

Pro-Poor HPAI Risk Management in the Greater Mekong Sub-Region

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Abstract

Since its emergence in East Asia, H5N1 HPAI has attracted considerable public and media attention because the viruses involved have been shown to be capable of producing fatal disease in humans, which gives rise to the fear that the virus might acquire the capacity for sustained human-to-human transmission and thus cause a global influenza pandemic. Driven by this fear of a possible human pandemic, responses to HPAI outbreaks have generally been top-down, heavy handed interventions which involved the culling of millions of birds at great expense. However, despite determined eradication efforts, outbreaks continue on a regular cycle and in some areas the disease appears to have become endemic. It is also evident that applied control measures have unintended behavioural consequences that undermine their effectiveness because they have negative economic impacts, particularly with respect to the livelihoods of smallholder poultry keepers and other actors engaged in poultry value chains. This paper presents the results of an interdisciplinary HPAI research project carried out in the greater Mekong sub-region (GMS)

Materials and Methods

A collaborative, interdisciplinary research project, which integrates epidemiology, economics and behavioural as well as institutional aspects of HPAI and its control is being carried out in the GMS to support the formulation of a new generation of HPAI control policies to effectively manage this animal and public health risk while at the same time addressing the needs of poor majorities in the subject countries. The research combines the compilation and analysis of existing data from a wide variety of sources, field data collection, the conduct of pilot trials, and simulation modelling, the results of which are translated into policy recommendations.

Results

Structure of the poultry industry in the GMS: Although the poultry industry in the three countries included in the project is at different stages of development, extensive small-scale poultry raising is ubiquitous and small flocks (<30 birds) constitute the vast majority of flocks (>90%) in all GMS countries. Nearly all rural households in the more remote areas of the GMS depend to some degree on backyard poultry for both sustenance and income. However, the majority of the GMS's smallholder poultry keepers live in the densely populated lowlands, where market transactions and movement of goods, livestock and people are more intensive, and where poultry supply chains support the livelihoods of an extended network of low-income groups through production, distribution, processing, and marketing. Smallholder poultry keepers tend to specialize in traditional bird varieties, which command higher prices for their taste and are mostly raised in traditional low-input systems. For the majority of rural households, poultry raising is a minor contributor to household income (< 10%) and most farmers can cope with a 'once-in-a-while' loss of their poultry stock by moderately increasing other agricultural activities.

Temporal evolution of HPAI outbreaks in the GMS: The first outbreaks of HPAI were officially reported almost simultaneously in Cambodia, Thailand and Viet Nam in January 2004 although anecdotal evidence suggests that the disease had already been occurring in late 2003 both in Thailand and Viet Nam, the worst affected countries in the region. The implementation of systematic control measures greatly reduced the number of outbreaks but also changed the temporal pattern of HPAI occurrence. The occurrence of smaller outbreaks between the main epidemic waves supports the hypothesis of the presence of a fairly widespread and endemic infection reservoir in the GMS, possibly among domestic and wild water birds. HPAIV clade 1, which dominated the early phase of the epidemic, has been replaced by clade 2.3.4 in northern Viet Nam and Lao PDR while clade 1 still dominates in southern Viet Nam and continues to sporadically reappear in central Thailand and Cambodia. This suggests different

mechanisms of HPAI virus introduction and maintenance between different areas within the region. A striking feature of the different epidemic waves in the GMS is that they did not appear to be synchronous, which raises questions about the underlying factors that may define 'hot' periods during which increased virus circulation can be expected.

HPAI risk by flock size / production system: Traditional, extensive small-scale backyard poultry producers do not appear to have been the main spreader of HPAIV H5N1 in the initial waves of infection, and there is no conclusive evidence that smallholder poultry present HPAI outbreak risks that are commensurate with the control resources that have been targeted at them. Indeed, at least in the case of Viet Nam, on a headcount basis it appears that HPAI risk increases with flock size. However, given the large share of smallholders among poultry keepers, the majority of outbreaks is recorded in small flocks (<1,000 birds), promoting the assumption that large scale poultry keeping is 'safer'. In Viet Nam, the poultry trading network has an important role in the spatial spread of infection. The direct and indirect contact potential resulting from the overlap through visiting the same communes between individual poultry traders' contact networks can provide effective spread of HPAI H5N1 virus over a well defined geographical space. There is evidence that more experienced traders are less likely to be involved in trade between communes affected by outbreaks while there is also evidence that traders at retail markets (as opposed to wholesale traders) are more likely to be involved in trade between communes affected by outbreaks.

HPAI control in Viet Nam and Thailand: In both countries the initial waves of the epidemic were controlled through massive culling of poultry around outbreaks resulting in the destruction of over 100 million birds. In the second half of 2005, Viet Nam introduced annual mass vaccination campaigns as control measure, which appears to have been successful in significantly reducing the daily level of transmissibility between communes. However, reduced daily transmission probability was offset, to a certain extent, by an increase in the time it took for outbreaks to be reported within a commune, giving rise to an extended commune-level infectious period. In comparison to previous epidemic waves in both Viet Nam and Thailand this resulted in a less intense but longer lasting waves of outbreaks after the introduction of mass vaccination. The high level of temporal and spatial dispersion observed in outbreaks in Viet Nam since introduction of large-scale vaccination in 2005 suggests that significant changes in the mechanisms of transmission and spread have occurred. Possible factors involved are an increase in the proportion of outbreaks which are not being detected or in the relative importance of ducks. Thailand has not resorted to poultry vaccination, but instead focused national control efforts on detection (x-ray surveys), culling, prohibition of grazing duck production, information campaigns targeted towards increased awareness, and bio-security enhancements. With this approach, Thailand has managed to achieve and maintain a very low risk of outbreak occurrence for several years now, with only sporadic outbreaks being reported.

Economic impact: The loss of poultry dying from HPAI is dwarfed by the impacts resulting from public control measures and consumer / market reactions, which affect the entire industry, irrespective of the infection status of a particular enterprise. This actually offers wide scope for mitigating the impact of HPAI through well-designed public HPAI risk management programmes. Commercial poultry producers and market agents (usually relatively small-scale) specialized in poultry represent the category of producer / household individually most severely affected by HPAI and HPAI control measures in the GMS, even if collectively they may not carry the bulk of the HPAI burden. The reason for this is that they only represent a minority of producers, but a minority whose livelihoods are most threatened by longer lasting HPAI outbreaks and / or protracted control measures due to their relatively high investments and specialization in poultry.

In Thailand, investigations of the smallholder poultry supply chain, suggest that recent changes in market conditions, as an indirect result of the HPAI outbreaks, are making it very difficult for small-scale poultry farmers to sustain their rural enterprises. Despite the absence of large outbreaks since mid 2004, there have been significant movements out of the native chicken sector during 2006 and 2007. Households who grew chicken in the past continue to do so for own consumption, but they presently see sharply diminished prospects of a livelihood from this form of livestock. The industrial sector has adapted to HPAI by exerting increasing control over every stage of production and emphasizing their safety standards in their marketing campaigns. Additionally, because of export restrictions and changing consumer demands, processing plays an increasingly important role in the organization of Thailand's poultry sector.

Conclusions

Standard prescriptions which populate international guidelines for disease response and are replicated in country plans assume well-functioning health and veterinary systems, rapid and efficient responses and the availability of epidemiological information and technical expertise – in Cambodia, Lao PDR and Viet Nam these assumptions did / do not hold true. In these countries, the technocratic, expert-driven, top-down solutions faltered in the face of bureaucratic and political complexity. Socio-cultural constructions of risk, threat and the role of poultry strongly define perceptions and response. HPAI control policies thus need to be adapted to local, national and regional settings.

As both rural and urban poor populations need a secure and affordable food supply, smallholder farmers need to be recognized as part of the solution to protecting a global commons of disease freedom, which has important implications for HPAI control policy. A significant amount of HPAI risk seems to arise from information failures and incentive failures in poultry supply chains, such as inadequate compensation and extensive preventive culling. This has been recognized by Thailand's Department of Livestock Development and largely rectified by a combination of measures including increasing awareness about risk factors, adequate compensation, introduction of compartmentalisation and more focused culling, thereby contributing to the highly reduced risk of outbreak occurrence since the first outbreak wave in 2004.

Mass vaccination, as used by Viet Nam, undoubtedly contributed to reducing HPAIV spread and human exposure but did not eliminate virus circulation. The achievable coverage with mass vaccination campaigns is not sufficient to break infection chains. Without concomitant efforts to improve disease detection, mass vaccination campaigns are an unsustainable HPAI control instrument in situations where backyard chicken, broilers, and ducks represent a large share of the national poultry flock. Gains in detection would have had a large impact upon the scale and duration of the 2007 wave and any which may occur in the future supporting the notion that more targeted surveillance may be necessary for effective control. Research and investment to enhance monitoring / surveillance efficiency at low cost is a major priority.

Policies that disrupt livelihoods may drive production and trade underground and thereby unintendedly increase disease risk. On the other hand, allowing the regional poultry trade, in its current form, poses risks to public health and large-scale producers, in addition to the risks posed to small-holders' poultry and their own health. Given the structure of current market incentives, smallholder poultry keepers are unlikely to adopt compulsory bio-security measures. Diseases are part and parcel of their everyday experience and local responses are determined by local cultural rather than by imposed technical rationales. Support to 'diversification' and quality improvement appears a more promising tool for HPAI risk reduction than support payments (compensation) for stock losses or production and trade bans, which cannot be enforced.

HPAIV H5N1 now appears to be endemic parts of the GMS and domestic and (especially) external public resources for control measures will be difficult to sustain at the previous levels. Consumers across all GMS countries exhibit a preference for local, non-industrially raised poultry and are manifesting this preference through willingness to pay price premia for these birds, albeit to a different extent across the region. Product certification is a systemic remedy that can be used to create virtuous quality cycles, combining risk reduction with higher product value along supply chains of low income market participants and may provide more effective long term risk reduction.

Transboundary transmission risk within the GMS appears to be high and Thailand, Lao PDR and Viet Nam are exposed to the risk of HPAIV introduction from southern China, suggesting an urgent need for more determined multilateral policy coordination. It will be difficult to effectively utilize domestic or external resources in individual countries in the absence of such coordination.