



Meeting Report

Shifting from Emergency Response to Prevention of Pandemic Disease Threats at Source

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Summary points:

- High profile outbreaks such as SARS, H5N1 avian influenza and the H1N1 pandemic influenza have provided a potent reminder of our increasing vulnerability to the emergence of infectious diseases that are transmitted from animals to humans.
- Public health authorities traditionally respond by identifying risk factors relating to human and increasingly animal diseases, focusing on an 'emergency response' to contain and then eliminate the infections in human and animal populations once they had been detected in humans.
- The global community is now moving towards a 'One Health' approach that recognises the interrelatedness of human, animal and environmental sectors and calls for coordinated prevention, detection and control strategies.
- However, a recent Chatham House meeting concluded that better prevention and control could be achieved by addressing the underlying factors which, although not traditionally seen as related to animal and human health, facilitate the emergence and spread of these diseases. These factors shape disease risks by changing the nature of interactions among and between wildlife, livestock and humans – through, for instance, land-use change, trade practices and climate change.
- To prevent serious infectious disease outbreaks in the future, collaborative efforts will need to focus on identifying the most cost-effective and feasible intervention strategies and mobilise the necessary political and financial support to implement them.

The Energy, Environment and Development Programme and the Centre on Global Health Security at Chatham House convened policy makers, representatives of international organisations and other experts in animal, human and environmental health in London on 16-17 March 2010 to discuss options for *Strengthening Collaboration between Wildlife, Livestock and Human Health Sectors* to prevent the emergence and spread of infectious diseases at the human-animal interface. This report summarises the main points raised at the meeting. Further information, including the background document, agenda and presentations, can be found at www.chathamhouse.org.uk/events/view/-/id/1425.

THE NEED FOR A FUNDAMENTAL SHIFT – FROM RESPONSE TO PREVENTION

Infectious diseases that spread from animals to humans are a growing threat to health security and economic stability.

Health and economic impacts of such diseases and associated control measures can be severe.

The international community is increasingly recognising that focus needs to shift from emergency response to prevention, with strong coordination among the human, livestock and wildlife sectors.

However, an effective One Health approach requires shifting the focus even further upstream, beyond an emphasis on the diseases themselves to the

Outbreaks of infectious diseases at the human-animal interface are posing a growing threat to health security and economic stability locally, nationally and globally. This threat is likely to be exacerbated as the demands of an increasingly interconnected world and its expanding population continue to change the interactions between humans and domesticated and wild animals.

In recent years, the world has witnessed how these global changes are beginning to result in a higher frequency of outbreaks of infectious diseases with pandemic potential. The establishment of HIV/AIDS around the world is a persistent reminder of the devastation to human lives that can be caused by diseases that cross the species barrier from animals to humans, even when the spread is more insidious. While we have so far escaped a worst-case scenario when it comes to the scale of human deaths due to more recent outbreaks such as SARS, highly pathogenic H5N1 avian influenza and the current H1N1 influenza pandemic, the local, national and global economic impacts of the diseases and associated control measures have been severe. The World Bank estimates that over the last decade outbreaks of infectious diseases that have spread from animals to humans have cost approximately \$20 billion globally in direct costs such as health services and compensation for animal culling and other livestock sector losses, and more than \$200 billion in indirect costs, such as lost trade, tourism and tax revenues.¹ At times, it is not even primarily the disease that results in most serious economic impacts, but rather how the disease is addressed.

To date, the international approach to combating outbreaks of such diseases has tended to centre on the human health sector, focusing on an 'emergency response' to contain and then eliminate the diseases in human and animal populations once they have been detected in humans. This approach, however, is increasingly coming under scrutiny as policymakers seek to identify policy options that will prevent the occurrence of such outbreaks. As part of this shift, efforts are now being made to better understand the dynamics of infectious diseases in animals and to attempt to identify those infections that pose potential risks to humans. In this context, the global community is now moving towards a 'One Health' approach that recognises the interrelatedness of human, animal and environmental sectors and calls for coordinated detection and response mechanisms. Indeed, some positive signs have begun to surface: in recent years, unprecedented levels of international and regional collaboration have been mobilised to combat H5N1 through disease surveillance, prevention and control in poultry, and expanded surveillance in wild birds.

However, as a recent Chatham House meeting highlighted, more effective control of infectious disease threats that cross the species barrier requires shifting the focus even further upstream – beyond an emphasis on disease detection, surveillance and response to also addressing the underlying factors that influence emergence and spread of the diseases, but that may not traditionally be seen as

¹ World Bank. 2010. *People, Pathogens and Our Planet - Volume 1: Towards a One Health Approach for Controlling Zoonotic Diseases*. Washington D.C.: The World Bank, pvii.

underlying factors influencing disease emergence and spread.

relating to animal or human health. Such factors include human-induced changes in natural landscapes, urban areas and agricultural systems, as well as global changes related to trade integration, migration and climate change. These shape the frequency, geographical range and manner of interaction among and between wildlife, livestock (and livestock products) and humans, thereby changing the risks of pathogens emerging and spreading.

Addressing these underlying factors of disease emergence and spread would also help tackle existing animal diseases that periodically cross the species barrier.

Focusing on these upstream factors will not only support efforts to prevent the emergence of new infectious diseases at the human-animal interface, but also help to reduce the risk of re-emergence and spread of existing animal diseases that periodically cross the species barrier. In this context, tackling existing diseases and strengthening prevention of emerging diseases in both humans and animals are not competing, but rather mutually beneficial objectives. A more systemic understanding of the conditions in which infectious diseases are borne, transmitted among and across species and controlled will also enable better predictions of their likely evolution and scale of threat to global security, greater understanding of the most effective points for intervention and ensure that the focus and funds are prioritised accordingly.

MOVING TOWARDS DISEASE PREVENTION AT SOURCE

Research and fresh thinking are needed to identify possible intervention points and evaluate best strategies.

More research and innovative thinking are required to identify possible points of intervention within the full ecosystem-animal-human continuum and to evaluate which strategies would be most effective, how feasible they would be and how they can be implemented, giving consideration to political, social and economic contexts. Interventions will then need to be prioritised to ensure that resources are targeted effectively and that roles of responsible organisations are clarified, streamlined and coordinated.

1. Understand possible points of intervention to prevent the emergence and spread of infectious diseases at the human-animal interface.

The role of underlying factors is poorly understood. Factors may include environmental stewardship, livestock production practices and medicine, trade, climate change and risky human behaviours.

For diseases that spread from livestock to humans, detection, prevention and control in livestock are essential. However, other factors that may not traditionally be seen as related to animal and human health also influence the emergence and spread of infectious diseases from animals to humans, but their role is poorly understood. They are associated with natural ecosystems, food and agriculture systems, environments in which humans live, as well as human behaviours. Together, they are changing the ways in which animals and humans interact. Such factors may include:

- Environmental stewardship decisions around such issues as land use planning, water management, deforestation and wildlife and habitat conservation.
- Livestock production practices, both on the industrial and small-holding levels.
- Trade of wild and domesticated animals and their products.
- Incentives for disease reporting and compliance with control efforts.

- Health education, risk communication and incentives to modify human behaviours that increase risk of exposure.
- Commercial attractiveness of developing livestock diagnostic tests, vaccines and medicines.
- Impacts of climate change on animal and human migration, shifts in agricultural areas, weather patterns and water quality and availability.

Identifying the role of these factors in determining disease risks and how changing different variables will change risks can help to facilitate prevention, early detection and intervention before serious economic and health impacts occur.

2. Determine the feasibility of various intervention strategies and establish priorities.

Once possible intervention points have been identified, feasibility studies are needed to prioritise interventions, determine funding and define roles.

Once the factors are more clearly understood and possible intervention points have been identified, it will be necessary to determine what is technically, institutionally, financially and politically feasible in order to prioritize interventions and capacity building activities, determine funding targets and needs and assign responsibilities. Some considerations include:

Technical: Strengthening technological and human capacities

Technologies can be an important part of intervention strategies, including those relating to surveillance, food systems, pharmaceuticals development and mapping of ecosystem and wildlife changes.

Technologies play an important role in disease prevention strategies and efforts will need to focus on how best to mobilise them. For example:

- *Tracking and surveillance technologies* are integral to predicting the fault lines of emerging diseases and critical for targeting interventions. Advances in genomics research, for instance, could help to move from surveillance based on detecting clusters of illness and/or death towards the identification of geographic “hot spots” to monitor the emergence of new infectious diseases in wildlife. This research is also leading to advances in producing food animals with increased resistance to disease.
- *Innovation in food systems*, including in livestock production, feed and food processing and transport, can reduce outbreak risks. One example is processing livestock products – ideally without loss of nutritional or commercial value - before they are traded, to prevent diseases from spreading through the trade in unprocessed products.
- The *pharmaceutical industry* could benefit from an improved understanding of the origins of specific infectious diseases, allowing human and animal vaccines and treatments to be developed more rapidly and effectively.
- *Mapping and planning systems* to track changes in the ecosystem and in wildlife can inform preventive action to minimise the risks of transmission at the animal-human interface.

Issues of information ownership and sharing, as well as balancing incentives for innovation with access, will need to be addressed.

The practicalities of placing complex global disease management systems in areas with underdeveloped infrastructure, as found in particular in some developing countries, will be a major concern in the implementation of a strategy. Moreover, key questions of ownership of information, the extent to which information will be shared among organisations and whether or not it is to be made public can also have important implications. Maximising the use of technologies will require balancing incentives for innovation – for instance through intellectual property protection – while ensuring that those who require the technologies are able to access and adapt them to different contexts.

Cross-disciplinary workforce training will be needed, including the education of One Health para-professionals.

A more holistic approach to disease prevention will also require a much wider and at times different skill set than may be needed for pandemic emergency response. In this context, human capacities will need to be developed. The education of ‘One Health’ professionals and para-professionals equipped with cross-disciplinary training, as well as strengthening community health systems, could help address some of the current gaps. In addition, health-related considerations will need to be integrated in training and university curricula of other disciplines, such as agriculture, economic policy, social sciences, land-use planning and water management. These efforts could build on progress that has already been made in some academic institutions. Likewise, the contributions to society and health from animal production, environmental management and other disciplines will need to be integrated into the training of human health professionals.

Institutional: Fostering cross-sectoral cooperation

Improving inter-sectoral cooperation and funding allocation at all levels is critical for efficiency and effectiveness.

The success of establishing a ‘One Health’ approach will depend on improved cross-disciplinary engagement among primarily sector-focused ministries, international organisations and research institutes. This will require developing new modes of institutional cooperation, based on a better understanding of institutional missions, capacities and how roles and responsibilities should be assigned. Issues of leadership and responsibility will need to be addressed in a way that fills collaboration gaps, reduces duplication and avoids exacerbating divisions and isolation. Moreover, through cross-sectoral funding allocations, governments and foundations can play an important role in stimulating multi-sectoral research agendas. It would also be worthwhile to assess opportunities for solidifying alliances that were built during the implementation of the global H5N1 and H1N1 responses, as well as regional responses to food safety related outbreaks such as *Listeria*. At times, involvement at the prime ministerial level may be needed to bridge cooperation gaps between sectors.

Deeper engagement of professionals from sectors not traditionally involved in human and animal health is necessary.

Moreover, cross-sectoral cooperation will need to strengthen the involvement of additional sectors, including from areas as diverse as land-use planning, watershed management, conservation, livestock production, food and feed processing, social sciences, insurance, trade, meteorology and climate change adaptation. The private sector – including the pharmaceutical, food and livestock production industries – can play a particularly important role in preventing, detecting and responding to infectious diseases. Improvements in the engagement with the media will also be essential for reducing media

coverage that provides confusing public health messages on actual sources of risk or that exacerbates economic impacts by fuelling panic with inaccurate information. There also needs to be greater involvement of ministries of finance, planning and foreign affairs as important decision makers at the national level. In addition, strategies for institutional cooperation will need to take into account shifts in production and consumption patterns, trade flows and investment trends, which are in large part shaped by the emergence of new international players such as China, India, Brazil, South Africa and the Gulf states.

Incentives for cooperation, including for disease reporting by livestock producers, must be explored.

On an individual level, it should be recognised that the current incentive structure at times does little to encourage cooperation. This is particularly true for the livestock production sector, which frequently is under-resourced in the public sector of developing countries and often bears the economic brunt of human-focused response strategies through losses of animals, markets and income. Any new strategy should explore strengthening national veterinary services and providing incentives to encourage engagement, to address underreporting of animal diseases by livestock producers and national governments. Such an approach should also seek to reduce stigmatization of a sector or industry and mitigate economic costs to trade in wild and domesticated animals at local, regional and national levels. It is also important to work with those directly affected by proposed changes, such as farmers and rural populations.

Financial: Identifying funding gaps

Funding philosophy will need to evolve to ensure money flows support prevention and control in the absence of crisis.

While recent emergencies have helped to leverage significant funding to respond to infectious disease threats, the challenge will be to channel these funds into tackling the main underlying factors influencing disease emergence and spread and into strengthening the capacities of all relevant sectors to prevent, detect and contain outbreaks. This will require long-term international multi-sectoral financial commitment to disease prevention and control in the absence of a crisis.

Cross-sectoral funding opportunities are minimal, so potential funding sources and mechanisms must be evaluated.

There is currently little provision for cross-sectoral funding to control infectious diseases. Indeed, institutional barriers between organisations responsible for animal and human health are encouraged by the current sector- and project-focused funding architecture. Potential funding sources and mechanisms will need to be evaluated, including an assessment of capacities to manage funds, and distribution criteria established.

Cost-effectiveness analyses will be necessary to understand costs and benefits of various strategies.

As part of the assessment to identify the most suitable points of intervention, evidence should be gathered to evaluate the cost-effectiveness of different strategies and how the costs of preventive interventions compare to those of emergency response. This could include modelling of different response scenarios – for instance related to H5N1 – to better understand the direct and indirect costs and benefits of different strategies for global health and economic security.

Political: Placing intervention strategies within political contexts

Strategies must respond to local, national and international contexts to secure political support.

Mobilising political will at the highest level and among a broad range of policy actors will be a prerequisite for effective disease prevention, with clear messages to which politicians can respond. To this end, proposed prevention strategies will need to respond to the local, national and international contexts in which the strategies would be implemented, including the likely 'winners' and 'losers' of different intervention strategies. Such an assessment will inform the development of policies that minimise negative social, economic and environmental impacts.

Assignment of roles and resources may raise challenges.

A shift towards prevention will also involve key decisions over the assignment of roles and resources. It is clear that some institutions – both governmental and non-governmental – may treat such a shift as a threat to their funding and mandates, while others may be concerned with the incorporation of responsibilities deemed to be outside of their purview or that of cooperating partners.

Despite agreement on the overall goal, priorities are likely to differ, so demonstration of benefit for all is essential for cooperation.

It is important to recognise that while there may be agreement on the overall goal, each sector – and the actors within them – will bring different priorities to the table, be it conservation for the wildlife sector, income and trade concerns for the livestock sector or health implications for the human health sector. This will be particularly true when addressing the underlying factors of disease emergence and spread where the causal links have not yet been well articulated. Identifying differing priorities and reconciling them will be important, and it is essential that any new strategy clearly illustrates how an approach which combats the drivers of infectious diseases will benefit the environmental, livestock and human health sectors alike.

LOOKING AHEAD – BUILDING POLITICAL SUPPORT, MEASURING PROGRESS

Identify milestones, develop evaluation criteria and assign responsibility for monitoring progress and ensuring accountability.

Translating the long-term vision into manageable milestones – including a clear articulation of costs and benefits associated with each step in the process – will be an important means of building support among politicians and others that are likely to be affected by systemic changes. Criteria for measuring progress also need to be established and responsibility for evaluation and ensuring accountability must be assigned.

Promote cooperation by highlighting the personal, national and the global benefits of engaging in prevention strategies.

Achieving the necessary level of cooperation will require understanding and highlighting why it is in the global, national and individual interests of all involved – be it for economic, health-related, social or environmental reasons – to engage in prevention strategies that tackle diseases before they can cause significant harm to global security.

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Centre on Global Health Security

The Centre on Global Health Security at Chatham House analyses policies and mechanisms that underpin global health security and recommends possible solutions to overcome any obstacles identified, in order to assist policy makers in reaching decisions that have favourable outcomes for all those involved.

Global health security is the protection of the health of individuals and of societies. It includes access by individuals to quality-controlled medicines, vaccines and medical care, and reduction in collective vulnerability to global public health events that have the potential to spread across international borders. Health security is thought to provide major contributions to social stability, government legitimacy and demographic developments that underlie national security. Further information can be found at www.chathamhouse.org.uk/research/global_health/.

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