Stopping Asia’s Avian Flu: A Worrisome Third Outbreak

Tokyo—Health officials are racing to contain an avian influenza outbreak that surfaced in South Korea in December, then in Japan and Vietnam early this month. It is virulent, they say: After making an unusual leap to humans, it has infected and killed at least five people in Vietnam. Ten more suspect cases in Vietnam are under investigation. Researchers have not yet determined the virus’s DNA sequence or its source. But authorities in the region, using the only tool available, have killed more than 3 million potentially exposed chickens to slow its spread.

Although the virus appears to be transmitted only by birds and not person-to-person, health authorities are watching it nervously. The more virus in circulation, the greater the chance it could re-assert “into something with the lethality of the avian flu and the transmissibility of a human flu,” says Ilaria Capua, a virologist at Italy’s National Reference Laboratory for Avian Influenza, a part of the Istituto Zooprofilattico Sperimentale delle Venezie in Padua. The potential for this deadly combination is “frightening,” says Capua, whose lab is also affiliated with the Paris-based World Organization for Animal Health (OIE, from its French name). A more infectious variant could touch off a pandemic.

The virus behind these fears is known as influenza A subtype H5N1. Subtypes are categorized by the forms of two surface glycoproteins, hemagglutinin (H) and neuraminidase (N). H5N1 first surfaced in poultry in Hong Kong in 1997, when it jumped the species barrier into humans, killing six of the 18 people it infected. Humans have limited immunity to avian viruses, which means “this virus is bad in humans,” says Robert Webster, a flu expert at St. Jude Children’s Research Hospital in Memphis, Tennessee.

The reappearance of H5N1 was no surprise. Webster and others have been warning that it could touch off a pandemic ever since it first appeared in Hong Kong. The territory contained the outbreak by slaughtering all of the city’s 1.4 million chickens and ducks. But experts have long believed that there is one or more animal reservoirs. “This virus is out there in large amounts somewhere,” Webster says.

An evolved variant showed up in wild birds in Hong Kong parks in late 2002. Then in February 2003, a variant nearly identical to the wild bird form was isolated from a Hong Kong man, who died, and his son, who became seriously ill but recovered. The man’s daughter had died of an undiagnosed respiratory illness while the family was visiting relatives in China’s Fujian Province (Science, 7 March 2003, p. 1504). The source was never pinned down. But Kennedy Shortridge, a virologist and now a professor emeritus at the University of Hong Kong who was involved in the 1997 investigations, says that the evidence all pointed to “the existence of natural reservoirs in southern China.” China has claimed in reports to OIE never to have had any large-scale outbreaks of avian influenza.

The appearance of H5N1 in South Korea, Japan, and Vietnam shows that the virus is spreading. But whether it was spread by migratory birds or infected poultry or poultry products is not clear. Webster developed a vaccine for the 1997 variant, but it’s not known if it would have any effect on this latest version.

Outbreaks of highly pathogenic avian influenza are increasing in frequency and severity, Capua warns. There were only 17 outbreaks in the 40 years from 1959 to 1998, she says. But there have been six in the 6 years from 1997 to 2003—not counting the latest incidents.

Capua suspects a combination of factors. The most important may be a phenomenal growth in demand for poultry, leading to denser concentrations of larger poultry farms without appropriate biological safeguards. Once an infection is introduced into this environment, “it spreads very rapidly and is very difficult to get rid of,” she says. Even if the virus is successfully contained this winter, Capua believes it is only a matter of time before it reappears.

—DENNIS NORMILE