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"One Health is the collaborative efforts of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, plants and our environment."

"One Health implementation will help protect and/or save untold millions of lives in our generation and for those to come."

"Between animal and human medicine there are no dividing lines--nor should there be." Rudolf Virchow, MD (the father of cellular pathology)

Coughs and sneezes, bats, birds, pigs and you

By Jack Woodall, PhD

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In 1998, pig farmers in northern Peninsular Malaysia noticed that their pigs were getting a disease that caused loud coughing. Next, people started coming down with fatal encephalitis, which was attributed to endemic, mosquito-transmitted Japanese encephalitis. But some of the victims also had atypical pneumonia, some of them had been vaccinated against Japanese encephalitis and would have been immune to it, and all of them were ethnic Chinese. The solution to the riddle was that in Moslem Malaysia, only non-Moslem Chinese raised pigs, and the vaccination did not protect because it was a different virus, a new member of the paramyxovirus family that is responsible for respiratory disease in humans and animals. It was named Nipah virus, after the Malaysian village from which the specimen came which yielded the first isolate of the virus. Its origin was traced back to fruit bats, which had been displaced from their original habitat by forest clearing and sought alternate food on farms. They were feeding on mangoes in trees overhanging the pig pens, into which their dejecta fell and contaminated the pig feed and water.

Cases turned up in later years, also in Asia: in Bangladesh between 2001 and 2008, outbreaks claimed over 129 victims with a case fatality rate (CFR), of about 75%; and in 2007 in India, with more than 70 cases and a 70% CFR. Transmission was no longer airborne from livestock, but was still connected with fruit bats. In those countries, collectors of palm sap for fermenting into palm wine found that their containers were attracting the bats, which were contaminating them in the same way as in Malaysia. By keeping out the bats with slatted bamboo mats over the cups on the palm trees, these outbreaks were curtailed.

Swine flu

Type A influenza viruses, including H3N2 and its variants, commonly cause outbreaks in pig farms. Most of the type A influenza viruses that infect swine are genetically very different from human (seasonal) influenza viruses. In 2012 an influenza A(H3N2)v (v for variant) swine influenza virus strain has been causing human infections at agricultural fairs in some parts of the United States. It has not so far been detected in pigs in European countries. Only people in direct contact with infected swine, such as in barns and livestock exhibits housing swine at fairs, are likely to be at risk of contracting this H3N2v strain of influenza virus. However transmission of this variant strain is thought to occur in the same way that seasonal flu transmits in people, which is mainly through coughing or sneezing by people who are infected. People also may become infected by touching something with flu viruses on it and then touching their mouth or nose. In most cases, variant flu viruses have not spread widely from person to person.

Severe Acute Respiratory Syndrome (SARS)

Coronaviruses, so called because they look like little crowns under the electron microscope, are common causes of the common cold in humans and animals, but most of them cause little inconvenience to you and me apart from giving us the occasional case of the snuffles. But in late 2002, one strain turned nasty.

In Guangdong province, China, people started coming down with a fatal pneumonia. The first the world knew about it was from an American public health physician who came across it by chance in an internet chat group with Chinese teachers, and reported it globally on ProMED. The disease spread to Hong Kong, where a visiting businessman came down with it, and unknowingly gave it to a number of fellow-guests in his hotel. The virus couldn't have chosen a better base, because those infected people travelled to their home countries and spread it all over the world. The disease was named Severe Acute Respiratory Syndrome (SARS), and before the pandemic burned itself out it had infected over 8000 people in 26 countries and killed nearly 800.

The proximate source appeared to have been masked palm civets, slender cat-like animals sold in wet markets all over southern China as a much sought-after delicacy. After they were banned from sale, and the markets disinfected, the epidemic ceased in China, and soon in the rest of the world. Much later, after the genome of the virus was sequenced, its closest relatives turned out to be bat coronaviruses, but nobody can figure out how bats could have infected civets.

Bird flu

At the end of 2003, an avian influenza virus jumped species from wildfowl, principally waterbirds, to poultry and people. It was named influenza A H5N1. Since then, it has spread to over 60 countries, where more than 250 million poultry in infected flocks have died or been culled, and over 500 human cases have been reported in 15 countries, with a 60% CFR. Since October 2012 outbreaks have been reported in poultry in India and Australia, and thousands of wild ducks have died from it in Russia, on lakes near the Black Sea. Ducks and hens don't cough; bird flu spreads between poultry and waterfowl through the feces, just like the bat-related viruses that caused the SARS pandemic and Nipah outbreaks.

Novel coronavirus

Fast forward a decade to April 2012, when there was an outbreak in a hospital in Jordan, which spread from a patient with pneumonia to a dozen members of the hospital staff, one of whom died. Their specimens were tested against all known human respiratory agents without a positive result. Careful surveillance did not reveal any community spread. But in late November, WHO reported that a novel coronavirus had been isolated from another Arab pneumonia patient, this time from

Saudi Arabia, and that retrospective testing had found the same virus in yet another recent Arab pneumonia patient from Qatar. Molecular studies have found that this virus is, once again, closely related to bat coronaviruses.

Before you suggest that all we have to do to protect ourselves is exterminate bats, be aware that they eat vast numbers of mosquitoes, protecting us from many mosquito-borne diseases, and they also pollinate most of the fruit trees which provide an important part of our food.

What we can do

On 30 November 2012, World Health Organization (WHO) put out a global alert asking all health personnel worldwide, not just in Arab countries, to look out for cases of severe acute respiratory infections (SARI), especially clusters in health care personnel. Given the history of bird and swine flu, Nipah and SARS viruses, I would strongly suggest that all of us who deal with livestock, companion animals or wildlife -- farmers, pet owners, zoo keepers, park rangers and nature lovers -- look out also for unusually virulent respiratory symptoms in the animals we care about, and report suspicious cases to the relevant authorities. The experience of recent years shows that we ignore diseases in the animals around us at our peril.

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