

Experiences in the capture of poultry population data for an emergency response

Houston, C W, Gibbens, J C, Jordan, L, Wilesmith, J W, Smith, L H, Roberts, S, Paiba, G A, Parish, W E G and Lysons R E

Animal Health and Welfare Directorate General, Defra, 1A Page Street, London SW1P 4PQ, United Kingdom

Abstract

Experiences in Great Britain with Classical Swine Fever and Foot and Mouth Disease (FMD) outbreaks in 2000 and 2001 respectively, and an outbreak of Newcastle Disease (2005) demonstrated the need for access to animal population data in the face of a disease outbreak. This paper describes how some of the issues associated with the sourcing and management of population data for an emergency response have been addressed during recent activities to improve our preparedness for the possible incursion of avian influenza into Great Britain.

Introduction

The recent identification of H5N1 in wild birds in European Member States (MS) resulted in the passing of European legislation (Commission Decision 2005/734/EC) in November 2005 that required MS to reduce the risk of transmission of highly pathogenic avian influenza due to subtype H5N1 from wild birds to poultry and provide an early detection system. This meant that MS were responsible for defining risk areas and having the ability to restrict keeping poultry outdoors in those areas. To do this it was necessary for each MS to have a database that recorded where poultry are kept and whether they are kept outdoors.

In Great Britain, ongoing work had indicated that the existing data collection systems were not capable of fulfilling the EU requirement. Therefore, new legislation was enacted that required the registration of all commercial poultry flocks with 50 or more birds to form the Great Britain Poultry Register (GBPR). This 'cut-off' was chosen on the hypothesis that small flocks are incapable of generating large amounts of virus and rarely have links with the commercial sector of the industry, and so are less likely rapidly to cause an explosive epidemic involving millions of birds.

Materials and Methods

Workshops were held with commercial and scientific stakeholders, as well as those directly involved in disease control. These were to establish their requirements, and seek consensus on the design and implementation of data capture. During these workshops the data to be captured were agreed.

Results

Data

It was decided that data should be captured on a premises basis, rather than simply by company or agricultural holding number (CPH). A variety of data was captured to enable the distribution and maximum number of birds of species defined as poultry to be analysed. Address fields for the premises, the bird keeper, owner and linked companies together with details of whether the premises hatched birds and some specific disease risk questions were also collected. The risk factor data included information that would help to assess the risk of avian influenza from wild birds, to birds on particular sites, such as whether the birds were kept outdoors, or near water courses, and whether the premises was stocked only at particular times of year. Copies of the registration forms are available on the Defra website (Defra, 2006a).

Registration and responses

Registration of flocks began in December 2005; there were several channels made available to registrants these are indicated in Table 2. Multi-site companies were offered the option of a visit by Defra staff to capture the data directly from their systems. Interactive web forms are also being developed. The legislation required all eligible flocks to be registered by the end of February 2006. However the register remains open for late or new flock registrations. Premises that no longer keep birds are required to de-register, thus making the poultry register a dynamic list of active premises. Table 2 shows the number of registrations made through each channel.

Table 2. Number of Registrations through different communication channels, at 20 April 2006

	Phone	Post	E mail	Visit	Total
Number	12,165	8,207	2,678	58	23,108
Percentage, %	52.6	35.5	11.6	0.3	100

Over 23,000 poultry premises are now registered, more than 19,000 of them representing compulsory registrations (holding more than 50 birds, Defra, 2006a). Kernel-smoothed density maps showing the numbers of poultry premises captured by the register are available on the Defra website (Defra, 2006b). Analyses of the register data to identify systematic biases such as gaps in geographical coverage or industry sector of all legal registrations are ongoing. The data has been provided to various parties for contingency planning and for modelling potential outcomes should disease be introduced into the domestic GB poultry population.

Management of the data

The data is held in three systems, (i) the poultry register that captures and maintains the population data, (ii) a transactional system that can receive and collate population data (from the Register) with the administrative and epidemiological data that is captured during an outbreak (Diseases of Poultry Disease Control System, DP-DCS) and (iii) a stable information management system in which analyses can be performed (Rapid Analysis and Detection of Animal-related Risks, RADAR, Defra 2006c). Programming to allow transfer of data between these systems on a regular basis has been completed. A dynamic link has been established between DP-DCS and the GBPR; new premises and updates are loaded every half-hour. In order to ensure staff implementing disease control measures have access to the most recent data about premises, a system has been established to allow them to register new premises, through a priority registration channel, with the commitment that their new premises will get from the register through to the DP-DCS within 35 minutes.

Both DP-DCS and the poultry register have been linked to RADAR - an animal health information management system (Smith *et al.*, 2006). RADAR will provide the data for users during an outbreak including epidemiologists and the State Veterinary Service. DP-DCS and RADAR are networked and so allow both central and regional user access,

Uses of the data

The data have been used for the following purposes: (i) release to modelling groups for the development of disease transmission models, (ii) release to Local Authorities to enforce compliance with the legislation, (iii) to inform epidemiology, resource management and other aspects of disease control in a major national exercise, (iv) to define the risk area and inform other disease control activities when H5N1 was recovered from the carcase of a swan, and (v) to test the planned system to alert poultry keepers to a significant change in risk of avian influenza, *e.g.* to advise flock owners of the requirement to house birds. The latter showed that the alert function worked well, with mobile phone text messaging being the most rapidly effective.

Discussion

The threat of avian influenza provided an opportunity to establish improved systems for capturing population data for use in an emergency. Implementation of the GBPR was a large-scale exercise necessarily conducted in a short space of time, however it appears to have been successful. Checks are ongoing, but preliminary analyses indicate that the GBPR has been successful in capturing the eligible premises. This should reduce the need for local data capture and management, and the consequent proliferation of local datasets with potentially different information about the same event. However the solution is designed for use in an emergency and little progress has been made in establishing 'peacetime' use, which would allow familiarity with it to develop. Thus one of the reasons that local and independent data management is often set up during an outbreak has not yet been addressed.

The restriction of the statutory requirement for registration to premises with more than 50 birds ensured that larger holdings would be registered earlier and helped to manage the resource requirement for handling compulsory registrations between December 2005 and February 2006. The recent network analysis study carried out by one of the authors (JWW) has validated the hypothesis that holdings with less than 50 birds are unlikely to be important disseminators of disease, and suggests a higher cut-off value, possibly as many as 1000 birds, would be more appropriate for Great Britain. This may inform the consultation that is in progress on the requirement and scope for registrations in the longer term, as the current legislation to require registration is temporary. In the event of an outbreak, patrols would capture details about smaller premises within the disease control zones.

The alert system worked well, and feedback from those contacted during the test was very positive, however it demonstrated that more than one communication route would be needed to ensure a high contact rate.

References

- Defra, 2006a. 'Veterinary surveillance: Great Britain Poultry Register' website, <http://defraweb/animalh/diseases/vetsurveillance/poultry/index.htm> Accessed 19 April 2006.
- Defra, 2006b. Density of Poultry and Premises Registered in GB Poultry Register. Version 2, at <http://defraweb/animalh/diseases/vetsurveillance/reports/pdf/poultry-registered130306.pdf>
- Defra, 2006c. 'Veterinary surveillance: Rapid Analysis & Detection of Animal-related Risks (RADAR)' website at <http://defraweb/animalh/diseases/vetsurveillance/radar/index.htm>
- Smith, L. H., Paiba, G.A., Holdship, S., Lysons, R., Lawton, S., Hicks, J. and Roberts, S. 2006. UK Surveillance: Adding Value to Data by Conforming Domains and Deriving Additional Attributes. Paper 751, Proceedings of ISVEE XI, 6-11 August 2006, Cairns, Australia.