Veterinary services for poultry production

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SUMMARY
The current highly pathogenic avian influenza (HPAI) crisis has brought poultry production to the focus of public attention. Poultry production takes place in two basic systems: the industrial sector and the small-scale production system at village level. The level of involvement of veterinary services differs greatly between the two systems. While private veterinary services are important in the industrial sector, there is only limited provision of veterinary services in small-scale production systems. This has consequences for the success of disease control measures.

As HPAI is a zoonotic disease, its control is undoubtedly a public good and ultimate responsibility for this should lie with the official veterinary services. However, as both public and private sectors are contributing to disease control, this paper suggests strengthening national animal health systems and ensuring that all service providers have clearly defined roles and responsibilities under the leadership of the official veterinary services. Evidence gained during Newcastle disease control projects at village level, indicates that a paradigm shift in disease control is needed, promoting strong involvement of communities in policy development. This requires a multidisciplinary approach that enables a better understanding of this specific sector to be obtained. The Food and Agriculture Organization of the United Nations (FAO) is implementing pilot projects in different countries to better understand virus spread, value chains, the role of poultry in livelihoods, and the species and breeds kept. Broader knowledge, will allow the impact of control measures in this sector to be assessed, and national HPAI preventive and control policies to be adjusted as needed.

Key words: disease control, poultry, multidisciplinary, small scale

1 INTRODUCTION
Since the outbreak of highly pathogenic avian influenza (HPAI) H5N1 in poultry, in 2003/2004, in Southeast Asia, and its subsequent spread to more than 50 of the world’s countries, poultry production has come sharply into the focus of the international community’s attention. This heightened awareness is in large part due to the zoonotic potential of HPAI H5N1-V. The present virus strain has a relatively low ability to spread from poultry to humans, but evidence shows that once this transfer occurs the virus causes a very high mortality rate. More importantly, there is a fear that a new strain will emerge and cause a human flu pandemic.

Right from the beginning, the challenge for governments and technical agencies was
to ensure early detection and control of the disease. Even with the improvements in detection achieved over the last three years, there is still need to strengthen surveillance systems further and institutionalize them within national animal health systems.

In this paper, existing poultry health systems are described and an outlook is tentatively given as to how to improve the linkage between poultry owners, and private and public veterinary services.

2 VETERINARY SERVICES IN POULTRY PRODUCTION

Two basic systems of poultry production can be identified and are present in most countries: an industrial poultry sector and a small-scale production system. It is recognized that other classification systems exist (see Rushton and Ngongi (1998) for early versions and more recently FAO (2004) for a classification based on a notional idea of biosecurity). The approach and level of involvement of veterinary services in poultry production differ greatly between the industrial sector and the small-scale production system.

The industrial sector, which often operates in international markets, has a high use of variable inputs, mainly concentrate feed, and significant investments in infrastructure. This sector has developed its own poultry health schemes to ensure the productivity and health of the birds, a development crucial to avoiding production losses resulting from diseases and ensuring that disease-related market shocks are minimized. These requirements apply at farm level, but in the case of diseases that are notified under international agreements, also apply at national level. Notification to the World Organisation for Animal Health (OIE) generally entails international market bans, and in the case of zoonotic diseases also gives rise to internal market shocks. Another relevant consideration is that companies often use their poultry health schemes as a sales argument when negotiating with their clients.

Even though private poultry health schemes may vary in their details, implementation is organized mostly in the same way in all countries. The schemes are conceived for all participants in the chain – hatcheries, producers (broilers, pullets and layers), slaughterhouses, transporters and feed mills. It includes biosecurity (bioexclusion) measures at farm level, sampling at critical control points in the chain, vaccination schemes and other prophylactic measures for the animals. These activities and the results of control measures are internally recorded. The veterinary services (diagnostic, prophylactic and therapeutic) are generally provided by private veterinarians, either employed by the company or contracted with specific terms of reference. It is common for diagnostic work (detection of pathogens and residues) to be carried out in laboratories that are often owned by the poultry companies. In an integrated poultry chain it is mandatory for poultry producers to be part of a poultry health scheme, whatever their contractual status. This approach ensures maximum consistency in the quality of the produce and the services provided; it allows a fast and targeted reaction in the case of hazards. It also maintains high levels of productivity as the large quantities of inputs involved (mainly feed) are used by healthy flocks.

The role of the official veterinary services in this context is mainly to ensure that moral hazards affecting consumers are kept to a minimum and that there is an effective framework for research and dissemination of knowledge that has a strong public good nature. The responsibilities of the official veterinary services can be derived from agreements such as the World Trade Organization’s Agreement on the Application of Sanitary and Phytosani-
Veterinary services for poultry production

There are defined responsibilities set out in the *Animal Health Codes* of OIE for disease surveillance; prevention, control and eradication of highly contagious diseases; and movement controls and quarantining. The diseases covered by these provisions have serious consequences in terms of socio-economic impact, trade and public health. Regarding food and feed safety, the basic roles of the state are defined in the *Codex Alimentarius* which covers official inspections regarding food hygiene, including controls on residues.

For some aspects of the above-described animal health system in the industrial poultry sector, the respective roles of service providers can be clearly defined. For example, flock treatments to increase flock productivity have a strong private good component and are best left to private veterinary services. However, the maintenance of low levels of drug residues in food is clearly a moral hazard issue, which state veterinary services need to address to protect consumers. Some other issues are less clear, and require careful coordination between public and private veterinary services. For example, there are strong incentives for producers to prevent the entry of a disease agent, but if a disease agent enters a flock, the private incentives for containment are not clear and the state needs to play a strong role.

Dividing tasks between private and public services requires a close relationship between the two sectors to ensure appropriate roles, cooperation and implementation.

The small-scale/backyard sector operates in a completely different setting. The most important differences with regard to disease control are as follows:

- very diverse organization of the sector in different regions;
- minimal or no external inputs;
- poultry flocks that are generally managed by women, who may well own the birds and market the produce;
- production exclusively for household consumption, or local or national trade; and
- no integration of the associated market chains.

The use of veterinary products and services are limited in this sector because:

- losses due to diseases are common and often considered inevitable; and
- many poultry producers are poorly connected to veterinary product distribution and advice networks – making the transaction costs involved in obtaining such goods very high.

Where there is a possibility to get regular access to markets and therefore to generate income, small-scale poultry producers will make investments in inputs, including veterinary services. Such services are frequently provided by non-veterinarians, such as trained paravets or other knowledgeable people in the villages. In some countries where private veterinary services are under development, the official veterinary services may provide clinical services at village level.

The roles and responsibilities of public and private sectors in animal health service delivery have been described by Leonard (2000) and Ahuja (2004). The latter author provides a useful analysis of the public and private good nature of animal health services, which has

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3 [http://www.codexalimentarius.net/web/index_en.jsp](http://www.codexalimentarius.net/web/index_en.jsp) (December 5, 2007).
been used to develop a list of the roles and responsibilities of public and private sectors in animal health delivery (see Table 1).

According to the classification set out in Table 1, non-zoonotic, highly contagious poultry diseases, such as Newcastle disease or duck plague, should only be part of official control programmes when they may endanger international trade. This is the case, for example, in the European Union, North America and Japan. These regions/countries have important market interests in the international poultry sector, and trade bans have consequences for their economies. In other regions of the world, there is no official programme to control these diseases although they are notifiable to the OIE. Their control is generally not considered a public good according to the above-described classification (Ahuja, 2004).

<table>
<thead>
<tr>
<th>Animal health function</th>
<th>Appropriate delivery channel</th>
<th>Economic characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease surveillance, prevention, control and eradication of highly contagious disease with serious socio-economic, trade and public health consequences</td>
<td>√</td>
<td>Public good</td>
</tr>
<tr>
<td>Disease surveillance, prevention, control and eradication of diseases of low contagion</td>
<td>√</td>
<td>Public good with externalities</td>
</tr>
<tr>
<td>Quarantine and movement control</td>
<td>√</td>
<td>Measures to correct for externalities</td>
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<td>Emergency responses</td>
<td>√</td>
<td>Public good</td>
</tr>
<tr>
<td>Veterinary inspection</td>
<td>√</td>
<td>Measures to correct for “moral hazard”</td>
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<tr>
<td>Wildlife disease monitoring</td>
<td>√</td>
<td>Public good</td>
</tr>
<tr>
<td>Zoonosis control</td>
<td>√</td>
<td>Measures to correct for externalities</td>
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<tr>
<td>Disease investigation and diagnosis</td>
<td>√</td>
<td>Private good with externalities</td>
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<tr>
<td>Drug/vaccine quality control</td>
<td>√</td>
<td>Require measures to correct for “moral hazard”</td>
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<tr>
<td>Production and distribution of drugs and vaccines</td>
<td>√</td>
<td>Private good</td>
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<tr>
<td>Vaccination and vector control</td>
<td>√</td>
<td>Private good with externalities</td>
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<tr>
<td>Research, extension and training</td>
<td>√</td>
<td>Public and private</td>
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<tr>
<td>Clinical diagnosis and treatment</td>
<td>√</td>
<td>Private good</td>
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<tr>
<td>Food hygiene and inspection</td>
<td>√</td>
<td>Measures to correct for “moral hazard”</td>
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<tr>
<td>Residue testing</td>
<td>√</td>
<td>Public good</td>
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<tr>
<td>Food safety tasks</td>
<td>√</td>
<td>Public good</td>
</tr>
<tr>
<td>Compliance and monitoring</td>
<td>√</td>
<td>Public good</td>
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</tbody>
</table>

Source: modified from Ahuja (2004).
3 EXPERIENCE IN COMBATTING NEWCASTLE DISEASE AT VILLAGE LEVEL

As poultry production can be considered an important development tool for promoting food security at household level, there have for a many years been various initiatives to improve production and to provide veterinary services such as vaccination to protect animals from Newcastle disease (Copland, 1987; Sagild and Haresnape, 1987; Ideris et al., 1990; Jagne, 1991; Rweyemamu et al., 1991; Spradbrow, 1993; Rushton in FAO, 1993; Rushton in FAO, 1995; Rushton in FAO, 1996; Bell et al., 1995; Alders and Spradbrow, 2001) and other diseases (Permin and Pedersen, 2002).

International development agencies and NGOs have initiated extended activities to control Newcastle disease in village poultry (e.g. French initiative in West-Africa, the initiatives of the Australian Centre for International Agriculture Research). Key elements in these initiatives are vaccination, communication and information, and monitoring and evaluation (Dolberg in FAO, 2007). Although the design of such programmes may differ, success depends in all cases largely on the involvement of the national government and its veterinary service, and of producers and their veterinary services provided by private veterinarians or paravets.

As the programmes mainly address very poor people, national governments and public veterinary services have to be involved. Their role is to provide an adequate policy framework – for example, introducing village poultry production into national poverty eradication programmes, designing and conducting information campaigns, and initiating vaccination campaigns (including making the decision as to the type of vaccine to be used).

The producers and their associated veterinary services have to recognize the programme as something that adds value to their poultry production. This requires medium- to long-term programme implementation in order to build up trust and ensure sustainability.

A Newcastle disease control programme will only be successful and sustainable if there is a win–win situation for both sides. Therefore, there is a need for reliable national policies and commitment from the public sector. One way to meet this requirement would be to integrate the programme in national livestock policy. In addition, there is a need to involve the international donor community and the development agencies. These actors will be required to assist the programme, at least at the beginning, especially in developing the initial vaccination and information campaigns – including training, logistics (procurement and distribution of the vaccine, and monitoring the success of the vaccination) and disseminating the results. This requires the mobilization of additional funds.

The experience gained in developing and implementing Newcastle disease control programmes could be utilized for the control of HPAI, even though the nature of the disease requires the use of other control tools.

4 THE EMERGENCE OF HPAI H5N1

HPAI H5N1 has changed the situation for the poultry sector tremendously. This virus is panzootic, zoonotic and has the potential to become pandemic. All the criteria for a public good apply to the animal disease caused by this virus. Therefore, there is urgent need for national veterinary services to be involved in the control of this disease. While this occurs more or less successfully in the industrial system, it appears to be very difficult in the small-scale sector.
The classical tools utilized to control highly contagious diseases (biosecurity at farm level, movement bans/restrictions, culling and vaccination) first require some basic planning data on the poultry sector:

- species and approximate numbers of birds;
- type of production;
- marketing and distribution systems;
- slaughterhouses; and
- locations of production and marketing, including hatcheries, slaughterhouses and wet markets.

These data are generally available for the industrial sector, but rarely for the small-scale sector. Moreover, as in most of the affected countries there is no official registration system for small-scale production units (in some, registration does not exist even for the industrial sector), they are unlikely to become available in the short or medium term.

The lack of data and surveillance for the small-scale sector might be one reason why the control of HPAI in the industrial sector is quite successful, while the virus persists for longer in the small-scale sector. In addition, small-scale/backyard producers regularly experience substantial losses in their flocks due to contagious diseases such as Newcastle disease, but also malnutrition, parasites and predation. As they rarely receive help to prevent such losses, they will generally not report an event even if it might be an HPAI outbreak. Even worse, experience teaches the villagers that if by chance the official veterinary services become aware of an HPAI outbreak, birds are destroyed, production and marketing is limited, and access to any sort of compensation maybe limited or non-existent. For these reasons, possible outbreaks in backyards are rarely reported by the poultry owners and are often only detected after investigation of outbreaks in commercial farms, as the result of an active surveillance exercise (“Participatory Disease Search” programme in Indonesia, market surveillance in Viet Nam) or when a human case occurs.

It is obvious, therefore, that a paradigm shift is needed in approaches to combating HPAI in small-scale/backyard systems and to create a win–win situation in which both the needs of producers at community level and the concerns of the international community are addressed (BMELV/GTZ, 2006).

5 MULTIDISCIPLINARY APPROACHES TO DISEASE CONTROL

Based on experience of poultry development programmes for villagers (including the above-described Newcastle disease campaigns), and experience of HPAI control to date, it can be concluded that the classical disease control measures (biosecurity at farm level, movement controls, culling and vaccination) will have only limited impact on the disease in this sector. Rushton and Ngongi (1998) note that interventions rarely work if they are implemented in isolation. Interventions need to be supported by a package of measures covering health, husbandry and marketing. As in the implementation of Newcastle disease control programmes, long-term strategies developed through a multidisciplinary approach and involving the communities will be critical for HPAI control. This was acknowledged by the Technical Meeting on Highly Pathogenic Avian Influenza and Human H5N1 Infection, held in Rome in June 2007.
A contribution to this new approach is a project, funded by Germany and currently being implemented by FAO in three pilot countries: Cambodia, Egypt and Uganda. The project aims to promote policies and strategies for prevention and control of HPAI that are sensitive to the needs of smallholder producers, especially poor rural families, and to poultry genetic resources. It considers, in a multidisciplinary manner, three main fields of concern: animal health, poultry breeds and livelihoods. The project will contribute to creating a safe production environment for smallholders, which supports sustainable livelihoods and poultry genetic diversity.

The knowledge needed to implement the approach will be generated during the pilot studies which aim to increase understanding of how animal disease control measures affect livelihoods and poultry genetic resources at country level.

Three main objectives for the studies have been identified:

- understanding chicken and duck genetic resources in the respective country;
- understanding animal health control measures from the perspective of small-scale poultry production; and
- understanding the role of poultry in the livelihoods of poor people.

The focus of the studies will be on the communities involved, collecting information through participatory methods and sampling of birds. This will allow characterization of the breeds and assessment of the disease situation in the village sector. Based on the resulting comprehensive data on the livelihood impacts of animal health control measures, including impacts on poultry genetic diversity, it is planned:

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4 Developed by Karin Schwabenbauer, Badi Besbes, Jonathan Rushton and Olaf Thieme (FAO).
5 GCP/INT/010/GER “Promoting strategies for prevention and control of HPAI that focus on smallholder livelihoods and biodiversity”
• to propose improved sustainable poultry health and management practices at household level;
• to define the involvement of the smallholder sector in national animal health systems; and
• to contribute to strengthening veterinary services through public–private partnership.

It is intended that this will provide a baseline for improved reporting and surveillance systems for HPAI.

6 CONCLUSIONS

Poultry production takes place in two different settings: the industrial sector, operating nationally, regionally and in some cases globally; and the small-scale sector, operating with minimal inputs and with products mainly aimed at household consumption or local markets. The types of veterinary services demanded by and provided to these two basic types of poultry production are very different. This influences the effectiveness of disease control measures. The classical tools (biosecurity at farm level, movement control, culling and vaccination) are likely to have an impact in the case of an outbreak in the industrial sector, but are far less successful in the small-scale sector.

It is argued in this paper that in order to strengthen national animal health systems, institutional arrangements for animal disease control need to reflect the incentives of the public and private sectors in the different components of poultry production systems. This requires well-defined roles and responsibilities which take into account the fact that animal health measures generate both public and private goods, but also that the leadership for the animal health system should rest with the official veterinary services.

In addition, improvements in animal disease control in small-scale village poultry production require a better understanding of this sector, regarding virus spread, value chains, the contribution of poultry to livelihoods, and the species and breeds kept. Based on broader knowledge, the impact of control measures in this sector can be assessed and the national HPAI prevention and control policy adjusted, as needed. Building trust in improved veterinary services based on a public–private partnership is critical for this process. This will not be realized at short notice, and requires strong involvement of communities in policy development and strong commitment from the public sector. This is a major challenge.

REFERENCES


Veterinary services for poultry production


