

## Monitoring avian influenza virus variants

### OFFLU project looks at Indonesian isolates

Since 2005, Indonesia has been the global hotspot for the highly pathogenic avian influenza (HPAI) epizootic in poultry and human H5N1 infections. Due to the high levels of H5N1 virus circulating in poultry and the frequent contact between poultry and humans, Indonesia is widely regarded as the country where there is still a high risk of emergence of a new virus which might cause an eventual human influenza pandemic.

Underlying this pandemic risk, however, is a continuing serious animal health problem. Since it was first recognized in 2003, HPAI has become enzootic in poultry throughout much of Indonesia, and outbreaks are being reported on every island where veterinary services are actively looking for disease. In this context, vaccination can be a useful tool in the short- to long-term control of enzootic HPAI on condition that an efficacious vaccine is available, that the strategies for vaccination are clearly defined, appropriate and implementable, sustainable and accompanied by other control measures, such as culling in outbreaks, control of movements and improved biosecurity, and that post-vaccination monitoring is undertaken.



The Indonesian government introduced a policy of vaccination against H5N1 in early 2004 as one of the measures aimed at controlling the developing HPAI epidemic. The large commercial sector has used vaccine widely and the information available indicates that this has reduced disease and commercial losses but, overall, the government vaccination campaign has had limited impact on disease incidence. Barriers to effective application of vaccination against avian influenza viruses in Indonesia include the difficulty in covering backyard and small village producers and insufficiently defined vaccination strategies. In addition, the problem of new circulating strains, and uncertain vaccine efficacy in ducks render the situation even more complex.

The results of a collaborative 'Vaccine Efficacy Project' run by the Indonesian government, FAO Indonesia technical staff and two OFFLU<sup>1</sup> laboratories (AAHL<sup>2</sup> and USDA-ARS<sup>3</sup>/SEPRL<sup>4</sup>) were presented in June 2007 in Jakarta. The project had been designed to evaluate the protection conferred by currently available vaccines against three

Indonesian H5N1 field viruses. The results showed that although the antibody response was good, indicating that the currently available vaccines were of high quality, they were not fully protective in challenge studies. Vaccine protection was poor for one virus strain, partly protective for a second strain and good for the third strain. The differences in levels of protection suggested significant variation in the antigenicity of the tested field strains. At the same time, the distribution and prevalence of recent virus strains in Indonesia remained unknown.

To shed new light on circulating H5N1 field viruses as well as the efficacy of currently used vaccines, OFFLU has drawn up the 'Monitoring avian influenza virus variants in Indonesian poultry and defining an effective and sustainable vaccination strategy' project. Implemented by FAO on behalf of OFFLU, the one-year study was launched in October 2007, and involves a number of international laboratory partners (AAHL, CVI<sup>5</sup>, Erasmus University, SEPRL and VLA<sup>6</sup>) and Indonesian partners (including laboratories and the poultry industry). The project includes capacity building as a major component and receives generous funding from USAID and AusAID.

Through the OFFLU project, HPAI field isolate collection and characterization is being intensified and researchers are carrying out virus characterization and antigenic mapping<sup>7</sup> of recent Indonesian isolates. Protective vaccines will be selected on the basis of the outcomes of the antigenic mapping of H5N1 field isolates and confirmation will be sought with challenge tests. Distribution of viruses geographically, by enterprise type, by species and by flock vaccination status will also be considered when selecting vaccine seed strain(s). Elaboration of new vaccine strain(s) for Indonesia is part of this project.

The OFFLU project aims to provide conclusive recommendations for a revision of the vaccination strategy in Indonesia, including clear criteria for vaccine selection, and is seen as an essential contribution to reducing HPAI infection both in the region and globally.

<sup>1</sup> OIE/FAO network of expertise on Avian influenza ([www.offlu.net](http://www.offlu.net))

<sup>2</sup> Australian Animal Health Laboratory, Geelong, Australia

<sup>3</sup> United States Department of Agriculture, Agricultural Research Service

<sup>4</sup> South East Poultry Research Laboratory, Georgia, USA

<sup>5</sup> Central Veterinary Institute, Wageningen, The Netherlands

<sup>6</sup> Veterinary Laboratories Agency, Weybridge, UK

<sup>7</sup> Smith et al. *Mapping the antigenic and genetic evolution of influenza virus*. Science. 2004 ;305:371-6.