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# Indonesia struggles to control bird flu outbreak

As officials in Washington discuss how to tackle outbreaks of bird flu more effectively (see page 927), an outbreak in humans continues in Asia. **Declan Butler** assesses the situation in Indonesia, and finds out how likely it is that the virus might evolve into a pandemic strain.

**How worrying is the Indonesian outbreak?** Previous human outbreaks have largely been in quite remote areas, but this one is centred on Jakarta, one of the world's largest conurbations and home to some 21 million people. Moreover, the country's population of 240 million looks after 1.3 billion chickens, many of which live among the 30 million backyard farms. These are spread across some 6,000 inhabited islands, making it difficult to track and control cases. Most of the cases so far have arisen on Java, home to half of Indonesia's population.

It is also unclear when or if the outbreak will end. Avian flu is now endemic in Indonesian poultry, in part because the government failed to cull birds when the virus first appeared.

#### What is so bad about the H5N1 strain of avian flu virus?

When scientists sequenced the genome of the flu strain that caused the devastating 1918 pandemic (see *Nature* 437, 794–795; 2005), they concluded that it probably arose from an avian flu that jumped directly to humans.

The team identified 25–30 amino-acid mutations in 1918 flu that seem to account for its virulence. Initial analysis of H5N1, which has killed 65 people in Asia so far, suggests that it already has some of these mutations. The fear is that if it accumulates more, it could acquire the ability to spread readily between humans. Each new human case gives the virus a chance to mutate and gain this ability.

#### How many people have the virus?

The media, the Indonesian government and the World Health Organization (WHO) all

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**Under pressure:** Indonesian officials are finding it hard to quantify and control the outbreak of bird flu among the country's chickens.

give conflicting numbers. This is partly because Indonesia's Ministry of Health declares cases immediately, whereas the WHO does not count cases until it has checked them in its own labs. The best current estimate, based on tests done by the Ministry of Health and the US Naval Medical Research Unit Number 2 (NAMRU-2) in Jakarta, is seven confirmed cases and two probable cases. Six of these nine individuals have died. There are also about 80 suspected cases, but most will probably prove not to be H5N1.

#### How well equipped is Indonesia to detect and treat cases quickly?

Outbreak investigation staff are stretched but coping, according to Steven Bjorge at the WHO's Jakarta office. Others are less sanguine. "One just has to look at the current polio, measles and dengue epidemics in Indonesia to

realize that the public-health system is having trouble coping with preventable diseases, so I don't have a lot of faith," says one scientist involved in monitoring the outbreak.

But other countries are helping out. Until 1999, Indonesia had virtually no flu-surveillance capacity. Since then, NAMRU-2, helped by the US Centers for Disease Control and Prevention in Atlanta, Georgia, has been working with the country's authorities to strengthen their ability to monitor and diagnose avian flu (C. G. Beckett *et al. Clin. Infect. Dis.* 39, 443–449; 2004). Over the past few weeks, teams have been sent to areas with poultry outbreaks to look for suspected human cases. Teams of foreign scientists, and aid, are also converging on the country.

#### Is the virus passing between people?

Probably, but in only a very limited way. Most cases have been spread out but there have been some family clusters. In July, an eight-year-old became sick, followed by her sister and father. On 10 September, a 37-year-old woman died in Jakarta, then her nine-year-old nephew contracted the virus. And the most recent cases — four- and five-year-old boys — are the nephews of a 20-year-old patient from Bandar Lampung in Sumatra.

But nailing down human-to-human transmission is difficult. Researchers have to work out how the first case got infected from poultry, then rule out the possibility that the other family members did not catch the virus in the same way. Most of the time, the inquiry gets nowhere. "We have no firm evidence of human-to-human transmission within a family, although sometimes it is difficult to exclude it," says Bjorge.

#### Has the virus mutated to make it more adapted to humans?

Not so far. "Sequences of recent human isolates are very similar to previous ones in Indonesia," says Masato Tashiro, a virologist at the National Institute of Infectious Diseases in Tokyo, which sent a team to Indonesia last week.

#### What are scientists worried about now?

Vietnam is bracing itself for an expected further wave of cases, as the colder temperatures during the winter months from November to February are conducive to transmission of the virus. Meanwhile, Europe is on the alert after suspected outbreaks were detected in poultry last weekend. If confirmed, they would add to fears that birds migrating from China and Russia this autumn may extend the geographical spread of H5N1. ■