandemic rang alarm bells. As a US government official put it:

In the wake of 9/11 scenario and the transformation of the institutional response capability within the US, we were looking at a sort of all hazards approach, and how the White House sees that with homeland security, it was kind of natural to see this potential threat in a broader context and to respond to it in a fairly robust manner... Also the sensitivity to criticism that came out of Katrina lent the whole White House focus a sharp edge. We don't want to be criticised like that again so we really need to do a good job on this... It is one of our high priorities because this is a presidential initiative and the president has an interest in what is going on...there's the White House, the Homeland Security Council, that's a sort of national security council, and they've had the primary lead, and it's a real lead. If something happens it's homeland security. It's very much in a security framework.¹⁴

Another continued:

Now if you are looking at what motivated this I would say it is not a lot of dead chickens. It's fear of a lot of things. There is no question that the high level of interest at the highest level of government took place because of the fear of a 1918 style epidemic. And I've been at meetings in the White House where it was said that the scenario of 1918 was not necessarily the worst case - mortality, morbidity and so on. So what drove this? I think we just have to be frank – it is the fear of a severe human pandemic... No matter how much we prepare there are huge concerns out there and electorates can be very unforgiving... There are limits to how much you can do to prevent these kinds of things from happening. The limits changed for us on 9/11. Now we are a lot more concerned about terrorism, but you could argue that it still is not enough if you want to have perfect security. It's the same with preparing for a pandemic. You can always put more in. But governments have to make decisions, they have to manage risks, and I think this is a risk that the US government, possibly more than any other government, has accentuated to the world. This is a serious risk we have to prepare for.¹⁵

An unforgiving electorate, an anxious population and a media which fed off ever more terrifying disaster scenarios was a potent mix. The UN was concerned too. What would happen if an influenza pandemic really did occur? How would national and international systems cope – and how would the UN respond? Across Asia, Europe and the US there was very real concern: 'Governments thought a pandemic was around the corner. Really, Association of South East Asian Nations (ASEAN) heads of government were particularly concerned'.¹⁶ Concerns were also being raised by country officials, as well as UN, World Bank and other agency staff based particularly in south-east Asia. This provoked high level discussions among the Deputy UN Secretary General and the then Secretary General, and a UN System Influenza Coordinator in September 2005. Estimates of huge potential mortalities made at the time of his appointment provoked a major furore among the technical agencies, but it certainly resulted in the raising of the profile of the issue among a wider constituency, moving the debate from concerns at the 'periphery' right to the centre of the global system.¹⁷ This was accelerated by the arrival of H5N1 in Europe and human cases in Turkey in January 2006. The possibility of a major pandemic looked to be potentially just around the corner.

But there was not one single political motivation for action. Different pressures and influences arose on different sides of the Atlantic. In the US, as already mentioned, the 'homeland security' and 'bio-terror' angle was critical. But so was, according to some, lobbying from pharmaceutical business interests, keen to create new market opportunities from the avian influenza crisis. This dynamic took a different complexion in Europe, however. As one informant argued:

The EU, of course, sees harmonization among member states as key. While market drivers are there, the pharma industry in Europe is more established, stable. They are worried about the politics of the Union: the two-speed Europe. Avian influenza was a very useful basis for mending political fences – dealing with the aberrations of a two-track Europe. Fake urgency helped bring things together. It helped push the political process forward.¹⁸

While policy narratives were being constructed in the context of 'big politics', this intersected with more technical debates. In 2005 a series of models were produced which showed the potential of spread from isolated outbreaks, and the importance of control and containment measures of various sorts (Longini et al, 2005; Ferguson et al, 2005). At the same time scientific assessments of the H5N1 virus showed its variability and the potential for rapid change. While couched in cautions and provisos, these emerging findings provided further impetus towards a concerted response. Business interests got in the act too. The anti-viral oseltamivir (Roche Pharma AG's Tamiflu) was presented as an important stop-gap measure, reducing the impact of the virus in infected individuals. Governments quickly ordered stockpiles and the public sought supplies from any source.¹⁹ Meanwhile, vaccine manufacturers went in search of an elusive vaccine solution – one that would deal with seasonal influenzas as well as potential pandemic strains, at least until a more targeted one could be developed.²⁰

In 2005 the new International Health Regulations (IHR) were published in response to the crisis.²¹ These allowed for direct intervention at source in response to globally threatening disease situations. They also required a more streamlined and effective reporting system, building on the successful response following the Severe Acute Respiratory Syndrome (SARS) outbreaks of 2002-03. As discussed in more depth in chapter 2, the IHR 2005 signalled an important shift in the international governance of public health issues, with a ceding of national sovereignty, at least in theory, in the face of a global threat (Heymann, 2006).

The Beijing inter-ministerial pledging conference, held in January 2006, provided a focus for the growing global effort. US\$1.8 billion was pledged, and the main technical agencies – the WHO, the FAO and the OIE – came up with a series of plans and strategies prepared for the conference.²² Whilst the issue had been live before, it was at this point that the ambitions and activities of the international response significantly scaled up. As the rest of this book clearly shows, this has taken many forms in different places.

[a]Dynamic biology²³

All of this political, institutional and administrative action has been a response to the H5N1 virus. What is this virus and what makes it so potentially dangerous? This section offers a brief outline of some of the underlying biological and ecology dynamics that have been intimately interwoven with the political and policy processes which are the focus of this book.

Avian influenza is an infectious disease of birds caused by type A strains of the influenza virus. All 16 HA (haemagglutinin) and 9 NA (neuraminidase) subtypes of influenza viruses can infect wild waterfowl, which provide a reservoir of influenza viruses circulating in bird populations. Infected birds shed influenza virus in their saliva, nasal secretions and faeces. Domesticated birds may become infected through direct contact with infected waterfowl or other infected poultry or through contact with contaminated surfaces, water or feed. The dynamic biology of viral circulation is fast changing. For example, studies have shown how ducks infected with H5N1 virus are shedding more virus for longer periods without showing symptoms of illness, making both wild and domestic ducks significant in the transmission of the disease.²⁴

Highly pathogenic avian influenza (HPAI) was first noted in Italy in 1987. It is characterized by sudden onset, rapid spread and a mortality rate that can approach 100 per cent within 48 hours. The virus not only affects the respiratory tract, as in the mild form, but also invades multiple organs and tissues. To date, all outbreaks of the highly pathogenic form of avian influenza have been caused by viruses of the H5 and H7 subtypes. H5 and H7 viruses of low pathogenicity can, after circulation, mutate into highly pathogenic viruses. Thus wild waterfowl can introduce low pathogenic avian influenza viruses to poultry flocks, and some species of migratory waterfowl can carry the H5N1 virus in its highly pathogenic form, spreading it to new areas along flight routes. Highly dynamic processes of evolutionary and population ecology thus influence the spread and transmission of viruses.

Avian influenza viruses are highly contagious among poultry populations and easily transmitted between farms by the movement of live birds, people and contaminated equipment. Highly pathogenic viruses can also survive for long periods in the environment, especially at low temperatures. In birds, the most important control measures are rapid culling of all infected or exposed birds, proper disposal of carcasses, movement controls, the quarantining and rigorous disinfection of farms and the implementation of strict sanitary or biosecurity measures.²⁵ The use of poor quality or inappropriately matched vaccines may accelerate changes in the virus (Escorcia et al, 2008; Webster et al, 2006; Lee et al, 2004). Poor quality animal vaccines may also pose a risk for human health, as they may allow infected birds to shed virus while still appearing to be disease-free. Thus the socio-ecological and economic context for poultry keeping and disease control add a further dimension to the complex dynamic biology involved.

Of the hundreds of strains of avian influenza A viruses, only four are known to have caused human infections: H5N1, H7N3, H7N7 and H9N2. Other influenza viruses, such as swine flu A(H1N1), has elements derived from avian sources have also posed threats. Human infection mostly results in mild symptoms, but of the avian viruses the H5N1 virus has caused by far the most human cases of very severe disease and the greatest number of deaths. It crossed the species barrier to infect humans in Hong Kong in 1997 and 2003 and in the on-going outbreaks that began in December 2003, focused in particular in south and east Asia. Close contact with dead or sick birds is the major source of human infection. Especially risky behaviours include the slaughtering, de-feathering, butchering and preparation for consumption of infected birds. It is at this critical interface between humans and birds that disease transmission occurs. Yet remarkably little is known about the dynamics of transmission. While the veterinary studies focus on the disease in animals and medical research focuses on human impacts, the crucial human-animal interaction remains poorly understood.

Under the right conditions the H5N1 virus (or some new combination) may develop the characteristics needed to start an influenza pandemic in humans. Currently there are only three subtypes of influenza viruses (H1N1, H1N2, and H3N2) circulating among humans, with H1N1 (swine flu) doing so in pandemic proportions. Some genetic elements of current human influenza A viruses came from birds originally, but influenza A viruses are constantly changing, and future patterns of spread and infection remain highly uncertain.

The virus can improve its ability to spread among humans through two main routes. First is a reassortment event, in which genetic material is exchanged between human, swine and avian viruses during the co-infection of a human or pig. Reassortment could result in a fully transmissible pandemic virus, announced by a sudden surge of cases with explosive spread, as with A(H1N1) swine flu. The second route is a more gradual process of adaptive mutation, whereby the capability of the virus to bind to human cells increases over a series of infections. With early detection, small clusters of human cases could probably be dealt with, while rapid reassortment and spread would be more challenging. At present, H5N1 avian influenza remains largely a disease of birds. To date, the virus does not easily cross from birds to infect humans. Despite the infection of tens of millions of poultry over large geographical areas since mid-2003, only 436 human cases have been confirmed in laboratories.²⁶ As with some other influenza outbreaks, there is a concentration of cases in previously healthy children and young adults. Yet we do not know the patterns of exposure, behaviours and possible genetic or immunological factors that enhance the human infection. In many patients, the disease caused by the H5N1 virus follows an unusually aggressive clinical course, with rapid deterioration and high fatality. Initial symptoms include a high fever, usually with a temperature higher than 38°C, and influenza-like symptoms (Kortweg and Gu, 2008)

Genetic sequencing of avian influenza A (H5N1) viruses from human cases in Vietnam, Thailand, and Indonesia shows resistance to the antiviral medications amantadine and rimantadine, two of the medications commonly used for treatment of influenza, (Cheung et al, 2006). This leaves two remaining antiviral medications (oseltamivir and zanamivir) that should still be effective against currently circulating strains of H5N1 viruses.²⁷ A small number of oseltamivir resistant H5N1 virus

infections of humans have been reported (Fleming et al, 2009, Gupta et al, 2006) Efforts to produce pre-pandemic vaccines for humans continue, although no H5N1 vaccines are currently available for human use.

Thus the dynamic biology of the H5N1 virus means that the response, whether focusing on poultry or humans, on behaviour change or technological intervention, must always be responsive to a highly dynamic, fast-moving and complex intersection of evolutionary genetics and population ecology. Such dynamics are always highly interdependent, non-linear and context-specific, involving both short-term shocks and longer-term trends. And just as a new policy, plan or technology is unveiled the biology changes again, making the interaction between biology and policy an on-going race, where the virus almost always wins.

There are thus certain aspects of this biology which make the H5N1 virus – along with other influenza viruses - powerful and influential policy players. First, is the ability to transform, resulting in the emergence of new, potentially more dangerous, forms. Currently H5N1 has high morbidity (the spread of the disease across the population) and high mortality (the death rate per infection) among poultry, but low morbidity and high mortality among humans. By contrast H1N1 (swine flu) currently has high morbidity and low mortality among humans. But a high morbidity/high mortality virus is the one to fear, and so viral mixing between H1N1 and H5N1 or a new strain of either must remain the focus of surveillance attention. Second, is the ability of H5N1, and other influenza viruses, to move between species and particularly between animals and humans. Third, is the propensity to travel rapidly across the world – through wild birds' migration routes, through international trade systems or through international air travel. Fourth, is the massive reservoir of the H5N1 virus (and potential for mixing and genetic reassortment) that exists in Asia, for example in the Qinghai lake of southern China. The human pandemic potential of this type of virus thus derives from these key biological characteristics, and is made more likely by the intersection of viral biology, human ecology and socio-economic contexts.

Thus in the rapidly urbanizing parts of Asia where the virus circulates, domestic animals – including poultry, ducks and pigs – interact with humans in close proximity. Urbanization creates the economic conditions for more intensive rearing and marketing of poultry, but often without the necessary biosecurity measures applied. And movement – of people and products (and so viruses) – as part of an increasingly globalized world ensures rapid spread and further mixing. These dynamic biological, ecological and socio-economic contexts offer a potent mix of conditions for any virus' evolutionary success

[a]One World, One Health: A new paradigm for health?

It is this juxtaposition of human and animal biology in the context of highly dynamic and fast-changing ecosystems that gave rise to proposals for a 'One World, One Health' approach. Other labels have been applied, but the basic principles are the same. Zinsstag et al (2009, p123), for example, list numerous initiatives over the last decade. It clearly makes sense, and particularly in the response to emerging infectious diseases, and especially zoonoses. It makes even more sense in the conditions pertaining in large parts of the developing world – which also coincide with the potential 'hotspots' for new disease emergence – where public animal and human health services are inadequate and with poor capacity. Joining forces with an integrated approach that links animal and human health across surveillance, disease management and treatment responses makes a huge amount of sense (Zinsstag et al, 2005).

Yet good sense and clear logic does not always translate into action, particularly in the context of international public health and veterinary systems and so, to date, systems remain largely separate and poorly integrated, both at the international and national levels. However, as this book shows, the avian influenza experience over the last decade or more has clearly shown the need for a shift in thinking and practice. The strategic framework for reducing risks of infectious diseases at the animal-human-ecosystems interface, '*Contributing to One World, One Health*', presented at the

inter-ministerial meeting in Egypt in October 2008 identifies six strategic foci (FAO et al, 2008, p18). These are:

**Initiating more preventive action by dealing with the root causes and drivers of infectious diseases, particularly at the animal–human–ecosystems interface.

**Building more robust public and animal health systems that are based on good governance and are compliant with the International Health Regulations (IHR) 2005 (WHO, 2005) and OIE international standards, with a shift from short-term to long-term intervention.

**Strengthening the national and international emergency response capabilities to prevent and control disease outbreaks before they develop into regional and international crises.

**Better addressing the concerns of the poor by shifting focus from developed to developing economies, from potential to actual disease problems, and to the drivers of a broader range of locally important diseases.

**Promoting wide-ranging institutional collaboration across sectors and disciplines.

**Conducting strategic research to enable targeted disease control programmes.

No-one could argue with these high-sounding aims of course. But translating them into an effective programme of action on the ground is another matter. This will require some major shifts in approach, and some fundamental restructuring of priorities, institutions and disciplinary foci. Where vested interests are at play, this is not an easy task. Chapter 7 of this book returns to the One World, One Health approach and asks, in the light of the experiences documented in this book, what are the key lessons learned and what ways forward are defined? Ten key challenges are identified which, together, provide a new agenda for human and animal health, centred on a One World, One Health approach. Meeting this challenge is not going to be easy. But failing to do so may result in the unfolding of a human influenza pandemic – from whatever source; maybe from H5N1, maybe not – of devastating proportions.

[a]Understanding the policy process

Before we can move towards any conclusions about the way forward, we must focus on the experiences of the recent past and draw lessons from these. What can we learn from the extraordinary and unprecedented array of activity associated with the international response to avian influenza? This book aims to probe into the underlying rationales and drivers of different policies and actions, both at national and international levels – and crucially at the intersections between them.

Why focus on the politics of policy? This is important as it reveals how the response is framed and by whom. It offers insights into the underlying political economy of policy-making: who gains, who loses and who calls the shots. Through this analysis, it offers insights into what and who is missed out, and why. This in turn leads to a broader assessment of policy – not just in terms of technical efficacy or benefits over costs, but in terms of winners and losers, dominant ideas and alternatives. By exploring the political dynamics of policy-making the different options and alternatives - sometimes obscured, blocked or hidden - are revealed and the diverse pathways to disease response are highlighted. Multiple pathways emerge from diverse framings of different policy actors (Leach et al, forthcoming). These are highly contingent, and based on the social positions, histories and politics of different players. Each person – or group of people making up a ‘policy network’ (cf. Jordan, 1990), ‘epistemic community’ (cf. Haas, 1992) or ‘discourse coalition’ (Hajer, 1995) – may tell a different story about a disease and its consequences.

Such ‘narratives’ have beginnings, which define the problem, middles, which outline the cause and effect explanations and assumptions and ends, which define the solutions (Roe, 1991). Such narratives define pathways of disease response – including some aspects of intervention and policy, whilst excluding others. Thus medical professionals may tell different stories to veterinarians, while humanitarian agency personnel may have a different version to local poultry keepers. Evidence and argument is brought to bear on these stories in different ways. Sometimes this is through epidemiological data or mathematical population models; sometimes it is systematic

field observation. Sometimes narratives are derived from direct experience and personal testimonies; at other times they emerge more indirectly through other evidence-gathering methods. Whatever their source, narratives – and the stories, data, forms of evidence and argument that go with them – enter a social and political terrain where debates over evidence, interpretation, direction and implication are often highly contested.

Neat, rational, linear processes of resolving such disputes over what is the best way to respond to a particular policy challenge are always illusory. Evidence and argument always carries with it a politics and a social context which it can never escape. Nor indeed should it. For all policy narratives must be understood in context, and the tussles over the way forward are as much about politics as they are about science. This is not of course a rejection of science. Far from it. There are important things to be understood about viral genomics, ecology and evolution, as well as the economic and social contexts of disease dynamics. But this is only one part of the story. In fact by now there is quite a lot known about the underlying science of H5N1 and its impacts in different contexts, and these findings will be referred to throughout the book. This science-based discovery has been a critical part of the international response. But this book shines a different light on a different part of the story, one that has seen far less attention and remarkably little debate. To complement any understanding based on more technical insights from biology or economics, this book argues it is essential to get to grips with the wider politics of policy in order to define a way forward – and so improve our collective ability to respond to new, emerging diseases and potential pandemics.

Extending the work of Keeley and Scoones (2003), understanding the underlying politics of policy processes involves asking a series of interrelated questions:

****First, what are the narratives – the storylines – which define the way the disease problem is understood and the way the response has unfolded? In other words, how are both problems and solutions framed, and through what mechanisms?**

****Second, who are the actors involved in these narratives and how are they linked? How do they align – or not – with the main policy narratives being promoted? And how do they align with different interests – professional, organizational, political or commercial?**

****Third, in this process and over time, what 'policy spaces' (Grindle and Thomas, 1991; Brock et al, 2001) open up – and what spaces are closed down? What moments of debate, dispute and dissent exist – over what and between whom? And how do these spaces (or lack of them) affect what can be done?**

****Fourth, who wins and who loses through these processes? What are the impacts on poverty and livelihoods? Whose version wins out, whose gets excluded, and why? And what other narratives, actors and interests exist with different perspectives, and how might these have an influence on framing alternative interventions?**

****Fifth, what governance arrangements for disease response encourage greater responsiveness of state and private players charged with disease control and management as well as more effective accountability mechanisms, which are more inclusive and allow for the expression of voice, especially of the poorer and marginalized people more likely to be the victims of emergent disease (cf. Goetz and Gaventa, 2001)?**

****Finally, how do policy processes result in increased resilience of disease response systems - in other words an improved ability to respond to often unknown or unknowable shocks and stresses? And what different pathways to more sustainable disease response and management system are revealed – defined in normative terms in relation to concerns of equity and social justice as well as economic and environmental metrics (Leach et al, forthcoming)?**

For each of the case studies from Cambodia, Vietnam, Indonesia and Thailand, we attempt to answer elements of these questions. Each of the cases is very different and different aspects of policy and governance are emphasized. Overall a comparative approach is adopted in this book, aiming to draw out both context-specific particularities, but also broader more generalisable themes.

[a]A comparative approach

A comparative lens looking across scales, from the local to the global, has been at the centre of the research approach documented in this book. Moving from the very local, village setting to the global context allows a triangulation between perspectives and a tracking of events and processes. The research was undertaken during 2007 and 2008 and through a series of iterations. A scoping study defined some of the key issues at a global level, and this was followed by a focus on the international response and global institutions. The research team met then to discuss the country studies and mapped out some key questions looking at how the international response to avian influenza intersected with national contexts in southeast Asia. A final workshop developed the comparative analysis and began to sketch out the implications for future policy directions, and particularly the One World, One Health initiative.²⁸

Table 1.1 offers a very schematic view of some of the key axes of comparison between the four countries. The final two rows offer, first, some indicators of impact, in terms of human mortalities and, second, the style of national response that emerged. We can expect that the way the avian influenza response played out is affected by a number of factors which differ across the countries. For example, policies may be influenced by the significance of the poultry sector to overall gross domestic product (GDP) and perhaps particularly to export earnings. The role of agriculture – and the poultry sector in particular - in national political and policy processes will also be key. The country's dependence on aid will in turn influence the reliance on external donors and expertise. The structure of production systems also is likely to have a big effect: where poultry production is large-scale and industrialized, owned by a relatively few influential players, both the political economy of policy and the nature of the response will differ from settings where the sector is dominated by numerous small-scale, backyard operations. Perceptions of the seriousness of the risk, and so the degree of urgency of the response, may be influenced by the array of other risks and hazards that people and politicians must deal with. An uncertain, potential risk may pale into insignificance alongside the greater imperatives of dealing with volcanoes, boat disasters or tsunamis, for example. Finally, the political and governance context makes a big difference to both the nature of policy-making, and how interests, forms of patronage and political connections are deployed, and the capacity to deliver through a well-functioning centralized or decentralized bureaucratic and administrative apparatus.

Table 1.1 *A comparative picture*

	Cambodia	Vietnam	Indonesia	Thailand
<i>Humans and livestock</i>	14.4m people, 18 per cent urban. 16m poultry, 90 per cent backyard	85.1m people, 27 per cent urban. 245m poultry; 65 per cent backyard	225.6m people, 43 per cent urban. 600m poultry; 40 per cent backyard	63.8m people, 33 per cent urban. 260m poultry; 20 per cent backyard
<i>Poverty and human development</i>	62 per cent below \$2 (PPP) per day; income gini coefficient, 0.38; HDI rank 131	73 per cent below \$2 per day; income gini coefficient, 0.37; HDI rank 105	40 per cent below \$2 per day; income gini coefficient 0.40; HDI rank 107	26 per cent below \$2 per day; income gini coefficient 0.42; HDI rank 78
<i>Economy and aid</i>	GDP at PPP: US\$23bn; agriculture 32 per cent of GDP. GNI/capita (Atlas Method) US\$550. ODA 8 per cent of GDP. Tourism critical sector; no poultry exports	GDP at PPP: US\$198bn; agriculture 20 per cent of GDP. GNI/capita US\$770. ODA 3.6 per cent of GDP. Rapid economic growth; negligible poultry exports	GDP at PPP US\$770bn; agriculture 14 per cent of GDP. GNI/capita US\$1650. ODA 0.2 per cent of GDP. Limited poultry exports, but major local large-scale production.	GDP at PPP: US\$482bn; agriculture 11 per cent of GDP. GNI/capita US\$3400. ODA negligible per cent of GDP. Fast-growing economy; significant poultry exports (US\$828m in 2007).

<i>Risks and perceptions</i>	Other risks: droughts, floods, economic impacts on tourism. Major coverage of avian influenza in media	Other risks: economic instability, commodity price hikes; floods climate change. Selective media coverage of avian influenza; little public debate	Other risks: earthquakes, tsunamis, ferry disasters. Avian influenza widely reported in media	Other risks: SARS, tsunami, finance crises, political instability. Major media coverage of avian influenza
<i>Politics, governance and political culture</i>	Strong patronage politics	Party dominance, patronage politics	Decentralized, chaotic, patronage politics	Top down, centralized; extra-governmental, commercial interests
<i>Human deaths (at July 2009)</i>	7	56	115	17
<i>Response</i>	Public awareness, village animal health workers	Vaccination; culling and compensation	Selective culling, intensive monitoring and surveillance and participatory disease search; some local drug/vaccine manufacturing capacity	Ring culls and compensation; public information campaigns; expansion of laboratory capacity; significant vaccine and drug manufacturing capacity

Sources: World Bank World Development Indicators, 2007; Asian Development Bank Key Indicators, 2008; World Health Organization cumulative mortalities; Food and Agriculture Organization statistics; case study authors. Codes: GDP = Gross Domestic Product; GNI = Gross National Income; PPP = Purchasing Power Parity; Gini coefficient = measure of income equality (0=evenly distributed); HDI = Human Development Index

The four countries explored in later chapters of this book are very different, as this table makes immediately clear. Highly divergent economic, production, political and governance settings exist. The assumption that a standardized response plan could be effective in such diverse contexts is of course absurd. While no-one would ever admit to such an intention – all the international frameworks, capacity building programmes and so on were only meant to be guidelines or proposals – of course, but with an urgency to act and substantial funds to spend, it never quite works out like that. As we will see in later chapters, a broadly similar set of plans were proposed, which unfolded in different places in highly divergent ways, with diverse consequences. As Table 1.1 shows, different emphases were evident in different countries. All involved a mix of responses, focused on animal health (including vaccination, culling and market restructuring), human health (including public health information and behaviour change programmes, alongside drug and vaccine stockpiling) and pandemic preparedness (including contingency plans for basic public services, movement and travel restrictions and continuity in key economic sectors). The front-line efforts have been substantially focused on poultry (mostly chickens and to some degree ducks), as the main source of the virus. While Vietnam opted for vaccination, Thailand opted for ring culling. Indonesia invested in a major village level surveillance programme, while Thailand combined human and animal surveillance systems. Cambodia meanwhile focused in particular on public education and awareness-raising. Chapters 3-6 tell the complex story of the avian influenza response across southeast Asia, and the intersections of international and national processes, while the next chapter introduces the international response.

Across the book a number of issues and questions recur. First, the book examines the link between the international effort and local and national processes, and in particular the political economy of this interaction. It asks: do national policy processes mirror those at the international level, or do they have a distinct flavour and dynamic? Do more local perspectives challenge – directly or indirectly – international policy framings? The avian influenza response was pitched internationally

as a global public good: for everyone and for the good of humanity. A second theme thus explores how international public goods are constructed in the policy debate, both at the international and national levels, asking, for example, which goods and which public? Such questions of political economy are the focus of a third theme. Has the response been driven by concerns for welfare, poverty reduction, social justice and development or the structure and interests of business concerns and the fears about 'health security' of elites in northern countries? A fourth theme examines the role of science, expertise and evidence in the framing and influencing of policy, asking how important is evidence, what sources are used and what are consequences? In particular, the subsequent chapters examine how risk and uncertainty are framed and in turn dealt with in the design and implementation of policy. A fifth theme focuses on the distributional consequences of the policy responses: who wins, and who loses and how is this handled in political debate?

As discussed earlier, the overall aim is to explore the implications of policy responses for the design of effective, equitable and resilient surveillance and response systems. Are the responses that have emerged to date, and particularly as they have been played out in reality, on the ground, rather than in the documents and statements of international agencies, been up to the task of meeting future shocks, stresses and unknown and uncertain challenges? Substantial international resources have been invested in the international response to avian influenza, and in particular in the most 'at risk' regions of southeast Asia that are the focus of this book. Have the substantial aid resources been effectively spent? Is the organizational architecture for responding to emerging diseases and potential pandemics that has emerged through this process 'fit for purpose'? And if so, fit for what and for whom? By dissecting the response to avian influenza, both at the global level and across four different countries, many lessons can be learned from achievements and successes, as well as weaknesses and limitations. Taken together, these can feed into a redefinition of our approach to emerging disease and pandemic response, and so can help construct an effective, resilient and socially just One World, One Health approach for the future.

[a]Conclusion

A number of challenges to mainstream thinking are posed by this book. Standard public good and security discourses that drive international health responses are questioned. By asking 'whose world, whose health?', for example, questions of access, equity and justice are brought into the picture. Through an examination of the institutional and governance dimensions of the avian influenza response, questions are raised about the appropriateness of the existing organizational architecture for international policy and response, developed and designed for a very different era, with very different challenges. And, finally, a challenge is laid down to the dominant technical and policy framings that define disease responses, and a questioning of the role and composition of different types of professional expertise.

These conclusions are elaborated throughout the book in different ways, and are returned to in the final chapter. First, though, in the next chapter we turn to the international context of the avian influenza response for a detailed look at what happened where and when, and who was involved with what consequences.

[a]Notes

¹*Economist* 28 June 2008, www.economist.com/world/asia/displaystory.cfm?story_id=11622415; see www.info.gov.hk/info/flu/eng/index.htm, accessed 25 July 2009.

² Swine flu: All of humanity under threat, warns WHO', *Daily Telegraph*, 30 April 2009. www.telegraph.co.uk/health/swine-flu/5247242/Swine-flu-All-of-humanity-under-threat-WHO-warns.html, accessed 25 July 2009; Swine flu: The whole of humanity is under threat, *The Sun*, 30 April 2009.

³www.oie.int/eng/press/en_090427.htm and www.fao.org/news/story/en/item/13002/icode/, accessed 25 July 2009.

⁴www.who.int/mediacentre/news/statements/2009/h1n1_pandemic_phase6_20090611/en/index.html, accessed 25 July 2009.

www.who.int/csr/disease/swineflu/assess/disease_swineflu_assess_20090511/en/index.html, accessed 25 July 2009.

⁵ www.news24.com/News24/World/SwineFlu/0,,2-10-2501_2513186,00.html, accessed 18 June 2009.

⁶Johnson and Müller (2002). As the iconic event of the past century, around which much media and policy discussion has centred, the 1918 pandemic has been the subject of intense research, ranging from social histories to technical assessments (cf. Morens and Facui, 2007; Taubenberger and Morens, 2006; Taubenberger et al, 2005).

⁷Murray et al (2007) offer a more sophisticated analysis.

⁸See, for example: Woolhouse, 2008; Jones et al, 2008; Webster et al, 2007; Woolhouse and Gaunt, 2007; Woolhouse and Gowtage-Sequeria, 2005; Woolhouse et al, 2005; Webster, 2002.

⁹See Wildlife Conservation Society, 2004, www.wcs.org/sw-high_tech_tools/wildlifehealthscience/owoh for an early exposition of the 'One World, One Health' concept. It is a registered trademark of the WCS and subsequent reference to the term in this book acknowledge this. See also www.oneworldonehealth.org/ and www.wcs.org/conservation-challenges/wildlife-health/wildlife-humans-and-livestock/one-world-one-health.aspx, accessed 25 July 2009, for details of the 'Manhattan Principles'. For more recent explorations in the context of the avian influenza response, see FAO et al (2008) and Public Health Agency of Canada (2009).

¹⁰www.who.int/csr/disease/avian_influenza/country/cases_table_2009_07_01/en/index.html (as of 1 July 2009). For useful reviews, see MacKellar (2007), Parry (2007) and Li et al (2004)

¹¹World Bank (2005a); (2005b); McKibben and Sidorenko (2006).

¹²Food and Agriculture Organization (2007a); Sims (2007).

¹³ <http://georgewbush-whitehouse.archives.gov/news/releases/2005/09/20050914.html>, accessed 25 July 2009.

¹⁴Interview, Washington DC, 11 June 2008.

¹⁵ Interview, Washington DC, 11 June 2008.

¹⁶David Nabarro, pers. comm., August 2008.

¹⁷Bird Flu 'Could Kill 150m People.' *BBC Online* 30 September 2005 <http://news.bbc.co.uk/1/hi/world/asia-pacific/4292426.stm>, accessed 25 July 2009.

¹⁸Interview, Geneva, 5 March 2008.

¹⁹www.guardian.co.uk/business/2005/oct/20/birdflu, accessed 25 July 2009

²⁰see Stöhr and Esveld (2004); WHO (2009); WHO (2007a)

²¹www.who.int/ihr/en/, accessed 25 July 2009; see Fidler (2005b)

²²One plan (*A Global Strategy for the Progressive Control of Highly Pathogenic Avian Influenza* 2005, later revised 2007) focuses on the animal health aspects and was led by FAO and OIE, with inputs from WHO, see: Food and Agriculture Organization and Organisation International des Epizooties (2005); Food and Agriculture Organization (2007b). Another from WHO (*Responding to the Avian Influenza Pandemic Threat: Recommended Strategic Actions*) focuses on public health aspects, see:

www.who.int/csr/resources/publications/influenza/WHO_CDS_CSR_GIP_05_8-EN.pdf, which is currently under revision.

www.fao.org/ag/againfo/resources/documents/empres/AI_globalstrategy.pdf, accessed 25 July 2009.

- ²³ This section draws directly on information provided by the WHO (www.who.int/mediacentre/factsheets/avian_influenza/en/index.html), and the Centers for Disease Control (www.cdc.gov/flu/avian/gen-info/facts.htm), accessed 25 July 2009.
- ²⁴ www.oie.int/eng/press/en_041111.htm, accessed 25 July 2009.
- ²⁵ www.oie.int/Eng/info_ev/en_AI_prevention.htm, accessed 25 July 2009.
- ²⁶ www.who.int/csr/disease/avian_influenza/country/cases_table_2009_07_01/en/index.html (1 July 2009).
- ²⁷ New Data For GlaxoSmithKline's Pre-pandemic H5N1 Influenza Vaccine, Prepandrix™, www.medicalnewstoday.com/articles/121877.php, 18 September 2008. See also: Osterhaus (2007), Gambatto et al (2008)
- ²⁸ For all project materials, see: www.steps-centre.org/ourresearch/avianflu.html, accessed 25 July 2009.