



Animal influenza: recommendations for respiratory protection



NOTE: Most of the information about avian influenza also applies to other potential pandemics, such as swine-flu.

Avian influenza and the spread of infection

Avian influenza (bird flu) is caused by a virus that can result in high mortality among birds. Avian influenza has previously affected only birds, but in recent years, the disease has also spread to humans. The greatest threat of a pandemic is if the virus becomes capable of spreading from person to person. Such pandemics have taken place at least three times in the past 100 years.

Symptoms

During the outbreak in Hong Kong in 1997, the symptoms were described as mild, including raised temperature, coughing, sore throat, eye inflammation and gastric complaints.

Notwithstanding the 'mild' symptoms, the *mortality* in people who have contracted the disease has been **high**. Therefore, it is crucial to maintain a high level of protection for persons who may come into direct contact with infected animals and materials.

Risk of infection

The risk of infection is greatest when a person comes into contact with infected dead or live birds, their feathers, blood, body parts, eggs or droppings.

In regard to food preparation, the virus is killed by cooking methods using high heat (above +158°F). Note that the virus cannot be destroyed by freezing.

It has also been discovered that the flu virus cannot survive a soaking in a 70% or higher concentration of ethanol (ethyl alcohol) for several minutes.

Advice for workers at risk of infection

People at risk of infection include not only persons in direct contact with infected wild birds or domestic poultry, but anyone working in proximity to bird products or materials soiled by bird faeces, such as buildings, vehicles, footwear, clothing and similar.

The official advice from WHO and other authorities includes creating a barrier between the worker and the hazard, in the form of respiratory and skin protection.

US health authorities recommend:

At least a respirator featuring an N95-class filter. The N95 classification allows up to 5% inward leakage through the filter material alone, and does not take into account any further leakage around the rims of the mask. This recommendation means either an elastomeric mask fitted with a filter, or a disposable filtering face piece. The device should be individually fit tested (there are many sources, for instance the OSHA web site <http://www.osha.gov/dsg/guidance/avian-flu.html>)

The eyes must also be protected.

There are several problems associated with the use of disposable N95 respirators.

Apart from difficulties with establishing an adequate protection factor through individual fit testing, another obstacle is the very fact that this type of mask is disposable and designed to be discarded after each use.

While stockpiling of respirators and ramping up of mask production would be possible over a long period, a bird flu pandemic would probably result in a shortfall of respirators.

Consequently, this could lead to attempts at pushing disposable N95 respirators beyond their approved uses, and thus to exceed their limitations.

The Institute of Medicine states:

Ensuring adequate stockpiles and acquisition mechanisms will offer more protection than attempts to reuse facemasks that were not designed for that purpose. Indeed, it might be preferable to stockpile respirators that are already known to be reusable, such as elastomeric facepieces with replaceable filters or powered air-purifying respirators.

(Source: see document quoted at right)

Some main findings of the Institute of Medicine:

- *No manufacturing process has been found to permit re-use of disposable masks.*
- *No method of decontamination of disposable N95 respirators has been found that a) kills the virus, b) is harmless to the wearer, and c) causes no damage to the respirator.*
- *No modifications have been found that could obviate the need for individual fit testing of disposable N95 respirators.*
- *Many elastomeric facepieces can be disinfected and reused, can be fit tested, and should be considered for use instead of filtering facepiece respirators.*

Source: Institute of Medicine, 2006, Reusability of Facemasks During an Influenza Pandemic: Facing the Flu, National Academies, Board of Health Sciences Policy, Committee on the Development of Reusable Facemasks for Use During an Influenza Pandemic, National Academies Press, Washington DC, pp. 3–4

Complete document available at:

www.nap.edu/catalog/11637.html

The S.E.A. Group recommends:

1. SR100 half mask with SR510 (P100) mechanical particle filter with pre-filter SR221 and close-fitting goggles
2. SR200 full face mask with SR510 (P100) mechanical particle filter with pre-filter SR221

Re-use of respirator and filter

As shown above, disposable N95 filtering facepieces have been found to be unsuitable for re-use.

In addition, while immersion in a 70% ethanol solution has been found to effectively kill the virus, electro-static filters fitted to elastomer respirators are also unable to withstand such treatment without serious degradation (*Martin Jr, SB & Moyer ES 2000, Electrostatic Respirator Filter Media: Filter Efficiency and Most Penetrating Particle Size Effects, Appl. Occ. & Env. Hyg., vol. 15:8, pp. 609–617*).

Elastomeric respirators with P100 mechanical filters offer greater efficiency and can be reused. The Sundström equipment described above has been thoroughly tested without any detrimental effects. In fact, after the equivalent of being immersed in 70% ethanol for 5 minutes 4 times a day for 18 months, the equipment described in points 1 and 2 above suffered no effects in performance or efficiency, apart from the printing ink fading from the filter label.

ONE Sundström Bird Flu Kit (with 80 pre-filters)

disinfected 4 times a day for 18 months

= 2,160 disposable N95 respirators

For cleaning/disinfection of SR100 or SR200 mask and filter, our recommendation is as follows:

1. Remove the pre-filter holder with the pre-filter from the particle filter.
2. Remove the particle filter from the mask or filter adapter.
3. Place the mask, particle filter, pre-filter, pre-filter holder and filter adapter (if used) in 70% ethanol.
4. The parts must be completely immersed in the ethanol for at least five minutes.
5. Lift out the parts (wear protective gloves). Shake out the ethanol.
6. Let the parts air dry for at least one hour before next use.

This disinfection procedure can be done as often as necessary.

- Change the pre-filter SR 221 at least every 7 days.
- Change particle filter SR 510 after 18 months or sooner if there is any concern regarding physical damage, hygiene (soil/dirt), or increased breathing resistance.

If using SmallTalk voice communication:

Both the half mask and full face mask can be fitted with SmallTalk ST2 voice communication equipment. If using SmallTalk, modify disinfection procedure as follows:

1. Spray all equipment with 70% ethanol solution
2. Remove SmallTalk and let air dry
3. Proceed as above with respirator and filters

Further information:

Department of Health and Human Services: Centers for Disease Control and Prevention
<http://www.cdc.gov>

Martin Jr, SB & Moyer ES 2000, *Electrostatic Respirator Filter Media: Filter Efficiency and Most Penetrating Particle Size Effects*, Appl. Occ. & Env. Hyg., vol. 15:8

National Defense University
http://www.ndu.edu/ctnsp/life_sci/TheBirdFluandyou%20Big%20Final.pdf

NIOSH 1996, *[Guide to the] Selection and Use of Particulate Respirators [certified under 42 CFR 84]*, DHHS Publication No. 96-101, January

Swedish Work Environment Authority:
<http://www.av.se/inenglish/index.aspx>

World Health Organization
<http://www.who.int>

World Health Organization Regional Office for South-East Asia
http://w3.whosea.org/LinkFiles/Update_2006_leaflet-newO.pdf



SEA AMERICA

11 Business Park Drive
Branford, CT 06405, USA

T: +1 203-483 9483
F: +1 203-483 6633
TollFree: 1888-732 3500

SEA EUROPE

Storgatan 64
S-331 31 Värnamo
SWEDEN

T: +46 (0370) 69 34 40
F: +46 (0370) 179 79

SEA AUSTRALIA

North Shore Business Park
35/1 Jubilee Avenue
Warriewood NSW 2102
AUSTRALIA

T: +61 (02) 9910 7500

E: sea.america@theseagroup.com

TollFree: 1888-732 3500
E: sea.europe@theseagroup.com

F: +61 (02) 9979 5364
TollFree: 1800-655 129
E: sea.australia@theseagroup.com