Should the U.S. develop and stockpile vaccines against A(H5N1) avian flu?

A(H5N1) is a strain of flu virus that infects many species of birds, including domestic and migratory fowl. It has been progressing steadily, infecting more and more birds throughout the world, starting in Asia and then spreading to Europe and Africa. It has resulted in the death of tens of millions of birds; some had fallen ill and died, others were culled to prevent the spread of the infection. Although it has not reached the United States, many scientists predict that it will. The virus may enter the U.S. through migratory bird populations, many of which pass through Alaska on their migratory routes. The virus could also be introduced by smuggling of exotic birds which are never quarantined and checked for infections, or an infected individual may enter the country (Grady and Kolata, 2006).

The influenza virus has a history that includes pandemic outbreak. Consider the 1918 flu pandemic, which was caused by a strain of avian flu similar to A(H5N1). This outbreak was responsible for the deaths of millions of people. Currently, A(H5N1) infects mostly birds, but there have been humans who have contracted the virus, usually from close contact with infected birds. When this virus does infect humans, it has a high lethality rate, believed to be over fifty percent, an estimate that some think may be inflated because some less severe cases may go unreported. To date there has only been one instance of human to human transmission reported. A(H5N1)’s low transmissibility from person to person is a characteristic that could change by a mutation of the RNA that makes up its genetic code or by antigen shift, if it infects an
individual who is also infected with another flu virus. Either of these methods could give A(H5N1) high transmissibility and allow it to spread like the common cold. High transmissibility paired with high lethality could allow A(H5N1) to be the pathogen that causes the next pandemic.

The United States should develop and stockpile vaccines against avian flu, but efforts should not stop there. Stockpiling of a vaccine - even one that is not specific to a mutated form of the virus - could provide some protection. Studies have shown that the vaccine currently available for avian flu would protect some people against a mutated form of A(H5N1), but there are problems. In order for the current avian flu vaccine to produce an immune response, strong enough to build immunity to the virus, large amounts of the vaccine need to be administered. The country barely has facilities to keep up with the vaccine production that is currently needed for the flu vaccine that is produced annually to prevent the common flu; there are not enough manufacturers of vaccines to meet the demand to stockpile adequate amounts of the vaccine for everyone.

Adjuvants are substances that boost the effectiveness of vaccines, lowering the amount needed to protect an individual and they have been found to allow the vaccine to protect against a wider range of viruses. If these substances were also stockpiled, they could allow the vaccine supply to be "stretched" and afford protection to a greater portion of the population (Grady, 2006).

A viral infection can be treated using antiviral drugs such as Tamiflu, Relenza (Grady and Kolata, 2006), Osteltamivar, and Zanamivir (Groeneveld and Noordaa, 2005). Antiviral drugs, such as neuraminidase inhibitors, are an option that some feel
might prevent those who have been exposed to the virus from falling ill and shorten the length and severity of an infection in those who are symptomatic if these drugs are administered within a short time of showing symptoms. These drugs could also be taken prophylactically but they would only provide protection while the drugs were present in the body. This method alone would require extremely large reserves of these antiviral drugs.

Careful monitoring of viral infections is critical, so that if there is a mutation of A(H5N1) or any other virus into a highly virulent strain that has a high lethality and a high transmissibility among humans, there will be advance warning so research can begin immediately for the production of a vaccine specific to that virus strain. This is a process that could take months or years, and may not be completed in time to head off a pandemic. Also, information must be shared between countries and research organizations.

Simple education of the public could also slow the spread of a pandemic. If the public is kept informed, many people may panic, but simple measures could be taken by individuals to prevent an infection, such as hand washing or keeping sick children home from school.

Lastly, governments throughout the world need to make outlining strategies for minimizing the effects of a pandemic. There are many things that must be addressed. One such item is, who will make decisions to close schools, businesses, public transportation and other places where large numbers of people could be exposed to a virus and when would the decision be made. Decisions also need to be made as to who will receive the vaccines, adjuvants, and/or antiviral medications that are available.
How will hospitals handle an influx of the number of patients that require respirators, something that is already in short supply? How would suspected cases of the flu be reported? Would the families of a patient and others who were in contact with an infected person be quarantined or treated with antiviral medications or vaccines? Will more facilities be made available for the production of vaccines and other medications that can slow the spread of the virus?

These are only some of the questions that need to be answered. A wait and see attitude is one that should not be adopted. The government and other agencies need to be proactive when planning for a pandemic and educating the public. Research for a broad spectrum vaccine needs to continue as well as monitoring the status of world health. Vaccines should continue to be produced and stockpiled as well as antiviral drugs and adjuvants. We have seen instances, such as hurricane Katrina, where adequate plans were not in place and it had severe consequences, this should not be another example of poor planning and preparation.
References