

# How to Balance the Risk and Benefit of Dual Use Research of Concern

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## Abstract

Dual use research on H5N1 Influenza is a big debate topic as technologies in research improve. Once DURC research is published, these studies could be misused by bioterrorist and considered a potential risk for public health with individual ill intent. There are many risks and benefits of performing and publishing of H5N1 studies in the United States. Some restriction in DURC are needed to take place to make sure the benefits outweigh the risks, so research could be performed to ensure the global health.

**Keywords:** research of concern, risk and benefit, dual use research

In 2012 the *Science* magazine published a review of the result of two studies about the pathogenesis and transmissibility of H5N1 in ferrets and the concern of dual-use research in those studies. Both studies were funded by the National Institutes of Health. Herfst et al. (2012) research studied the transmission routine of influenza viruses via airborne transmission in ferrets, whereas Russell et al. (2012) study aimed for the factors that could increase or decrease the potential for H5N1 transmission via respiratory droplet with a ferret model for mammalian host (Herfst et al., 2012; Russell et al., 2012). Both studies were considered important for public health and one of them (Herfst et al., 2012) was published with protocols included “reverse genetics, re-assortment, and passing of viruses in mammals” (p.1522). The studies provide the public with knowledge H5N1 influenza; however, there is a concern about dual-use research. Some consider these studies essential to fill in our knowledge gap of influenza in order to prevent the transmission of H5N1 and to help in making a universal vaccine for H5N1. Others consider the studies of H5N1 should not have been performed in the first place because they could be misused by bioterrorists. Since H5N1 is most pathogenic strain with a mortality rate of 60% in humans and high mutability, it is a potential pandemic to humanity (Van Kerkhove et al., 2012). Multiple questions arise from this DUCR research debate: Should DURC research is allowed? Should DUCR be conducted using federally-provided research monies? And lastly, should DURC be published in whole in the research literature?

To address the first question, should DURC research is allowed; we have to think about the reasons for performing the research. H5N1 is an easily transmissible disease in pigs, dogs, birds, and human. Influenza A viruses are a threat to public health since it could kill approximately 50,000 people in the United States and 500,000 people around the world seasonally (Fauci & Collins, 2012). Furthermore, in Herfst et al. (2012) and Russell et al. (2012), we know that influenza H5N1 strain are human compatible and air transmissible between mammals. Therefore, with all the potential risks of an H5N1 pandemic, DURC research should be allowed in order to prevent those risks.

Since DURC research is necessary, this brings up to the next question, should DURC be conducted using federally-provided research monies? To answer this question, we must consider the outcome of research use between private company and government institute provided monies. In government research institutes, researchers have to follow inspections, regulations, and standards of care to prevent all the potential risks. On the other hand, private companies have more freedom to perform DURC research, since they could avoid these issues because they are privately held and are not required to publicly disclose research information. But it increases the risk because they are not accountable. To perform the DURC research in the right way, DURC should be conducted using federally-provided research monies.

This brings this essay to the third question, should DURC be published in whole in the research literature? To answer this question, we must consider all the risks and benefits of published entire research paper. In order to

perform the test on the transmissibility of H5N1 influenza viruses, Herfst et al. (2012) created a new pathogen of H5N1 influenza viruses that could easily transmit between ferrets through manipulation of the genes of the H5N1 influenza viruses. This brings a potential risk that this new pathogen could continually mutate and transfer to human. In short, their papers with demonstrated methods could create a significant risk to public safety because individuals with ill intent could use those methods to make and release that new pathogen to cause harm to the public. Therefore, we should have restrictions or limited publication of the methods or quantitative approach of the model use of research literature in whole. However, at the same time, we need to share or provide those limited sections to researchers who need the information to perform continuous or better research in H5N1 viruses, and who also pass the background check for biosecurity purposes.

The questions are hard to answer, since the debate of DURC is dependent on the knowledge of social and government policy regulations for DURC research. In my view, government has an important role to make regulations that maximize the benefit and minimize the risk of DURC's study. Without good regulations, the issue of biosafety and bioterrorists could slow down the benefits of DURC research and provide minimal contribution to community or global health.

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