3M Occupational Health and Environmental Safety Division

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Respiratory Protection and Avian Influenza Viruses Frequently Asked Questions

The U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) have issued precautions that should be used with regard to avian influenza viruses. For the most current information see the CDC or WHO websites:

CDC http://www.cdc.gov/flu/avian
WHO http://www.who.int/topics/avian_influenza/en/

3M has also received a number of inquiries regarding respiratory protection and avian influenza viruses. Following are many of the most commonly asked questions and responses based on information provided by the CDC and WHO.

What is avian influenza or bird flu?
Influenza viruses that infect birds, such as the H5N1 virus, are called "avian influenza viruses." Avian influenza viruses do not usually infect humans; however, influenza viruses are constantly changing, and several instances of human infections have been reported since 1997.

What are the symptoms of avian influenza?
Symptoms of bird flu in humans have ranged from typical flu-like symptoms (fever, cough, sore throat and muscle aches) to eye infections, pneumonia, severe respiratory diseases (such as acute respiratory distress), and other severe and life-threatening complications.

How is avian influenza transmitted?
Birds that are infected with avian influenza viruses can shed the virus in saliva, nasal secretions, and feces. It is believed that most cases of avian influenza infection in humans have resulted from contact with infected poultry or contaminated surfaces. In such situations, people should avoid contact with infected birds or contaminated surfaces, and should be careful when handling and cooking poultry. Strict hand hygiene must also be performed. Other means of transmission are possible, such as the virus becoming aerosolized and landing on exposed surfaces of the mouth, nose, eyes, or being inhaled.

Can avian influenza be transmitted from person to person?
To date the CDC and WHO have reported that although there is evidence of limited person-to-person spread of infection, sustained human-to-human transmission has not occurred.

How long can the avian influenza virus survive in the environment?

The duration that these viruses can survive in the environment depends on temperature and humidity conditions, but they may survive up to weeks in cooler and moister conditions.

What type of personal protective equipment (PPE) is recommended for those who are involved with disease control and eradication activities?
According to CDC and WHO, US NIOSH certified N-95, European CE certified EN143 P2 / EN149 FFP2, or comparable national/regional particulate respirators should be worn by workers who eradicate infected poultry. Higher level particulate respirators may also be used. Disposable gloves, protective clothing, shoe covers or boots, and safety goggles should also be worn by eradication workers. Disposable PPE should be properly discarded, and non-disposable PPE should be cleaned and disinfected. Hand hygiene measures should be performed after removal of PPE.

What type of personal protective equipment (PPE) is recommended for health care workers who are exposed to patients with known or suspected avian influenza?
The CDC and WHO recommend the use of PPE to help prevent direct contact with the influenza virus. PPE that may be used includes gloves, masks, gowns, eye protection and for certain procedures US NIOSH certified N-95, European CE certified EN143P2 / EN149 FFP2, or comparable national/regional particulate respirators. Higher level particulate respirators may also be used. As of April 24, 2006, WHO's guidance states that particulate respirators should be used when working in direct contact with a suspected or confirmed avian influenza infected patient, particularly during aerosol-generating procedures. Disposable PPE should be properly discarded, and non-disposable PPE should be cleaned and disinfected. Hand hygiene measures should be performed after removal of PPE. CDC and WHO websites should be consulted for the most current information.

What is a type N95 respirator?
N95 is one of nine classifications for National Institute for Occupational Safety and Health (NIOSH) certified particulate respirators. N95 rated filters have a filtration efficiency of at least 95% filtration against solid and liquid particles that do not contain oil. In the NIOSH classification system, particulate respirators are given an N, R, or P rating. N stands for Not Resistant to oil. R stands for Resistant to oil. P stands for oil Proof. Each particulate respirator is also given a filter efficiency rating of 95, 99, or 100 when tested against particles approximately 0.3 microns in size (mass median aerodynamic diameter) according to the criteria stated in 42 Code of Federal Regulations Part 84.

Does 95% efficient mean that 5% of the particles get through my respirator filter?
Respirators are designed to help reduce, not eliminate, workplace exposures to airborne hazards. N95 rated respirators have a filtration efficiency of at least 95% against solid and liquid particles that do not contain oil. However, the efficiency of the filter material alone does not determine the overall reduction in airborne hazards provided by a respirator. The other determinant in reducing exposure is fit. If a respirator does not seal properly to the face, airborne hazards can penetrate or enter underneath the face piece seal and into the breathing zone. The term that incorporates the overall expected reduction in exposure is called an "assigned protection factor" (APF). NIOSH defines APF as the "minimum anticipated protection provided by a properly functioning respirator or class of respirators to a given percentage of properly fitted and trained users." The APF tells you the factor by which the respirator will reduce your exposure. The APF takes into account all expected sources of facepiece leakage, such as leakage around the edges, valve leakage, and filter penetration. The APF of a NIOSH-certified half facepiece respirator is 10. This means that

a properly used NIOSH-certified half facepiece respirator (one that covers your nose and mouth only, such as an N95 particulate respirator) will reduce your exposure to airborne contaminants by a factor of 10. Note, the APF is not intended to take into account factors that may reduce respirator performance such as poor maintenance, failure to follow manufacturer's instructions, and failure to wear the respirator during the entire exposure period. It is important that the respirator is correctly worn and used as part of a comprehensive respirator program as specified in the Occupational Safety and Health Administration (OSHA) Respiratory Protection Standard 29 CFR 1910.134.

What does CE certified EN149 FFP2 mean and can I use this type of respirator in the US?
EN149 is the European standard specifying the product performance of Filtering Facepiece Respirators (also known as disposable respirators). FFP2 is one of three classifications of performance within EN149. CE certified means a product has been tested and approved by an accredited body, and shown to meet the requirements of the European Directive for PPE – 9/686/EEC. European CE certified respirators are not sold in the US. Additionally, NIOSH certified respirators are not sold in the European Union.

What particle sizes will a type N95 rated respirator filter?
Respirable airborne aerosols found in the work place generally range between 0.01 to 100 micrometers (µm). N95 particulate respirators have been tested against and filter out particle sizes much smaller and larger than this range. The filtration efficiency rating of a filter (e.g. 95% for type N95s) is based on testing against particles approximately 0.3 microns in size (mass median aerodynamic diameter) according to the criteria stated in 42 Code of Federal Regulations Part 84. The 0.3 µm particle diameter was selected because, for filters, it lies within the most penetrating particle size range. Smaller and larger particles will be trapped in the filter at higher rates due to the physics of filtration. By using this most penetrating particle size range, particulate filters certified under these procedures can be used regardless of aerosol size in the workplace.

Will I get more protection from using a NIOSH-approved half facepiece N100 or P100 respirator, compared to a NIOSH-approved half facepiece N95 respirator?
The overall level of protection offered by a NIOSH-certified respirator is described by the "assigned protection factor" (APF). NIOSH defines APF as the "minimum anticipated protection provided by a properly functioning respirator or class of respirators to a given percentage of properly fitted and trained users." The APF tells you the factor by which the respirator will reduce your exposure. The APF takes into account all expected sources of facepiece leakage, such as leakage around the edges, valve leakage, and filter penetration.

The APF of a NIOSH-certified half facepiece respirator (using any filtration level) is 10. This means that a properly used NIOSH-certified half facepiece respirator (one that covers your nose and mouth only, such as an N95 particulate respirator), will reduce your exposure to airborne contaminants by a factor of 10. Note, this assumes the respirator is correctly worn and used as part of a comprehensive respirator program as specified in the Occupational Safety and Health Administration (OSHA) Respiratory Protection Standard 29 CFR 1910.134). Therefore, for respirators approved by NIOSH, increasing only the filter level (i.e. from N95 to N100 or P100) does not increase the level of protection.

If you are using a half facepiece respirator, such as an N95, and wish to increase the amount of exposure reduction you receive, then you must move to a NIOSH-certified full

facepiece respirator (one that covers your nose, mouth and eyes) or a NIOSH-certified powered air purifying respirator (PAPR).

Can a valved respirator be used to reduce exposures to avian flu?
Yes. A valved respirator is designed to allow for easy exhalation through a one-way exhalation valve. If a person is wearing a respirator to help reduce his or her exposure to an infectious disease, a respirator with an exhalation valve would be acceptable. It would not be acceptable for someone to wear a valved respirator if they have an infectious disease spread by droplets, such as SARS or TB, as they would be exhaling into the environment.

For other situations where healthcare workers are required to wear a respirator the use of a valved respirator must be in accordance with national guidelines. For example, in some regions of the world such as the U.S. and Canada, it is not acceptable for a healthcare worker to wear a valved respirator in a situation requiring a sterile environment, such as the operating room. For additional information on use of a valved respirator consult with National Regulations / Guidelines for more information.

Should avian influenza patients wear a surgical mask?
Persons suspected of having avian influenza should be separated from others and asked to wear a surgical mask. If a surgical mask is not available, tissues should be provided and patients should be asked to cover their mouth and nose when coughing.

How do I clean my respirator after use?
Disposable respirators should not be cleaned; dispose of the respirator immediately after use according to facility policy. In addition, the CDC and WHO suggest not touching the front of particulate respirators during removal and to follow with hand hygiene procedures.

Reusable respirators may be disinfected using a mild bleach and water solution (0.1% sodium hypochlorite).

Can disposable respirators be shared between people?
No. Disposable respirators should never be shared.

Can respirators protect you from biological agents such as bacteria or viruses?
Respirators are designed to reduce exposures of the wearer to airborne hazards. Biological agents, such as viruses, are particles and can be filtered by particulate filters with the same efficiency as non-biological particles having the same physical characteristics (size, shape, etc.). However, unlike most industrial particles there are no exposure limits established for biological agents. Therefore, while respirators will help reduce exposure to avian influenza viruses, there is no guarantee that the user will not contract avian flu. Respirators may help reduce exposures to airborne biological contaminants, but they don't eliminate the risk of exposure, infection, illness, or death.

What is the difference between a government-certified respirator and a surgical mask?
Respirators are designed to help reduce the wearer’s exposure to airborne particles. The primary purpose of a surgical facemask is to help prevent biological particles from being expelled by the wearer into the environment. Some surgical masks are also designed to be fluid resistant to splash and splatter of blood and other infectious materials. Surgical facemasks are not necessarily designed to seal tightly to the face and therefore air leakage

around the edges is likely. However, some respirators are designed to have the characteristics of both an approved respirator and a surgical mask.

How important is respirator fit?
Fit is very important. If a respirator does not seal properly to the face, airborne hazards can penetrate or enter underneath the facepiece seal and into the breathing zone. It is very important to always follow the donning instructions and do a user seal-check or fit-check before entering the contaminated environment. Some countries, such as the US and UK, also require fit testing. A good fit can only be obtained if the face is clean-shaven in the area where the respirator seals against the face. Beards, long mustaches, and stubble may interfere with a good seal and cause leaks into the respirator. Many medical facemasks, not approved as respirators, do not seal tightly to the face allowing airborne hazards to enter the breathing zone. Even those medical facemasks that appear to seal tightly to the face have not been designed to protect the wearer from airborne hazards. Therefore, they should not be considered an equivalent to or substitute for government-approved respirators.

Is fluid resistance important?
It is up to the health care facility to determine the need to provide fluid resistant respirators or masks to their health care workers. In the U.S., the Occupational Safety and Health Administration (OSHA) has specific provisions under the Bloodborne Pathogen Standard that specifically details the "appropriateness" of personal protective equipment used by health care workers. Within the EU there are various National Guidelines on the need for fluid resistant PPE in Health care situations. Fluid resistance is the ability of a respirator's or mask's material construction to minimize fluids from traveling through the material and potentially coming in contact with the user of the facemask. Fluid resistance helps reduce exposure to blood or bodily fluids caused from splash, spray or splatter. If the mask or respirator comes in contact with blood or body fluids of a suspect or confirmed avian flu patient, it is recommended the respirator or mask be changed as soon as possible. Respirators should only be removed when the wearer is in an area that is considered free of airborne hazards, including confirmed or suspect avian flu patients.

Q: Is 3M allocating supply of N95s to customers and distributors?

A: 3M is attempting to ensure that N95 respirators go to the customers who need them most. We are prioritizing new and existing customers who are fulfilling the requirements of their occupational respiratory protection programs. We are protecting our current channel by not setting up any additional distribution. We are not prioritizing stockpiling except for when governments and states are increasing their readiness for natural disasters and a potential pandemic. For the most highly constrained products, we are building schedules to make sure that distributors have the most reliable supply of respirators possible.