Pandemic Reference Guides

The documents listed here add up to approximately 170 printed pages. Having them in a notebook will make them easier to read and refer to in an emergency. Suggested sections headings for your printed Pandemic Reference Guide book include...

- Flu Prevention
- Bird Flu/Pandemic Influenza
- Flu Treatment
- Infection Control
- Protective Equipment
- Food
- Water
- Emergency Preparedness
- Emotional Support

**Proper Handwashing Procedure** 1 page
Department of Health - Republic of Philippines
Be certain to wash under your fingernails and always dry with a disposable paper towel. Print this page and place a copy at all sinks.

**Bird Flu and You** 1 page
National Security Health Policy Center (NSHPC)

**Advice for people living in areas affected by Bird Flu or Avian Influenza** 3 pages
World Health Organization (WHO)

**Preparing For The Coming Influenza Pandemic** 24 pages
Grattan Woodson, MD, FCAP and edited by David Jodrey, PhD

**An Introduction To Postural Drainage and Precussion** 8 pages
Cystic Fibrosis Foundation

**Infection Control Guidelines for Health Care Facilities for Influenza A (H5N1)** - 58 pages
World Health Organization (WHO)

**Guidelines For Laundry In Healthcare Facilities** 3 pages
Centers for Disease Control (CDC)

**The Use of Bleach for Disinfection** 2 pages
Hong Kong Government Center for Health Protection

**Guidelines on Disinfection of Households** 2 pages
Hong Kong Government Information Center

**Sequence for donning and removing personal protective equipment** 14"x8-1/2"
Centers for Disease Control and Prevention (CDC)

**Personal Pandemic Preparedness** 10 pages
**Community Pandemic Preparedness** 8 pages

FluWiki
Disaster Supplies Kit  4 pages
Red Cross

Preparedness Brochure  16 pages
US Dept Homeland Security

Food and Water In An Emergency  16 pages
Federal Emergency Management Agency (FEMA) & Red Cross

Keeping Food Safe During an Emergency  8 pages
US Dept of Agriculture, Food Safety and Inspection Service

Fight Foodborne Bacteria Summary  2 pages
Partnership For Food Safety Education

Emergency Disinfection of Drinking Water  2 pages
Environmental Protection Agency (EPA)

Tips For Talking With Children After A Disaster  3 pages
US Dept of Health and Human Services National Mental Health Information Center

I also strongly recommend printing the entire manual titled
Infection Control for Viral Haemorrhagic Fevers  209 pages
Centers for Disease Control and Prevention and the World Health Organization.
The information could be very helpful for patient care in the event of a pandemic.
Proper Handwashing Procedure

1. Wet hands and wrist. Apply soap.
2. Right palm over left, left over right.
3. Palm to palm, fingers interlaced.
4. Back fingers to opposing fingers interlocked.
5. Rotational rubbing of right thumb clasped in left palm and vice versa
6. Rotational rubbing backwards and forwards with tops of fingers and thumb of right hand in left and vice versa.

Make it a habit to wash your hands with soap and water.
What You Can Do

Four Simple Things You Can Do To Protect Yourself And Your Family

COVER YOUR COUGH AND SNEEZE
- Cover your mouth and nose with a tissue
- Put your tissue in the trash can
- If you do not have a tissue, cough or sneeze into your upper sleeve, not your hands

WASH YOUR HANDS
- Wash hands with warm, soapy water for at least 10-15 seconds
- OR use a hand sanitizer after:
  - Coughing or sneezing
  - Using the bathroom
  - Caring for a sick person
  - Handling garbage or animal waste

KEEP LIVING AND WORK AREAS CLEAN
- Clean areas with household detergents (dishwashing liquid, laundry detergent, hand soap).
- Sanitize surfaces with bleach or alcohol

KEEP YOUR DISTANCE
- Avoid crowds
- Limit your travel
- Travel to and from work during off-peak hours, if possible
- Work from home, if possible

The facts, recommendations and advice expressed or implied on this poster are those of the contributors and do not necessarily reflect the views of the Department of Defense, the National Defense University or any other agency of the Federal Government. If you are in any doubt about what actions to take you should obtain professional healthcare advice.
Advice for people living in areas affected by bird flu or avian influenza
8 November 2004

How to use this guide

Health officials who are alerted to a location where poultry (chicken, ducks and other farmed birds) have been found to be dying of bird flu or avian influenza (H5N1 virus) will need to take immediate steps to ensure that the disease does not spread. With a good plan, one that includes effective communication measures, the spread of bird flu can be successfully arrested. This simple guide provides key messages and information to achieve this goal.

The first objective is to identify the people and communities that are most at risk. This would constitute the primary audience. The Food and Agriculture Organization estimates that 70% of poultry is raised in backyard farms. It is critical, therefore, that health authorities provide basic information on prevention and control of avian influenza to these people as they are at greatest risk of being exposed to the disease. It is also advisable that this information could be disseminated through other communication channels such as the media, community leaders, nongovernmental organizations and policy-makers. This would constitute the secondary audience.

The second objective is to adopt and adapt these key messages and information for local dissemination and use.

The third objective is to provide additional local information that will enable or reinforce positive or desired actions and behaviours of the target audience. Hotlines, referral numbers and names of key people who could provide help can be added by health officials to this guide.

Key steps to ensure the effective use of this guide:

- Identify audiences.
- Adopt, adapt and translate if necessary before dissemination.
- Add relevant information on local contact persons, hot lines, help centres, etc.

KEY MESSAGES AND ADVICE

The spread of bird flu in affected areas can normally be prevented.

- People should avoid contact with chickens, ducks or other poultry unless absolutely necessary. This is the best way to prevent infection with the bird flu virus.
- Children are at high risk because they may play where poultry are found. Teach your children the following basic guidelines:
  - Avoid contact with any birds, their feathers, faeces and other waste.
  - Do not keep birds as pets.
  - Wash hands with soap and water after any contact.
  - Not to sleep near poultry.
- Do not transport live or dead chickens, ducks or other poultry from one place to another even if you think your birds are healthy.
- Handling of poultry in affected areas should be done within the area without transporting them to other areas.
- Do not prepare poultry from affected areas as food for your family or animals. The slaughter and preparation of such birds for food is dangerous.
- If you unintentionally come into contact with poultry in an affected area, such as touching the bird's body, touching its...
faeces or other animal dirt, or walking on soil contaminated with poultry faeces:
  o wash your hands well with soap and water after each contact;
  o remove your shoes outside the house and clean them of all dirt; and
  o check your temperature for 7 days at least once daily. If you develop a high temperature (>37.5°C), visit a
  doctor or the nearest health care facility immediately.

Proper handling of poultry that are ill, suspected of having bird flu or dead is an important control measure to
prevent the spread of the disease.

• Make sure to keep children away from dead or sick poultry.
• If you need to handle dead or sick poultry, make sure you are protected. Wear protective clothing such as a mask,
goggles, gown, rubber boots and gloves. If these are not available, cover your mouth with a piece of cloth, wear
glasses, use plastic bags to cover hands and shoes and fix these tightly around wrists and ankles with a rubber band
or string. Wear overalls that can be washed.
• If you encounter sick and dead poultry for the first time and are unsure of the situation, inform the authorities
immediately and leave the handling of the poultry to experienced personnel (cullers, clean-up personnel, etc.).

Decontamination of the yard or chicken pen will help control the spread of the disease.

• If possible, ask experienced personnel to help you decontaminate the yard or chicken pen.
• If this is not possible and you have to do it yourself, wear protective gear to protect your eyes, hands, feet and other
exposed parts of your body as described above.
• Dead birds should be buried safely (see next section).
• Effective cleaning results in no visible feathers or faeces remaining in the shed.
• Influenza viruses can survive for some time in organic material, so thorough cleaning with detergents is an important
step in decontamination. All organic matter must be removed from poultry houses as much as possible.
• As outdoor areas used by poultry can be difficult to clean or disinfect, poultry should be excluded from these areas for
a minimum of 42 days to allow natural ultraviolet radiation to destroy any residual virus. The period of exclusion
should be longer in cold weather.
• Spraying of disinfectants on vegetated outdoor areas or soil is of limited value due to the inactivation of these
chemicals by organic material. Removal of surface soil is not normally recommended unless it is heavily contaminated
with faeces.

Dead birds and their faeces should be buried.

• As much as possible, seek assistance from your local agriculture authority on how to bury dead animals safely.
• When burying dead birds or their faeces, try to avoid generating dust. Spraying or sprinkle water to dampen the area
first. Bury bird carcass and faeces at a depth of at least 1 metre.
• When the dead birds and their faeces have been properly disposed, clean all areas very well with detergent and water.
Influenza viruses are relatively susceptible to a variety of detergents and disinfectants.

Contaminated protective clothing should be properly handled or disposed.

• After the area has been cleaned, remove all the protective materials and wash your hands with soap and water.
• Wash clothes in hot or warm soapy water. Hang them in the sun to dry.
• Put used gloves and any other disposable materials in a plastic bag for safe disposal.
• Clean all reusable items such as rubber boots and glasses/goggles with water and detergent, but always remember to
wash your hands after handling these items.
• Items that cannot be cleaned properly should be destroyed.
• Shower/wash body using soap and water. Wash your hair.
• Take care not to re-contaminate yourself or the cleaned area by avoiding contact with dirty, contaminated clothes and
items.
• Most importantly, wash your hands every time after handling any contaminated items.

Footwear should also be decontaminated.

• After walking around areas that may be contaminated (such as farms, markets or backyards with poultry), clean your
shoes as carefully as possible with soap and water.
• When cleaning shoes, make sure that you do not flick any particles into your face or on your clothes. Wear a plastic
bag over your hands, shield your eyes by wearing glasses or goggles, and cover your mouth and nose with a cloth.
• Leave dirty boots and shoes outside the home until they have been thoroughly cleaned.

**People who have flu-like illness should take additional precautions.**

• WHO believes it is very important to prevent human influenza from spreading in areas affected by bird flu. Where the avian influenza viruses and human influenza viruses come in contact with each other, there is a risk that genetic material will be exchanged and a new virus could emerge.
• Anyone with flu-like illnesses should therefore be careful with secretions from the nose and mouth when around other people, especially small children, in order not to spread human influenza viruses.
• Cover your nose and mouth when coughing or sneezing. Use a tissue and throw it away once used. Teach children to do this as well.
• Always wash your hands with soap and water after any contact with secretions from nose or mouth as these can carry a virus.
• Children are especially prone to touching their face, eyes and mouth with unwashed hands. Teach children the importance of hand washing after coughing, sneezing and touching dirty items.
• Inform the health authorities immediately and seek medical advice from a health professional if you develop signs of illness, such as fever and/or flu-like symptoms.

**Precautions can be taken when visiting friends or relatives in health-care facilities.**

• If you visit a patient who has bird flu, follow the advice from the hospital staff to wear protective clothing, including a mask, gown, gloves and goggles.
• Such special protective clothing is required when you have direct contact with the patient and/or the patient’s environment.
• It is important that the protective mask fits properly. If it doesn’t, seek advice from the hospital staff.
• When you leave the patient’s room you must remove these items and wash your hands with soap and water.

**In affected areas where the presence of bird flu has been confirmed, do not eat poultry meat that comes from dead or sick animals.**

• In affected areas it is advisable not to use dead and sick chicken or other poultry for preparing food for humans and/or animals. Even healthy-looking poultry of any kind from a bird-flu affected area should not be used for food.

**In neighbouring areas (next to the bird-flu affected area) some precautions need to be taken.**

• In general, only apparently healthy poultry should be prepared for food.
• For killing, use a method that does not contaminate you or the environment of your household with blood, dust, faeces and other animal dirt. Seek advice from the agriculture authority about the proper procedure.
• For plucking, use a method that does not contaminate you or the environment of your household with dust, faeces and other animal dirt. It is best to put poultry in boiling water before plucking feathers.
• For degutting, use a method that does not contaminate you or the environment of your household with blood, dust, faeces and other animal dirt.
• Do not touch other items or your face (e.g. rubbing your eyes) during the procedure, unless you have washed your hands with soap and water.

**Take all precautionary measures to ensure that poultry and poultry products are properly prepared and safe to eat.**

• Chicken prepared hygienically and cooked thoroughly, i.e. no pink juices should be observed, can be considered safe to eat. However, remember, if the bird has a transmittable disease, such as bird flu, the person preparing the food is at risk of becoming infected and the environment may become contaminated.
• Eggs, too, may carry pathogens, such as the bird-flu virus inside or on their shells. Care must be taken in handling raw eggs and shells. Wash shells in soapy water and wash hands afterwards. Eggs, cooked thoroughly (hard boiled, 5 minutes, 70°C) will not infect the consumer with bird flu.
• In general, all food should be thoroughly cooked to an internal temperature of 70°C or above.
Preparing for the Coming Influenza Pandemic

By Grattan Woodson, MD, FACP
Edited by David Jodrey, PhD
7Oct2005b
Author’s Foreword

An extraordinary event is happening right now in Southeast Asia that has the potential to affect humanity in ways thought banished years ago. Scientists are closely monitoring what looks like the birth of a super strain of one of humankind’s oldest and most persistent enemies, the influenza virus. This new strain has the potential to kill hundreds of millions given the right conditions. According to the World Health Organization and the US Centers for Disease Control and Prevention, the required conditions are now in place. We stand on the verge of a once a century influenza pandemic, an event quite different from our routine seasonal flu. Pandemic flu spreads like wildfire through the human race leaving death, chaos, and civil disorder in its wake.

This monograph is dedicated to, and written for my patients. I wrote it both to inform them about this health threat, and to provide them with some practical guidance on how they can survive the pandemic. It is certain that we will have another influenza pandemic, and probably soon. What is not known is whether the pandemic will be of the major variety resembling the 1918 flu, or a minor one more like the 1957 flu pandemic. My advice is to prepare for the worst and hope for the best.

The first few sections of this monograph deal with topics related to the influenza virus, with special attention on the 1918 Spanish Flu, which was the last major pandemic. What happened then is the best source of information on what could happen now. Given the extremely disruptive effect a major pandemic would have on society and essential services, several prudent suggestions are provided for you to consider taking before the pandemic sets in.

During a major pandemic, many ordinary people will find themselves responsible for providing medical care to loved ones and friends. Under usual circumstances patients this sick would be hospitalized — but during a major pandemic, that option is not likely to be available. To assist you in this heroic lifesaving task, I have included advice on how to provide home care to very sick or even dying influenza patients.

Revised 19Dec2005: 1) the Oral Rehydration formula was changed by an increase in the salt content to 1 tsp from ¼ tsp. The original formula would have worked OK but the increase in sodium in the new one is better. 2) The recommendation to re-administer urine as a method of recycling oseltamivir (Tamiflu) was removed from this version because of the suggestion that the oral bioavailability of oseltamivir carboxylate, the active metabolite or Tamiflu found in the urine was poor. While I have not been able to confirm this yet, I have decided to drop this recommendation until I can.
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### Information about the Coming Avian Influenza Pandemic

A highly virulent and deadly new influenza virus strain is emerging in Southeast Asia that is of great concern to health administrators and infectious disease specialists. The new virus is called H5N1 avian influenza virus type A. Many infectious disease experts think we are on the verge of a major worldwide influenza pandemic of similar severity to the 1918 Spanish Flu.
The impact of 1918 flu pandemic can be clearly seen as a spike up in US mortality. *Armstrong, etal. JAMA 1999;281:61-66

Pandemics are simply worldwide epidemics. During flu pandemics, a higher than usual percentage of the population becomes infected and more people die from these infections than during the usual annual flu season. Pandemics occur because a new influenza virus makes its way from birds or swine to humans resulting in a strain for which we have very little immunity.

There are major pandemics and minor ones. Minor ones are more common and much less severe than major ones, but still a lot worse than routine flu outbreaks we experience each winter. All pandemics infect many times more people than happens with the seasonal flu but during major pandemics the death rates also soar into the tens of millions or even higher.

I became aware of the potential threat of an avian influenza pandemic last year. One of the most surprising things I learned was that influenza pandemics are regular events. They have an almost predictable periodicity of 3 per century. In fact, over the last 400 years there have been 12 flu pandemics recorded. Every 100 years or so a major pandemic occurs that is so severe it dwarfs everything else by comparison. The last one of these events was the Spanish flu in 1918.

During that pandemic, 5 to 10 times as many people as usual became severely ill with flu, and many millions died from their infection. The percentage of the population that becomes ill with flu symptoms is known as the clinical attack rate. It is interesting to me that studies of influenza antibody levels in people before and after influenza epidemics reveal that the percentage of patients with blood evidence of having had the flu is twice as high as the reported clinical attack rate for the epidemic. In other words, for every person who gets sick with the flu there is another person who contracts the virus but has no or very few symptoms of the illness.

The medical term for the percentage of those who become ill who then die is the case fatality rate. The case fatality rate hovers around 0.2% to 0.35% during the usual winter flu season. During minor pandemics, this rate can increase up to 3 or 4 times but during a major pandemic the case fatality rate is increased by 10 to 50 times.

Most flu experts predict that it is only a matter of time before the virus becomes communicable between people, so that is really not the burning question. According to the World Health Organization guidelines for pandemics, as of September
2005 we are in Phase 3. This places us in the Pandemic Alert Period and just one step away from human-to-human spread that will be followed by a worldwide pandemic.

Epidemics and Influenza Pandemics

An epidemic is defined as an infectious illness that spreads so quickly that the number of new cases rises in an exponential manner rather than just increasing linearly. This means that during epidemics, the number of new cases doesn’t just go up by ones or twos each day. During an epidemic, the number of new cases doubles every few days.

A pandemic is an epidemic that spreads across the globe affecting every continent rather than being confined to one geographic area. One of the most important reasons for influenza’s success as a human invader is its infectivity. The infectivity of an organism is determined by how easily it is transmitted from one person to another. Infecting agents that can cause illness after a small exposure are more contagious than ones that require a larger exposure. Infectivity is increased when infection can be passed between people without any direct contact.

The most common way for flu to be transmitted is by breathing air contaminated with virus. Coughing is how the virus gets into the air in the first place. Flu can also be transmitted by direct contact with someone ill with the disease. This includes shaking their hand or even touching something that the sick person previously touched. Under the right conditions, flu can remain infectious for days outside of the human body, living on surfaces like counter tops or doorknobs. Transfer of the virus can occur when a susceptible person touches a contaminated surface.

After the virus is spread from one person to another, it can infect the new person only if that person is susceptible or vulnerable to it. With respect to influenza, virtually 100% of the human population is susceptible to a new strain. However, fully half the susceptible patients who contract the flu have no or few symptoms.

Influenza causes pandemics because it scores so highly in all these causes of infectivity. These characteristics of influenza help explain why this organism can quickly spread from one region of the globe to another. Even during the relatively primitive travel conditions existing in 1918 it only took 6 weeks for epidemic influenza to spread from the US to Europe and Africa. Imagine how fast the next pandemic virus will move across the globe given the many thousands of passengers traveling internationally by air every day! Taking this into account, the British Government’s Health Protection Agency predicts in their Influenza Pandemic Contingency Plan that once the first case of pandemic flu reaches Hong Kong it will take only 2 to 4 weeks for the pandemic strain to arrive in the United Kingdom.

WHO Pandemic Phases May 2005

<table>
<thead>
<tr>
<th>Interpandemic Period</th>
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</thead>
<tbody>
<tr>
<td>Phase 1. No new influenza virus subtypes detected in humans although there are some endemic in animals that have infected humans.</td>
</tr>
<tr>
<td>Phase 2. No new influenza virus subtypes detected in humans although there are some subtypes that pose a substantial risk to human health</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Pandemic Alert Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 3. Human infection confirmed with new sub-type but no or only minimal human to human spread among close contacts only confirmed.</td>
</tr>
<tr>
<td>Phase 4. Small clusters with limited human-to-human transmission but spread are highly localized, suggesting that virus is not well adapted to humans.</td>
</tr>
<tr>
<td>Phase 5. Larger clusters but human-to-human spread still localized, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).</td>
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</tbody>
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<table>
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<tr>
<th>Pandemic Period</th>
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<tbody>
<tr>
<td>Phase 6. Pandemic: increased and sustained transmission in general population.</td>
</tr>
</tbody>
</table>

Source: The WHO


A feature of influenza pandemics not well appreciated generally is that they occur in waves. The 1918 Spanish flu (H1N1) was associated with three waves, while the 1957 Asian flu (H2N2) and 1968 Hong Kong flu (H3N2) pandemics had two
distinct waves each. The reason for this wave behavior is not known, but some have speculated that it is due to a change in the season of the year. The timing of a wave may also be related to a genetic change or mutation in the new strain of influenza virus. In past pandemics, the time between two waves was 3 to 9 months. A point to keep in mind about pandemic waves is that the second wave can be much more severe than the first or third wave of the series. During the 1918 pandemic, the deadly second wave was responsible for > 90% of the deaths for the entire pandemic.

While the typical flu season predictably occurs from November through March, during pandemics, flu can vary from this script. The first wave of the 1918 flu occurred in the spring of that year ending in March. That flu was very severe by usual standards but the second wave beginning 6 months later in September was the most fatal. The third wave occurred during the following winter/spring and was the mildest of all. It is of note that pandemics end simply because all or most susceptible persons within the population have contracted the infection and have either died or developed immunity.

During pandemics, a major difference compared with seasonal flu is that the highest death rates are among the healthy 20 to 30 year old adults. This is in contrast with the seasonal flu that strikes the very old, the young, and the infirm the hardest. Of course, the usual victims of seasonal flu are not spared during pandemics. On the contrary, death rates are much higher for every age and risk group during pandemics compared with seasonal flu. The point here is that the age 20 to 30 year group, usually immune to the ravages of seasonal flu, experiences the highest death rates of any group during pandemic years. Ironically, one possible explanation for this pandemic observation may relate to the increased health and vigor of this group’s immune system.

What Makes the H5N1 Avian Flu so Fearsome?

The reason for the present state of alert among world health authorities is the belief that we are witnessing the development of a 1918-type major flu pandemic in Southeast Asia - a once in a 100-year major flu pandemic - due to the emergence of a H5N1 Influenza virus type A.

On average there are two minor pandemics for every one major pandemic. The minor pandemics are associated with lower clinical attack and case fatality rates than in major pandemics. For instance, the 1957 pandemic was associated with three times as many deaths than seen for seasonal flu but during the 1968 flu pandemic, there were only a few more deaths than would be expected. It has now been 37 years since the last flu pandemic, which suggests we may be due for another one soon.

What makes avian influenza H5N1 so troubling to the medical community? It is its stunning killing ability, a statistic known as the lethality of the disease. The 1918 flu, like most pandemics, infected 40% to 50% of the world’s population or approximately 640 million persons at the time. If we assume that approximately 80 million people died during the 1918 influenza pandemic, this results in a case fatality rate of about 12.5% of those infected. What is so worrisome to the influenza experts at the US CDC and WHO is the case fatality rate for humans that become infected with the strain presently brewing in Southeast Asia has been about 50%. This overstates the true lethality to an unknown extent, as there may well be a number of milder cases who have not come to the attention of the health authorities. Nevertheless, these fatalities show what kind of casualties the virus can cause.

Right now, the virus is confined mostly to birds, but has adapted to tigers and pigs. Almost all the humans infected have had contact with infected birds during processing, cooking, eating, caring for them, or visiting the zoo in Jakarta, Indonesia. However, a few people are thought to have caught the bird flu from close contact with infected relatives. Close attention is being given for any sign that H5H1 avian influenza has become more efficient in person-to-person spread, either from mutation or from swapping genes with another flu variety in an infected person or animal. When this event occurs, a development that influenza experts predict is imminent, the new viral offspring would gain the ability to spread directly from person-to-person. This development would signal the beginning of the pandemic.

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1 For a variety of reasons explained in the next section of this monograph, in my opinion the best estimate of the worldwide number of deaths attributable to the 1918 influenza pandemic is 80,000,000.
What was believed to be the first documented case of person-to-person transmission of avian flu last year in Thailand was reported in the New England Journal of Medicine. That strain did not spread further in people. However, as this is being written, in early fall 2005, a number of troubling cases of family clusters are being reported in Indonesia.

If and when a bird flu virus that spreads well between people emerges, we cannot be certain how lethal this new virus will be. It is not likely to be as lethal as native H5N1 avian flu has been to the people who have caught it from birds, but will probably be a lot worse than routine seasonal flu. While no one can predict this in advance, it seems logical to assume that there is 1 in 3 chance that the offspring virus will have a worldwide clinical attack rate of 35% and 50% and a case fatality rate of 3% to 10%. If this proves to be the case, the effect on humanity and society will be traumatic in ways thought impossible today in light of advances in technology and medicine since 1918.

In the opinion of Dr. Michael Osterholm, PhD, writing in the New England Journal of Medicine, the most likely scenario if we have a major pandemic, is for an event that approximates the death toll seen during 1918 Spanish Flu. On the other hand, if reassortment of H5N1 avian flu with human influenza results in a pandemic of the minor variety this would not represent a dire threat to humanity or lead to any significant disruption in our social or economic life.

Right now, we are dealing with probabilities and expert estimates. It seems there is a 1 in 3 chance the next pandemic will be of the major variety. Estimates by government agencies tend to focus on the hoped for 2 in 3 chance that the next pandemic will be of the minor variety. No doubt these sanguine estimates are affected by government policies, politics, and fears of upsetting the public.

These influences may explain why the government prediction for the clinical attack rate is at the low end for pandemics, and why the predicted case fatality rates are the same as those seen during seasonal influenza. Higher and more realistic morbidity and mortality estimates are beginning to emerge in the press and in television and radio interviews of influenza experts. Tommy Thompson, then Secretary of the US Department of Health and Human Services, made an interesting comment at a news conference he gave just before departing his office in early December 2004. He said that one of the things he was very concerned about was a worldwide influenza pandemic that could result in the deaths of 30 to 70 million people. Officially, however, the government is standing by their rosy scenarios.

A Comparison of Estimates for Influenza Pandemic Mortality and Morbidity

When trying to project the effect of a pandemic, the key statistics to predict are the case fatality rate and the clinical attack rate. This is because the death rate during a pandemic is the simple arithmetic product of these two rates. The formula for the number of deaths due to a pandemic is:

\[
\text{Number of Deaths} = \text{Case Fatality Rate} \times \text{Clinical Attack Rate} \times \text{Population Size}
\]

Where: Deaths is the number of people who die, the Case Fatality Rate is the percent of patients with the illness who die from the illness, and the Clinical Attack Rate is the percentage of the population who develops influenza with symptoms of infection. The number of deaths increases as either one of these key pandemic statistics increases.

Pandemic years are associated with many more cases of influenza and a higher case fatality rate than that seen in seasonal flu outbreaks. It is common to encounter clinical attack rate ranges for seasonal flu of 5% to 15% in the literature. For pandemic flu, clinical attack rates are reported in the range of 25% to 50%. Case fatality rates are more difficult statistics to come by. They are available for recent pandemic and seasonal flu in the developed nations, but unavailable for past pandemics and present seasonal flu in undeveloped nations. The most reliable pandemic statistic is the number of deaths

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3 Director of the Center for Infectious Disease Research and Policy, the associate director of the National Center for Food Protection and Defense, and a professor of public health at the University of Minnesota, Minneapolis
5 Draft Pandemic Influenza Preparedness and Response Plan, DHHS, August 2004
6 UK Health Protection Agency Pandemic Plan for Influenza Feb 2005
for the developed nations. The number of worldwide dead due to the 1918 pandemic was initially reported as 20,000,000. The most recent estimate of worldwide deaths during the 1918 pandemic is 60,000,000 to 100,000,000. It is of interest that despite being replaced by estimates using improved epidemiologic methods and better data, the discredited earlier statistics are often used in modern day publications on pandemics and even within otherwise authoritative government or scientific reports.

In the US, the Department of Health and Human Services has prepared a draft US Pandemic Influenza Preparedness and Response Plan that was published in August 2004. In this planning document, the DHHS also provides predictions on flu morbidity and mortality that they state are likely to occur during the next pandemic. These estimates can be extrapolated to the world as a whole.

### US DHHS Mortality and Morbidity Estimates for the US and Worldwide for the Next Pandemic*

<table>
<thead>
<tr>
<th>US Population 2005 = 296,000,000</th>
<th>World Population 2005 = 6,600,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case Fatality Rate Estimate</strong></td>
<td><strong>Clinical Attack Rate Estimate</strong></td>
</tr>
<tr>
<td>0.20%</td>
<td>15%</td>
</tr>
<tr>
<td>0.20%</td>
<td>35%</td>
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*Adapted from the US Pandemic Influenza Preparedness and Response Plan: - DRAFT Aug 2004

Inspection of the US DHHS projections reveals that these calculations have used the case fatality rates seen during seasonal influenza in the US, which are far lower than those seen in either minor or major pandemics. In my opinion, this greatly weakens the credibility of the US estimates. If the US DHHS is actually using these predictions as the basis for their pandemic planning, I fear that we will be woefully unprepared.

For comparison, let’s turn to Osterholm’s recent *New England Journal of Medicine* article on influenza. Using a range of estimates of case fatality and attack rates, he calculates the number of deaths the US and world could expect from the next pandemic if it is equal in severity to the 1918 pandemic.

Osterholm used the simple expedient of extrapolating the same death rates observed during the 1918 pandemic to the present adjusted for the increase in population. For the worldwide death number, his range of 180 million to 360 million is based on the current best estimate of world deaths during the 1918 event of 60 to 100 million deaths.

### Osterholm’s Pandemic Case Fatality Rate Prediction for the US

| US Population 2005 = 296,000,000 |
|----------------|------------------|
| **Case Fatality Rate Prediction** | **Clinical Attack Rate Estimate** | **Number of Deaths in USA Estimate** |
| 2.30% | 25% | 1,700,000 |
| 1.64% | 35% | 1,700,000 |
| 1.15% | 50% | 1,700,000 |

### Osterholm’s Pandemic Case Fatality Rate Prediction Worldwide

| World Population 2005 = 6,600,000,000 |
|----------------|------------------|
| **Case Fatality Rate Prediction** | **Clinical Attack Rate Estimate** | **Deaths Worldwide Estimate** |
| 10.91% | 25% | 180,000,000 |
| 7.79% | 35% | 180,000,000 |
| 5.45% | 50% | 180,000,000 |
| 21.82% | 25% | 360,000,000 |
| 15.58% | 35% | 360,000,000 |
| 10.91% | 50% | 360,000,000 |
I conclude that the method used by Osterholm provides a more reliable estimate of the likely impact of the next pandemic than those provided by the government sources. Therefore it makes more sense to rely on Osterholm’s predictions as the best guide for what to expect if we experience a major pandemic. If the next pandemic is of the minor variety, then there is little chance for any major disruption of civil society or any of its institutions. This is not to say that the number of deaths will be inconsequential, or that the medical systems worldwide will not experience temporary overcapacity and shortages. But this is not the issue and never has been. The critical issue is not how to cope with a minor pandemic but rather how to cope with a major event. That is the focus of this guide. Preparing you for this possibility is my goal.

In my view, the gross underestimate of the impact of the next pandemic on the US by the Department of Health and Human Services suggests a number of unsavory possibilities. Since they have access to the best-educated and brightest epidemiologists and medical scientists, the reason for their less than robust prediction is not for lack of information or analytic ability. Suffice it to say that their performance so far does not bode well for them being a reliable source of information as the pandemic progresses.

It is likely that the forces and motives operating within the US Government that lead to this treatment of the truth are shared by other national governments as well.

**Issues Affecting Medical Treatment of Avian Influenza**

**Vaccination**

Vaccination is the most effective method of protecting against this infection. Overall, vaccination is considered 70% effective in prevention of influenza. The most commonly employed method of flu vaccine manufacture entails growing live virus in fertilized chicken eggs and then separating the viral particles from the egg. The particles are inactivated by heat, blended, and then mixed with sterile water to produce a specific concentration of killed viral particle proteins.

Purified killed influenza vaccine is proven to be safe and effective for producing protection against flu infection. After vaccination, the body’s immune system recognizes these viral proteins as foreign invaders and mounts a vigorous campaign to destroy them. Vaccination leads to the formation of immune system cells that make antibodies against the virus and others that search out and destroy the virus directly.

These cells remain on alert in various locations of the body as well as circulating in the blood. They remain on guard for any sign that influenza has invaded the body. If the strain of influenza for which these cells are targeted is detected, they are called into action, multiply rapidly, and quickly mount a usually successful defense against the flu. One common misconception about flu vaccination is that it prevents infection with flu entirely. This is not so. Flu infection occurs even if you have been successfully vaccinated against that strain of flu. What happens when a vaccinated person develops the flu is that instead of experiencing a serious and in some cases life threatening illness, the resulting infection is much milder and shorter in duration, resembling a cold more than the flu. Some vaccinated patients have no symptoms at all when they contract the flu.

Manufacturers of flu vaccine have already begun brewing the strains of the virus planned for the 2005-6 flu season and the US has ordered 90 million doses. This number of doses is enough vaccine to immunize the Americans that fit the CDC’s recommended list for flu vaccination. This includes the very young, the elderly, the infirm, healthcare workers, public safety officers and all adults age 50 and older. There is very little vaccine earmarked for healthy teens or younger adults.

It takes 6 to 8 months to make a batch of vaccine using the chicken egg method and the capacity to manufacture vaccines has been in decline here and abroad for two decades. Today, world influenza vaccine capacity is just 300 million doses which is only enough to protect 5% of the world’s population. Most of the world’s influenza manufacturing capacity is in Europe (Great Britain and France) with a relatively small percentage in the US, Canada, and Japan.

Obviously with the world’s population now exceeding 6.6 billion, when the next pandemic occurs there is not going to be enough vaccine to go around. Recent studies show that young healthy adults become immune with a reduced (half) dose of killed flu protein if it is given combined with an **adjuvant**, a substance that stimulates the immune response to a protein.
So by mixing the vaccine supply with an adjuvant, we could roughly double the current supply but even that would not be nearly enough to protect the world’s population. This fact has been discussed and some have advocated that the world’s flu vaccine be shared more equitably between the developed (G8) countries that are now slated to get 90% of the vaccine output and the rest of the world. It does not appear that there will be a marked increase in vaccine manufacturing capacity or sharing of the limited vaccine supply. The ramifications of this lack of vaccine availability could have major world political and economic consequences extending many years into the future.

In March 2005, Sanofi Pasteur, the French vaccine manufacturer, released the first vaccine made for humans directed against the avian influenza A H5N1 virus for testing and evaluation by virology laboratories. This virus was based on a version of the virus that was circulating in 2004. Tests showed it was effective, but in a much higher than usual dose, meaning that fewer immunizations could be given from the same amount of material. Additional testing of adjuvants to extend the vaccine supply is also underway. While vaccine production using fertilized eggs takes 6 to 8 months under the best of circumstances, it has been more difficult than usual with the H5N1 strain because it is so lethal that it kills chicken embryo before there is enough time raise a good yield of vial particles. New methods of producing vaccines are needed and are being discussed and in some cases developed.

The Sanofi Pasteur H5N1 avian flu vaccine is unlikely to be of much use against the virus that eventually evolves as a human threat. Because the flu virus is always changing, both spontaneously and by swapping genetic material with other viruses when both infect the same organism, it constitutes an unpredictably moving target for the vaccine makers. Since it is impossible to predict what the pandemic flu will look like before it emerges, the planned vaccine for next season is highly unlikely to provide any protection against the pandemic avian influenza strain.

While vaccination is our best hope of avoiding catastrophe, it is pretty certain that none will be available when the first wave of the pandemic spreads across the globe. This means that in all likelihood, the first wave will be characterized with a high rate of infection and many deaths. The time between the first and second wave is crucial because there needs to be enough time for the flu manufacturers to brew enough vaccine to protect as many of the remaining susceptible population as possible. Patients who contract the flu during the first wave and live, will in all likelihood be immune from the pandemic strain, so they won’t need to be vaccinated. This includes those who become infected with pandemic flu, become ill, and are successfully treated with the antiviral drugs Tamiflu or Relenza.

**Antiviral Drugs**

Over the course of the pandemic, predictions are that 25% to 50% of the population will become sick. There is an antiviral drug tablet, Tamiflu®, oseltamivir, manufactured by Roche Pharmaceuticals, that is effective against avian influenza H5N1. The World Health Organization has recommended that every country establish a stockpile of enough drugs to treat 20% of its citizens in preparation for a possible avian influenza pandemic. Most of the developed nations have begun to do so, the U.S. more slowly than most.

The wholesale cost of Tamiflu is about $25 for a 5-day treatment course (10 tablets), a price that places it out of reach for the less developed nations to establish a Tamiflu stockpile. Manufacturing capacity for Tamiflu is also limited and manufacture of this Roche product takes place almost entirely in Europe. Most of the G8 countries have already placed their orders with Roche and governmental demand has been so great that this product was unavailable for a while in the spring of 2005 but as of June 2005, some Tamiflu has begun to trickle back into the retail chain but supplies remain tight.

Tamiflu works best if it is taken early in the course of the disease symptoms (within the first 48 hours of the illness). It might be useful even if started later but this is not established. I plan to administer it to very sick patients no matter how long they have had symptoms as long as there is hope they can survive.

It is also possible to prevent the flu by taking Tamiflu tablets at or immediately after exposure to the flu. While this strategy works, it requires the continuous use of the one tablet daily until the pandemic is past. Under conditions of severe shortage of Tamiflu that we are likely to face during a pandemic, using the drug in this way is unwise. The strategy I plan to follow is to wait until flu symptoms are present before beginning Tamiflu treatment. The recommended dose is one tablet twice daily for 5 days. A worrisome US National Institute of Health study published in the July 2005 issue of the
Journal of Infectious Disease reported that mice experimentally infected with the H5N1 avian flu strain required 10 days of Tamiflu treatment to prevent relapse and death instead of the currently recommended 5 day course of treatment. If this proves true for the pandemic virus, it means that treatment for 10 instead of 5 days with Tamiflu would be needed. This is a problem since the current stock of this drug would go only half as far thought initially.

Since half the population who contract influenza have no or only few symptoms of the disease, even if you don’t take Tamiflu in the preventive regimen you still have a 50% chance of not getting sick. By reserving the drug for those who become ill with flu, you will be able to effectively treat a much larger number of patients than if the drug is used in its preventive mode.

One recent development reported in May 2005 is the detection of some strains of H5N1 avian influenza that have crossed over from birds to humans in South East Asia that are developing resistance to Tamiflu.

While this is a disturbing observation, it does not mean that when pandemic flu arrives here it will be totally resistant to Tamiflu treatment. This is unlikely to be the case. It is likely however that some strains of the virus will carry this resistance factor meaning that some patients infected by those strains will not respond as well to Tamiflu treatment as expected.

There is a second antiviral drug that might be effective against H5N1 avian flu, Relenza®, zanamivir, but this has not been established. Relenza is also very expensive. Avian flu has been found to be resistant to the other older anti-influenza drugs like amantadine. So, other than a specific vaccine that has not yet been developed, and the antiviral drug Tamiflu and possibly Relenza, there really isn’t much else that can be done medically to prepare for this event.

A Major Pandemic will Likely Disrupt Essential Public Services and Supplies

In the event of a major pandemic with a case fatality rate that exceeds 5%, it is my opinion that there will be a temporary breakdown in food delivery, the electric and water utility services, and possibly even public order in major urban areas worldwide. This prediction is based on several factors. First is the marked expansion in the human population since the last major pandemic. In 1918, our population was 1.6 billion and today it is 6.6 billion. Only 17% of the world’s inhabitants lived in urban environments in 1918 and at the time there were only 15 cities with more than one million inhabitants. Today slightly less than half of humanity lives in urban settings that occupy only 3% of the earth’s surface area and there are over 400 cities with a population of over one million.

High population density is a well-known and understood factor favoring epidemics, including influenza. The world has never faced a major pandemic with its population so large or so geographically concentrated. This factor alone makes predicting the magnitude of the impact of a major pandemic difficult. The difficulty is not in predicting whether these population factors will worsen or lessen the severity of the pandemic. There is no question that it will worsen it, but by how much, we don’t know.

Cities are dependent on outside sources for critical supplies including food, power, and water. The provision of these essential goods and services requires the highly coordinated efforts of a large number of people. During a major pandemic, these activities are likely to be interrupted by widespread illness and death. The interdependent nature of modern society increases the risk that a systematic failure could occur due to a domino effect precipitated by the failures of one or two key institutions or resources. In other words, a failure of one critical system leads to the failure of another and so on until the entire system collapses.

Taken together, these factors are likely to result in the temporary disruption in the basic supplies and services we all now take for granted. The resulting chaos would likely be accompanied by a period of temporary anarchy, especially within large urban centers.

Practical Pre-Pandemic Preparations for Individuals

At the present time (October 2005) my estimate is that when H5N1 avian flu crosses over there is a 1 out of 3 chance of a major pandemic and a 2 out of 3 chance of a minor one. The most likely time for this to happen now is between

December 2005 and March 2006. If we have a major event, it would be prudent to plan to be self-reliant for about three months.

**Get Your Will in Order**

Let’s face it; you might not make it through a major pandemic. It is likely that one in forty won’t. So, get your will in order. Make sure you have a plan for those surviving that will see them through.

**Life Insurance**

If you need to, buy more life insurance now since it takes time to get a policy. If nothing happens, you can always cancel it later. You may wish to consider buying a life insurance policy for your spouse and children. It would be prudent to select only the bluest of blue chip insurers, as the economic impact of a major pandemic will not be predictable. Also, if a pandemic happens and a lot of folks die, the cost of life insurance in the future will be higher.

**Get a Flu Shot and a Pneumovax Vaccination**

Even though the recipe for the 2005-6-flu season does not include protection against the avian flu, be sure to get one anyway. The reason for this is that many experts predict that the most likely time for the pandemic to begin is during the regular flu season. If you have the flu shot, it will protect you against the seasonal flu and prevent you from developing it during the same time that pandemic flu is circulating in your community. Also, you do not want to come down with flu twice in the same year. Since pandemic flu is so different antigenically than seasonal flu, this could happen and if it does, your chances of surviving the second infection are not very good especially if you are still weakened by the first one. You can protect yourself from pneumococcal pneumonia by getting a Pneumovax vaccination. This will be important in the event that we experience a major flu pandemic.

**Food Security**

Food supplies are likely to become limited in the event of a major pandemic. Storing a supply of canned meat and fish, dried beans, and rice is a prudent consideration. Consider basics like salt, sugar, cooking oil, and multiple vitamins as well. If food shipments are interrupted to the urban centers, it won’t be very long before food is gone from the grocery shelves. If you have any doubt about this, think back to what happens when there is a threat of an ice or snowstorm.

**Electricity Service**

The power grid is fragile in the US, especially on the east and west coasts. Despite the brown and black outs of 2003, not much has been done to reduce the vulnerability of the power grid, the energy bill passage in July 2005 notwithstanding. The grid is literally interconnected such that what happens in one part has an impact in another. While the grid has some built-in automatic circuit breakers designed to isolate a power overload condition before it spreads and causes a widespread blackout, for the most part, the system is operator dependent.

Much of the power production in the US is coal fired and these units depend upon regular delivery of coal by rail. Power industry guidelines call for the plants to keep at least a 25-day coal stockpile to ensure uninterrupted power production in the event of a coal supply disruption. If a critical number of system engineers employed by the plant, the railroad, or the coalmine become ill, die, or are otherwise absent as a result of the pandemic this would result in the shutting down of that plant if coal supplies run out. Nuclear plants could be shut down if the number of plant personnel fell below a predefined threshold for safe operation of the plant.

Since plant and grid repair and restart crews would also be affected in a similar manner to the engineers, the time to bring the shutdown system back up will also be more prolonged than under normal conditions. If enough plants are affected, this raises the chances of brownouts or blackouts affecting large regions of the US that could be quite prolonged.

The interruption in electric power service could last a month or two at most. One way to cope with this is by having a small number of key battery operated devices like lighting, flashlights, and a radio. Nickel Metal Hydride (NiMH) rechargeable batteries are now available that are a much-improved rechargeable battery compared with what was available in the past. Good selections of excellent battery chargers that use solar power for energy are now available. These

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8 This prediction is based upon the time period when the next pandemic is most likely to begin. If we escape the pandemic during the 2005-06 flu seasons, unfortunately this does not get us off the hook. The pandemic risk simply rises until the event finally occurs since there is a 100% likelihood that it will happen. The advice given in this manual will be useful irrespective of when the flu pandemic strikes, especially if it is a major pandemic.
chargers can be coupled with a photovoltaic (solar power) module that will reliably and quickly (if big enough) charge your NiMH batteries over and over again. Good NiMH batteries, various chargers, and a selection of small PV modules suitable for this purpose can be purchased from Real Goods at www.realgoods.com.

**Water Service**

Public water systems employ a host of professional and operational staff that would be expected to experience illness at the average rate of the community as a whole. So, absenteeism could affect service reliability, as would loss of electric power, as these utilities use electric pumps to pressurize their systems. If water service is interrupted for a time, remember to wait a while before drinking the water once service is restored because it may be contaminated with bacteria initially. It would be prudent to have some potable water available for use in an emergency. Tap water can be stored in 55-gallon drums. Make sure the drum you purchase is new or if not, that it is OK for storage of potable (drinkable) water rather than one that held toxic chemicals. You might also consider how you could divert rainwater from your downspouts for storage and drinking. Water collected from the roof will need to be purified before drinking because it could be contaminated. I found several helpful water purification suggestions on the US Federal Emergency Management Administration’s web site.

**Communications Services**

Local TV and Radio broadcasts will probably cease if there is a regional power failure in your area as will cable TV. Satellite TV may remain active but you will need an alternative source of power to operate your system to view it since your power will be out. Landline telephone systems have an excellent record of remaining operational even during power failures. In the event of a widespread prolonged blackout, they will not be able to continue to function for very long. Cell phone towers have a small backup power capability but this won’t last long. So if the grid fails, all phone service will as well.

A good quality battery operated radio capable of receiving AM, FM, and Short Wave stations would be a smart way to keep up with local and world events in the event that the usual methods were impaired. Even if there are no operative local or regional news broadcasts, someone somewhere will be on the air reporting the news and providing information of interest to flu survivors. It will be comforting having access to this information should a major pandemic come to pass.

**Find a Rural Refuge**

During the Spanish Flu pandemic being away from centers of population was safer but even small communities were hit hard so it was no guarantee. There was some flu in just about every community; so living in a rural area is not going to be enough. Reverse quarantines, where the community kept outsiders from entering and bringing the flu with them did work occasionally in 1918. Some small communities might try this approach but for there to be any hope of success, it will need to be very strict and be started at the beginning of a pandemic or it will not work.

One lesson from major epidemics with high death rates is that these events almost always lead to civil disorder. In the event of a major pandemic, it would be wise to ride out the storm away from cities or other major population centers. It is probable that food and water will be easier to obtain in the country and people less likely to be hostile compared with what can be imagined to occur in the major metropolitan areas under similar circumstances.

If you plan to leave the city for the country, you may want to do so early in the pandemic. In the event that your city has the misfortune to be one of the first areas affected by the pandemic and the federal government elects to impose quarantines as a means of containing the spread of the pandemic (a strategy sure to fail), then you might find the road out of town blocked if you wait too long before decamping.

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9 From the FEMA Web site: How to correctly boil or disinfect water. Hold water at a rolling boil for 1 minute to kill bacteria. If you can’t boil water, add 1/8 teaspoon (~0.75 mL) of newly purchased, unscented liquid household bleach per gallon of water. Stir the water well, and let it stand for 30 minutes before you use it. You can use water-purifying tablets instead of boiling water or using bleach. For infants, use only pre-prepared canned baby formula. Do not use powdered formulas prepared with treated water. Clean children’s toys that have come in contact with water. Use a solution of 1 cup of bleach in 5 gallons of water to clean the toys. Let toys air dry after cleaning.
Hospital and Healthcare Services
In the event of a major pandemic, healthcare services and especially hospital services will be rapidly overwhelmed. It is likely that the healthcare system will be the first societal institution to collapse under the strain, with recovery not expected until after the return of other essential utilities and services. It is true that the first victims of the flu will get excellent treatment, including hospitalization and even ventilators if required. Before long, though, all the available resources will become exhausted.

In order to reduce healthcare costs, hospitals have significantly reduced the number of available patient beds and nursing staff. In fact it is a common occurrence today for hospitals to be “on bypass” when it comes to accepting critically ill patients in their emergency rooms via ambulance. This happens when every ICU and CCU bed is already occupied in the hospital. During a routine flu season these days, the number of patients hospitalized in critical condition is such that all these critical care beds and available ventilators in many US cities are fully occupied for weeks each year. So you can imagine that if the number of critically ill patients presenting to the hospital emergency department with pulmonary failure from influenza suddenly increased exponentially over those expected with the seasonal flu, the chances of getting an ICU bed or ventilator would not be good. Once the pandemic settles in, the hospitals will be full, including waiting rooms and hallways. The medical staff will be sick themselves; some will be dead. The hospital will quickly run out of supplies such that there will be a shortage of everything from drugs, IV fluids, to body bags. So, in my opinion, it would be unwise to remain in the city so you can take advantage of the healthcare system in case you become ill.

The Flu Survival Kit
Under the circumstances, having a supply of over-the-counter products and select prescription drugs on hand useful for the home treatment of cases of severe influenza is prudent. For instance, simple household items that will be very useful include ibuprofen, acetaminophen, table sugar, and table salt. It will also be helpful to have on hand, and know how to use a thermometer, an automatic blood pressure and pulse monitor. In the following discussion I will provide you with advice on how these simple items can be used very effectively for the home care of flu sufferers. In order to obtain the prescription drugs needed for the home care of the flu, please call your doctor who is best able to advise you. I have included the over-the-counter and prescription items that I think will be most useful but your doctor may have other equally good or better suggestions especially since he or her knows your specific medical condition much better than anyone else. I call the medications together with the household items useful for the home management of influenza “Flu Survival Kit”.

Simple Medical Skills Required
Caregivers need to learn how to obtain vital signs like pulse, blood pressure, temperature and respiratory rate. It will also be very useful to be able to use an automated blood pressure monitor to measure blood pressure. These devices come with pretty good instructions that clearly explain how to use them. “Practice makes perfect” applies to learning and perfecting these skills. If you need help learning how to do these, ask your doctor or his or her nurse for help. They will be happy to help you develop these simple skills. All you need to do is ask.

OTC products to have on hand for home treatment of one person with severe influenza

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<th>Product</th>
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10 The US Federal Emergency Management Association recommends using household bleach to purify water for drinking by adding 1/8 tsp per gallon of water (1:7500 solution). To make a bleach disinfecting solution to contaminate surfaces and instruments mix 1-cup bleach to 1 gallon of water (1:10 solution). For general disinfectant purposes, the FEMA recommends 1-cup bleach to 5 gallons of water (1:50 solution).

11 Thermometers break so have more than one on hand.
Automatic blood pressure monitor¹²
Notebook for recording vital signs and fluid intake and output
Kitchen measuring cup with 500 cc (two cup) capacity
Diphenhydramine (Benadryl) 25mg capsules # 60: 1 tablet every 4 hours as needed for nasal congestion, allergy, or itching.

Prescription products for home treatment of one person with severe influenza
Tamiflu 75mg # 20: take two tablets daily for 5 (or 10) days for flu³
Promethazine (Phenergan) 25mg tablets # 60: take ½ to 1 tablet every 4 hrs as needed for nausea
Hydrocodone with acetaminophen (Lortab-5) # 60 (5mg/325mg): ½ to 1 tablet every 4 hrs as needed for cough or pain
Diazepam (Valium) 5mg # 60: ½ to 1 tablet twice daily as needed for anxiety, muscle aches, or insomnia

Symptoms of Influenza

The influenza virus usually enters the body through the respiratory tract but can also gain access through the intestinal tract. The virus causes a variety of symptoms with fever, sore throat, cough, runny nose and general aches and pains as the leading ones. In addition to these principal symptoms many also experience headache, nausea, abdominal cramps and diarrhea.

These symptoms could be due to some other infectious agent or even the influenza virus but not the pandemic strain since it is possible that both endemic (routine seasonal flu varieties) and pandemic strains could both be circulating in the community at the same time if the pandemic flu appeared during the November-March flu season. In fact, this scenario is what looks to be the most likely time for the pandemic to begin. The best guess for the start of the pandemic at this point is between December 2005 and April 2006.

There are several ways to tell the difference between the flu and less severe illnesses. First of all, unless the flu is circulating in the community, then your illness is probably not flu, because it tends to occur in epidemics that are easy to spot epidemiologically. If the world is in the midst of a major pandemic, you will have no problem knowing about it. Just tune into CNN, as it is likely to be wall-to-wall pandemic coverage 24/7. Another clue to whether or not someone has flu is that flu is much worse than simple cold viruses or most other causes of respiratory or gastrointestinal (GI) infections. The fever and body aches are really quite remarkable and often associated with strong shivering.

When flu affects the GI tract it presents with nausea, vomiting and diarrhea. Patients with flu are really sick and often are so weak they have a hard time getting up out of bed without help. So, one way to tell the difference between the flu and other infections is that the flu is really severe and tends to affect the respiratory track most often, but can also cause severe gastroenteritis (nausea, vomiting, and diarrhea).

¹² I recommend the hand pumped automatic BP monitor rather than ones with electric pumps.
¹³ Tamiflu is expensive costing about $200 for 20 tablets. If you have insurance, you will still pay stiff co-pay. All the other prescription drugs are generic and not expensive.
Patient prognosis during pandemic influenza

One thing that is different about a major pandemic is just how hard it hits patients and how rapidly it kills. Patients affected by the flu can be broadly categorized into 3 prognostic types. The first type has a poor prognosis no matter what is done for them. The second might survive if there was full access to high technology medical care and resources. The third type is highly likely to recover from the flu as long as they are provided with consistent low-technology supportive measures that can be administered in home settings.

Type 1 patients have the poorest prognosis and almost all will die within 2 or 3 days of the development of their first symptoms. The cause of death in these patients during the 1918 flu was massive respiratory failure from overwhelming lung-destroying viral pneumonia. There was no effective treatment for this in 1918, and there is none today despite all the advances in medicine that have occurred over the last 90 years. Signs and symptoms of type 1 patients include rapid onset of severe shortness of breath, cyanosis (bluish discoloration of the skin of the hands, feet, and around the mouth and spreading centrally), or bleeding from the lungs, stomach and rectum.

Type 2 patients are similar to type 1 patients except they do not die after 3 days. Some but not many of these patients would survive if they had access to an ICU, ventilators and expert medical care but if we have a severe pandemic, those resources will not be widely available. Even if they had access to these services, many of them would die anyway. Remember, no matter what you do, they are likely to pass away in a week to 10 days after becoming ill.

Type 3 patients make up the majority of those that become ill with influenza. Fortunately, these patients have a good prognosis if they receive timely and diligent supportive care that can be provided well in a non-medical setting such as the home. Most of these pandemic flu victims will be severely ill and weakened by the infection such that they will be too ill to get out of bed. Many type 3 patients will be completely dependent on others for care. Without simple care, some of these patients will die from preventable causes like dehydration but with simple care, most of these patients will recover. No matter how good the care provided, some type 3 patients will die. This is not your fault. This happens usually because they develop a serious secondary condition that actually becomes the cause of death. Examples of these secondary conditions include bacterial pneumonia, stroke, and heart attack. There is nothing you can do but keep doing the best you can and let nature take its course.
In my opinion, as a general rule, provide everyone with the same level of supportive care. This is a rational course because it is not always possible to predict who will survive and who will not, especially early in the course of the flu.

**Using scarce resources wisely**

Patients *in extremis*, which means they are near death at the time they are encountered, should not be disturbed unless there is something that you can do to make them more comfortable. Fortunately, patients *in extremis* are usually already unconscious and beyond suffering.

If medical supplies are in short supply, especially like the antiviral drug Tamiflu, the decision on how to ration these resources is best made by health professionals if they are available. If not, my suggestion is to concentrate your efforts and precious supplies on those with the best chance of survival, i.e., type 3 patients. In a severe pandemic it is unwise to use limited medical resources on critically ill type 1 or 2 patients, as they are unlikely to survive. So my advice is to focus your greatest efforts on type 3 patients where the prognosis is good for a complete recovery.

**Supportive Treatment of Influenza**

**Home Flu Treatment Advice for the Laymen**

Caring for severely ill flu patients is something that everyone is capable of doing. You can do this. No medical skill is required. The skills needed are the same parents use to care for their young children or adult children use to care for their elderly parents. The basic goals are to keep the patient clean, dry, warm and well hydrated. They need a soft place to lie down and they need to be comforted and told that they are going to be OK and reassured that you will be there for them. The most important medical treatment is to make sure they have plenty of fluids. Dehydration must be prevented, as this can be fatal in a patient who would otherwise survive. This is really important. Keeping the patient hydrated is the best treatment for the flu and the one that is most likely to save lives.

**Fever, body aches, chills, sore throat, and headache:** Ibuprofen and/or acetaminophen are used to lower fever and help the patient feel better. The above symptoms respond well to these drugs. Use these products for the flu according to my instructions, not the bottle label. Don’t under dose the patient. Many people take doses that are ineffective for fear of taking too much. Remember that acetaminophen can be used at the same time and in full doses as ibuprofen because they are in different drug classes and have different drug side effects. Combination treatment with both has an additive effect of benefit without increasing risk. The dose of ibuprofen I recommend you use is 2 to 4 tablets (400mg to 800mg) every four hours. For acetaminophen, the dose is two 500mg tablets 4 times daily. Do not exceed these doses for either drug. This is the maximum for both. There is a risk of causing Reyes Syndrome is children and teens with fever are given aspirin or aspirin like drugs including ibuprofen.

A very high fever (> 104 F) can cause seizures and brain damage and must be avoided. Using tepid water sponge baths works well for a high fever. Do not use alcohol sponge baths instead of water. Alcohol can be absorbed through the skin, especially in children, resulting in toxic effects. Ibuprofen and acetaminophen are very good at lowering temperature. Studies show that the body's natural defenses are better able to fight infection with some fever (say up to 101 F), so maybe we shouldn’t try to completely suppress the temperature to normal (98.5 F).

Gargling with hot salt water is a good treatment for sore throat. Hot caffeinated tea is also very helpful for headache, sore throat, and cough. We are taking advantage of the pharmacologic effect of caffeine, long recognized as an excellent herbal therapy for these problems. Hot or cold tea is also a mild stimulant that improves the sense of the patient’s well being. Sore throats also respond well to ibuprofen or acetaminophen.

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14 For the purposes of this guide, ibuprofen means aspirin, Advil, Aleve, ibuprofen, or Nuprin since they are all alike. Acetaminophen (Tylenol) is not an aspirin.

15 Reyes is a rare occurrence (1:1,000,000 annually) but can be a fatal one when it happens. Reyes is associated with increased pressure in the brain and liver damage. When confronted with a child or teen with an unremitting high fever (>104 F) that is not responding to acetaminophen/hydration/and tepid water sponge baths, one has to consider the risk of brain damage from fever verses risk from Reyes. This is a tough call. I would probably use the aspirin in this case, understanding various risks.
**Food:** Eating is not really important because the patient will be breaking down their own muscle and fat for energy. The flu takes your appetite away so the patient probably won’t be hungry. If the patient is hungry and asks for food, this is great as it is a real sign of improvement. By all means feed the patient at that point but your food selection needs to be appropriate. Specific directions on how to feed patients recovering from severe flu are provided below.

**Fluids:** What will be much appreciated by a sick patient, especially if they are dehydrated, is a simple Oral Rehydration Solution (ORS) made from water, sugar and salt.

**The ORS Formula**
ORS is simply homemade IV fluids for oral use.

The formula is:
- 4 cups of clean water
- 3 tablespoons of sugar
- 1 level tsp salt

**Identifying Dehydration:** Preventing dehydration in flu victims will save more lives than all the other treatments combined. When patients have a fever or diarrhea, they lose much more water from the body than is commonly appreciated. Symptoms of dehydration include weakness, headache, and fainting. Signs of dehydration include dryness of the mouth, decreased saliva, lack or very decreased urine that is dark and highly concentrated, sunken eyes, loss of skin turgor (the elasticity of the skin), low blood pressure especially upon sitting up or rising from the sitting to the standing position and tachycardia (fast pulse) when laying or sitting up.

Fever is an especially easy way to become dehydrated with no one even noticing. That is because the loss of body fluid occurs through the skin and quickly evaporates. This is called insensible loss, and great quantities of fluid can escape a patient this way quickly. The smaller the body size and the higher the temperature, the faster this can happen. Water in the form of vapor is also lost through the breath. So when the patient is short of breath leading and breathing rapidly, this is another source of hidden fluid loss.

If you detect or suspect that dehydration is developing, administer fluids by mouth. If the patient is too ill to drink, someone should sit with the patient giving him or her fluids drop by drop if needed. Work up to using a teaspoon if possible. Don’t stop until the patient has been able to keep down at least quart of fluids. This could take several hours so be patient. It will have a dramatic effect on sick patient’s well being and will be very rewarding to those of you who persist because you just saved a life. After the first quart, the patient should begin to urinate again. This is a good prognostic sign and when this happens you can assume you have restored their fluid level back to a safer level. “Safer” should not be confused with safe. Don’t stop there. With sick patients like these, you really need to “push the fluids” so don’t let your guard down.

This will be very refreshing for the patient and will quickly revive them. Fluids can be served cool or hot depending on the climate, patient symptoms, and fever status. A patient with a high fever should probably not be given hot fluids because it will raise the temperature further. A patient with a sore throat will get relief from a hot beverage. A patient hot with fever might prefer cool or even cold beverage. If it is cold outside especially if the patient is cold, use hot fluids. You can drink the ORS plain or flavor it with just about anything like citrus, mint, or herbs.

If juice is available, you can substitute 1 cup of it for 1 cup of the water and cut the sweetener in half. Boil the solution to purify it if needed or you can use purify water for drinking by adding 1/8 tsp of household bleach to 1 gallon of water. Administering fluids to the sick in your charge will be one of the main activities day in and day out until the crisis passes. Try and get 2 to 3 quarts of fluids down the patient every day at a minimum. Don’t give up or slack off. Make this your most important task.

**Preventing the virus and bacteria from spreading within the household**
It is unlikely that we will be able to limit exposure to the virus if there are a lot of sick people around us. The flu is so easily passed from one person to the next that it is difficult to control even in the hospital setting. The WHO has issued guidelines for reducing exposure among healthcare workers taking care of rare cases of H5N1 flu under “non-pandemic” conditions in the hospital setting. It is not likely that these techniques will be able to be followed for very long after the pandemic gets going, especially in the case of a major pandemic. The WHO recommendations were published in the
September 28, 2005 issue of the New England Journal of Medicine. Under these pre-pandemic conditions the WHO recommends such things as negative pressure rooms, long-sleeved full-length gowns, gloves, and NIOSH N-95 masks, face shields or eye goggles.

Obviously these recommendations are not appropriate for home care. In truth, pandemic influenza is so infectious that those of taking care of sick folks in our homes are simply not going to be able to prevent being exposed to the virus. As we provide needed care to our family, friends and even sick strangers we will be constantly exposed to infectious viral particles. This will happen when we change soiled patient clothes and bedclothes and clean up spilled body fluids, blood, and excrement. Even simply breathing the air in the vicinity of the sick will result in significant exposure. So you see, we simply can’t avoid exposure. It is a fact we will have to accept. Use of a cloth facemask is not effective in preventing the mask wearer from becoming exposed. It is useful for preventing you from spreading disease to someone else. Masks were thought to be an effective means of preventing spread of bacterial pneumonia as secondary infections in patients with lungs already weakened by flu during the 1918 pandemic but this opinion was never proven scientifically.

It will be very important to keep the sick and their bed and bed clothing clean and dry. Likewise the sick rooms and bathrooms need to be maintained in good condition. The soiled garments and bedclothes will need to be washed and dried, a task likely to be made quite challenging by the lack of electrical and water service. It will be important to wash these soiled items in hot water using soap and chlorine bleach if possible. Hard surfaces should be wiped clean using soap and water and then sprayed with 1:10 bleach to water solution and wiped down a second time. This will effectively remove all trace of body fluids, vomitus, and excrement and neutralize all infectious viral particles.

So, caregivers and anyone in the vicinity of the sick, which will be virtually everyone, will be exposed repeatedly to the pandemic virus loads sufficient to cause infection. Despite this fact, if this pandemic behaves as expected, roughly half of us will not develop symptoms of flu or if we do will have mild cases. Those of us who do develop infection and recover, will be immune from the pandemic strain in the future.

Keep a record on every patient
It will be very useful for you to write down certain information about the patient or patients you are taking care of at home. Devote a section of the notebook to each patient you are taking care of. Keep the record in chronological order day by day. Keep as accurate and careful records as you can. Don’t worry about keeping a perfect record; just keep one that is good enough.

Each day start with the patient’s vital signs. Include their temperature, pulse rate, breathing rate, and blood pressure. Repeat the vital signs routinely 4 times daily (for instance at 0800, 1200, 1600, and 2000). These vital signs should be measured more often in very sick patients. You can get a really clear picture of how the patient is doing using these simple measurements. It is very important to keep up with the patient’s fluid intake and their output so record the fluid they are taking in and passing out in a notebook. Intake is pretty easy since you are giving them the fluids but output can be difficult to accurately record. Have the patients to save all their urine by urinating in a bucket, pot, or basin instead of the toilet. Measure the urine output using the kitchen-measuring cup. The amount taken in is always more than the amount

Example Home Patient Medical Record

Patient Name: Mary Smith
Date of Birth: 3-31-1951
Date symptoms first began: January 15, 2006

1-17-05 3:00 PM Initial Note

Subjective (S): Mary became weak and faint today after suffering from muscle aches and pains for the last couple of days. She has trouble standing up without dizziness. She is nauseated and also complains of headache and sore throat. She is urinating but not as much as usual. She has been trying to drink more but has been busy taking care of the sick. She has not been getting much sleep for the last 2 weeks.

Objective (O): Vital Signs: Temp: 102.1 F, Pulse: 110/min and regular, Resp Rate: 22/min, BP 100/60. The skin is pale and mildly moist. Mary looks very tired but is awake and alert. Her mouth is moist.

Assessment (A): Flu with mild dehydration and fatigue

Plan (P): Push fluids (ORS), ibuprofen 800 mg every 4 hours as needed for temp > 101 or pain. Bed rest. Keep track of fluid intake and urine output. Take VS and check hydration, fluid input/output, and 4 times daily. (Begin Tamifu if you have it) (Use anti-nausea meds if available).

1-17-05 6:30 PM

S: Mary’s sleeping on and off. She feels less faint but still dizzy. She is peeing.
O: Temp 100 F, Pulse 90/min, BP 100/60
Fluid In: 1500 ml ORS, Urine Out: 250 ml
A: Flu, improved symptoms, patient still dehydrated but hydration underway
P: Push more fluids.

passed out because of the insensible losses described above (loss through the skin and in the breath). If the patient is incontinent of urine, just indicate in the record that the patient was incontinent of a small, medium or large amount of urine. For our purposes, large is good, small is bad.

Diet Recommendations

The Clear Liquid Diet: A clear liquid diet is used to treat certain intestinal diseases, especially infectious diarrhea. Patients suffering from diarrheal illnesses often experience abdominal cramping and frequent, loose stools if they eat solid foods. In addition, a great deal of water and minerals (sodium, chloride, and potassium) are lost in the watery portion of the diarrheal stool; if you are not careful this can lead to dehydration. Patients with diarrhea have to drink considerably more fluid than usual to prevent the dehydration. This is especially important if the patient also has a fever, which in itself leads to increased loss of body water through the skin as perspiration.

17 The SOAP medical note format is a useful way to record medical information on patients. “S” is for subjective and used for what the patient tells you about their illness. This includes how they feel, what hurts and where, what they did for the symptoms, etc. “O” stands for objective and includes the things you observed or measured. This means her vital signs, skin tone, fluid in and urine out. “A” is your assessment of the patient’s medical condition. “P” is the plan you make for helping the patient get better. I use this method in my practice and suggest it to you for your patient notes too.

18 Temperature can be measured in degrees F or C which ever is most familiar to you. In this manual, I use degrees in F.

19 The pulse is usually regular, like a tom-tom drum. The beats are equally spaced and occur regularly. If you tap your toe to the pulse, a regular pulse is one that occurs predictably one beat after another. A regular pulse is normal. An irregular pulse is not. Having an occasional extra beat or drop beat is OK. A very fast irregular pulse can be a problem. This gets too complicated for me to give you specific advice except to say that a regular fast pulse in the context of flu suggests dehydration is present.

20 Normal respiratory rates are in the range of 12 to 16 breaths per minute. Fever and dehydration are associated with faster respiratory rates. Acidosis from massive infection is also a cause of high respiratory rates. When patients are near death, the respiratory rate slows down and becomes more and more shallow.

21 Normal BP is 120/80 or so but there is a wide range of normal from a low of 90/60 for teens and girls to 140/90 for some adults. Pressures below 90/60 are usually abnormal and in the context of flu due to dehydration. These low BPs are often associated with a high pulse. Try and keep the patient’s BP above 100 on the top and 60 on the bottom if possible.

22 Fluid in and out is best measured in milliliters (ml). Most kitchen measuring cups are graduated in both ml and ounces/cups.
In most cases, patients with diarrhea can tolerate a clear liquid diet without cramping or diarrhea. This is because the small intestine can absorb water, minerals, and sugars pretty well even when infected. The diet starts off with clear liquids only. As symptoms abate, the diet slowly adds simple-to-digest, low-residue foods, one step at a time. Don’t advance to the next step until the patient is completely symptom-free in the present step. As the patient progresses through each step, if the cramps and diarrhea return, drop back to the previous step they tolerated.

This same Clear Liquid Diet approach is the one to use for patients who have been ill with the flu and have been too ill to eat. They will have been on Step 1 already so when they become hungry, begin them on Step 2 and advance them through the steps as above.

**Step 1:** Oral Rehydration Solution (ORS), water, fruit juice, Jell-O, Gatorade or PowerAid, ginger ale, Sprite, tea.

**Step 2:** Add white toast (no butter or margarine), white rice, and cream of wheat, soda crackers, and potatoes without the skin.

**Step 3:** To Steps 1 and 2 add canned fruit and chicken noodle soup.

**Step 4:** To Steps 1 through 3 add poached eggs and baked chicken breast without skin, canned fish or meat.

**Step 5:** To Steps 1 through 4 add milk and other dairy products, margarine or butter, raw fruits and vegetables and high-fiber whole grain products.

By recognizing the symptoms a patient has or the signs of the disease in the body, you can use the chart below to guide your treatment. Here’s how.

<table>
<thead>
<tr>
<th>Symptom or Sign</th>
<th>Likely Assessment</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low urine output</td>
<td>Dehydration</td>
<td>Push fluids</td>
</tr>
<tr>
<td>High pulse rate (&gt;80 but especially &gt; 90)</td>
<td>Dehydration or fever</td>
<td>Push fluids</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>Pneumonia</td>
<td>Push fluids</td>
</tr>
<tr>
<td>Shaking chills and shivers</td>
<td>Viremia (virus in the blood) or pneumonia</td>
<td>Keep warm</td>
</tr>
<tr>
<td>Cyanosis (skin turns blue)</td>
<td>Respiratory failure, death likely</td>
<td>Keep as comfortable as possible. Give hydrocodone with promethazine for comfort, give diazepam for anxiety</td>
</tr>
<tr>
<td>Bleeding from mouth, coughing up blood, passing red blood per rectum. Severe bruising.</td>
<td>A severe blood clotting abnormality has occurred due to the virus (DIC). Death is likely</td>
<td>Keep as comfortable as possible. Give hydrocodone with promethazine for comfort, give diazepam for anxiety</td>
</tr>
<tr>
<td>Vomiting</td>
<td>Virus affecting GI tract</td>
<td>Use promethazine for vomiting, push fluids</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>Virus affecting GI tract</td>
<td>Push fluids, clear liquid diet</td>
</tr>
<tr>
<td>Severe stomach cramps</td>
<td>Virus affecting GI tract</td>
<td>Use hydrocodone and promethazine for comfort</td>
</tr>
<tr>
<td>Headache</td>
<td></td>
<td>Ibuprofen and/or acetaminophen or hydrocodone if very severe</td>
</tr>
<tr>
<td>Fever</td>
<td></td>
<td>Ibuprofen, acetaminophen, push fluids, keep warm or cool, consider tepid water baths if &gt; 102 F. OK if &lt;101 as this may help kill virus.</td>
</tr>
<tr>
<td>Sore throat</td>
<td></td>
<td>Gargle with hot salt water; drink hot tea or hot water, ibuprofen and or acetaminophen.</td>
</tr>
<tr>
<td>Cough</td>
<td></td>
<td>Push fluids, drink hot tea for effect on breathing tubes, use hydrocodone ½ tablet with or without ½ promethazine to suppress cough if needed</td>
</tr>
</tbody>
</table>

23 Sick patients break down their muscle tissue for needed protein and calories. This is fine as long as it does not go on for long. It is important to begin feeding the patient high quality animal protein as soon as they can tolerate it to help them maintain their strength.

24 Are these the right treatments for this symptom in every case? Of course not! I am providing you with my best guess of how to manage the average very sick flu patient, but not every very sick flu patient. I recognize that for some like those with Adult Respiratory Distress Syndrome (ADRS) or congestive heart failure for instance,
Advanced Home Treatment Considerations for Health Professionals

If you have access to Tamiflu, the dose is one tablet twice daily for 5 days. It is best to begin Tamiflu within two days of the beginning of symptoms but might be useful when used even later in the course.

Management of Dehydration Using Urine SG: Urine specific gravity is best measured using a hand held refractometer. You can also use a urine dipstick to estimate SG. Urine SG is an excellent objective measure of the state of patient’s hydration given normal renal function. Urine SG ranges from 1.000 (distilled water) to 1.035 (really concentrated). Normal kidneys can easily concentrate urine to 1.020 or above without difficulty after a typical overnight fast. Patients with chronic renal insufficiency are not able to concentrate urine much above 1.010. A clinically dehydrated patient with a urine SG of 1.010 is diagnostic of renal failure.

**Recommendation:** Adjust the rate of oral fluid administration to maintain the urine SG between 1.010 and 1.020.

How to Find Out More about the Avian Flu and Influenza Pandemics

Medical scientists around the world are closely monitoring the situation in Southeast Asia and regularly make reports that are published in the medical, scientific and lay press. You can follow these reports best using the Internet. To start, use the Google News service at [www.google.com](http://www.google.com) to search for articles relating to “avian influenza”. This is one of the best ways to keep up-to-date on what is happening in Southeast Asia, which is the most likely place for the pandemic to begin.

One of the most informative sources of information is the recent documentary about the 1918 Spanish Flu written by John Barry entitled, *The Great Influenza*. This book is widely available in bookstores and on [www.amazon.com](http://www.amazon.com). This excellent work chronicled the worldwide epidemic from start to finish and provided me with a new perspective on just how serious influenza can be when the conditions are right as they are today. What I found most interesting in Barry’s book were the many first hand accounts of how the pandemic struck the US and the world and just how devastating the illness was. The total inability of our institutions to stand up to the stress placed upon it by the 1918 pandemic was particularly enlightening for me.

I highly recommend you read about the 1918 flu pandemic since we could be on the verge of a similar event. Start by using Google to search for “1918 Spanish Flu”. You will find a lot of information about that event. By learning more about the 1918 event, you will be able to fill in many of the details about this developing crisis we may be facing today. For those of you who remain in doubt about how serious a crisis this actually is, researching this issue on your own should help you develop a better appreciation of the situation.

A recently published book that does an excellent job of laying out the danger we face is *The Monster at our Door: The Global Threat of Avian Flu*, by Mike Davis. He has a valuable discussion of the biology of the influenza virus, and how the ecology of poultry and livestock living in close contact with people has promoted the development and spread of this potential pandemic.

While putting this manual together, I discovered several very informative web sites that you will want to visit on a regular basis to keep up with pandemic developments. The first is [www.recombinomics.com](http://www.recombinomics.com), a site maintained and authored by Henry L. Niman, PhD, a virologist with a special interest in recombinant viruses like influenza. He provides an excellent commentary on avian influenza events worldwide and usually has information on new developments and his commentary on their significance before virtually any other site.

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these suggestions will not be helpful and would be considered harmful under usual circumstances. You will not be able to tell when you are dealing with one of these rare patients. So, what should you do? For most patients, following the advice will do a lot of good and makes the most sense under these unique circumstances. All you can do is the best you can do. So do that with a satisfied mind. You can’t save every patient. Don’t let any tragic loss prevent you from keeping faith in your ability to help most patients with the techniques found here.

You are their only hope.
The second is www.fluwikie.com. This site is dedicated to the avian flu pandemic and all aspects of it. It is a one-stop shop for anyone interested in the topic. It also has a neat bulletin board with an active online community, and a list of other recommended links for keeping up with the news on this issue.

Finally, Nature, the international journal of science, has an avian influenza web page that has a collection of articles their staff has done on the developing pandemic over the last few years. This is a wonderful resource for anyone interested in learning more about past as well as future pandemic developments: www.nature.com/nature/focus/avianflu.

**Citizen Advocacy**

In addition to getting ready to handle whatever situation comes along for yourself and your family, I urge you to be active as a citizen. Some national, state and local authorities are beginning to see that getting ready to face the risk of a pandemic is necessary, but adding your voice can make it more probable that enough is done, soon enough, if nature is kind and the pandemic is delayed beyond this winter. By all means communicate with your elected officials about the urgent need for contingency planning, and funding for vaccine and antiviral research, production, and stockpiling.

**A Doctor's Letter during the Height of the 1918 Pandemic**

In September 1918, the second pandemic influenza wave was making its way through the America. Military bases were especially hard hit by the pandemic in the US. Below is a reprint of a letter from a recently recruited military doctor assigned to a US Army base in Massachusetts, Camp Devens. This was a training base for new recruits and was one of the worst affected by the flu. The letter is important for its clear description of the rapid course of the illness, how this pandemic flu differed so greatly from the usual seasonal variety, and how the medical resources of the camp had become exhausted by the sheer number of cases and the high case fatality rate.

Camp Devens, Mass.
Surgical Ward No 16
29 September 1918
(Base Hospital)

My dear Burt-

It is more than likely that you would be interested in the news of this place, for there is a possibility that you will be assigned here for duty, so having a minute between rounds I will try to tell you a little about the situation here as I have seen it in the last week.

As you know I have not seen much Pneumonia in the last few years in Detroit, so when I came here I was somewhat behind in the niceties of the Army way of intricate Diagnosis. Also to make it good, I have had for the last week an exacerbation of my old "Ear Rot" as Artie Ogle calls it, and could not use a Stethoscope at all, but had to get by on my ability to "spot" 'em thru my general knowledge of Pneumonias. I did well enough, and finally found an old Phonendoscope that I pieced together, and from then on was all right. You know the Army regulations require very close locations etc.

Camp Devens is near Boston, and has about 50,000 men, or did have before this epidemic broke loose. It also has the Base Hospital for the Div. of the N. East. This epidemic started about four weeks ago, and has developed so rapidly that the camp is demoralized and all ordinary work is held up till it has passed. All assemblages of soldiers taboo.

These men start with what appears to be an ordinary attack of LaGrippe or Influenza, and when brought to the Hosp. they very rapidly develop the most viscous type of Pneumonia that has ever been seen. Two hours after admission they have the Mahogany spots on their cheek bones, and a few hours later you can begin to see the Cyanosis extending from their ears and spreading all over the face, until it is hard to distinguish the colored men from the white. It is only a matter of a few hours then until death comes, and it is simply a struggle for air until they suffocate. It is horrible. One can stand it to see one, two or twenty men die, but to see these poor devils dropping like flies sort of gets on your nerves. We have been averaging about 100 deaths per day, and still keeping it up. There is no doubt in my mind that there is a new mixed infection here, but what I dont know. My total time is taken up hunting Rales, rales dry or moist, sibilant or crepitant or any other of the hundred things that one may find in the chest, they all mean but one thing here -Pneumonia-and that means in about all cases death.

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25 Published in the British Medical Journal, December 22, 1979
The normal number of resident Drs. here is about 25 and that has been increased to over 250, all of whom (of course excepting me) have temporary orders—"Return to your proper Station on completion of work". Mine says "Permanent Duty", but I have been in the Army just long enough to learn that it doesn’t always mean what it says. So I don’t know what will happen to me at the end of this.

We have lost an outrageous number of Nurses and Drs., and the little town of Ayer is a sight. It takes Special trains to carry away the dead. For several days there were no coffins and the bodies piled up something fierce, we used to go down to the morgue (which is just back of my ward) and look at the boys laid out in long rows. It beats any sight they ever had in France after a battle. An extra long barracks has been vacated for the use of the Morgue, and it would make any man sit up and take notice to walk down the long lines of dead soldiers all dressed and laid out in double rows. We have no relief here, you get up in the morning at 5:30 and work steady till about 9.30 P.M., sleep, then go at it again. Some of the men of course have been here all the time, and they are TIRED.

If this letter seems somewhat disconnected overlook it, for I have been called away from it a dozen times the last time just now by the Officer of the Day, who came in to tell me that they have not as yet found at any of the autopsies any case beyond the red hepatitis stage. It kills them before they get that far.

I don’t wish you any hard luck, Old Man but I do wish you were here for a while at least. It’s more comfortable when one has a friend about. The men here are all good fellows, but I get so damned sick of Pneumonia that when I go to eat I want to find some fellow who will not “Talk Shop” but there ain’t none nobbaw. We eat it, live it, sleep it, and dream it, to say nothing of breathing it 16 hours a day. I would be very grateful indeed if you would drop me a line or two once in a while, and I will promise you that if you ever get into a fix like this, I will do the same for you.

Each man here gets a ward with about 150 beds, (Mine has 168) and has an Asst. Chief to boss him, and you can imagine what the paper work alone is - fierce,-- and the Govt. demands all paper work be kept up in good shape. I have only four day nurses and five night nurses (female) a ward-master, and four orderlies. So you can see that we are busy. I write this in piecemeal fashion. It may be a long time before I can get another letter to you, but will try.

This letter will give you an idea of the monthly report, which has to be in Monday. I have mine most ready now. My Boss was in just now and gave me a lot more work to do so I will have to close this.

Good Bye old Pal,
"God be with you till we meet again"
Keep the Bowels open.
(Sgd) Roy.

About the Author

Grattan Woodson, MD FACP obtained his MD at the Medical College of Georgia in 1980 and completed his internal medicine training at an affiliate of Columbia University College of Physicians and Surgeons in New York, New York in 1983. He joined the full-time faculty of Emory University School of Medicine where he taught internal medicine and worked as a diagnostician at Emory Clinic. Presently he is an attending physician at the Druid Oaks Health Center in Decatur, GA

Dr. Woodson first became concerned about avian influenza after learning about the first human cases in Hong Kong in 1997. His interest increased significantly when the disease re-emerged in Southeast Asia in 2003. As the disease has evolved it became evident to him that the likelihood of a worldwide influenza pandemic similar to the devastating 1918 Spanish Flu was increasing. In order to prepare his patients for a catastrophic event that most would think inconceivable today, Dr. Woodson has authored this manual.

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This document may be copied and shared freely in the interest of increasing awareness of the risk we face from Pandemic Influenza. The purpose of this manual is to explain the reasons why we need to be concerned about pandemic influenza and to provide some common sense medical guidance for providing care to very sick patients in the home setting.

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Spread of the 1918 pandemic across the US

**Approximate beginning of the epidemic, 1918**

The second pandemic wave of the 1918 Spanish flu began in late August or early September.
By Mid September, pandemic influenza was reported in most major US cities.

By the end of September, almost the entire country was affected by the pandemic.
October 5th was the approximate end of the 2nd pandemic wave. Most of the deaths were recorded in that month but many actually occurred in September.

The first pandemic wave began in January 1918 and ended in April. The second wave began in September and ended in October. The third began in December ending March 1919.
An Introduction to Postural Drainage & Percussion

**Postural Drainage and Percussion (PD & P)**, also known as chest physical therapy, is a widely accepted technique to help people with cystic fibrosis (CF) breathe with less difficulty and stay healthy. PD & P uses gravity and percussion to loosen the thick, sticky mucus in the lungs so it can be removed by coughing. Unclogging the airways is critical to reducing the severity of lung infections.

PD & P is easy to perform using the techniques you will learn here. For the child with CF, PD & P can be performed by physical therapists, respiratory therapists, nurses, parents, siblings and even friends.

PD & P is sometimes used along with other types of treatments, such as inhaled bronchodilators and antibiotics. If ordered, bronchodilators should be taken before PD & P to open the airways, and aerosolized antibiotics should be taken after PD & P to treat the opened airways. Your doctor or therapist at your Cystic Fibrosis Foundation care center will recommend a routine for you or your child.

**BECOMING FAMILIAR WITH THE LUNGS**

Learning more about the respiratory system and its relationship to internal organs can help you to understand why PD & P treatments are effective, and how each lung segment is drained.

**Draining the Lung Segments**

The goal of PD & P is to clear mucus from each of the five lobes of the lungs by draining mucus into the larger airways so that it can be coughed out. The right lung is composed of three lobes: the upper lobe, the middle lobe and the lower lobe. The left lung is made up of only two lobes: the upper lobe and the lower lobe.

The lobes are divided into smaller divisions called segments. The upper lobes on the left and right sides are each made up of three segments: apical, posterior and anterior. The left upper lobe includes the lingual, which corresponds to the middle lobe on the right. The lower lobes each include four segments: superior, anterior, basal, lateral basal and posterior basal.

Each segment of the lung contains a network of air tubes, air sacs and blood vessels. These sacs allow for the exchange of oxygen and carbon dioxide between the blood and air. It is these segments that are being drained. Note the position of each lung segment in Figure 1 below.
PERFORMING PD & P

The performance of PD & P involves a combination of techniques including: multiple bronchial drainage positions, percussion, vibration, deep breathing and coughing.

Although individual PD & P techniques will be further detailed, a brief summary of the complete treatment follows.

Once the person is in one of several prescribed bronchial drainage positions, the caregiver performs percussion on the chest wall. This treatment usually is given for a period of three to five minutes, sometimes followed by vibration over the same lung segment for approximately 15 seconds (or during five exhalations). The person is then encouraged to cough or huff vigorously to get rid of mucus, clearing the lungs.

Description of PD & P Techniques

Postural drainage uses gravity to help move mucus from the lungs up to the throat. The person lies or sits in various positions so that the segment to be drained is uppermost on the patient’s body. The segment is then drained using percussion, vibration and gravity. For a complete description of these positions, see diagrams on pages 5 through 8. Your CF care team may tailor these positions to yours or your child’s needs.

Percussion or clapping by the caregiver on the chest wall over the lung segment to be drained forces secretions into the larger airways. The hand is cupped as if to hold water but with the palm facing down as in Figure 2. The cupped hand conforms to the chest wall and traps a cushion of air to soften the clapping.

Percussion is done vigorously and rhythmically, but should not be painful or sting if the hand is cupped properly. Each percussion also should have a hollow sound. The majority of the movement is in the wrist with the arm relaxed, making percussion less tiring to perform.

Percussion should be done only over the ribs. Special attention must be taken to avoid percussing over the spine, breastbone, stomach and lower ribs or back to prevent trauma to the spleen on the left, the liver on the right and the kidneys in the lower back.

Various mechanical devices may be used in place of the traditional cupped palm method for percussion. Ask your doctor or therapist for advice.

Vibration gently shakes secretions into the larger airways. The caregiver places a hand firmly on the chest wall over the appropriate segment and tenses the muscles of the arm and shoulder to create a fine shaking motion. Then, the caregiver applies a light pressure over the area being vibrated. (The caregiver also may place one hand over the other, then press the top and bottom hand into each other to vibrate.) Vibration is done with the flattened hand, not the cupped hand, as in Figure 3. Exhalation should be as slow and as complete as possible.

Deep breathing moves the loosened mucus and may stimulate coughing. Diaphragmatic breathing/belly breathing or lower chest breathing is used to encourage deep breathing to move air into the lower lungs. The belly moves outward when the person breathes in and sinks in when he or she breathes out.

Coughing is essential in clearing the airways. A forced but not strained exhalation, following a deep inhalation, may stimulate a productive cough. The mucus can then be
coughed out. To increase the cough’s effectiveness while decreasing the strain to the person, coughing may be assisted by supporting the sides of the lower chest with the hands or elbows.

**Huffing**

At the end of each drainage position, the person can take a deep breath, and then expel it quickly in a “huff.” This “huff” forces the air and mucus out, making the cough more effective.

**Timing of PD&P**

Generally, each treatment session can last for 20 to 40 minutes. PD & P is best done before meals or one and a half to two hours after eating to minimize the chance of vomiting. Early morning and bedtime sessions are recommended. The length of PD & P and the number of treatment sessions may need to be increased if the person is more congested. The recommended positions and durations of treatment are prescribed by the CF doctor or therapist.

**ENHANCING PD & P FOR THE PERSON AND CAREGIVER**

Both the person and the caregiver should try to be comfortable during PD & P. Before beginning PD & P, the person should remove tight clothing, jewelry, buttons and zippers around the neck, chest and waist. Light, soft clothing, such as a T-shirt, may be worn and an extra towel or layer of clothing can be used to lessen any sting from percussion. **Do not perform PD & P on bare skin.** The therapist or caregiver should remove rings and other bulky jewelry such as watches or bracelets. An ample supply of tissues or a place to cough out the mucus should be provided.

**Performing PD & P Comfortably and Carefully**

If the head down position is recommended, the person’s head should be well supported. The person can bend at the hips and knees to allow for both a stronger cough and a more comfortable position.

The caregiver should not lean forward when treating the person, but should remain in an upright position to protect his or her back. To achieve this, the table on which the person lies should be positioned at a comfortable height for the caregiver.

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**Purchasing Equipment**

Equipment such as drainage tables, electrical and non-electrical palm percussors and vibrators may be helpful and can be purchased from medical equipment stores. Older children and adults may find percussors useful when performing their own PD & P, but younger children may be frightened by the noise of a percussor.

Ask your doctor or therapist at your CF care center for recommendations on equipment.

**Tips for Achieving the Proper Positions**

To enable you to perform PD & P more frequently and effectively, select a method of achieving the proper bronchial drainage angles that is easy to set up. Some people use a firm padded board or table. These tilt boards, or drainage tables, can be elevated at one end by placing blocks on the floor. Tables that adjust to various angles or heights can be constructed or bought.

Pillows, sofa cushions, bundles of newspapers under pillows for support, cribs with adjustable mattress heights/tilts, foam wedges and bean bag chairs work for many families. Infants can be positioned with or without pillows in the caregiver’s lap.

**Making PD & P More Enjoyable**

An additional benefit of PD & P is that it promotes a special time together. On a regular basis, PD & P offers a specific time for you to enjoy each other’s company.

To enhance the quality of the time you spend with your caregiver or child doing PD & P, do one of the following:

- Schedule PD & P around a favorite TV show.
- Play a favorite tape of songs or stories.
- Spend time playing, talking or singing before, during and after PD & P.
- For kids, encourage blowing or coughing games during PD & P, such as blowing pinwheels or coughing the deepest cough.
- Ask willing and capable relatives, friends, brothers and sisters to perform PD & P occasionally. This can provide a welcome break from the daily routine.
- Minimize interruptions.

Identifying ways that make PD & P more enjoyable at all ages can help you keep a regular routine and get maximum health benefits.
SUMMARY OF POSTURAL DRAINAGE POSITIONS

Lung segments are drained using gravity as the patient lies or sits in different positions. Percussion and vibration are performed on the front, back and sides of the person’s chest and are followed by deep breathing and coughing.

Figure 4 summarizes all positions used for bronchial drainage. Details and explanations are provided for people of all ages on pages 5 through 8 of this brochure.
INSTRUCTIONS FOR POSTURAL DRAINAGE POSITIONS

The following diagrams describe the drainage positions necessary to drain each lung segment. In the diagrams, shaded areas on the chest indicate the location of the segment that is to be drained in each position.

The maneuvers vary slightly with the person’s age. Here, the diagrams illustrate the first PD position for 1) an infant with the caregiver holding the infant on his or her lap, 2) an older child or adult who performs PD & P independently (assistance may be needed to treat some positions) and 3) a child or adult with the caregiver assisting with PD & P. The remaining diagrams illustrate a caregiver giving PD & P to a child, and can be adapted for infants and adults.

Instructions are shown using a drainage table, but alternatives are available. Pillows may be used for added comfort, but should not lessen the angle necessary for drainage. If the person tires easily, the sequence of positions can be varied, but all segments should be treated regularly.

Please remember to percuss and vibrate only over the ribs. Avoid percussing and vibrating over the spine, breastbone, stomach and lower ribs or back to prevent trauma to the spleen on the left, the liver on the right and the kidneys in the lower back. Do not percuss or vibrate on bare skin.

**INFANT**

**Position #1: UPPER LOBES**

**Apical Segments**

Lean the infant back from a sitting position at a 30 degree angle on a pillow in your lap. Percuss and vibrate over the muscular area between the collarbone and the top of the shoulder blade. Percuss and vibrate on both the left and right sides.

* Infant shown without T-shirt for illustration purposes only.

**ADULT**

**Position #1: UPPER LOBES**

**Apical Segments**

Sit on a chair and lean backward on a pillow at a 30 degree angle. Percuss and vibrate over the muscular area between the collarbone and the top of the shoulder blade on both the left and right sides of the chest.
**CHILD**

**Position #1: UPPER LOBES**

**Apical Segments**

The child sits on the flat drainage table and leans on a pillow at a 30 degree angle against the caregiver. Percuss and vibrate over the muscular area between the collarbone and the top of the shoulder blade on both the left and right sides.

* Child shown without T-shirt for illustration purposes only.

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**CHILD**

**Position #2: UPPER LOBES**

**Posterior Segments**

The child sits on the flat drainage table and leans forward over a folded pillow at a 30 degree angle. Stand behind the child and percuss and vibrate on the upper back on the left and right sides of the chest.

* Child shown without T-shirt for illustration purposes only.

---

**CHILD**

**Position #3: UPPER LOBES**

**Anterior Segments**

The child lies on his or her back on a flat drainage table. Percuss and vibrate between the collarbone and nipple on both the left and right sides of the chest.

* Child shown without T-shirt for illustration purposes only.
**CHILD**

**Position #4: LINGULA**

Elevate the foot of the table 14 inches (about 15 degrees). The child lies head down on the right side and rotates 1/4 turn backward. A pillow may be placed behind the child (from shoulder to hip) and the child may flex his or her knees. Percuss and vibrate just outside the left nipple area. For females with tenderness around the breasts, percuss and vibrate with the heel of hand under the armpit and fingers extended forward beneath the breasts.

* Child shown without T-shirt for illustration purposes only.

**CHILD**

**Position #5: MIDDLE LOBE**

Elevate the foot of the table 14 inches (about 15 degrees). The child lies head down on the right side and rotates 1/4 turn backward. A pillow may be placed behind the child (from shoulder to hip) and the child may flex his or her knees. Percuss and vibrate just outside the right nipple area. For females with tenderness around the breasts, percuss and vibrate with the heel of hand under the armpit and fingers extended forward beneath the breasts.

* Child shown without T-shirt for illustration purposes only.

**CHILD**

**Position #6: LOWER LOBES**

**Anterior Basal Segments**

Elevate the foot of the drainage table 18 inches (about 30 degrees). The child lies on his or her right side with the head down and a pillow behind the back. Percuss and vibrate over the lower ribs on the left side of the chest, as shown in the diagram. To drain the right side of the chest, the child lies on his or her left side with the head down and a pillow behind the back. Percuss and vibrate over the lower ribs on the right side of the chest.

* Child shown without T-shirt for illustration purposes only.
**Position #7: LOWER LOBES**

**Posterior Basal Segments**

Elevate the foot of the drainage table 18 inches (about 30 degrees). The child lies on his or her abdomen, head down, with a pillow under the hips. Percuss and vibrate on both the left and right sides of the spine. Do not percuss or vibrate over the spine or lower ribs.

* Child shown without T-shirt for illustration purposes only.

**Position #8 & 9: LOWER LOBES**

**Lateral Basal Segments**

Elevate the foot of the table 18 inches (about 30 degrees). The child lies on his or her left side, head down, and leans 1/4 turn forward toward the table. The child can flex his or her upper leg over a pillow for support. Percuss and vibrate over the uppermost portion of the lower ribs to drain the right side, as shown in the diagram. To drain the left side, the child lies on his or her right side in the same position. Percuss and vibrate over the uppermost portion of the lower left ribs.

* Child shown without T-shirt for illustration purposes only.

**Position #10: LOWER LOBES**

**Superior Segments**

The child lies on his or her abdomen on a flat drainage table with two pillows under the hips. Percuss and vibrate over the middle part of the back at the bottom of the shoulder blade on both the left and right side of the spine. Do not percuss or vibrate over the spine.

* Child shown without T-shirt for illustration purposes only.
Avian Influenza, including Influenza A (H5N1), in Humans: WHO Interim Infection Control Guideline for Health Care Facilities

Date of most recent amendment: 9 February 2006
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Purpose of document

• The purpose of this document is to provide infection control guidance for health care workers (HCWs)* in health care facilities evaluating or providing care for patients with suspected or confirmed avian influenza (AI) infection, including AI A (H5N1).
• This guideline is intended for use in the current inter-pandemic period, in which there are human AI infections, but no evidence for sustained human-to-human transmission.
• Although this guidance may be modified as the epidemiology of AI evolves, health care facilities may use this guidance, in addition to guidance in national pandemic influenza plans, to assist with pandemic influenza planning.

Intended audience

• This guidance is intended to be used by government planners, health care facility administrators, infection control practitioners, occupational health specialists, direct care providers, and other professionals involved in patient care.
• Although these recommendations are targeted for inpatient health care facilities, they may be applicable to other patient care settings.
• WHO recognizes that the recommendations in this guideline may need to be adapted due to the local setting, local needs, and limitations due to lack of resources.
• Health care facilities are encouraged to review the recommendations and to modify them according to what is possible, practical, and prudent.

Updates to guidance

• The present guideline replaces the document "Influenza A (H5N1): WHO Interim Infection Control Guidelines for Health Care Facilities" published by WPRO on 10 March 2004.
• Case surveillance and case and contact investigation are critical in defining and identifying changes in the epidemiology of human AI infection and will continue to inform AI infection control recommendations. Modifications to this guideline will be made, as necessary, as additional information becomes available. Please make sure the version being used is the most recent version available at: http://www.who.int/csr/disease/avian_influenza/guidelinestopics/en/index3.html.
• In the event of an AI pandemic, additional recommendations will be forthcoming, including recommendations for the care of patients in non-hospital settings.

Additional information

• This guideline does not include information on the laboratory diagnosis and clinical management of patients with AI infection. Please reference WHO guidance related to these topics at: http://www.who.int/csr/disease/avian_influenza/guidelinestopics/en/index1.html

*Any person working in a health care facility, e.g., medical officer, nurse, physiotherapist, cleaner, psychologist, laboratory worker, ambulance driver, etc. whether or not they are an employee of the facility.
I. Executive summary

Normally, AI viruses do not infect humans because of host barriers to infection, such as cell receptor specificities. However, they can occasionally cross the species barrier and directly infect humans, including highly pathogenic strains that have caused fatal disease in humans.[1] In 1997, AI A(H5N1) caused an outbreak in domestic poultry in Hong Kong and also infected humans, hospitalizing 18 people and causing 6 deaths.[2, 3] Since then, other AI outbreaks (e.g., H9N2 in 1999, H7N2 in 2002, and H7N7 in 2003) have resulted in human infections.[4] For more details on AI and the significance of its transmission to humans see Annex 1.

Since the last pandemic in 1968-1969, the risk of an influenza pandemic has not been considered greater than at the present time. As of the date of this document, AI A (H5N1) is endemic in birds in many parts of the world. The widespread persistence of H5N1 in bird populations poses two main risks to human health. The first is the risk of infection when the virus spreads directly from birds to humans. The second risk, which is of even greater concern, is that there will be increased possibilities for the widely circulating virus to infect humans and possibly re assort into a strain that is both highly infectious for humans and spreads easily from human-to-human. Such a change could mark the start of a pandemic.

The present document comprises three parts: I. Executive summary; II. Infection control recommendations; and III Annexes. The first part provides a summary of the main recommendations and rationale; the second part provides a detailed description of the recommendations; the annexes provide some background information for the recommendations in Part II and some practical tools.

Rationale

In an era of emerging and reemerging communicable diseases, basic infection control precautions are the cornerstone of the approach to prevent transmission of communicable diseases in health care facilities. The basic level of infection control precautions (standard precautions), when used as recommended, will be effective in preventing transmission of most communicable diseases in health care facilities. Facilitating compliance with these basic precautions should be emphasized in all health care facilities at all times.

WHO regards every case of transmission of an AI virus to humans as a cause for concern, heightened vigilance, and increased surveillance. During the 1997 human AI A(H5N1) outbreak in Hong Kong, no nosocomial spread was observed when droplet and contact precautions were used,[5, 6] and there is no evidence to suggest that airborne human-to-human transmission of AI A(H5N1) has occurred thus far.[7] However, although it is not unanticipated that there is little evidence of nosocomial transmission of AI A (H5N1) thus far because the virus has apparently not yet developed the ability to be readily transmitted between humans, it is concerning that recent publications have disclosed that HCWs have been exposed to AI-infected patients without any specific protection.

This could have resulted in transmission of AI A (H5N1) infection to HCWs with consequences for the health of individual HCWs, as well as for public health. HCWs are first responders, and it
is of utmost importance to provide them with protection against the hazards associated with the provision of health care.

Available evidence suggests that transmission of human influenza viruses occurs through multiple routes including large droplets, direct and indirect contact, and droplet nuclei.[8-12] However, observational studies conducted in health care facilities suggest that droplet transmission is the major mode of transmission in that setting [8, 9, 11] and standard precautions plus droplet precautions are recommended for the care of patients infected with seasonal influenza (Annex 2).

However, as of the date of this document, sound evidence on exact modes of transmission of AI viruses is still missing. Given the uncertainty about the exact modes by which AI, including influenza A (H5N1) may first be transmitted between humans, due to the high mortality of the disease, and the possibility that the virus could mutate or reassort at any time into a strain capable of efficient human-to-human transmission, enhanced infection control precautions for patients with suspected or confirmed AI infection appear warranted.

Summary of WHO recommendations:

- Standard and droplet precautions should be the minimum level of precautions to be used in all health care facilities when providing care for patients with acute respiratory illness, regardless of whether AI infection is suspected. The most critical elements of these precautions include facial protection (eyes, nose, and mouth) and hand hygiene and these precautions should be prioritized (Annex 3).
- Full barrier precautions, which include standard, contact, and airborne precautions (plus eye protection) should be used, when possible, when providing care for suspected or confirmed AI-infected patients with close patient contact and during aerosol-generating procedures.
- Because some elements of full barrier precautions (particularly those related to airborne precautions) may not be available in all health care facilities, minimal requirements for caring for AI-infected patients should include standard, contact, and droplet precautions (plus eye protection when within 1 meter of patient and for all aerosol-generating procedures). Additional elements should be prioritized and pursued when resources permit.

Personal protective equipment (PPE) recommendations for HCWs providing care to AI-infected patients

- The use of PPE is mandatory if direct close contact with the patient is anticipated and when entering the room where aerosol-producing procedures in AI-infected patients are being performed.
- Particulate respirators that are at least as protective as U.S. NIOSH-certified N95, EU FFP2, or equivalent (Annex 4).
  - Appropriate procedures should be used to select a particulate respirator that fits well and a user seal check should be performed each time a disposable particulate respirator is worn.
Disposable particulate respirators, although similar in appearance to surgical masks, differ significantly from surgical masks because they are specifically designed to protect the wearer from exposure to airborne infectious diseases by sealing tightly to the face and filtering infectious particles from the air.

If a particulate respirator is not available, a tightly fitting surgical or procedure mask should be used.

Surgical and procedure masks do not provide protection against small-particle aerosols (droplet nuclei) and aerosol-generating procedures (Annex 4) should not be performed if a particulate respirator is not available;

- Eye protection (face shield, visor, or goggles) if close contact with the patient is anticipated and for all aerosol-generating procedures;
- Clean, nonsterile, ambidextrous gloves, which should cover the cuffs of the gown.
- Clean, nonsterile long sleeved gowns (fluid-resistant, if available);
  - If cloth gowns are used, a waterproof apron should also be used if splashing of blood, body fluids, excretions, or secretions is anticipated.

PPE is an integral part of routine infection control practice and is an important component of prevention and control activities that are intended to reduce the risk of healthcare-associated infections, including avian influenza, in health care facilities. However, use of PPE on its own does not prevent acquisition of any pathogen associated with the process of care. Compliance with the use of recommended infection control precautions (Annexes 3 and 4) is critical to prevent the possible transmission of AI and other infections to HCWs, patients, and visitors.

- HCWs should receive training on the use of recommended infection control precautions as well as on the underlying concepts that form the basis for these recommendations;
- **Hand hygiene** is an important component of infection control precautions (Annex 3);
- HCWs must also be trained to use PPE correctly. Incorrect use of PPE may fail to protect HCWs against the acquisition of healthcare-associated infections and may also lead to self-contamination and inoculation with infectious agents; and
- PPE placement should be carefully done before entering the isolation room or area and careful removal of PPE is critical to avoid self-contamination. Follow recommended procedures for PPE placement and removal (section II, 4).

Infection control precautions and PPE are just some of the components of an overall programme of infection prevention and control in health care facilities. All health care facilities should establish an infection control programme and it is also important that there is an infection control programme at the national level to support these activities in health care facilities (Annex 5).
II. Infection control recommendations

1. Standard infection control precautions for all health care facilities

Standard precautions[10] (Annex 3) include:

a) **Hand hygiene:**
   - Before and after patient contact;
   - After removing gloves or any other PPE item;
   - Routine hand hygiene is performed either by using an alcohol-based hand rub (preferably) or by washing hands with soap and water, using a single-use towel for drying hands;
   - If hands are visibly dirty or soiled with blood or other body fluids, or if broken skin might have been exposed to potentially infectious material hands should be washed thoroughly with soap and water. Hands should also be washed after using the restroom.

b) Use PPE based on risk assessment and avoid contact with blood, body fluids, excretions, and secretions.

c) Appropriately handle patient care equipment and soiled linen.

d) Prevent needlestick/sharp injuries.

e) Appropriate environmental cleaning and spills-management.

f) Appropriate handling of waste.

**Rationale**

The SARS outbreak illustrated the critical importance of basic infection control precautions in health care facilities. Nosocomial transmission of SARS was often associated with noncompliance with the basic level of infection control precautions (standard precautions). Standard precautions include the use of facial protection (nose, mouth, and eye protection) by HCWs when they are providing care to coughing/sneezing patients. However, it has not been the routine practice of HCWs in many health care facilities worldwide to use this protection or to ask patients with respiratory symptoms to wear masks. In addition, numerous studies have documented the lack of compliance with hand hygiene, a major component of standard precautions. The use of alcohol-based hand rubs in health care facilities has been implemented in recent years in an attempt to increase compliance with hand hygiene. Standard precautions, including appropriate use of facial (eyes, nose, and mouth) protection when caring for respiratory symptomatic patients and hand hygiene, should be a priority in all health care facilities.

For additional information on standard precautions, see:


2. Respiratory hygiene/cough etiquette for all health care facilities

   a) Persons with respiratory illness should be educated to:
      - cover their mouth and nose with a tissue when coughing and dispose of used tissue in waste containers;
      - use a mask if coughing, when a mask can be tolerated;
      - perform hand hygiene (use an alcohol-based hand rub or wash hands with soap and water) after contact with respiratory secretions; and
      - stand or sit at least 1 meter (3 feet) from other persons, if possible.

   b) Health care facilities should promote respiratory hygiene/cough etiquette by:
      - Educating HCWs, patients, family members, and visitors on the importance of containing respiratory aerosols and secretions to help prevent the transmission of influenza and other respiratory viruses.
      - Posting signs requesting that patients and family members immediately report symptoms of respiratory illness and use respiratory hygiene/cough etiquette.
      - Posting signs requesting that persons with respiratory illness refrain from visiting the health care facility.
      - Considering making masks, tissue, and alcohol-based hand rubs available so that source control measures can be used in common areas and areas used for the evaluation of patients with respiratory illness.

Rationale

Respiratory hygiene/cough etiquette procedures should be used for all patients with respiratory symptoms (e.g., coughing, sneezing). The impact of covering coughs and sneezes and/or placing a mask on a coughing/sneezing patient on the containment of respiratory droplets and secretions or on the transmission of respiratory infections has not been systematically studied. In theory, however, any measure that limits the dispersal of respiratory aerosols should reduce the opportunity for transmission. Masking of some patients may be difficult, in which case the emphasis should be on cough etiquette.

For additional information, see Respiratory Hygiene/Cough Etiquette in Healthcare Settings
http://www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm
3. Early recognition, isolation, and reporting of possible AI cases
   a) Health care facilities should:
      • Make it a facility priority to establish methods to ensure early recognition and investigation
        of possible AI cases;
      • Promptly initiate infection control precautions when AI infection is suspected; and
      • Link the hospital-based surveillance system to the public health surveillance system and
        report immediately all available essential information regarding possible AI cases to
        public health authorities via the local surveillance system, as per Annex 1 of the International
        Although the IHR (2005) will not enter into force until June 2007, they are cited here as the
        recommended best practice.  At the national level the IHR (2005) will require the
        international notification to WHO by States Parties of "human influenza caused by a new
        subtype" [Annex 2 of the IHR(2005)].
   
   b) In countries* with known AI infections in animals or humans, consider the diagnosis of AI:
      • In all patients who present with severe acute febrile respiratory illness (e.g., fever > 38°C,
        cough, shortness of breath) or other severe unexplained illness (e.g., encephalopathy or
        diarrhoea),[13] particularly in patients with a history of bird exposure, exposure to known or
        suspected AI-infected patients, or exposure to other severely ill people.
      • Family members who accompany suspected AI-infected patients to the health care facility
        can be assumed to have been potentially exposed to AI and should also be evaluated for AI
        infection.
      • If symptoms and exposure history support the possibility of AI infection, such patients
        should be put under isolation precautions and should be moved away from other persons and
        evaluated as soon as possible.
   
   c) In countries* without known AI infections in animals or humans:
      • Query patients with severe acute febrile respiratory illness (e.g., fever > 38°C, cough,
        shortness of breath) or other severe unexplained illness (e.g., encephalopathy or
        diarrhoea),[13] about travel to AI affected countries within the prior two weeks.
      • Consider the diagnosis of AI in patients with acute febrile respiratory illness who have
        travelled to an AI affected country within the prior two weeks and who have had bird
        exposure, exposure to known or suspected AI-infected patients, or exposure to other
        severely ill people while in an AI affected country during this time period.
      • If symptoms, travel, and exposure history support the possibility of AI infection, such
        patients should be put under isolation precautions and should be moved away from other
        persons and evaluated as soon as possible.

   *To access updated information about AI affected countries, please see:
   http://www.who.int/csr/disease/avian_influenza/en/

Rationale
Prompt identification and isolation of patients, HCWs, or visitors who may be infected with AI is
critical to minimize the risk of nosocomial transmission and to enable an efficient public health
response.
Figure 1: Initiation of AI infection control precautions in health care facilities

Patient enters triage with symptoms of acute respiratory illness

Patient admitted for investigation of influenza A/H5

Patient confirmed as having A/H5 infection (see case definition)

Infection control measures

Follow standard and droplet precautions
⇒ HCWs should use facial protection (surgical/procedure mask, goggles / face shield)
⇒ Place a surgical/procedure mask on the patient when in the waiting room; if no masks are available, ask the patient to cover mouth and nose with a tissue when sneezing or coughing
⇒ If possible, place patient in a place that is separate from other patients

⇒ Single room accommodation - with negative pressure, if possible
⇒ If single room is not possible, cohort patients
⇒ Staff should use full barrier precautions

Report to public health authorities

Other diagnosis
⇒ Reassess precautions

Full infection control barriers to remain in place for the duration required

Adult > 12 years
Child ≤12 years

Full infection control barriers to remain in place for 7 days after the resolution of fever
Full infection control barriers to remain in place for 21* days after the onset of illness

*Shedding of virus can be at high titres for up to 21 days in young children.
4. Isolation precautions for suspected or confirmed AI-infected patients

a) Patient placement:
   - Place patient in a negative pressure room (airborne infection isolation room) or area, if available (Annex 6).
   - If a negative pressure room is not available or cannot be created with mechanical manipulation of the air, place patient in a single room.
   - If a single room is not available, suspected and confirmed AI-infected patients may be cohorted separately in designated multi-bed rooms or wards.
   - Doors to any room or area housing suspected or confirmed AI-infected patients must be kept closed, when not being used for entry or egress.
   - To facilitate cleaning and to reduce the potential for virus aerosolisation via vacuuming, house AI-infected patients in uncarpeted rooms/areas, if possible.
   - When possible, isolation rooms should have their own hand washing sink, toilet, and bath facilities.
   - The number of persons entering the isolation room should be limited to the minimum number necessary for patient care and support.

b) Cohorting
   - If single rooms are not available, patients infected with the same organisms can be cohorted (share rooms). These rooms should be in a well-defined area that is clearly segregated from other patient care areas used for uninfected patients.
   - Designated units or areas should be used for cohorting AI-infected patients (suspected and confirmed cases should be housed separately).
   - The distance between beds should be > 1 meter. Increasing spatial distance between patients may theoretically be helpful in preventing transmission of respiratory aerosols.
   - Whenever possible, HCWs assigned to cohorted patient care units should be experienced house staff and should not “float” or otherwise be assigned to other patient care areas.
   - The number of persons entering the cohorted area should be limited to the minimum number necessary for patient care and support.
   - Consider having portable x-ray equipment available in cohort areas.
   - HCWs assigned to cohorted patient care units should be aware that AI-infected patients may be concurrently infected or colonized with other pathogenic organisms (e.g., Staphylococcus aureus, Clostridium difficile) and should use standard and applicable transmission-based infection control precautions to prevent transmission of healthcare-associated infections.

c) Barrier precautions for the care of patients with respiratory illness or suspected or confirmed AI infection. In addition to hand hygiene, all individuals providing care for patients with respiratory illness or suspected or confirmed AI infection should use PPE as indicated in Table 1 below.

d) PPE for the care of suspected or confirmed AI-infected patients includes:
   - A particulate respirator that is at least as protective as a U.S. NIOSH-certified N95, EU FFP2, or equivalent (Annex 4).
Avian Influenza, including Influenza A (H5N1), in Humans: WHO Interim Infection Control Guidelines for Health Care Facilities (9 February 2006)

- Appropriate procedures should be used to select a particulate respirator that fits well and, whenever possible, a user seal check should be performed each time a disposable particulate respirator is worn.
- If particulate respirators are not available or if the number is limited, tightly fitting surgical or procedure masks should be used when providing direct care and particulate respirators should be reserved for aerosol-generating procedures (Annex 4).
- Clean, non-sterile ambidextrous gloves if direct contact with the patient is anticipated.
- Long-sleeved gown, if contact with patients anticipated.
- Protective eyewear (face shields/goggles/visors) if close contact with respiratory symptomatic patients and for all aerosol-generating procedures.
- If a gown that is not fluid-resistant is worn, a waterproof apron should be worn over the gown if splashing or spraying of potentially infectious material is anticipated as per standard precautions.
- Follow recommended steps for placement and removal of PPE and performance of hand hygiene after PPE removal (see next paragraph).
- Aerosol-generating procedures increase the potential for dissemination of small-particle aerosols (droplet nuclei) and should only be performed:
  o when absolutely essential;
  o with the fewest number of personnel necessary;
  o with the most experienced personnel available;
  o under elective, controlled conditions, if possible (e.g., earlier intubation with patient sedated/paralysed); and
  o in a negative pressure room, if available.

e. PPE placement and removal procedures

- If possible, have an observer monitor placement and removal of PPE.
- **Entering the isolation room/area**
  1. Collect all equipment needed.
  2. **Perform hand hygiene with an alcohol-based hand rub (preferably) or soap and water.**
  3. Put on PPE:
     o Put on fluid-resistant gown.
     o Put on disposable particulate respirator.
     o Perform user seal check of particulate respirator.
     o Put on hair cover (if used, e.g. during an aerosol generating procedure).
     o Put on face shield or goggles.
     o Put on gloves (make sure gloves cover cuff of gown sleeves)
  4. Enter the room and shut the door.

- **Leaving the isolation room/area**
  1. Remove PPE in a manner that prevents self-contamination or self-inoculation with contaminated PPE or hands. The procedure listed below is suggested to remove PPE (if possible, have an observer monitor PPE removal to minimize the risks further):
     o Leave the isolation room/area.
Remove PPE either in the anteroom or if there is no anteroom make sure that neither the environment outside the isolation room/area nor other persons can get contaminated.

- Remove protective eyewear and discard in rubbish bin. If reusable, place face shield in container for decontamination.
- If worn, remove hair cover and discard in rubbish bin.
- Remove gown and discard in rubbish bin.
- Remove gloves and discard in rubbish bin (gloves may be peeled from hands when gown is removed).
- Perform hand hygiene with an alcohol-based hand rub (preferably) or soap and water.
- Remove particulate respirator by grasping elastic bands, do not touch front of particulate respirator (front of particulate respirator may be contaminated) and discard in rubbish bin.

2. Perform hand hygiene with an alcohol-based hand rub (preferably) or soap and water.

f. Preparation of the isolation room/area

- Ensure infection control precautions through appropriate signage on the door.
- Place a recording sheet at the entrance of the isolation room/area. All HCWs and visitors entering the isolation room/area should print their names (visitors should also provide contact information) on the recording sheet so that follow up/contact tracing is possible, if necessary.
- Remove all nonessential furniture. The remaining furniture should be easy to clean and should not conceal or retain dirt or moisture, either within or around it.
- Stock linen as needed outside the isolation room (e.g., in the change room).
- Stock the sink area with suitable supplies for hand washing, as well as with alcohol-based hand rub near point of care and room door.
- Place appropriate waste bags in a foot-operated bin.
- Place a puncture-proof container for sharps inside the isolation room.
- Keep the patient’s personal belongings to a minimum. Keep water pitcher and cup, tissue wipes, and all items necessary for attending to personal hygiene within the patient’s reach.
- Non-critical patient care equipment (e.g., stethoscope, thermometer, blood pressure cuff, sphygmomanometer) should be dedicated to the patient. Any patient care equipment that is required for use by other patients should be thoroughly cleaned and disinfected prior to use.
- Set up a trolley outside the door to hold PPE. A checklist may be useful to ensure that all equipment is available (see sample checklist in Annex 6).
- Place an appropriate container with a lid outside the door for equipment that requires disinfection and sterilization. Once equipment has been appropriately cleaned it can be sent to the sterilizing service department.
- Keep adequate equipment required for cleaning and disinfection inside the patients’ room and ensure scrupulous daily cleaning of the isolation room/area.
- A telephone or other method of communication should be set up in the patient room to enable patient or family members/visitors to communicate with HCWs to minimize the necessity for HCWs to enter the room.
Table 1. Barrier precaution recommendations for persons providing care for patients with respiratory illness/suspected or confirmed AI infection

<table>
<thead>
<tr>
<th></th>
<th>Close contact (&lt; 1 meter) with patients with acute febrile respiratory illness who have no known AI risk factors*</th>
<th>Entry to AI isolation room/area, but no anticipated patient contact</th>
<th>Close contact (&lt; 1 meter) with AI-infected patient in or out of isolation room/area</th>
<th>Performance of aerosol-generating procedure on AI patientb,c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand hygiene*</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Gloves</td>
<td>Not routinely</td>
<td>Risk assessment</td>
<td>Yesd</td>
<td>Yes</td>
</tr>
<tr>
<td>Apron</td>
<td>Not routinely</td>
<td>Risk assessment</td>
<td>Not routinelyl</td>
<td>Not routinelyl</td>
</tr>
<tr>
<td>Gown</td>
<td>Not routinely</td>
<td>Risk assessment</td>
<td>Not routinelyf</td>
<td>Not routinelyf</td>
</tr>
<tr>
<td>Hair cover</td>
<td>Not routinely</td>
<td>Not routinely</td>
<td>Not routinely</td>
<td>Yes</td>
</tr>
<tr>
<td>Surgical mask (on HCW)</td>
<td>Yes</td>
<td>Not routinelyh</td>
<td>Not routinelyh</td>
<td>Not routinelyh</td>
</tr>
<tr>
<td>Particulate respirator</td>
<td>Not routinely</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Eye protection</td>
<td>Risk assessment</td>
<td>Risk assessment</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Surgical mask (on patient)</td>
<td>Yes</td>
<td>No</td>
<td>Not routinelyl</td>
<td>No</td>
</tr>
</tbody>
</table>

*Bird exposure in regions with AI infections in animals or exposure to AI-infected patients.

a. Standard precautions are the minimum level of precautions indicated for all patients at all times (Annex 3).
b. Aerosol-generating procedures create aerosols of different sizes (large and small-particle aerosols) (Annex 4). Examples of aerosol-generating procedures include: endotracheal intubation, aerosolized or nebulized medication administration, diagnostic sputum induction, bronchoscopy, airway suctioning, tracheostomy care, chest physiotherapy, nasopharyngeal aspiration, positive pressure ventilation via face mask (e.g., BiPAP, CPAP), high-frequency oscillatory ventilation, and postmortem excision of lung tissue.
c. Wherever possible, aerosol-generating procedures should be performed in negative pressure rooms, side rooms or other closed single-patient areas with minimal staff present (Annex 4). PPE should cover the torso, arms, and hands as well as the eyes, nose, and mouth.
d. Gloves and gown or apron should be worn during cleaning procedures.
e. Gloves should be worn in accordance with standard precautions. If glove demand is likely to exceed supply, glove use should always be prioritized for contact with blood and body fluids (ambidextrous non-sterile gloves), and contact with sterile sites (sterile gloves).
f. If splashing with blood or other body fluids is anticipated, and gowns that are not fluid-resistant are used, a waterproof apron should be worn over the gown.
g. If particulate respirator is not available, use tightly fitting surgical mask.
h. If particulate respirator is not available, use tightly fitting surgical mask and face shield.
i. Use eye protection if close contact (< 1 meter) with patient is possible.
j. Provide surgical mask for patient (if tolerated), when patient is outside of isolation room/area.
Rationale
Isolation rooms reduce the risk of transmission of infection from the source patient to others by reducing direct or indirect contact transmission. PPE is used as part of infection control precautions to provide the appropriate level of protection. Limiting contact between infected and uninfected persons, such as nonessential HCWs and visitors, will reduce the risk of AI transmission to susceptible persons.

5. Duration of infection control precautions
The recommended infection control precautions above should be implemented during the time the patient is infectious:
- adults and adolescents > 12 years of age – implement precautions at time of admission and continue for 7 days after resolution of fever.
- Infants and children ≤ 12 years of age – implement precautions at time of admission and continue for 21 days after illness onset (young children can shed seasonal influenza virus at high titres for up to 21 days).[14]

6. Recommendations for ambulatory care settings:
In countries without reported AI infections in animals or humans:
- Post signage to alert persons with severe acute febrile respiratory illness to notify staff immediately and to use respiratory hygiene/cough etiquette, see: http://www.cdc.gov/flu/protect/covercough.htm
- Evaluate patients with acute respiratory illness promptly.
- Consider scheduling clinic patients with acute respiratory illness at the end of the day or at a time separate from well patient visits.
- Patients with acute respiratory illness in waiting areas should stand or sit at least 1 meter (3 feet) from other persons or in a separate waiting area, if possible.
- Provide tissues in the waiting area to contain respiratory secretions when coughing or sneezing. Provide no-touch receptacles for disposal of used tissues.
- Provide alcohol-based hand sanitizers in waiting areas and encourage hand hygiene after contact with respiratory secretions.
- Eliminate or decrease the use of items shared by patients such as pens, clipboards, and telephones.
- Clean and disinfect environmental surfaces in waiting and patient care areas daily and when visibly soiled.
- Ensure that medical devices are appropriately cleaned and disinfected between patients.
- Mask persons with acute respiratory illness, if possible.
- Healthcare workers should use standard and droplet precautions when working with patients with acute respiratory illness.
- If a patient with an acute respiratory illness is referred to another health care facility, notify the receiving facility.
In countries with AI infections in animals or humans, in addition to the above measures, also:

- Establish triage criteria to promptly identify persons at risk for AI infection.
- Place patients with severe acute febrile respiratory illness in a negative pressure room (if available) or in a room with a door. Keep door closed except for entry and egress until admission to hospital, discharge home, or until the possibility of AI infection has been excluded.
- If AI infection is suspected, HCWs should use full barrier PPE, if available.
- High risk aerosol-generating procedures in patients with severe acute febrile respiratory illness (Annex 4) should not be performed in the ambulatory care setting, unless they are necessary to save life and no alternative exists.
  - If such a procedure is performed in this setting, a negative pressure room should be used, if available, and participating HCWs should use full barrier precautions.
- After a suspected AI-infected patient has left the ambulatory care setting, clean and disinfect environmental surfaces in the examination room or other areas where the patient was located and clean and disinfect any patient care equipment used for the patient.
- If a suspected AI-infected patient is admitted or transferred to another facility, notify transporting HCWs and receiving staff of the necessary infection control precautions.

7. Specimen collection/transport within healthcare facilities

- Specimens for transport must be placed in leak-proof specimen bags, which have a separate sealable pocket for the specimen (i.e., a plastic biohazard specimen bag).
- Personnel who transport specimens should be trained in safe handling practices and decontamination procedures in case of a spill.
- Specimens should be hand delivered where possible. Pneumatic tube systems must not be used to transport specimens that may contain AI virus.
- HCWs who collect specimens from AI-infected patients should wear full barrier PPE.
- The accompanying request form should be clearly labelled as “(suspected) AI” and the laboratory notified by telephone that the specimen is “on its way.”

**Rationale**

Following standard precautions, all specimens should be regarded as potentially infectious and HCWs who take, collect, or transport clinical specimens should adhere rigorously to recommended infection control precautions in order to minimize the possibility of exposure.

For further information see specimen collection guidelines at:

8. Family member/visitor recommendations

Visitors should be strictly limited to those necessary for the patient’s well-being and care and should be advised about the possible risk of AI transmission.

- Visitors should be provided PPE for full barrier precautions and should be instructed in the use of PPE and hand hygiene practices prior to entry to the patient isolation room/area.
Parents/legal guardians of paediatric patients should be strongly supported to accompany the patient throughout the hospitalization.

Parents/relatives/legal guardians may assist in providing care to AI-infected patients in special situations (e.g., lack of resources, paediatric patients, etc.) if adequate training and supervision of PPE use and hand hygiene is ensured.

Because family members may have been exposed to AI via the patient or similar environmental exposures, all family members and visitors should be screened for symptoms of respiratory illness at entry to the facility.

Symptomatic family members or visitors should be considered possible AI cases and should be evaluated for AI infection.

**Rationale**

Care of patients in isolation becomes a challenge when there are inadequate resources, or when the patient has poor hygienic habits, deliberately contaminates the environment, or cannot be expected to assist in maintaining infection control precautions to limit transmission of microorganisms (children, patients with an altered mental state, or elderly persons). Such patients should be managed on a case-by-case basis, balancing the rights of the patient with the risk they may present to others.

**9. Patient transport within health care facilities**

- Limit the movement and transport of patients from the isolation room/area for essential purposes only and inform the receiving area as soon as possible prior to the patient’s arrival of the patient’s diagnosis and of the precautions that are indicated.
- If transport outside the isolation room/area is required, the patient should wear a surgical mask and perform hand hygiene after contact with respiratory secretions.
- If there is patient contact with surfaces, these surfaces should be cleaned and disinfected afterwards.
- If patient cannot tolerate a mask (e.g., due to the patient’s age or deteriorating respiratory status) instruct patient (or parent of paediatric patient) to cover nose/mouth with tissue during coughing/sneezing or use the most practical alternative to contain respiratory secretions. If possible, instruct the patient to perform hand hygiene after respiratory hygiene.
- Surgical and procedure masks are appropriate for use by AI-infected patients to contain respiratory droplets and should be worn by suspected or confirmed AI-infected patients during transport or when care is necessary outside of the isolation room/area.
- HCWs transporting AI-infected patients should use PPE as per standard precautions.

**Rationale**

Reduce spread of virus. AI-infected patients' respiratory secretions are the principal source of infecting material in health care settings.

**10. Pre-hospital care and transport outside health care facilities**

- If tolerated by the patients, place a procedure or surgical mask on all patients with respiratory illness to contain droplets expelled during coughing. If this is not possible (i.e., would further compromise respiratory status, difficult for the patient to wear), have the
patient cover the mouth/nose with tissue when coughing, or use the most practical alternative to contain respiratory secretions.

- Screen patients with severe acute febrile respiratory illness for AI risk factors.
- HCWs should use full barrier precautions if pre-hospital care is being provided for a suspected or confirmed AI-infected patient.
- Unless medically necessary to support life, aerosol-generating procedures (e.g., mechanical ventilation) should be avoided during pre-hospital care or during transport.
- Optimize the vehicle’s ventilation to increase the volume of air exchange during transport. When possible, use vehicles that have separate driver and patient compartments that can provide separate ventilation to each area. In this situation, drivers do not require particulate respirators.
- Notify the receiving facility as soon as possible prior to arrival that a patient with suspected AI infection is being transported to the facility and of the precautions that are indicated.
- Use gloves for direct patient contact followed by hand hygiene. Follow recommended procedures for disposal of waste and cleaning and disinfecting the emergency vehicle and reusable patient care equipment after pre-hospital care or transport has been provided.

**Rationale**

Patients with severe AI infection may require emergency transport to a health care facility. The above recommendations are designed to protect health care workers, including emergency medical services personnel, during pre-hospital care and transport.

**11. Waste disposal**

Use **standard precautions** when working with solid waste that may be contaminated with AI virus outside of the isolation room/area. Clinical (infectious) waste includes waste directly associated with blood, body fluids, secretions and excretions; laboratory waste that is directly associated with specimen processing, human tissues, including material or solutions containing free-flowing blood, and animal tissue or carcasses used for research; and also includes discarded sharps.

- All waste generated in the isolation room/area should be removed from the room/area in suitable containers or bags that do not allow for spillage or leakage of contents.
- Waste should be classified as directed by the national laws or regulations. If waste from AI infected patients is classified as infectious, then all waste from an isolation room/area that should be treated as clinical waste and should be treated and disposed of as per facility policy and in accordance with national regulations pertaining to such waste.
- One waste disposal bag is usually adequate, providing waste can be placed in the bag without contaminating the outside of the bag. If the outside of the bag is contaminated, two bags should be used (double bagging). If additional bags are not available, clean and disinfect the outside of the bag before removing it from room.
- When transporting waste outside the isolation room/area, use gloves followed by hand hygiene.
- Although the possibility of transmission of AI infection via human faeces is unknown, faeces of AI-infected patients should be handled with caution and possible aerosolisation of faeces should be avoided (e.g., removal of faeces from bedpan, commode, clothing, or reusable incontinence pads by spraying with water).
Liquid waste such as urine or faeces can be flushed into the sewer system if there is an adequate sewage system in place. Close toilet cover when flushing faeces.

12. Dishes and eating utensils
Use standard precautions for handling dishes and eating utensils used by suspected or confirmed AI-infected patients outside of the isolation room/area:
- Wash reusable items in a dishwasher with detergent at the recommended water temperature, when possible. If dishwashers are not available, detergent and hot water should be used to wash items. Rubber gloves should be used if washing items by hand.
- If family members are providing care for patient, they should provide designated dishes and eating utensils for the patient’s use only.
- Disposable items should be discarded with other general waste.

13. Linen and laundry
The use of standard precautions is recommended for linen and other laundry that may be contaminated with blood, body fluids, secretions, or excretions from suspected or confirmed AI-infected patients outside of the isolation room/area.[15]
- Place soiled linen directly into a laundry bag in the isolation room/area.
- Contain linen in a manner that prevents the linen bag from opening or bursting during transport and while in the soiled linen holding area.
- Heavily soiled linen should be rolled or folded to contain the heaviest soil in the centre of the bundle. Large amounts of solid material (e.g., faeces) should be removed from linen with a gloved hand and toilet tissue and then placed into a toilet for disposal (close toilet lid when flushing), before linen is placed into the laundry bag.
- When transporting soiled linen and laundry outside the isolation room/area, use gloves followed by hand hygiene.
- Soiled linen and laundry should not be shaken or otherwise handled in a manner that might create an opportunity for contamination of the environment or reaerosolisation of virus.
- Laundry personnel should use standard precautions and perform hand hygiene after removing PPE that has been in contact with soiled linen and laundry.
- Wash and dry linen according to routine facility standards and procedures.[15]

- Cleaning MUST precede disinfection.
- AI virus is inactivated by a range of disinfectants,[16] including:
  - phenolic disinfectants
  - quaternary ammonia compounds
  - peroxygen compounds
  - sodium hypochlorite (household bleach) (Annex 7)
  - alcohol (Annex 7)
  - other germicides with a tuberculocidal claim on the label
  - other registered/licensed disinfectants
- Any germicide with a tuberculocidal claim on the label (i.e., an intermediate-level disinfectant) is considered capable of inactivating influenza.[15]
Avian Influenza, including Influenza A (H5N1), in Humans: WHO Interim Infection Control Guidelines for Health Care Facilities (9 February 2006)

- Use manufacturer’s recommendations for use/dilution, contact time, and handling.
- Patient rooms/areas should be cleaned at least daily and terminally cleaned at discharge. In addition to daily cleaning of floors and other horizontal surfaces, special attention should be given to cleaning and disinfecting frequently touched surfaces (e.g., medical equipment, bedside and over-bed tables, TV controls, call buttons, safety/pull-up bars, doorknobs, commodes, ventilator surfaces).
- To avoid possible reaerosolisation of AI virus; damp, rather than dry dusting or sweeping should be performed, whenever possible. Wet-dust horizontal surfaces by moistening a cloth with a small amount of disinfectant.
- During wet cleaning, cleaning solutions and equipment soon become contaminated; clean less heavily contaminated areas first and change cleaning solutions, cleaning cloths, and mop heads frequently.
- Double bucket method (i.e., one bucket for cleaning solution, one for rinsing) is recommended.
- Equipment used for cleaning and disinfection must be cleaned and dried between uses. Mop heads should be laundered daily and dried thoroughly before storage or reuse.
- Carpeted areas should not be designated for AI infected patients. If this cannot be avoided and vacuuming is necessary, a vacuum cleaner with HEPA filtration should be used.
- Keep areas around the patient free of unnecessary supplies and equipment to facilitate daily cleaning.
- Paper sheeting that is changed between patients is appropriate for patient examination tables in outpatient areas; use disinfectant to wipe down table between patients.
- Do not spray (i.e., fog) occupied or unoccupied rooms with disinfectant. This is a potentially dangerous practice that has no proven disease control benefit.

**Rationale**

Environmental cleaning and disinfection is intended to remove pathogens from contaminated surfaces and items, thus breaking the chain of transmission. Disinfection is a process of killing microorganisms without complete sterilization. Cleaning MUST precede disinfection. Items and surfaces cannot be disinfected if they are not first cleaned of any kind of organic matter (patient excretions, secretions, dirt, soil, etc.). For more details on the use of alcohol and bleach, see Annex 7.

**15. Patient care equipment**

Use standard precautions, facility practices, and manufacturer’s recommendations for handling and reprocessing used patient-care equipment, including medical devices:
- If possible, place contaminated patient care equipment in suitable bags or containers before removing it from isolation room/area.
- Clean heavily soiled equipment and then apply a disinfectant effective against influenza virus before containing it and removing it from the isolation room/area.
- When transporting contaminated patient care equipment outside the isolation room/area, use gloves followed by hand hygiene.
- Use standard precautions and follow current recommendations for cleaning and disinfection or sterilization of reusable patient care equipment.
If not visibly soiled, wipe external surfaces of portable equipment that has been used for performing x-rays and other procedures in the isolation room/area with an approved hospital disinfectant upon removal from the room/area.

16. Patient discharge

- If the patient is discharged while possibly still infectious (see above), family members should be educated on personal hygiene and infection control measures (e.g., hand hygiene and the use of a surgical or procedure mask by a patient who is still coughing).
- Family members should be educated to avoid poultry and other animals that have been ill and how to self-monitor their health status (Annex 8).
- Terminal cleaning of the patient room should be performed.

17. Occupational health recommendations

17.1. Recommendations for occupational health administrators

- Keep a register of HCWs who have provided care for AI-infected patients.
- Develop a HCW influenza-like illness surveillance system in the health care facility, including self-reporting and self-isolating by symptomatic HCWs.
- Develop a system to monitor work absenteeism for health reasons, especially in HCWs providing care for AI-infected patients.
- Screen all HCWs providing care AI-infected patients for influenza-like symptoms before each time they start duty. Symptomatic HCWs should be evaluated and excluded from duty.
- Contact public health officials for local policy on antiviral prophylaxis of HCWs and assistance for obtaining adequate supplies of neuraminidase inhibitors for prophylaxis of HCWs providing care for AI-infected patients (Annex 9).
- Develop a system to provide neuraminidase inhibitors to HCWs exposed to AI infected patients according to local/national policies.
- Develop methods to provide additional support (e.g., emotional and family support) to HCWs, as necessary.

17.2. Recommendations for all HCWs

- Receive the current seasonal influenza vaccine* as soon as possible (if not already vaccinated).
- Observe good respiratory and hand hygiene at all times.
- Observe all other recommended infection control precautions.
- Monitor for symptoms of influenza-like illness (cough, sore throat, difficulty breathing).

17.3. Recommendations for HCWs who have provided care for AI-infected patients

- Check temperature twice daily and monitor for symptoms of influenza-like illness (cough, sore throat, difficulty breathing) for 10 days after last possible AI exposure (Annex 10).
In the event of fever > 38°C or the development of influenza-like symptoms, HCWs should immediately limit their interactions with others, exclude themselves from public areas, and notify the infection control/occupational health team (and/or their health care provider) that they are symptomatic and may be infected with AI.

**Rationale**

HCWs also are members of the community, and during seasonal influenza outbreaks they can become infected with influenza either through exposure in the community or in the health care facility (not necessarily as a result of patient exposure). Seasonal vaccine will not protect against AI, but will help prevent concurrent infection with human influenza and AI, which will minimize the possibility of reassortment of the virus. Protective levels of antibodies are usually detectable 2-4 weeks after vaccination with seasonal influenza vaccine. In addition, HCWs who provide care for AI-infected patients may potentially be exposed to AI viruses and should be monitored and supported as needed.

**17.4. Other occupational health issues**

- Perform serologic and other testing for AI on HCWs with influenza-like illness and who have cared for AI-infected patients;
- HCWs with serological evidence of AI A (H5N1) infection should have protective antibodies against this strain and can be prioritized for the care of AI A(H5N1) patients. These workers could also be prioritized to provide care for patients who are at risk for serious complications from influenza (e.g., transplant patients and neonates).
- HCWs who are at high risk for complications of influenza (e.g., pregnant women, immunocompromised persons, and persons with respiratory diseases) should be informed about the medical risks and offered work assignments that do not involve providing care for AI-infected patients.
- HCWs who are ill should not be involved in direct patient care since they may be more vulnerable to other infection and may be more likely to develop severe illness if infected with AI. In addition, ill HCWs can transmit their illness to vulnerable patients.

**18. Administrative control strategies for health care facilities**

- Develop plans for the evaluation and management of suspected or confirmed AI-infected patients, including infection control precautions.
- Develop a system to promptly identify and isolate possible human AI cases, and to promptly notify public health authorities.
- In countries with known AI infections in animals or humans post signage at all entrances and clinical evaluation areas (e.g., clinics, emergency departments, etc.) in health care facilities to alert patients and visitors to report severe acute febrile respiratory illness immediately.
- Once confirmed AI-infected patients have been admitted to the facility, nosocomial surveillance should be heightened for evidence of transmission to other patients and HCWs.
- Educate HCWs to follow combined standard and droplet precautions for all patients with acute febrile respiratory illness.
- Educate HCWs about AI and the recommended infection control precautions for suspected or confirmed AI-infected patients.
• Use evidence-based methods to increase compliance with infection control precautions, including visual aids in appropriate locations.
• Ensure that adequate supplies for infection control precautions are provided:
  o Hand hygiene facilities, soap and clean running water and alcohol-based hand rub.
  o PPE should be available for HCWs and family members/visitors
    ▪ Gowns, gloves, eye protection, particulate respirators, and surgical masks.
    ▪ Additional PPE items for housekeeping purposes: protective footwear, waterproof aprons, and rubber gloves.
    ▪ Adequate supply of appropriate cleaning and disinfection materials.
• Post signage requesting that persons with acute respiratory illness not visit the facility. Educate HCWs and visitors on the correct use of PPE and hand hygiene.
  o Recommended steps for placement and removal of PPE and performance of hand hygiene.
  o Appropriate procedures should be used to select a disposable particulate respirator that fits well.
  o Train persons who will be likely to use disposable particulate respirators how to put them on and how to perform user seal checks.
• Plan for adequate staffing; use of full barrier PPE increases worker fatigue and decreases productivity. PPE breaks are necessary and it is helpful if an observer monitors placement and removal of PPE.
• To minimize the number of HCWs entering the rooms of suspected or confirmed AI-infected patients, facilities may consider primary care of such patients by selected nursing staff that will provide meals, collect specimens, clean room, and handle laundry and waste disposal.
• Develop a policy to limit visits of family members (other than parents of paediatric patients) and ensure that visitors comply with infection control precautions, including correct use of PPE and hand hygiene.
• Consider the availability of neuraminidase inhibitors for treatment of patients and prophylaxis of exposed HCWs.
• Develop risk communication strategies for HCWs, patients, and patient families/visitors
• Encourage partnerships between patients, their families, and HCWs that promote good infection control practices in the health care facility.
• Align the health care facility with the national pandemic preparedness plan, if it is available. Such plans may include consideration of AI evaluation clinics, designation of AI referral health facilities, health care facility entry controls, and other measures.

Rationale
Hospital administrators and governments play a key role in creating the necessary conditions at the institutional level to promote prevention of spread of health care-associated pathogens. The lack of written guidelines, availability of necessary conditions (staff and supplies), the lack of culture or tradition of adherence to infection control practices, as well as the lack of administrative leadership, or support are targets for improvement. Enhancing individual and institutional attitudes regarding the feasibility of making changes, obtaining active participation at both levels, and promoting an institutional safety climate, all represent major challenges. Lessons from the SARS outbreak showed that the most important factors involved with
compliance were the HCWs' perception that their facilities had clear policies and protocols, the perceived attitudes and actions of management regarding the importance of occupational health and safety, having adequate training in infection control procedures, and having specialists available.[17, 18]

**Education, regular supplies and adequate staffing, institutional climate, and leadership are the cornerstone of promotion of good infection control practices.**

**Infection control education for HCWs**

**All HCWs**
- Standard and droplet precautions for all patients with respiratory symptoms.
- Epidemiology of AI and the appropriate infection control precautions (Annexes 1, 2, 3, 4).

**HCWs who may have contact with an AI-infected patient**
- Self-monitoring for influenza-like illness
- Self-reporting to the appropriate surveillance person in the health care facility
- Training in the use of PPE; including the correct steps for placement and removal of PPE and performance of hand hygiene.

**19. Prioritizing the use of PPE when supplies are limited**

_PROVISION OF NECESSARY SUPPLIES SHOULD BE AN INSTITUTIONAL PRIORITY._

- Reuse of disposable PPE items should be avoided.
- Data on reuse of disposable PPE items for influenza are not available and reuse may increase the potential for contamination; however, this risk must be balanced against the need to fully provide protection for HCWs.
- If a sufficient supply of PPE items is not available, health care facilities may consider reuse of some disposable items only as an urgent, temporary solution and only if the item has not been obviously soiled or damaged (e.g., creased or torn).
- To avoid wastage, critically evaluate in which situations PPE is indicated using the rationale provided in Table 1.

**Respiratory protection**

- If AI-infected patients are cohort in a common area or in several rooms on a nursing unit, and multiple patients will be visited over a short time, it may be practical to wear one particulate respirator for the duration of the activity.

**Surgical and procedure masks**

If a particulate respirator is not available, a tightly fitting surgical or procedure mask should be worn.
- Wear masks once and then discard.
- Change masks when they become moist.
- Do not leave masks dangling around the neck.
After touching or discarding a used mask, perform hand hygiene.

Gloves
- If supplies of gloves are limited, reserve gloves for situations where there is a likelihood of contact with blood or body fluids, including during aerosol-generating procedures.
- Use other barriers (e.g., disposable paper towels, paper napkins) when there is no direct contact with patient’s respiratory secretions (e.g., to touch equipment linked to the patient). Scrupulous hand hygiene is critical in this situation.

Gowns
- If supplies of gowns are limited, gown use should be prioritized for aerosol-generating procedures and for activities that involve holding the patient close (e.g., in paediatric settings), or when other extensive body surface-to-body surface contact is anticipated.
- If there is a shortage of gowns, gowns may also be worn in the care of more than one patient in a cohort area if there is no direct contact between the gown and the patients.

Eye protection
Reusable eye protective equipment poses a potential risk for cross-infection. Any such items must be cleaned and disinfected after each use when leaving an isolation room/area, using agents effective against influenza and preferably using agents recommended by the manufacturer. Cleaning must precede disinfection. Hand hygiene must be performed after disposal or cleaning of eye protective equipment.

- Keep spatial separation of ≥ 1 meter between patients with respiratory illness/AI and other persons.
- As an extra precaution against airborne infection transmission, some isolation rooms include a small, attached room (anteroom) at the entry to the patient room where PPE and other supplies may be stored and where HCWs can put on and remove some PPE.
  - Direction of airflow in anterooms is variable and HCWs must be educated about where to place and remove PPE based on anteroom airflow.
  - If possible, develop methods that do not require retrofitting to create negative pressure and increased air changes per hour by mechanical manipulation of the air in rooms/areas housing AI-infected patients, particularly in rooms/areas where aerosol-generating procedures may be performed (Annex 6).[19-21]
- In health care facilities without central air conditioning, consider the use of natural ventilation (open windows in isolation rooms/areas) if weather permits, keeping the door closed.[22]
- Provide “no touch” devices when possible (e.g., water that can be turned on/off with elbow or foot).

Rationale
Engineering controls may reduce the risk of AI transmission in patient care areas housing AI-infected patients or in areas used for the evaluation of patients with respiratory illness.
21. Care of the deceased[23]

21.1. Removal of the body from the isolation room/area
- Use standard precautions for routine care of the body
- PPE to be used by HCWs
  - Particulate respirator, if HCWs remove the body immediately after the patient's death.
  - Surgical or procedure mask is sufficient, if air in the isolation room/area has been exchanged.
  - Disposable long-sleeved, cuffed gown, (waterproof if outside of body is visibly contaminated with potentially infectious excretions or secretions). Alternatively, if no waterproof gown is available, a waterproof apron can be used.
  - Nonsterile, ambidextrous gloves (single layer): should cover cuffs of gown.
- If splashing of body fluids is anticipated:
  - Balaclava-type cap (disposable).
  - Face shield (preferably) or goggles.
- The body should be fully sealed in an impermeable body bag prior to removal from the isolation room/area and prior to transfer to pathology or to the mortuary.
- No leaking of body fluids should occur and the outside bag should be kept clean.
- After removing PPE, perform hand hygiene.
- If the family of the patient wishes to view the body, they may be allowed to do so. If the patient died in the infectious period, the family should wear gloves and gowns and perform hand hygiene.
- Transfer to pathology or to mortuary should occur as soon as possible after death.
- Cultural sensitivity should be practised when an AI patient dies.

21.2. Postmortem examination[24]
- If postmortem examination is needed, obtain family consent.
- Family should not observe the postmortem procedure.

Recommendations to reduce aerosols in the autopsy room (e.g., lung excision)[24, 25]
- Avoid the use of power saws;
- Conduct procedures under water if there is a chance of aerosolisation; and
- Avoid splashing when removing lung tissue.
- The number of HCWs present should be restricted to the minimum number necessary.
- The team should consist of at least two people wearing appropriate PPE.

Recommended PPE
- Scrub suits: tops and trousers or equivalent garments.
- Disposable, waterproof, long-sleeved, gowns (if a waterproof gown is not available, a waterproof apron can be used over a gown).
- Surgical masks, or if small particle aerosols might be generated during autopsy
procedures, a particulate respirator at least as protective as a NIOSH-certified N95, EU FFP2 or equivalent should be used.

- Face shield (preferably) or goggles.
- Either autopsy gloves (cut-proof synthetic mesh gloves) or double layers of latex gloves
- Balaclava-type caps (disposable)
- Boots, canvas or similar slip-on shoes or overshoes (disposable) or stout plastic bags

**PPE placement**

1. In the change-room HCWs should replace their outer street clothes with scrub suits, or equivalent coverall garments, plus canvas or similar slip-on shoes.
2. Wear standard autopsy PPE, including a scrub suit worn under a fluid-resistant gown or a non-fluid-resistant gown plus waterproof apron, eye protection (i.e., face shield, goggles), double surgical gloves with an interposed layer of cut-proof synthetic mesh gloves, particulate respirator or surgical mask (as appropriate), and shoe covers.
3. Then, proceed to the post-mortem room where the body is located.

**Figure 2. Placement of PPE, including surgical mask and goggles**

**PPE removal**

Remove PPE before leaving the autopsy suite and dispose of it in accordance with recommendations. Remove PPE avoiding contamination of hands. After removal of gloves, perform hand hygiene (use an alcohol-based hand rub or wash hands with soap and water).
Cleaning of surfaces after autopsy
- Surfaces that have become contaminated with tissues or body fluids should be cleaned and decontaminated by:
  - removing most of the tissue or body substance with absorbent materials;
  - thorough cleaning of surfaces with water and liquid detergent;
  - wetting the surface with a sodium hypochlorite solution (Annex 7);
  - allowing at least 10 minutes contact time; and
  - rinsing thoroughly.

Engineering controls[15]
- Whenever possible, perform autopsies on AI-infected human bodies in autopsy settings that have an adequate air-handling system. This includes a minimum of 6 to 12 air changes per hour, negative pressure relative to adjacent areas, and direct exhaust of air to the outside. Exhaust systems around the autopsy table should direct air (and aerosols) away from HCWs performing the procedure (e.g., exhaust downward).
- Use containment devices whenever possible. Use biosafety cabinets for the handling and examination of smaller specimens. When available, use vacuum shrouds for oscillating saws or local exhaust ventilation to contain aerosols and reduce the volume released into the ambient air environment.

Rationale
Safety procedures for AI-infected human bodies should be consistent with those used for any autopsy procedure. In general, the acknowledged hazards of work in the autopsy room seem to depend more on contact with infected material, and particularly with splashes on body surfaces, than to inhalation of infectious material.

However, if the AI-infected patient died during the infectious period, the lungs may still contain virus and additional respiratory protection is needed during procedures performed on the lungs or during procedures that generate small-particle aerosols (e.g., use of power saws, washing
intestines). Therefore, postmortem exams of AI-infected patients should be conducted in a postmortem room using full barrier precautions.

21.3. Mortuary home care[26]
- Mortuary home staff should be informed that the deceased had AI.
- If mortuary staff are responding to the death of an AI-infected patient who died at home, full barrier PPE should be used while in the home.
- In the mortuary, mortuary staff and the burial team should use standard precautions when caring for the body. This includes appropriate use of PPE and performance of hand hygiene to avoid unprotected contact with blood, body fluids, secretions, or excretions.
- Embalming may be conducted as per routine.
- Hygienic preparation of the deceased (e.g., cleaning, tidying of hair, trimming of nails, and shaving) may also be conducted.
- The body in the body bag can be safely removed for storage in the mortuary, sent to the crematorium, or placed in a coffin for burial.
- If autopsy is being considered, the body may be held under refrigeration in the mortuary. Standard infection control precautions should be followed; there is no further risk of airborne or droplet spread of AI.
- If the family of the patient wishes to touch the body, they may be allowed to do so. If the patient died in the infectious period, the family should wear gloves and gowns and follow with hand hygiene.
- If family members want to kiss the dead body (hands, face) these body parts should be disinfected, using a common antiseptic (e.g., 70% alcohol).
- If the family wants only to view the body and the face of the deceased, but not touch it, there is no need to wear any kind of PPE.
Annex 1

Avian influenza background

1. Avian influenza

AI is an infectious disease of birds caused by type A strains of the influenza virus. The disease, which was first identified in Italy more than 100 years ago, occurs worldwide.[27] All birds are thought to be susceptible to infection with AI. Infection in birds causes a wide spectrum of symptoms, ranging from mild illness (low pathogenicity) to a highly contagious and rapidly fatal disease resulting in severe epidemics, which is known as “highly pathogenic AI” (HPAI). This form is characterized by sudden onset, severe illness, and rapid death of affected birds/flocks, with a mortality rate that can approach 100%.

Direct or indirect contact between domestic flocks and wild migratory waterfowl has been implicated as a frequent cause of epidemics in poultry populations. It is generally accepted that migratory waterfowl, most notably wild ducks, are the natural reservoir of AI viruses, which can be transmitted to domestic bird populations and to commercial poultry. In the absence of good surveillance and prompt control measures, AI epidemics can last for years.

The current outbreak of highly pathogenic AI A(H5N1), which began in Southeast Asia in mid-2003, is the largest and most severe on record. Never before in the recorded history of this disease have so many countries been simultaneously affected. The AI A(H5N1) virus has also proved to be especially tenacious. Despite the death or destruction of an estimated 150 million birds, the virus is now considered endemic in many parts of Indonesia and Viet Nam and in some parts of Cambodia, China, Thailand, and possibly the Lao People’s Democratic Republic. The risk of a pandemic will persist until the disease is controlled in birds, which may take several years.

2. Avian-to-human AI A (H5N1) transmission

The first human cases of AI A (H5N1) associated with the current outbreak in birds were confirmed in January 2004, after clinical samples taken from two children and one adult admitted to hospital in Hanoi with severe respiratory illness tested positive for this strain.[28] Since then, additional human cases have occurred in several countries, and the clinical spectrum of AI A (H5N1) infection in humans ranges from asymptomatic infection to severe disseminated disease.[7] For updated information on affected countries, see at http://www.who.int/csr/disease/avian_influenza/country/en.

3. Human-to-human AI A (H5N1) transmission

Although assessment of possible human-to-human transmission of AI A (H5N1) is complicated by the likelihood that close contacts often have similar exposure histories (e.g., poultry exposures), available evidence indicates that limited human-to-human transmission
may have occurred. However, sustained transmission has not been demonstrated and there is no evidence that there has been more than one generation of human-to-human transmission. In the 1997 AI A(H5N1) outbreak in Hong Kong, there was evidence of possible human-to-human transmission between infected persons and household contacts and HCWs, but social contact was not associated with AI A (H5N1) infection.[5, 6, 29]

In the current AI outbreak, investigation of human AI A (H5N1) cases suggests that human-to-human transmission may have occurred in household clusters[28] and in one case of apparent child to mother transmission.[30] Thus far, all secondary cases appear to have had close contact with cases without the use of precautions and human-to-human transmission via the airborne route has not been identified.[31]

Human conjunctivae and ciliated nasal epithelial cells contain cellular receptors that are preferentially recognized by avian, rather than human, influenza hemagglutinin.[32, 33] Therefore, the contribution of the possible routes of transmission in humans may differ between AI A (H5N1) and seasonal human influenza. Although it is unknown at this time whether inoculation of the eye or nose will be important in the acquisition of human AI A (H5N1) infection, it seems prudent to protect these sites from inoculation. Also, since diarrhoea has been frequently noted in AI A(H5N1) infected patients[7] and AI A(H5N1) has been isolated from the faeces of a human case,[13] faeces may also prove to be a source of infection.

Disease transmission and severity may also be related to viral load, viral strain, and host immune response.[31, 34] Although the theory advanced during the SARS outbreak that “superspreading” events may occur[35] is unproven and it is unknown if superspreading-like events will occur with AI A(H5N1).

Although human-to-human transmission of AI A (H5N1) has been rare to date, the accumulation of point mutations or reassortment with a human influenza virus could lead to increased transmissibility of the virus at any time. Infections in HCWs could signal such a change.

4. AI A (H5N1) transmission of in health care facilities

Although complicated by different definitions of “exposure,” and limited data, studies to date indicate that AI A (H5N1) is not easily transmitted between humans in health care facilities at this time. Thus far in the current (animal) outbreak, the risk of nosocomial transmission of AI A (H5N1) to HCWs has been very low, even when no specific infection control precautions were used, and no cases have been detected among HCWs who observed droplet and contact precautions. However, because AI A (H5N1) is not easily transmissible between humans at this time, nosocomial transmission would not be expected to be common, irrespective of the precautions used.

So far, there is no evidence of sustained human-to-human transmission of AI A (H5N1). In 1997, serologic studies of HCWs exposed to AI A (H5N1) infected patients suggested that if transmission occurred, it was inefficient.[5, 6]
In a report on the first 10 human cases admitted to two hospitals in Vietnam during the current outbreak, no influenza-like illness was reported in health care or laboratory workers even though two of the patients were managed with standard precautions only and neither facility was equipped with airborne infection isolation (negative pressure) rooms.[28]

In another report, no evidence of transmission was found among HCWs who provided care for two very ill AI A (H5N1) infected patients although the implementation of droplet and contact precautions was delayed and no negative pressure rooms were available.[36].

In two additional seroprevalence studies, no evidence of infection with AI A (H5N1) was identified in HCWs exposed to infected patients or their clinical samples.[37, 38] In one of these studies, most HCWs reported wearing PPE when providing care for AI A (H5N1) infected patients with 73% reported using a surgical mask.[37]. The possible use of negative pressure rooms was not reported.

The other study involved HCWs who were exposed to an AI A (H5N1) infected patient without the use of appropriate PPE.[38] None of these HCWs were infected, despite the fact that surgical masks, gloves, and gowns were not implemented until after the infected patient had been admitted for 48 hours. After that time, HCWs performing aerosol-generating procedures used N95 particulate respirators, hair covers and/or hoods, and goggles, in addition to gowns and gloves.[38] This facility did not have negative pressure rooms or any special ventilation system.

In the current outbreak, patients from Thailand, Viet Nam, and Cambodia were admitted a median of 6-8 days (range 3-8) after illness onset so it is possible that some patients may have been less infectious during their hospitalization, minimizing the risk of AI A(H5N1) transmission to HCWs.[7, 37]

In February 2005, a case of severe respiratory illness was reported in a nurse who provided care to an AI A (H5N1) infected patient in Viet Nam.[7] This case has not been confirmed, and the route of transmission is unclear because it was reported that the nurse had also visited a village where the poultry were ill. Similarly, in an Indonesian nurse, who developed respiratory symptoms on 31 December 2005 after providing care for an H5N1 infected patient, occupational exposure is considered unlikely, since she also had potential exposure to infected poultry.
Annex 2.

Human-to-human seasonal influenza A transmission

Most of our present knowledge on the transmission of seasonal influenza to humans is based on epidemiological studies of human influenza and some experimental studies in animals.

The recommendations to prevent and control human-to-human transmission are based on the following rationale.

1. Infectious respiratory aerosols
   Coughing, sneezing, and talking can generate respiratory aerosols, which contain particles of varying sizes.[39] Particle size is determined by the force and pressure involved in the generation of the particles. The greater the force and pressure, the smaller the particle size will be. The length of time particles remain suspended in the air is determined by particle size, settling velocity, relative humidity and airflow. Larger particles (≥5 μm) typically remain suspended in the air for limited period of time and settle within 1 meter (3 feet) of the source. The smallest particles (< 5 μm) evaporate quickly and the dried residues that remain (droplet nuclei) settle from the air slowly. Because the velocity of the air movement in a room can be greater than the settling velocity, droplet nuclei may be carried on air currents for some distance and remain suspended in the air for considerable lengths of time.[39] There is no predictable size for droplet nuclei; the final size depends on the nature of the fluid that contained the organism/s, the initial size of the aerosol, environmental conditions (e.g., temperature, relative humidity, and airflow), the time spent airborne, and the size of the organism/s within a droplet.
   Infection control guidelines frequently cite a particle size of 5 μm as a break point, which distinguishes between diseases spread by droplet transmission (larger particles ≥ 5 μm) and diseases spread by airborne transmission (small particles < 5 μm).[10]

2. Human influenza A routes of transmission[10]
   Available evidence suggests that transmission of human influenza viruses occurs through multiple routes including large droplets, direct and indirect contact, and droplet nuclei.[8-12] Airborne (droplet nuclei) transmission may be more likely to occur in situations in which droplet nuclei particles are generated (i.e., aerosol-generating procedures in infected patients).

   Using current transmission-based terminology, influenza is transmitted between humans via droplets (droplet transmission), by direct and indirect contact (contact transmission), and small-particle aerosols (airborne transmission).[8-11] However, the importance of each route of transmission, particularly in settings where there are adequate air changes per hour, remains unclear. Observational studies conducted in health care facilities suggest that droplet transmission may be the major mode transmission in that setting.[8, 9, 12]
2.1 Droplet transmission
Droplets are generated primarily during coughing, sneezing, and talking. Droplet transmission occurs when larger particles (>5 µm) containing the infectious agent are propelled through the air and deposited on the host's conjunctivae, nasal mucosa, or mouth. Larger particles spread in this manner typically do not remain suspended in the air for long periods, therefore, special air handling and ventilation are not required. Large droplet transmission has been considered a major mode of transmission of influenza based on epidemiologic patterns of disease transmission.

Evidence for droplet transmission of human influenza A
The main source of information on transmission of human influenza comes from observational studies.[9] During the 1957-1958 H2N2 influenza pandemic, an acutely ill patient was admitted to a four-person hospital room with no precautions. The following day, roommates and HCWs became ill. Subsequently, additional HCWs and scattered patients in other wards became ill. The epidemiological investigation suggested that HCWs helped disseminate infection to patients in other wards through either droplet or contact spread.[40]

More recently, nosocomial influenza experiences at two U.S. hospitals were described. In one hospital, transmission of influenza was rarely noted. In this facility, most rooms were private, but had positive pressure.[8] In the other hospital, transmission of influenza in paediatric patients was most often observed among patients in the same room, particularly those in adjacent cribs. Patients in other rooms in the same ward were less likely to become infected, even though room doors were open and influenza patients were not housed in negative pressure rooms.[9] These two studies suggest that the predominant mode of transmission was either through large droplets or by direct or indirect contact.

2.2 Contact transmission
Contact transmission may occur through either direct skin-to-skin contact or through indirect contact with virus in the environment and inoculation of the conjunctivae, nose, and mouth typically occurs via contaminated hands.

- Direct contact involves a direct body surface-to-body surface contact and physical transfer of microorganisms between an infected or colonized person and a susceptible host, such as occurs when a HCW turns a patient, bathes a patient, or performs other patient care activities that require direct personal contact. Direct-contact transmission can also occur between two patients, with one serving as the source of the infectious microorganisms and the other as a susceptible host.
- Indirect contact involves contact of a susceptible host with a contaminated intermediate object, usually inanimate, such as contaminated surfaces, patient care equipment, instruments, or dressings, and contaminated hands that are not cleaned or contaminated gloves that are not changed between patients.

Evidence for contact transmission of human influenza A
Influenza infection has been induced by the application of nasal drops,[41] suggesting a possible role for contact transmission (e.g., intranasal inoculation by contaminated fingers).
Human influenza virus has been found to survive <24-48 hours on nonporous surfaces and <8-12 hours on cloth, paper, and tissues at 35-49% humidity and a temperature of 28°C. Virus can be transferred from nonporous surfaces to hands for 24 hours and from paper tissues to hands for 15 minutes. However, influenza virus could only be recovered from hands for five minutes, and only if viral titres were high. Survival of AI virus also is dependent on environmental conditions.

2.3 Airborne transmission

Airborne transmission occurs by dissemination of either airborne droplet nuclei (particles <5 µm of evaporated droplets containing microorganisms that can remain suspended in the air for long periods of time) or dust particles containing the infectious agent.

Airborne transmission can result in wide dispersal of the infectious agent by air currents and inhalation by a susceptible host within the same room or a longer distance from the source patient, depending on environmental factors; therefore, special air handling and ventilation are required to prevent airborne transmission.

Evidence for airborne transmission of human influenza A

To this point, the available studies have not definitely demonstrated the role of airborne transmission in human influenza. The best evidence of airborne transmission of influenza in humans comes from a 1979 study of influenza transmission on an aircraft. Passengers, including a passenger who became acutely ill with a new H3N2 influenza strain, were detained on a runway for 4.5 hours. During this time the ventilation system was turned off for 2-3 hours. Although the ill passenger stayed on the plane the entire time, the other passengers and crew were free to come and go. The passengers (including the index case) were eventually separated into two groups and flown to their destination on two other planes. Within 72 hours, 72% of the passengers and crew subsequently developed influenza-like-illness (91% with confirmed influenza). The risk of illness was dependent on the amount of time spent on board. However, there were no differences in attack rates between the groups on the two subsequent planes, suggesting that additional exposure in an airplane with standard ventilation did not increase the risk of illness. Although airborne transmission is a possible explanation, droplet and contact spread cannot be excluded because passengers and crew would have passed within 1 meter of the coughing passenger on their way to various aircraft facilities.

Experimental studies in animals provide evidence for airborne transmission of influenza. However, it is unclear whether the results of these animal studies can be extrapolated to humans.
Annex 3.

Standard and transmission-based precautions

1. Standard precautions[10]

Background
Standard precautions should be used for all patients receiving care in hospitals, regardless of their diagnosis or presumed infection status. Standard precautions apply to 1) blood; 2) all body fluids, secretions, and excretions except sweat, regardless of whether or not they contain visible blood; 3) non-intact skin; and 4) mucous membranes. Standard precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals.

Hand hygiene
Hand hygiene, which includes hand washing with soap and water and the use of alcohol-based hand rubs is critical to prevent possible self-inoculation of the nose, mouth, and conjunctivae and the transfer of microorganisms to the environment or other patients by contaminated hands. Hands should be washed with either a plain or antimicrobial soap and water when visibly soiled or contaminated with proteinaceous material. The use of an alcohol-based hand rub for routine hand antisepsis is recommended in the health care setting for all other clinical situations.

Perform hand hygiene after touching blood, body fluids, secretions, excretions, and contaminated items, whether or not gloves are worn. Perform hand hygiene immediately after gloves are removed, between patient contacts, and when otherwise indicated to avoid transfer of microorganisms to other patients or environments. It may be necessary to perform hand hygiene between tasks and procedures on the same patient to prevent cross-contamination of different body sites.

Alcohol-based hand rubs
Alcohol-based hand rubs have been recommended for hand hygiene in health care settings when hands are not visibly soiled or contaminated with proteinaceous material. If hands are visibly soiled or contaminated with proteinaceous material, hand washing with soap and water must be performed. When decontaminating hands with an alcohol-based hand rub, apply product to palm of one hand and rub hands together, covering all surfaces of hands and fingers, until hands are dry. Follow the manufacturer's recommendations regarding the volume of product to use.[48]

Many studies have demonstrated that influenza, an enveloped virus, is susceptible to alcohols when tested \textit{in vitro}[49] and \textit{in vivo} testing with a 95% ethyl alcohol hand disinfectant reduced influenza virus on hands by a log_{10} reduction > 2.5.[50] Ethyl alcohol has greater activity against viruses than isopropyl alcohol,[51] therefore, ethyl alcohol-based hand disinfection products may be preferred over isopropyl alcohol products in settings where transmission of AI is likely.
**Hand washing**

When washing hands with soap and water, wet hands first with water, apply an amount of product recommended by the manufacturer to hands, and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water and dry thoroughly with a disposable towel. Use towel to turn off the faucet.[48]

**Gloves**

Wear gloves (clean, non-sterile gloves are adequate) when touching blood, body fluids, secretions, excretions, and contaminated items. Put on clean gloves just before touching mucous membranes and non-intact skin. Change gloves between tasks and procedures on the same patient after contact with material that may contain a high concentration of microorganisms. Remove gloves promptly after use, before touching non-contaminated items and environmental surfaces, and before going to another patient, and wash hands immediately to avoid transfer of microorganisms to other patients or environments.

**Mask, eye protection, face shield**

Wear a mask and eye protection or a face shield to protect mucous membranes of the eyes, nose, and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, and excretions.

**Eye protection/face shield**

As per standard precautions, eye protection should be used, regardless of the diagnosis, when there is a risk of contamination of the eyes/conjunctivae by splashes and sprays of blood, body fluids, secretions, and excretions generated through patient care. The use of eye protection should be based on an individual risk-assessment at the time of providing care:

- Eye protection should always be worn during aerosol-generating procedures (Annex 4).
- Eye protection should be used when working within 1 meter of suspected or confirmed AI-infected patients.

Eye protection can be achieved by the use of any one of the following:

- face shield;
- visor;
- goggles; or
- full face piece particulate respirator.

**Gown**

Wear a gown (a clean, non-sterile gown is adequate) to protect skin and to prevent soiling of clothing during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions. Select a gown that is appropriate for the activity and amount of fluid likely to be encountered. Remove a soiled gown as promptly as possible and wash hands to avoid transfer of microorganisms to other patients or environments.

**Foot protection**

Although not typically referenced as an element of standard precautions, adequate foot protection is an important element of HCW protection. Health care facilities should ensure that
all HCWs wear appropriate footwear (i.e., fluid-resistant shoes that cover all parts of the feet) while working in the health care facility (no sandals).

**Patient care equipment**

Handle used patient-care equipment soiled with blood, body fluids, secretions, and excretions in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of microorganisms to other patients and environments. Ensure that reusable equipment is not used for the care of another patient until it has been cleaned and reprocessed appropriately. Ensure that single-use items are discarded properly.

**Environmental control**

Ensure that the hospital has adequate procedures for the routine care, cleaning, and disinfection of environmental surfaces, beds, bedrails, bedside equipment, and other frequently touched surfaces, and ensure that these procedures are being followed.

**Linen**

Handle, transport, and process used linen soiled with blood, body fluids, secretions, and excretions in a manner that prevents skin and mucous membrane exposures and contamination of clothing, and that avoids transfer of microorganisms to other patients and environments.

**Occupational health and bloodborne pathogens**

Take care to prevent injuries when using needles, scalpels, and other sharp instruments or devices; when handling sharp instruments after procedures; when cleaning used instruments; and when disposing of used needles. Never recap used needles, or otherwise manipulate them using both hands, or use any other technique that involves directing the point of a needle towards any part of the body; rather, use either a one-handed "scoop" technique or a mechanical device designed for holding the needle sheath. Do not remove used needles from disposable syringes by hand, and do not bend, break, or otherwise manipulate used needles by hand. Place used disposable syringes and needles, scalpel blades, and other sharp items in appropriate puncture-resistant containers, which are located as close as practical to the area in which the items were used. Avoid use of reusable syringes, but if it is necessary, place reusable syringes and needles in a puncture-resistant container for transport to the reprocessing area. Use mouthpieces, resuscitation bags, or other ventilation devices as an alternative to mouth-to-mouth resuscitation methods in areas where the need for resuscitation is predictable.

**Patient placement**

Place a patient who contaminates the environment or who does not (or cannot be expected to) assist in maintaining appropriate hygiene or environmental control in a private room. If a private room is not available, consult with infection control professionals regarding patient placement or other alternatives.

**Resource for standard and transmission-based precautions**

2. Transmission-based precautions[10]

Transmission-based precautions (droplet, contact, and airborne) are to be used in addition to standard precautions when providing care for patients who are suspected or confirmed to be infected with highly transmissible or epidemiologically important pathogens for which additional precautions beyond standard precautions are needed to interrupt transmission in health care facilities.

**Droplet precautions**
- Patient placement: private room, if possible; if not available, use cohorting, keeping at least 1 meter between patients' beds.
- Use surgical or procedure mask when entering the patient room; masking is mandatory if working within 1 meter of the patient.
- Patient transport: limit patient movement, use of surgical mask by the patient.

**Contact precautions**
Use for all contact with the patient or the patient’s environment:
- **Gloves**
  - Clean non-sterile, ambidextrous gloves are adequate.
  - Gloves should cover the cuff of the gown.
  - Gloves should be worn only once and then placed in a waste receptacle.
- **Gown**
  - A disposable gown made of synthetic fibre or a washable cloth gown may be used.
  - Ensure that gowns are of the appropriate size to fully cover the area to be protected.
  - Gowns should preferably be worn once and then placed is a waste or laundry receptacle, as appropriate, and hand hygiene performed.
- Use either disposable equipment or dedicate equipment such as stethoscopes, blood pressure cuffs, thermometers, etc. to specific patients. If equipment needs to be shared among patients, it must be cleaned and disinfected between uses.
- It is critical that HCWs refrain from touching their eyes, nose, or mouth with potentially contaminated gloved or ungloved hands.
- Avoid contaminating environmental surfaces that are not directly related to patient care (e.g., door handles, light switches).
Airborne precautions

- When entering the isolation room/area or when providing care to a patient with an airborne infectious disease in other settings, use a particulate respirator that is at least as protective as a U.S. NIOSH-certified N95, EU FFP2, or equivalent (Annex 4).[10]
- Appropriate procedures should be used to select a particulate respirator that fits well and a user seal check should be performed each time a particulate respirator is worn.
- Airborne precautions also include engineering controls, such as placing the patient in an airborne infection isolation (negative pressure) room or area.[15]

Resource for transmission-based precautions
CDC. Guideline for Isolation Precautions in Hospitals


Resource for airborne infection isolation rooms
CDC. Guideline for Environmental Infection Control in Health-Care Facilities, 2003
http://www.cdc.gov/ncidod/dhqp/gl_environinfection.html
Annex 4.

Respiratory protection

1. High risk aerosol-generating procedures
It is likely that aerosol-generating procedures could increase the potential for dissemination of small-particle respiratory aerosols (droplet nuclei) in the immediate vicinity of an AI patient. Examples of aerosol-generating procedures include:

- endotracheal intubation
- administration of aerosolized or nebulized medication (this administration route should be strongly discouraged in AI-infected patients if appropriate airborne precautions are not guaranteed).
- diagnostic sputum induction
- bronchoscopy
- airway suctioning
- tracheostomy care
- chest physiotherapy
- nasopharyngeal aspiration
- positive pressure ventilation via face mask (e.g., BiPAP, CPAP)
- high-frequency oscillatory ventilation
- resuscitation manoeuvres
- postmortem excision of lung tissue

Transmission of SARS to HCWs in Toronto was associated with intubation, suctioning before intubation, and manipulation of oxygen masks.[52, 53] Transmission to health care workers in Hong Kong was associated with the use of a medication nebulizer.[54] Although the risk of aerosol-generating procedures has not been evaluated for influenza, additional precautions for HCWs performing aerosol-generating procedures on AI-infected patients appear warranted.[55] PPE should cover the torso, arms, and hands as well as the eyes, nose, and mouth. A hair cover can be used optional.

2. Respiratory protection for aerosol-generating procedures
During aerosol-generating procedures, there must be minimal particulate respirator face-seal leakage to fully protect HCWs from exposure to small-particle respiratory aerosols. The following respiratory protection options should be considered:

- A particulate respirator at least as protective as a NIOSH-certified N95, EU FFP2 or equivalent is the minimum level of respiratory protection required for HCWs performing aerosol-generating procedures.
- Appropriate procedures should be used to select a particulate respirator that fits well and a user seal check should be performed each time a disposable particulate respirator is worn, before entering the isolation room/area.
3. **Engineering controls for aerosol-generating procedures**
   - Perform the procedure in a negative pressure room (if available).
   - If a negative pressure room/area is not available:
     - Perform the procedure in a private room away from other patients.
     - If possible, increase air changes, create negative pressure relative to the hallway, and avoid recirculation of the room air (exhaust air outside).[19-21]
     - If recirculation of air from such rooms is unavoidable, pass the air through a HEPA filter before recirculation.
     - Keep doors closed except when entering or leaving the room, and minimize entry and egress to the room during the procedure.
   - Closed ventilation systems for intubated patients may also be used.

4. **Selection of respiratory protection equipment**
   **Particulate respirators**
   - HCWs working with AI-infected patients should select the highest level of respiratory protection equipment available, preferably a particulate respirator. Particulate respirators are designed to protect the wearer from respiratory aerosols expelled by others, regardless of particle size.
   - Use a particulate respirator that is at least as protective as U.S. NIOSH-certified N95, EU FFP2, or an equivalent.[10] Examples of acceptable disposable particulate respirators in various parts of the world include:
     - U.S. NIOSH-certified N95 (95%), N99 (99%), N100 (99.7%)
     - Australia/New Zealand: P2 (94%), P3 (99.95%)
     - China: II (95%), I (99%)
     - Japan: 2nd class (95%), 3rd class (99.9%)
     - Korea: 1st class (94%), Special (99.95%)
     - EU: FFP2, FFP3
   - The fit and seal of disposable particulate respirators is critical for effective function. If possible, it is recommended that fit testing be performed prior to the first use of a disposable particulate respirator to determine if an acceptable fit and seal can be achieved.
   - A user seal check should be performed each time a disposable particulate respirator is worn. If there is not a good fit and seal the particulate respirator will not be effective.
   - HCWs with facial hair should not use a disposable particulate respirator because a good seal cannot be obtained. HCWs with facial structure abnormalities may also be unable to obtain a good seal.
   - Some factors to consider when choosing particulate respirators in this setting include affordability, availability, impact on mobility, impact on patient care, potential for exposure to higher levels of aerosolized respiratory secretions, and potential for reusable particulate respirators to serve as fomites for transmission.

For information on particulate respirators, fit testing, and user seal checks, see:

- [http://www.cdc.gov/niosh/npptl/topics/respirators](http://www.cdc.gov/niosh/npptl/topics/respirators)
Avian Influenza, including Influenza A (H5N1), in Humans: WHO Interim Infection Control Guidelines for Health Care Facilities (9 February 2006)

**Surgical and procedure masks**

- Surgical or procedure masks are indicated when providing care for patients infected by droplet transmitted diseases and/or as part of facial protection during patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions.
- Surgical and procedure masks do not offer appropriate respiratory protection against small-particle aerosols (droplet nuclei) and should not be used unless particulate respirators are not available when dealing with airborne transmitted diseases.[56-58] If a particulate respirator is not available, use a tightly fitting mask.
- There are no minimum standards or standardized testing methods for surgical mask filter efficiency, and there are a wide variety of filter efficiencies among available masks.
- Surgical and procedure masks are not designed for fit and thus do not prevent leakage around the edge of the mask when the user inhales, which is a major limitation for protection against droplet nuclei.[59]
- Surgical masks come in two basic types: one type is affixed to the head with two ties, conforms to the face with the aid of a flexible adjustment for the nose bridge, and may be flat/pleated or duck-billed in shape; the second type is pre-moulded, adheres to the head with a single elastic band and has a flexible adjustment for the nose bridge.
- Procedure masks are flat/pleated and affix to the head with ear loops. All masks have some degree of fluid resistance, but those approved as surgical masks must meet specified standards for protection from penetration of blood and body fluids.
Annex 5

National infection control programmes

The responsible health authority should develop a national (or regional) infection control programme to support health care facilities in reducing the risk of healthcare-associated infections.


Such programmes must:
- set relevant national objectives consistent with other national health care objectives;
- develop and continually update guidelines for recommended health care surveillance, prevention, and infection control practices;
- develop a national system to monitor selected infections and assess the effectiveness of interventions;
- harmonize initial and continuing training programmes for HCWs;
- facilitate access to materials and products essential for hygiene and safety;
- encourage health care establishments to promote infection control best practices, and
- encourage health care establishments to monitor health-care associated infections and to provide feedback to the HCWs concerned.

The national or regional health authority should designate an agency to oversee the programme (a ministerial department, institution, or other body), and plan national activities with the help of a national expert committee.

The National infection control committee should:
- review risks associated with new technologies, and monitor the risk of acquiring an infection from new devices and products, before their approval for use;
- review and provide input into investigation of outbreaks and epidemics; and
- communicate and cooperate with other health care facility committees with common interests, such as pharmacy and therapeutics or antimicrobial use committee, biosafety or health and safety committees, waste management committee, and blood transfusion committee.

Each health care facility should:
- develop an infection control programme to ensure the well being of patients, HCWs, and visitors;
- develop an annual work plan to assess and promote good health care, appropriate isolation; sterilization; and other infection control practices, HCW training, and epidemiological surveillance;
• provide sufficient resources to support the infection control programme.

Risk prevention for patients and HCWs is the concern of everyone in the facility, and must be supported by the senior administration.
Annex 6.

Airborne infection isolation rooms

Characteristics of airborne infection isolation rooms
Airborne precautions also include engineering controls, such as placing the patient in an airborne infection isolation (negative pressure) room or area. It is recommended that such rooms have:

- a door that closes;
- monitored negative air pressure (exhaust air volume > supply air volume) in relation to the adjacent space (i.e., the direction of the air flow is from outside the adjacent space, such as a corridor, into the room);
- 6 to 12 air changes (ACH) per hour; [19-21] and
- room/area air exhausted directly outside (ensuring that it does not expose others) or recirculated after filtration by a high-efficiency particulate air (HEPA) filter.

For more information on airborne infection isolation rooms, see:
http://www.cdc.gov/ncidod/dhqp/gl_environinfection.html
Suggested checklist for isolation room/area trolley/table

The following items should be kept on the trolley at all times so that personal protective equipment is always available for health care workers.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Stock present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face shield/visor/goggles</td>
<td></td>
</tr>
<tr>
<td>Single use gloves for clinical use (sizes: small, medium, and large)</td>
<td></td>
</tr>
<tr>
<td>Gloves (reusable for environmental cleaning)</td>
<td></td>
</tr>
<tr>
<td>Hair covers (optional for high risk procedures, but should be available)</td>
<td></td>
</tr>
<tr>
<td>Particulate respirators (N95, FFP2, or equivalent)</td>
<td></td>
</tr>
<tr>
<td>Surgical or procedure masks</td>
<td></td>
</tr>
<tr>
<td>Single-use long sleeved fluid-resistant gowns</td>
<td></td>
</tr>
<tr>
<td>Single-use plastic aprons (optional if splashing is anticipated)</td>
<td></td>
</tr>
<tr>
<td>Alcohol-based hand rub or alternative method for washing hands in clean water</td>
<td></td>
</tr>
<tr>
<td>Plain soap (liquid if possible)</td>
<td></td>
</tr>
<tr>
<td>Disinfectant</td>
<td></td>
</tr>
<tr>
<td>Clean single-use towels</td>
<td></td>
</tr>
<tr>
<td>Appropriate disinfectant for environmental cleaning</td>
<td></td>
</tr>
<tr>
<td>Large plastic bags</td>
<td></td>
</tr>
<tr>
<td>Appropriate clinical waste bags</td>
<td></td>
</tr>
<tr>
<td>Linen bags</td>
<td></td>
</tr>
<tr>
<td>Collection container for used equipment</td>
<td></td>
</tr>
</tbody>
</table>

For more information on isolation precautions see:


For additional information on hand hygiene, see:

Annex 7.

Use of disinfectants

Alcohol and Bleach
Health care facilities with limited resources may not have access to standard hospital disinfectants. Alcohol and bleach are acceptable alternatives when used as directed below.

**Alcohol**
Alcohol is effective against influenza virus.[49]Ethyl alcohol (70%) is a powerful broad-spectrum germicide and is considered generally superior to isopropyl alcohol. Alcohol is often used to disinfect small surfaces (e.g., rubber stoppers of multiple-dose medication vials, and thermometers) and occasionally external surfaces of equipment (e.g., stethoscopes and ventilators). Because alcohol is flammable, its use as surface disinfectant should be limited to small surface areas and it should be used in well-ventilated spaces only. Alcohol may also cause discoloration, swelling, hardening, and cracking of rubber and certain plastics after prolonged and repeated use.

**Sodium hypochlorite (bleach)**
Bleach is a strong and effective disinfectant, but it is readily inactivated in the presence of organic material. Its active ingredient, sodium hypochlorite, is effective in killing bacteria, fungi, and viruses, including influenza virus.

Diluted household bleach works at variable contact times (from 10 to 60 min), is widely available at a low cost, and can be recommended for disinfection in health care facilities. However, bleach irritates mucous membranes, the skin and the airway, decomposes under heat or light, and reacts readily with other chemicals. Therefore, caution is advised when bleach is used. Improper use of bleach may reduce its effectiveness for disinfection and can also result in health care worker injury.

**Procedures for preparing/using diluted bleach**
- Use mask, rubber gloves, and waterproof apron. Goggles are also recommended to protect the eyes from splashes.
- Mix and use bleach solutions in well-ventilated areas.
- Mix bleach with cold water because hot water decomposes the sodium hypochlorite and renders it ineffective.
- Bleach containing 5% sodium hypochlorite should be diluted as in the table below:
Table: Sodium hypochlorite: concentration and use.

<table>
<thead>
<tr>
<th>Solution</th>
<th>Recommended dilution</th>
<th>Available chlorine after dilution</th>
<th>Uses</th>
<th>Contact time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most household bleach preparations contain 5% sodium hypochlorite (50,000 parts per million of available chlorine).</td>
<td>Usually a 1:100 dilution of 5% sodium hypochlorite is recommended. For bleach containing 5% sodium hypochlorite, use 1 part bleach to 99 parts cold tap water (1:100 dilution) for disinfection of surfaces.[15] Adjust ratio of bleach to water as needed to achieve appropriate concentration of sodium hypochlorite, e.g., for bleach preparations containing 2.5% sodium hypochlorite, twice as much bleach should be used (2 parts bleach to 98 parts water).</td>
<td>For bleach preparations containing 5% sodium hypochlorite, a 1:100 dilution will yield 0.05% or 500 parts per million available chlorine. Bleach solutions containing other concentrations of sodium hypochlorite will contain differing amounts of available chlorine when diluted.</td>
<td>Disinfection by wiping of nonporous surfaces. Surfaces must be cleaned of organic materials, such as secretions, mucus, vomitus, faeces, blood, or other body fluids prior to disinfection.</td>
<td>A contact time of ≥ 10 minutes is recommended.</td>
</tr>
</tbody>
</table>

Bleach precautions

- Bleach can be corrosive to metals and damage painted surfaces.
- Avoid touching the eyes. If bleach gets into the eyes, immediately rinse with water for at least 15 minutes and consult a doctor.
- Bleach should not be used together or mixed with other household detergents because this reduces its effectiveness and can cause chemical reactions.
- A toxic gas is produced when bleach is mixed with acidic detergents such as those used for toilet cleaning and this gas can cause death or injury. If necessary, use detergents first and rinse thoroughly with water before using bleach for disinfection.
- Undiluted bleach liberates a toxic gas when exposed to sunlight and should be stored in a cool and shaded place out of the reach of children.
- Sodium hypochlorite decomposes with time. To ensure its effectiveness, it is advised to purchase recently produced bleach and avoid over-stocking.
- Diluted bleach should be made fresh daily, labeled, dated, and unused portions discarded 24 hours after preparation.
- Organic materials inactivate bleach; surfaces must be cleaned of organic materials prior to disinfection with bleach.
- Keep diluted bleach covered, protected from sunlight, in a dark container (if possible) and keep out of the reach of children.
Annex 8.

Information about contact with chickens, ducks, and other animals

- Avoid contact with chicken farms, duck farms, or any farm where animals have been ill, slaughtered, or are thought to harbour AI
- If you inadvertently come into contact with an environment that has had sick/dead poultry, wash your hands thoroughly and monitor your temperature for 7 days. If you develop a sudden high fever (> 38º C) or signs of respiratory illness, consult your doctor regarding whether or not you should receive antiviral medication.
- If you have had contact with poultry that have died from AI or if you have had contact with the faeces of these poultry, consult your health care adviser for advice regarding self-monitoring of temperature and where to obtain treatment/prophylaxis if needed.
Annex 9.

**Antiviral prophylaxis after AI exposure**

Antiviral drugs have demonstrated efficacy in the treatment and prevention of seasonal influenza A.\cite{60, 61} Additional data are needed on the role of antivirals in the treatment and prophylaxis of AI. Older M2 inhibitor antivirals (amantidine and ramantidine) are ineffective against AI A(H5N1) \textit{in vitro}, \cite{62} but AI A(H5N1) is susceptible \textit{in vitro} to neuraminidase inhibitors (oseltamivir and zanamivir).\cite{63-65} The optimal dose and duration of treatment for AI with neuraminidase inhibitors are unknown.

Of 25 AI A(H5N1) patients who received oseltamivir, 19 died. However, treatment may have been started too late to be effective.\cite{7, 28} The development of antiviral resistance is also a concern and oseltamivir resistance has been detected in AI A(H5N1) isolates from several patients treated with oseltamivir.\cite{66, 67} Even if proven effective for treatment or prophylaxis of AI A(H5N1), neuraminidase inhibitors are expensive and current supplies are limited.

Health care facilities should follow the national policy on antiviral prophylaxis of HCWs providing care for AI infected patients.

**Antiviral prophylaxis for potentially exposed HCWs\cite{7}**

- Although the efficacy of neuraminidase inhibitors as prophylaxis for AI A(H5N1) is unknown, prophylaxis is suggested for exposed HCWs because of the high mortality of the disease.
- When used for potentially exposed HCWs, the HCW should take 75 mg oseltamivir phosphate each day for at least 7 days beginning immediately or as soon as possible after unprotected exposure (< 48 hours) to a AI A(H5N1) infected patient. When used, prophylaxis should continue until 1 week after the last unprotected exposure. \cite{7}
Annex 10.
Sample HCW influenza-like illness monitoring form

Name: _________________________________________  Home telephone number: _______________________

Job title:  _______________________________________  Work location: _______________________________

Date/s of exposure (list all, use back of page if necessary):      ____/____/________         ____/____/________

Type of contact with AI patient, patient environment, or virus:
____________________________________________________________________________________________

Was personal protective equipment (PPE) used:  No ______  Yes ______

If yes, list PPE used (e.g., gown, gloves, particulate respirator, surgical mask, eye protection, etc):
____________________________________________________________________________________________

List any non-occupational exposures (i.e., exposure to birds or persons with severe acute respiratory illness):
____________________________________________________________________________________________

Please check your temperature twice a day for 10 days after providing care for an AI-infected patient, including 10
days after your last exposure, and also monitor yourself for any of the following influenza-like illness (ILI)
symptoms:
•  Fever > 38° C
•  Cough
•  Acute onset of respiratory illness
•  Sore throat
•  Arthralgia
•  Myalgia or prostration
•  And/or gastrointestinal symptoms (e.g., diarrhea, vomiting, abdominal pain)

If any symptoms of influenza-like illness occur, immediately limit your interactions with others, exclude yourself
from public areas, and notify _____________________________at __________________________ immediately.

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
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<tbody>
<tr>
<td>Date</td>
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<tr>
<td>No Yes</td>
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<table>
<thead>
<tr>
<th>Day 6</th>
<th>Day 7</th>
<th>Day 8</th>
<th>Day 9</th>
<th>Day 10</th>
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Guidelines for Laundry in Health Care Facilities

Introduction

Although soiled linen has been identified as a source of large numbers of pathogenic microorganisms, the risk of actual disease transmission appears negligible. Rather than rigid rules and regulation, hygienic and common-sense storage and processing of clean and soiled linen are recommended. Guidelines for laundry construction and operation for health care facilities have been published (1,2).

Control Measures

Soiled linen can be transported in the hospital by cart or chute. Bagging linen is indicated if chutes are used, since improperly designed chutes can be a means of spreading microorganisms throughout the hospital (3). Recommendations for handling soiled linen from patients on isolation precautions have been published (4).

Soiled linen may or may not be sorted in the laundry before being loaded into washer/extractor units. Sorting before washing protects both machinery and linen from the effects of objects in the linen and reduces the potential for recontamination of clean linen that sorting after washing requires. Sorting after washing minimizes the direct exposure of laundry personnel to infective material in the soiled linen and reduces airborne microbial contamination in the laundry (5). Protective apparel and appropriate ventilation (2) can minimize these exposures.

The microbicidal action of the normal laundering process is affected by several physical and chemical factors (5). Although dilution is not a microbicidal mechanism, it is responsible for the removal of significant quantities of microorganisms. Soaps or detergents loosen soil and also have some microbicidal properties. Hot water provides an effective means of
destroying microorganisms, and a temperature of at least 71 C (160 F) for a minimum of 25 minutes is commonly recommended for hot-water washing. Chlorine bleach provides an extra margin of safety. A total available chlorine residual of 50-150ppm is usually achieved during the bleach cycle. The last action performed during the washing process is the addition of a mild acid to neutralize any alkalinity in the water supply, soap, or detergent. The rapid shift in Ph from approximately 12 to 5 also may tend to inactivate some microorganisms.

Recent studies have shown that a satisfactory reduction of microbial contamination can be achieved at lower water temperatures of 22-50 C when the cycling of the washer, the wash formula, and the amount of chlorine bleach are carefully monitored and controlled (6,7). Instead of the microbicidal action of hot water, low-temperature laundry cycles rely heavily on the presence of bleach to reduce levels of microbial contamination.

Regardless of whether hot or cold water is used for washing, the temperatures reached in drying and especially during ironing provide additional significant microbicidal action.

Recommendations

1. Routine Handling of Soiled Linen
   a. Soiled linen should be handled as little as possible and with minimum agitation to prevent gross microbial contamination of the air and of persons handling the linen. Category II
   b. All soiled linen should be bagged or put into carts at the location where it was used; it should not be sorted or pre-rinsed in patient-care areas. Category II
   c. Linen soiled with blood or body fluids should be deposited and transported in bags that prevent leakage. Category II
   d. If landry chutes are used, linen should be bagged, and chutes should be properly designed. Category II

2. Hot-Water Washing

   If hot water is used, linen should be washed with a detergent in water at least 71 C (160 F) for 25 minutes. Category II

3. Low-Temperature Water Washing
If low temperature (<70 C) laundry cycles are used, chemicals suitable for low-temperature washing at proper use concentration should be used.  

*Category II*

4. Transportation of Clean Linen

Clean linen should be transported and stored by methods that will ensure its cleanliness. *Category II*

References

2. Joint Committee on Health Care Laundry Guidelines. Guidelines for healthcare linen service. Mallandale, FL: Textile Rental Services Association of America, 1983; TRSA publication no. 71482

Reference: Guideline for Handwashing and Hospital Environmental Control, 1985; Garner, J.S., Favero, M.S., in Guidelines for Protecting the Safety and Health of Health Care Workers
**The Use of Bleach**

Bleach is a strong and effective disinfectant. Its active ingredient, sodium hypochlorite, denatures protein in micro-organisms and is therefore effective in killing bacteria, fungus and viruses. Household bleach works quickly and is widely available at a low cost. Diluted household bleach is thus recommended for the disinfection of facilities.

As bleach irritates mucous membranes, the skin and the airway, decomposes under heat or light and reacts readily with other chemicals, caution should be exercised in the use of it. Improper use of bleach may reduce its effectiveness in disinfection and also lead to accidents which can be harmful to health. Overuse of bleach or using a bleach solution that is too concentrated results in the production of toxic substances that pollute the environment and disturb ecological balance.

**Tools and Equipment**

Before cleaning, get all necessary tools and equipment ready. Cleaning tools, cleansers/disinfectants, measuring tools and protective gear will be needed.

Cleaning tools:
Brush, mop, towel, spray can and bucket.

Cleansers/disinfectants:
Bleach and water.

Measuring tools:
Tablespoon and measuring cup.

Protective gear:
Mask, rubber gloves, plastic apron and goggles (recommended).

**Procedures of Preparing/Using Diluted Bleach**

1. Keep windows open when diluting or using bleach to ensure good ventilation.
2. Put on protective gear when diluting or using bleach as it irritates mucous membranes, the skin and the airway.
3. Cold water should be used for dilution as hot water decomposes the active ingredient of bleach and renders it ineffective.
4. Bleach containing 5.25% sodium hypochlorite should be diluted as follows (demonstration short):
   - 1:99 diluted household bleach (mixing 10ml of bleach with 1litre of water) can be used for general household cleaning.
   - 1:49 diluted household bleach (mixing 10ml of bleach with 0.5litre of water) is used to disinfect surfaces or articles contaminated with vomitus, excreta, secretions or blood.
5. Make adjustments to the amount of bleach added if its concentration of sodium hypochlorite is above or below 5.25%.
   - Calculation: Multiplier of the amount of bleach added = 5.25 concentration of sodium hypochlorite in bleach
   - For example, when diluting a bleach containing only 5% sodium hypochlorite, the multiplier is 5.25 5=1.05. That means 10 x 1.05 =10.5ml of bleach should be used when preparing a bleach solution.
6. For accurate measurement of the amount of bleach added, a tablespoon or measuring cup can be used.
7. Rinse disinfected articles with water and wipe dry.
8. Cleaning tools should be soaked in diluted bleach for 30 minutes and then rinsed thoroughly before reuse.
9. Finally, wash hands with liquid soap, then dry hands with a clean towel or disposable towel.

**Precautions**

- Avoid using bleach on metals, wool, nylon, silk, dyed fabric and painted surfaces.
- Avoid touching the eyes. If bleach gets into the eyes, immediately rinse with water for at least 15 minutes and consult a doctor.
- Bleach should not be used together or mixed with other household detergents as this reduces its effectiveness in disinfection and causes chemical reactions. For instance, a toxic gas is produced when bleach is mixed with acidic detergents such as those used for toilet cleaning. This could result in accidents and injuries. If necessary, use detergents first and rinse thoroughly with water before using bleach for disinfection.
- As undiluted bleach liberates a toxic gas when exposed to sunlight, it should be stored in a cool and shaded place out of reach of children.
- Sodium hypochlorite decomposes with time. To ensure its effectiveness, it is advised to purchase recently produced bleach and avoid over-stocking.
- For effective disinfection, diluted bleach should be used within 24 hours after preparation as decomposition increases with time if left unused.
Inspection Tips
Pay special attention to the following:

- Ensure soil and waste pipes function properly. Repair any defects or leaks immediately.
- Look for signs of pest infestation (e.g. rodent droppings, cockroaches, stagnant water) and if present, clean immediately. If necessary, seek help from the management company.
- Keep carpets clean by vacuuming daily and regular dry cleaning.
- Ensure ventilation systems are clean and well maintained. Clean air filters regularly.

For any enquiries, please contact the Food and Environmental Hygiene Department Hotline on 2868 0000.

Health Advice

- Maintain good body immunity. Eat a proper diet, exercise regularly, get adequate rest, reduce stress. Don’t smoke.
- Maintain good personal hygiene. Wash hands frequently using liquid soap. Use disposable towels or a hand dryer to dry hands.
- Cover the nose and mouth when sneezing or coughing.
- Wash hands after coughing, sneezing or wiping the nose.
- Wash hands before touching the eyes, nose and mouth.
- Do not share towels.
- Do not share eating utensils – use serving spoons and chopsticks.
- Maintain good indoor ventilation.

Atypical Pneumonia
Guidelines on Disinfection of Households
Items in Frequent Contact with Occupants

Sitting Area / Bedrooms
- Door knobs/window handles/buttons/switches
- Sofa
- Telephones/intercom/computer keyboards and mouses
- Carpet
- Surfaces (e.g. tables)
- Children’s toys
- Floors

Dining Area
- Tables/chairs
- Eating utensils
- Floors

Kitchen and Toilet
- Water taps/shower heads
- Door knobs/window handles/buttons/switches
- Water closets and cistern handles/seat and cover flaps
- Bath-tubs and wash-basins
- Drain outlets
- Dustbins
- Walls and floors

Cleaning and Disinfection Procedures
(Also applies to general workplaces)

Furniture
Step 1
- Wipe thoroughly with a 1:99 solution of diluted household bleach (mix 1 part household bleach with 99 parts water).
- For areas that are dirty, use a stronger solution of bleach at the ratio of 1:49.
Step 2
- Wipe dry.

Walls
Step 1
- Wipe thoroughly with a 1:99 diluted household bleach solution.
- For dirty areas, use a stronger 1:49 bleach solution.
Step 2
- Wipe dry.

Mopping floors
Step 1
- Sweep litter before mopping.
Step 2
- Mop thoroughly with a 1:99 diluted household bleach solution.
- For areas that are dirty, use a stronger 1:49 bleach solution.
Step 3
- Clean and mop dry.

Toilet bowls
Step 1
- Clean with a toilet brush and a 1:99 diluted household bleach solution.
Step 2
- Flush.

Bath-tub and basins
Step 1
- Clean with an ordinary brush and a 1:99 diluted household bleach solution.
Step 2
- Rinse with water.

Drain outlets
- Pour a teaspoonful of 1:99 diluted household bleach solution down the drain outlet.
- After 5 minutes, pour clean water down the drain outlet.

General Cleaning and Disinfection Tools
- Broom
- Mop
- Brush
- Bucket
- Towel
- Bleach
- Appropriate protective clothing
- Face mask
- Rubber gloves

Points to Note
- Clean and disinfect your home at least once a day.
- Pay attention when cleaning electrical switches or computer equipment.
The type of PPE used will vary based on the level of precautions required; e.g., Standard and Contact, Droplet or Airborne Infection Isolation.

1. GOWN
   - Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
   - Fasten in back of neck and waist

2. MASK OR RESPIRATOR
   - Secure ties or elastic bands at middle of head and neck
   - Fit flexible band to nose bridge
   - Fit snug to face and below chin
   - Fit-check respirator

3. GOGGLES OR FACE SHIELD
   - Place over face and eyes and adjust to fit

4. GLOVES
   - Extend to cover wrist of isolation gown

USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

El tipo de PPE que se debe utilizar depende del nivel de precaución que sea necesario; por ejemplo, equipo Estándar y de Contacto o de Aislamiento de infecciones transportadas por gotas o por aire.

1. BATA
   - Cubra con la bata todo el torso desde el cuello hasta las rodillas, los brazos hasta la muñeca y dóblela alrededor de la espalda
   - Átesela por detrás a la altura del cuello y la cintura

2. MÁSCARA O RESPIRADOR
   - Asegúrese los cordones o la banda elástica en la mitad de la cabeza y en el cuello
   - Ajustese la banda flexible en el puente de la nariz
   - Acomódese la cara y por debajo del mentón
   - Verifique el ajuste del respirador

3. GAFAS PROTECTORAS O CARETAS
   - Colóquesela sobre la cara y los ojos y ajustela

4. GUANTES
   - Extienda los guantes para que cubran la parte del puño en la bata de aislamiento

UTILICE PRÁCTICAS DE TRABAJO SEGURAS PARA PROTEGERSE USTED MISMO Y LIMITAR LA PROPAGACIÓN DE LA CONTAMINACIÓN

- Mantenga las manos alejadas de la cara
- Limite el contacto con superficies
- Cambie los guantes si se rompen o están demasiado contaminados
- Realice la higiene de las manos
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| Gloves            | - Outside of gloves is contaminated!  
- Grasp outside of glove with opposite gloved hand; peel off  
- Hold removed glove in gloved hand  
- Slide fingers of ungloved hand under remaining glove at wrist  
- Peel glove off over first gloved  
- Discard gloves in waste container |
| Goggles or Face Shield | - Outside of goggles or face shield is contaminated!  
- To remove, handle by head band or ear pieces  
- Place in designated receptacle for reprocessing or in waste container |
| Gown              | - Gown front and sleeves are contaminated!  
- Unfasten ties  
- Pull away from neck and shoulders, touching inside of gown only  
- Turn gown inside out  
- Fold or roll into a bundle and discard |
| Mask or Respirator | - Front of mask/respirator is contaminated — DO NOT TOUCH!  
- Grasp bottom, then top ties or elastics and remove  
- Discard in waste container |

**SEQUENCE FOR REMOVING PERSONAL PROTECTIVE EQUIPMENT (PPE)**

**Con la excepción del respirador, quitese el PPE en la entrada de la puerta o en la antesala. Quitese el respirador después de salir de la habitación del paciente y de cerrar la puerta.**

**PERFORM HAND HYGIENE IMMEDIATELY AFTER REMOVING ALL PPE**

**EFFECTUE LA HIGIENE DE LAS MANOS INMEDIATAMENTE DESPUÉS DE QUITARSE CUALQUIER EQUIPO DE PROTECCIÓN PERSONAL**

*Except for respirator, remove PPE at doorway or in anteroom. Remove respirator after leaving patient room and closing door.*
Consequences: Personal Pandemic Preparedness

Personal Pandemic Preparedness

by eyeswideopen

Preliminary considerations:

• There will most likely not be a targeted vaccine until about 6 months after pandemic has begun; any vaccine prepared ahead of the pandemic will likely confer only partial protection
• There will most likely not be enough antivirals for treatment, let alone prophylactic use
• Assume a quarter to a half of the public will become infected over a 3 month period (a flu wave, of which there usually are 3 — the worst being the 2nd — a few weeks or months apart) and 3/4 to a half staffing everywhere for various durations
• Virus will be shed before symptoms appear (which can be 3 - 6, up to even 17 days) and after symptoms (21 days for children, 3–5 days for adults, longer for the immunocompromised)
• Children and otherwise healthy young adults are disproportionately at risk
• All bodily excreta will be very dangerous, especially feces and sputum/mucus; virus often multiplies in gut and diarrhea is often first symptom, preceding respiratory symptoms
• We will probably need two or more times the hospital beds and ICU facilities
• There will probably be mortality of at least an extra 50% beyond normal; a high percentage of these are likely to be under 65 years old, which comprise workers in essential services
• Most patients should probably be treated in the home, or if more critical, in secondary ICU-like set ups in schools or other locations
• Hospitals will need to continue their usual work and erect a firewall to protect vulnerable inmates from flu
• Childcare and family nursing responsibilities will strain ability of healthcare workers and other essential infrastructure workers to provide services
• Public services such as water, power, waste disposal, communications, and transportation will likely be intermittently interrupted
• Deliveries of food and other essential commodities may be disrupted
• There may be civil disorder due to shortages and desperation

Personal Bird Flu Preparedness

• Don’t panic.
• Get into the habit of washing your hands 20 seconds hot water with soap or ethanol hand sanitizer; carry antiseptic wipes
• Get into the habit of coughing/sneezing into the crook of your arm/sleeve or better yet, use tissue, not your hands; hands are a major means of spreading germs; virus lasts up to 48 hours on steel and plastic; 12 hours on cloth and paper.
• Get a flu shot and if over 50 a pneumovax
• Consider preparations to isolate yourself for about 3–6 months
• Stock up on potable water and food with long shelf-life, water, medicines, basic household necessities (toilet paper, paper towels, plastic bags, tissues, plain bleach, soaps and detergents, batteries etc) masks, latex gloves, sugar, salt, multivitamins, and other staples
• Accumulate vacation time
• Make contingency arrangements with your workplace to be able to work from home if possible
• Be prepared for essential services to be interrupted: see AlphaGeek’s 5 part series on emergency preparedness and the Red Cross’s Disaster planning booklets from the Pandemic Preparedness Guides page
• Learn how to treat water to make it potable (or at least usable for washing) in case of interruptions of water supply link
• If possible, start a vegetable garden and/or orchard
• Learn basic cooking if necessary
• Get a clothesline and clothespins or folding drying rack
• Put together a basic set of handyman tools and learn how to use them
• Have a mobile phone and an email address; get high-speed computer access
• Get a passport or other photo ID and credit card if you don’t already have them; use electronic transactions preferentially
• Save money; have cash on hand
• Consider getting a good bicycle
• Consider learning self-defense and acquire pepper spray and/or stun device
• Ensure car(s) are in good working order, have good spare tires, maps, and keep car filled with fuel. Get a good fuel can for extra fuel
• Remember that your car is a generator; all you need is a DC/AC inverter and cable (do not idle car in closed area where Carbon Monoxide poisoning may occur)
• Exercise regularly in order to strengthen your heart and lungs; taking care of your health now will benefit you later
• If you smoke, stop now
• Get a physical exam and get your medical history and records in order; include list of necessary medicines
• Put medical and financial records onto a small flash data card (keep updated)
• If you have high cholesterol, take statin drugs — they apparently reduce flu complications as a beneficial side effect
• If you have gout, use probenecid, as it will double the half-life of Tamiflu in the body, thereby stretching supplies
• Learn how to take blood pressure, pulse, temperature, respiration rate; learn basic first aid and nursing procedures
• Stock your medicine cabinet: aspirin and other OTC pain relievers, codeine, phenergan, valium, Tamiflu or Relenza (use Relenza only in those 7 years or older, without COPD or asthma) if possible
• Obtain a stockpile of essential medicines; contact your doctor explaining why; watch expiration dates
• Be sure you have a complete first aid kit
• Prepare a living will and a regular will; arrange for organ donation (if you wish)
• Network with your friends and family about plans with respect to pandemic
• Think about how to isolate yourself and your family, minimizing contact with others, for 3 months
• Learn as much as you can about bird flu
• Consider how you can help during a pandemic (preferably if you are resistant to the virus through vaccination or survival); volunteer for training with local hospital, CERT or Red Cross
• Expand alternate means of communication such as teleconferencing, cell phones, landlines, email, ham radio, CB radio with single sideband capability
• Until further notice, avoid getting pregnant

Should Birds in the US Become Infected:
- Wash eggs to remove fecal traces and cook all poultry products thoroughly (use food thermometer — cook to 158 degrees F.) if you continue to consume them; eggs should not be runny; avoid raw egg products such as mayonnaise, some ice creams, etc.
- Avoid contaminating other foods with raw poultry juices
- Wash hands before and after handling food
- Sanitize cutting boards, knife, and counter tops with hot soapy water or a bleach solution 1 tsp bleach to 1 qt water)
- Avoid sick or dead birds, especially wild birds
- If you keep birds, prevent any contact with wild birds or the excreta thereof; keep them under cover
- Report suspicious instances of sick or dead birds
- Keep pet cats away from dead birds; A(H5N1) can infect cats. Although A(H5N1) has not been seen in dogs, it would be wise to keep pet dogs away, too
- Put enhanced hygiene measures into high gear

**Should a pandemic occur:**

- Put enhanced hygiene measures into highest gear
- Avoid close contact and shaking hands, restrict visitors, avoid mass transit and gatherings of people. Infective radius around someone with flu is about 3 feet, so adjust your social distance
- Avoid touching eyes, nose and mouth
- Wear glasses instead of contact lenses so you minimize touching your eyes
- Don’t share eating utensils, glasses, etc.
- Avoid directly touching water taps and doorknobs
- Wash or sanitize hands after touching anything that others may have touched
- Disinfect surfaces (door knobs, keyboards, phones, money, taps etc.) with 1:50 bleach (1 cup bleach to 5 gallons water) or 70% alcohol solution: leave on surface for 2 minutes; surfaces contaminated with body fluids should sit 10–15 minutes in a 1:10 (1 cup bleach to 1 gallon water) bleach solution
- Wear disposable surgical masks in public
- Pull your kids out of school; home school (hopefully using internet resources to be made available)
- Work from home if possible
• Organize your neighborhood so you can share goods and take care of each other; survivors will be more resistant and thus able to run essential errands for others, if they have fully recovered
• Learn how to identify bird flu symptoms and learn effective nursing specific to the disease (classes may be offered at your local hospital)
• Designate a sick room area that is treated with an increased hygienic sensibility, make it easy to clean; perhaps use an antiviral air filter
• Laundry should be done in hot water, with bleach to sterilize
• If you can afford it, get an oxygen concentrator and needed tubes
• Download a copy of Dr. Woodson’s Personal Preparedness Guide for Avian Flu
• Keep your plumbing in good working order via preventive measures; should someone in your household become ill, feces are full of virus and thus are very dangerous; it may become very difficult to find a plumber (copper sulfate for tree roots in pipes, bleach gel for clearing pipes (never use bleach with ammonia), or use commercial treatments)
• Keep yourself informed with updates
• Handle incoming mail with caution
• Sterilization of appropriate items can be done in a microwave (3 minutes on high)
• Get a trash can with a foot-activated lid to use as a bag-lined biohazard waste bin for used masks, gloves, etc.
• Utilize electronic and internet transactions preferentially; delivery systems should be less vulnerable due to limited interactions with people, although driver and fuel shortages could hinder
• Consider removing facial hair to improve fit of filtering masks
• Learn how to properly fit filtering masks to avoid leaks

If you get sick:

• Stay home if you become ill or if you feel you might have been exposed to the virus; see below, last entry
• If you are concerned that you have been exposed and possibly infected, immediately contact healthcare professionals
• If you get sick, immediately get Tamiflu or Relenza and take it — it must be taken within 36 hours of onset; do not take it as a preventative as it only protects for the duration you take it. You are vulnerable thereafter. Tamiflu: 2 x 75 mg caps for 7 days
If you get very sick, contact healthcare professionals or go to designated medical facility for A(H5N1)

- Wear a mask as much as possible when others are around

If you are nursing a sick patient:

- Wear N95 mask (ensure proper fit), gown, hair covering and goggles
- Wash up thoroughly after every contact
- The most important thing is to keep patient hydrated to avoid dehydration; diarrhea, vomiting, and high fever make this all the more critical
- You will need to make a fluid replacement fluid using clean water (1 qt.), sugar (3 Tbsp.), and salt (1/4 tsp.) (see Dr. Woodson’s guide for directions); you will have to force fluids, drop by drop if necessary
- You will need Tamiflu or Relenza, hydrocodone, phenergan, and valium as well as antipyretics such as aspirin, acetaminophen, ibuprofen
- Give patient a bell or other means of signaling you
- You may need an oxygen concentrator to deliver oxygen to the patient; there are services renting these but they will probably be in short supply
- Lower a very high fever to about 101 degrees F, the optimum temperature to fight the virus; use antipyretics like acetaminophen or ibuprofen or (in adults) aspirin and a lukewarm moist compress
- Patient may have diarrhea early on; feces contain virus; you may need a bed pan or bedside commode; be very cautious in emptying; sterilize with bleach solution
- Consider rigging a make-shift curtain around the patient if possible
- Be exceedingly careful in handling all materials in contact with the patient such as laundry and utensils; disinfect using bleach
- Burn all used kleenexes used by flu patient; they are hazardous waste
- Use trash bag-lined biohazard trash bin (foot activated lid)
- All contacts of A(H5N1) victim should monitor their own temperature and symptoms; self-quarantine for 1 week and check daily for 14 days after last exposure for signs of fever, influenza-like symptoms, and gastrointestinal symptoms; possible postexposure chemoprophylaxis with 75 mg Tamiflu 1x day for 7–10 days, ask healthcare professional (it is doubtful there will be sufficient Tamiflu for this sort of usage except in very serious situations)
- Isolate the patient from CDC and WHO “Infection Control for Viral Haemorrhagic Fevers”
• Planning and setting up the isolation area from CDC and WHO “Infection Control for Viral Haemorrhagic Fevers”

WHEN SERVICES FAIL:

Electricity:

• all else flows from electricity: heat, food preparation, communications, lighting, computing, entertainment
• DC to AC inverter to use car as generator (not in a closed space: CO poisoning) as long as there is gasoline; have a self-contained jumpstarter on hand in case you run down your car battery, REMEMBER: use the inverter off the car battery with the engine off
• For short term AC: House power to truck battery charger to 75 amp batteries in parallel to inverter, charge one battery then add batteries one at a time, wire size dependant on the number of batteries
• 5 gallon (bright red) fuel can full, stabilized with Sta-Bil (a double dose keeps it fresh 2 years), stored carefully, protected, away from the house; date it
• Consider a backup solar system with battery array

Lighting:

• Battery-operated LED lanterns for ambient light
• Solar battery charger (solar and LED gear: http://store.sundancesolar.com)
• If you use candles or candle lantern, be careful as they are a fire hazard
• Hand-crank or shake flashlights
• LED lightbulbs (standard base) 2 or 4 watt, if you have limited backup electricity like solar/wind/batteries

Communications:

• passive:
• Radio: hand cranked or battery-powered, solar battery charger; XM satellite radio has a 24/7 emergency channel, consider getting a receiver
• TV: small portable TV with multiple power options (assuming TV stations are up and running)
• active: phones, internet, loud whistle
- Roll of quarters, prepaid phone card for pay phones (locate them in your area)
- Have at least one old-style low-power telephone (not cordless) that can function without electricity
- Prepare and carry a laminated card with all important contact information
- Obtain a cellphone if you don’t already have one; learn how to send/receive text messages on your cellphone; familiarize yourself with wireless data capabilities of phone
- Manual cell phone charger like Sidewinder
- For internet when there is no electricity: use battery-powered laptop; recharge via car/DC-AC inverter or portable solar panel, REMEMBER: use the inverter off the car battery with the engine off

**Entertainment:**

- Books, games, musical instruments
- Battery-operated DVD and CD players

**Natural gas:**

- Warmth:
  - Close off unused areas of house; seal off with plastic and duct tape; cover walls and floors with rugs and blankets;
  - Fireplace with reflector or wood stove; fleece clothing
  - Emergency heating: Coleman Catalytic Heater and lots of 1 lb propane canisters (3/day)
- Cooking and hot water:
  - Barbecue with briquettes or coal (must be used with proper ventilation)
  - Jetboil or other camp stove such as Coleman, plus fuel cartridges
  - Solar cooker and solar water heater (Super solar shower, 4 gal capacity)
  - Grate for cooking on fireplace fire

**Water:**

- Store about 50 gallons of potable water; consider obtaining a food grade 55 gallon water storage barrel, keep it fresh
- Learn how to purify water (rolling boil for 10 minutes, use AquaPak solar sterilizer, filtration, chemical, etc) link
• Obtain water purifier such as Exstream Orinoco or Exstream Mackenzie water bottle for small amounts; First Need Deluxe Portable water purifier/filter for groups (get spare cartridges)
• Use swimming pool water for non-drinking uses such as washing
• If water pressure drops, indicating failure, shut off master valve to avoid contamination to water in your system; then, water in hot water heater tanks can still be used

Food:

• Dried and canned foods, rice and beans, food bars, trail mix, candy bars, etc
• Staples such as sugar, flour, salt, pepper, spices, Parmalat or dried or canned milk
• Plant fruit trees, vegetable garden
• Food preservation: 5 day super-insulated coolers with wheels; unload the contents of your freezer into them as soon as power goes out; keep in cool place; consider getting a small car-sized 12 volt DC mini cooler if you have medicines requiring refrigeration

Transportation:

• mobility may be restricted, mass transit could be hazardous, and fuel shortages are likely
• Consider getting a bicycle
• Safely store extra fuel (see above, under electricity)
• Get car with highest MPG

Hygiene:

• Laundry, dish washing, hand washing all need hot water (see above, under natural gas)
• Human waste: porta-potty, bucket with lid, or use strong trash bags duct-taped into drained (shut off water to it and then flush until empty) toilet, seal completely and dispose of after use; there are digesting enzymes and deodorants for toilet bags; use bleach solution to sterilize
• Trash: compost pile for non-meat organic waste; paper can be burned if trash and recycling pickups are interrupted
• Baking soda and white vinegar can serve as cleaners and deodorizers for many purposes if you run out of detergents
- Moist baby wipes (unscented), Purell waterless hand sanitizer (use one with ethanol), rubber gloves

The above “When Services Fail” section is a very brief outline largely based on pertinent aspects of AlphaGeek’s excellent and highly recommended 5 part guide on Disaster Preparedness (scroll down to links) or at Daily Kos

Page last modified on June 28, 2006, at 11:41 PM
Community Pandemic Preparedness

Preliminary considerations:

- There will most likely not be a targeted vaccine until about 6 months after pandemic has begun; any vaccine prepared ahead of the pandemic will likely render partial protection.
- There will most likely not be enough antivirals for treatment, let alone prophylactic use.
- Assume a quarter to a half of the public will become infected over a 3 month period (a flu wave, of which there usually are 3 — the worst being the 2nd — a few weeks or months apart) and 3/4 to a half staffing everywhere for various durations.
- Virus will be shed before symptoms appear (which can be 3 - 6, up to even 17 days) and after symptoms (21 days for children, 3–5 days for adults, longer for the immunocompromised).
- Children and otherwise healthy young adults are disproportionately at risk.
- All bodily excreta will be very dangerous, especially feces and sputum/mucus; virus often multiplies in gut and diarrhea is often first symptom, preceding respiratory symptoms.
- We will probably need two or more times the beds and ICU facilities.
- There will probably be mortality of at least an extra 50% beyond normal; a high percentage of these are likely to be under 65 years old, which comprise workers in essential services.
- Most patients should probably be treated in the home, or if more critical, in secondary ICU-like set ups in schools or other unused locations.
- Hospitals will need to continue their usual work and erect a firewall to protect vulnerable inmates.
- Childcare and family nursing responsibilities will strain ability of healthcare workers and other essential infrastructure workers to provide services.
- Public services such as water, power, waste disposal, communications, and transportation will likely be intermittently interrupted
- Deliveries of food and other essential commodities may be disrupted
- There may be civil disorder due to shortages and desperation

City functions:

- Close schools and other (nonessential) places where people congregate
- Stockpile materials, medicines, face masks, gloves, antiseptic cleansers, wipes, etc.
- Set up vaccination priorities (in conjunction with medical personnel) in a logical way that puts essential personnel first: medical, police, essential waterworks, power, communications, waste and morgue workers; then children and adults, preferably those latter who commit to serve as neighborhood or healthcare volunteers (if we should be so lucky to have vaccine at all)
- Policing will be needed to guard hospitals and pharmaceutical stockpiles
- Develop plans to keep essential services operational; establish minimum staffing level requirements
- Establish lines of succession in critical positions
- Coordinate essential commodities deliveries and rationing
- Set up a city-based delivery network with designated staging areas
- Essential pre-purchased supplies could be dropped at neighborhood staging areas for distribution. Delivery personnel should be sufficiently safe if they do not make contact
- Establish emergency fuel supplies
- Negotiate with private water companies to utilize water delivery trucks
- Include area for public information updates on website and arrange with local radio & TV for regular accurate official updates (assuming media is functioning); utilize ham radio
- Institute Cisco system linking emergency radio networks
- Establish guidelines or rules for (voluntary?) quarantine: home isolation, isolation of contacts of known cases, restriction of movement, requirements for use of face masks
- Restrictions on airports and international and national travel as well as public transportation
- Ports and shipping: sterilization procedures for certain goods entering
- Curfew should there be unrest
• Insure that institutions where people live together such as nursing homes or prisons are prepared
• Consider how to deal with the homeless, who will be particularly vulnerable and thus hazardous
• Set up temporary morgues; body recovery teams with prepared vans that completely isolate corpse and protect drivers; body disposal in least potentially infective way, cremation encouraged
• Videotape school classes to put on TV or the internet so education can continue at home
• Gilead, the company that created Tamiflu but licensed it to Roche (and is suing to get it back), is based in California: appeal to them to make it invoking compulsory license (long shot)
• Explore the possibility of temporarily taking over hotels or motels for secondary treatment centers. They would be preferable to school facilities, as they already have beds and bathrooms
• Issue recommendations to all employers to encourage and facilitate telecommuting and teleconferencing if possible
• Levy a tax for preparation; lobby state and federal government for city funding
• Fuel shortages are bound to cause difficulties. [If possible, acquire and use small fleet of electric or plug-in modified hybrid Prius (see calcars.com) cars, charged via solar panels (if possible using Toshiba’s high-capacity lithium ion batteries — 80% charge in 3 minutes, 100% in 10; due to be made available commercially in 2006)]

Hospital functions:

• Provide vaccine (if available) or prophylactic and therapeutic antivirals to healthcare workers to encourage continued service
• Set up mobile nursing units (part of firewall) with portable antiviral air filters for using in sick rooms (to protect the workers) as well as traditional protection
• Establish some means for healthcare workers’ children to be taken care of during shifts; possibly uninfected neighbors working at home
• Establish hotline for immediate assistance from mobile nursing units
• Establish teleconferencing and other communications capability for conferring with healthcare professionals
• Set up public information web pages and blog for Q&A; establish community liaison office; prepare and provide public education materials concerning flu and nursing procedures
• Stockpile supplies, vaccines, antibiotics, and antivirals, IV kits, fluids, O2 concentrators, ventilators, etc.
• Volunteer vetting and training: vaccination, administering meds, nursing assistance, testing for H5N1 (if possible), errands, etc.
• Establish minimum staffing levels; identify essential personnel; establish lines of succession
• Oversee secondary location set up and personnel (part of firewall)
• Suspend elective surgeries
• Close hospital wards to visitors
• Ensure critical functions such as waste disposal, backup power, supplemental water purification, laundry, sterilization, etc., with contingency plans for personnel shortages and service outages
• Transport seriously ill patients to secondary locations (EMT? City? neighborhood volunteers?)
• Documentation and data collection for analysis
• Air conditioning or forced air heating should be modified to eliminate viruses (UV, ozone, high filtration) in secondary facilities. Switch to radiant heat in winter and ice in summer
• Stockpile and establish a rental/delivery system for oxygen concentrators and ventilators
• Hire more respiratory therapists if possible but ensure their safety throughout the pandemic; train nurses in some RT techniques
• Pull doctors in from private sector corporate entities (which may be shut down anyway)
• Establish or lobby for a way to allow doctors licensed elsewhere or with lapsed licenses to practice during an emergency such as a pandemic
• Regular decontamination of patients’ quarters in secondary facility; need expanded morgue facilities
• Grief counseling will be in high demand
• Probenecid apparently doubles the half-life of Tamiflu in the body (see link to Reuters news story)

Neighborhood functions:
- Organize neighborhood around avian flu contingency
- Archive information about each neighbor, emergency contact information, required medicines, pets, location of critical items on property such as medicines, special skills each can bring to bear in emergencies
- CERT training; first aid/CPR training
- Neighborhood education and news updates via newsletter, websites, email lists or phone trees
- Establish liaison with local hospital, healthcare professionals or city health services office
- Set up communications node (if communications are still up and running) or point persons and runners; maintain contact with neighbors
- Ham radio - have one licensed operator
- Keep track of all cases; transport afflicted when necessary (using personal protective equipment)
- Stockpile goods and move resources to where needed to prevent waste or shortage
- Establish staging areas for deliveries
- Immunized (via vaccination or flu survival) persons hopefully volunteer to run errands and help with nursing
- Consolidate errands to minimize contact in public places
- Purchase portable ventilator to share
- Elect a neighborhood “sheriff”; consider an armed guard if there is civil disorder

Public Education:

- Hygiene considerations: hand washing, cough technique, awareness of infectivity on surfaces and cleaning techniques; special effort to train children; use video to demonstrate
- Importance of flu shots and pneumovax
- Importance of staying home when ill or if exposed to A(H5N1)
- Material preparations such as stockpiling food, water, household basics, etc
- Advance planning such as how to educate children pulled from school and working from home
- Teach basic nursing skills such as taking blood pressure, pulse, temperature, respiration rate
- Teach public how to identify A(H5N1) and specific nursing measures for home care; videotape classes for broadcast on TV and web for the public
• Encourage businesses to make contingency plans to accommodate social spacing via telecommuting, teleconferencing, etc; if employees can work from home, this is optimal

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Disasters happen anytime and anywhere. And when disaster strikes, you may not have much time to respond.

A highway spill of hazardous material could mean instant evacuation.

A winter storm could confine your family at home. An earthquake, flood, tornado or any other disaster could cut off basic services—gas, water, electricity and telephones—for days.

After a disaster, local officials and relief workers will be on the scene, but they cannot reach everyone immediately. You could get help in hours, or it may take days. Would your family be prepared to cope with the emergency until help arrives?

Your family will cope best by preparing for disaster before it strikes. One way to prepare is by assembling a Disaster Supplies Kit. Once disaster hits, you won’t have time to shop or search for supplies. But if you’ve gathered supplies in advance, your family can endure an evacuation or home confinement.

To prepare your kit

- Review the checklist in this brochure.
- Gather the supplies that are listed. You may need them if your family is confined at home.
- Place the supplies you’d most likely need for an evacuation in an easy-to-carry container. These supplies are listed with an asterisk (*).
Here are six basics you should stock in your home: water, food, first aid supplies, clothing and bedding, tools and emergency supplies and special items. Keep the items that you would most likely need during an evacuation in an easy-to-carry container—suggested items are marked with an asterisk (*). Possible containers include:

- a large, covered trash container,
- camping backpack, or a duffle bag.

**SUPPLIES**

- **Water**
  Store water in plastic containers such as soft drink bottles. Avoid using containers that will decompose or break, such as milk cartons or glass bottles. A normally active person needs to drink at least two quarts of water each day. Hot environments and intense physical activity can double that amount. Children, nursing mothers and ill people will need more.

  - Store one gallon of water per person per day (two quarts for drinking, two quarts for food preparation/sanitation)
  - Keep at least a three-day supply of water for each person in your household.

- **Food**
  Store at least a three-day supply of non-perishable food. Select foods that require no refrigeration, preparation or cooking and little or no water. If you must heat food, pack a can of sterno. Select food items that are compact and lightweight.

  - Include a selection of the following foods in your Disaster Supplies Kit:
    - Ready-to-eat canned meats, fruits and vegetables
    - Canned juices, milk, soup (if powdered, store extra water)
    - Staples — sugar, salt, pepper
    - High energy foods — peanut butter, jelly, crackers, granola bars, trail mix
    - Vitamins
    - Foods for infants, elderly persons or persons on special diets
    - Comfort/stress foods — cookies, hard candy, sweetened cereals, lollipops, instant coffee, tea bags

- **First Aid Kit**
  Assemble a first aid kit for your home and one for each car. A first aid kit* should include:

  - Sterile adhesive bandages in assorted sizes
  - 2-inch sterile gauze pads (4-6)
  - 4-inch sterile gauze pads (4-6)
  - Hypoallergenic adhesive tape
  - Triangular bandages (3)
  - 2-inch sterile roller bandages (3 rolls)
  - 3-inch sterile roller bandages (3 rolls)
  - Scissors
  - Tweezers
  - Needle
  - Moistened towelettes
  - Antiseptic
  - Thermometer
  - Tongue blades (2)
  - Tube of petroleum jelly or other lubricant
  - Assorted sizes of safety pins
  - Cleansing agent/soap
  - Latex gloves (2 pair)
  - Sunscreen
  - Non-prescription drugs
    - Aspirin or nonaspirin pain reliever
    - Anti-diarrhea medication
    - Antacid (for stomach upset)
    - Syrup of Ipecac (use to induce vomiting if advised by the Poison Control Center)
    - Laxative
    - Activated charcoal (use if advised by the Poison Control Center)

Contact your local American Red Cross chapter to obtain a basic first aid manual.
Tools and Supplies
- Mess kits, or paper cups, plates and plastic utensils*
- Emergency preparedness manual*
- Battery operated radio and extra batteries*
- Flashlight and extra batteries*
- Cash or traveler’s checks, change*
- Non-electric can opener, utility knife*
- Fire extinguisher: small canister, ABC type
- Tube tent
- Pliers
- Tape
- Compass
- Matches in a waterproof container
- Aluminum foil
- Plastic storage containers
- Signal flare
- Paper, pencil
- Needles, thread
- Medicine dropper
- Shut-off wrench, to turn off household gas and water
- Whistle
- Plastic sheeting
- Map of the area (for locating shelters)
- Toilet paper, towelettes*
- Soap, liquid detergent*
- Feminine supplies*
- Personal hygiene items*
- Plastic garbage bags, ties (for personal sanitation uses)
- Plastic bucket with tight lid
- Disinfectant
- Household chlorine bleach
- Mess kits, or paper cups, plates and plastic utensils*
- Emergency preparedness manual*
- Battery operated radio and extra batteries*
- Flashlight and extra batteries*
- Cash or traveler’s checks, change*
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- Feminine supplies*
- Personal hygiene items*
- Plastic garbage bags, ties (for personal sanitation uses)
- Plastic bucket with tight lid
- Disinfectant
- Household chlorine bleach

Clothing and Bedding
*Include at least one complete change of clothing and footwear per person.
- Sturdy shoes or work boots*
- Rain gear*
- Blankets or sleeping bags*
- Hat and gloves
- Thermal underwear
- Sunglasses

Special Items
Remember family members with special needs, such as infants and elderly or disabled persons.

For Baby*
- Formula
- Diapers
- Bottles
- Powdered milk
- Medications

For Adults*
- Heart and high blood pressure medication
- Insulin
- Prescription drugs
- Denture needs
- Contact lenses and supplies
- Extra eye glasses
- Entertainment - games and books
- Important Family Documents
  - Will, insurance policies, contracts, deeds, stocks and bonds
  - Passports, social security cards, immunization records
  - Bank account numbers
  - Credit card account numbers and companies
  - Inventory of valuable household goods, important telephone numbers
  - Family records (birth, marriage, death certificates)

*SUGGESTIONS AND REMINDERS
- Store your kit in a convenient place known to all family members. Keep a smaller version of the Disaster Supplies Kit in the trunk of your car.
- Keep items in air tight plastic bags.
- Change your stored water supply every six months so it stays fresh.
- Rotate your stored food every six months.
- Re-think your kit and family needs at least once a year. Replace batteries, update clothes, etc.
- Ask your physician or pharmacist about storing prescription medications.
CREATE A FAMILY DISASTER PLAN

To get started...

Contact your local emergency management or civil defense office and your local American Red Cross chapter.

- Find out which disasters are most likely to happen in your community.
- Ask how you would be warned.
- Find out how to prepare for each.

Meet with your family.

- Discuss the types of disasters that could occur.
- Explain how to prepare and respond.
- Discuss what to do if advised to evacuate.
- Practice what you have discussed.

Plan how your family will stay in contact if separated by disaster.

- Pick two meeting places:
  1) a location a safe distance from your home in case of fire.
  2) a place outside your neighborhood in case you can’t return home.
- Choose an out-of-state friend as a "check-in-contact" for everyone to call.

Complete these steps.

- Post emergency telephone numbers by every phone.
- Show responsible family members how and when to shut off water, gas and electricity at main switches.
- Install a smoke detector on each level of your home, especially near bedrooms; test monthly and change the batteries two times each year.
- Contact your local fire department to learn about home fire hazards.
- Learn first aid and CPR. Contact your local American Red Cross chapter for information and training.

Meet with your neighbors.

Plan how the neighborhood could work together after a disaster. Know your neighbor’s skills (medical, technical). Consider how you could help neighbors who have special needs, such as elderly or disabled persons. Make plans for child care in case parents can’t get home.

Remember to practice and maintain your plan.

The Federal Emergency Management Agency’s Community and Family Preparedness Program and the American Red Cross Community Disaster Education Program are nationwide efforts to help people prepare for disasters of all types. For more information, please contact your local emergency management office and American Red Cross chapter. This brochure and other preparedness materials are available by calling FEMA at 1-800-480-2520, or writing: FEMA, P.O. Box 2012, Jessup, MD 20794-2012. Publications are also available on the World Wide Web at:

FEMA’s Web site: http://www.fema.gov
American Red Cross Web site: http://www.redcross.org

Local sponsorship provided by:

Homeland Security

www.ready.gov
Everyone should have a plan.

The likelihood of you and your family surviving a house fire depends as much on having a working smoke detector and an exit strategy, as on a well-trained fire department. The same is true for surviving a terrorist attack or other emergency. We must have the tools and plans in place to make it on our own, at least for a period of time, no matter where we are when disaster strikes. Just like having a working smoke detector, preparing for the unexpected makes sense. Get ready now.

Potential Threats  Terrorists are working to obtain biological, chemical, nuclear and radiological weapons, and the threat of an attack is very real. Here at the Department of Homeland Security, throughout the federal government, and at organizations across America, we are working hard to strengthen our Nation’s security and to reduce our vulnerability to emergencies of all kinds. Whenever possible, we want to stop terrorist attacks before they happen. All Americans should begin a process of learning about potential threats so we are better prepared to react during an attack, natural disaster or other emergency. While there is no way to predict what will happen, or what your personal circumstances will be, there are simple things you can do now to prepare yourself and your loved ones. Some of the things you can do to prepare for a terrorist attack, such as assembling a supply kit and developing a family communications plan, are the same for both a natural or man-made emergency. However, as you will read in this brochure, there are important differences among potential terrorist threats that will impact the decisions you make and the actions you take. With a little planning and common sense, you can be better prepared for the unexpected.
Emergency Supplies

Just like having a working smoke detector in your home, having emergency supply kits will put the tools you may need at your fingertips. Be prepared to improvise and use what you have on hand to make it on your own for at least three days, maybe longer. While there are many things that might make you more comfortable, think first about fresh water, food and clean air. Remember to include, and periodically rotate, medications you take every day such as insulin and heart medicine. Plan to store items in an easy-to-carry bag, such as a shopping bag, backpack or duffle bag. Consider two kits. In one, put everything you will need to stay where you are and make it on your own. The other should be a lightweight, smaller version you can take with you if you have to get away.

**Water** Store one gallon of water per person per day for drinking and sanitation in clean plastic containers. If you live in a warm weather climate more water may be necessary.

**Food** Store food that won't go bad and does not have to be heated or cooked. Choose foods that your family will eat, including protein or fruit bars, dry cereal or granola, canned foods and juices, peanut butter, dried fruit, nuts, crackers and baby foods. Remember to pack a manual can opener, cups and eating utensils.

**Clean Air** Many potential terrorist attacks could send tiny microscopic “junk” into the air. For example, an explosion may release very fine debris that can cause lung damage. A biological attack may release germs that can make you sick if inhaled or absorbed through open cuts. Many of these agents can only hurt you if they get into your body, so think about creating a barrier between yourself and any contamination. Be prepared to improvise with what you have on hand to protect your nose, mouth, eyes and cuts in your skin. Anything that fits snugly over your nose and mouth, including any dense-weave cotton material, can help filter contaminants in an emergency. It is very important that most of the air you breathe comes through the mask or cloth, not around it. Do whatever you can to make the best fit possible for children. There are also a variety of face masks readily available in hardware stores that are rated based on how small a particle they can filter in an industrial setting.

Given the different types of attacks that could occur, there is not one solution for masking. For instance, simple cloth face masks can filter some of the airborne “junk” or germs you might breathe into your body, but will probably not protect you from chemical gases. Still, something over your nose and mouth in an emergency is better than nothing.

Have heavyweight garbage bags or plastic sheeting, duct tape and scissors in your kit. You can use these things to tape up windows, doors and air vents if you need to seal off a room from outside contamination. Consider precutting and labeling these materials. Anything you can do in advance will save time when it counts.

**Basic Supplies** Store a flashlight, battery powered radio, extra batteries, a first aid kit, utility knife, local map, toilet paper, feminine hygiene products, soap, garbage bags and other sanitation supplies, plastic sheeting, duct tape, as well as extra cash and identification. Periodically rotate your extra batteries to be sure they work when you need them.
Emergency Supplies

**Warmth** If you live in a cold weather climate, you must think about warmth. It is possible that the power will be out and you will not have heat. Have warm clothing for each family member in your supply kit, including a jacket or coat, long pants, a long sleeve shirt, sturdy shoes, a hat and gloves. Have a sleeping bag or warm blanket for each person.

**Special Items** Think about your family’s unique needs. Pack diapers, formula, bottles, prescription medications, pet food, comfort items, books, paper, pens, a deck of cards or other forms of entertainment.

**Recommended Supplies to Include in a Basic Kit:**

- **Water** one gallon of water per person per day, for drinking and sanitation
- **Food** at least a three-day supply of non-perishable food
- **Battery-powered radio** and extra batteries
- **Flashlight** and extra batteries
- **First Aid kit**
- **Whistle** to signal for help
- **Dust mask** or cotton t-shirt, to help filter the air
- **Moist towelettes** for sanitation
- **Wrench or pliers** to turn off utilities
- **Can opener** for food (if kit contains canned food)
- **Plastic sheeting and duct tape** to shelter-in-place
- **Infant formula and diapers** if you have an infant
- **Garbage bags and plastic ties** for personal sanitation

**Unique Family Needs:**

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You should **plan in advance** what you will do in an emergency. Be prepared to assess the situation, use common sense and whatever you have on hand to take care of yourself and your loved ones. Think about the places where your family spends time: school, work and other places you frequent. Ask about their emergency plans. Find out how they will communicate with families during an emergency. If they do not have an emergency plan, consider helping develop one. **Use the tool in the back of this brochure to get started today.**

**Develop a Family Communications Plan** Your family may not be together when disaster strikes, so plan how you will contact one another and review what you will do in different situations. Consider a plan where each family member calls, or e-mails, the same friend or relative in the event of an emergency. It may be easier to make a long-distance phone call than to call across town, so an out-of-town contact may be in a better position to communicate among separated family members. Be sure each person knows the phone number and has coins or a prepaid phone card to call the emergency contact. You may have trouble getting through, or the phone system may be down altogether, but be patient.

**Deciding to Stay or Go** Depending on your circumstances and the nature of the attack, the first important decision is whether you stay put or get away. You should understand and plan for both possibilities. Use common sense and available information, including what you are learning here, to determine if there is immediate danger. In any emergency, local authorities may or may not immediately be able to provide information on what is happening and what you should do. However, you should watch TV, listen to the radio or check the Internet often for information or official instructions as it becomes available. If you're specifically told to evacuate or seek medical treatment, do so immediately.

**Staying Put and Shelter-in-Place** Whether you are at home, work or elsewhere, there may be situations when it's simply best to stay where you are and avoid any uncertainty outside. In fact, there are some circumstances where staying put and creating a barrier between yourself and potentially contaminated air outside, a process known as sheltering-in-place and sealing the room, is a matter of survival. Plan in advance where you will take shelter in this kind of an emergency. Choose an interior room or one with as few windows and doors as possible. Consider precutting plastic sheeting to seal windows, doors and air vents. Each piece should be several inches larger than the space you want to cover so that it lies flat against the wall. Label each piece with the location of where it fits.

Use available information to assess the situation. If you see large amounts of debris in the air, or if local authorities say the air is badly contaminated, you may want to shelter-in-place and seal the room. Quickly bring your family and pets inside, lock doors, and close windows, air vents and fireplace dampers. Turn off air conditioning, forced air heating systems, exhaust fans and clothes dryers. Take your emergency supplies and go into the room you have designated. Seal all windows, doors and vents with plastic sheeting and duct tape or anything else you have on hand. Listen to the TV, the radio, or check the Internet for instructions.
Getting Away There may be conditions under which you will decide to get away, or there may be situations when you are ordered to leave. Plan in advance how you will assemble your family and anticipate where you will go. Choose several destinations in different directions so you have options in an emergency. If you have a car, keep at least a half tank of gas in it at all times. Become familiar with alternate routes as well as other means of transportation out of your area. If you do not have a car, plan how you will leave if you have to. Take your emergency supply kit, unless you have reason to believe it has been contaminated, and lock the door behind you. Take pets with you if you are told to evacuate; however, if you are going to a public shelter, keep in mind that they may not be allowed inside. If you believe the air may be contaminated, drive with your windows and vents closed and keep the air conditioning and heater turned off.

Working Together Schools, daycare providers, workplaces, neighborhoods and apartment buildings, like individuals and families, should all have site-specific emergency plans. Ask about plans at the places where your family spends time: work, school and other places you frequent. If none exist, consider volunteering to help develop one. You will be better prepared to reunite your family and loved ones safely during an emergency if you think ahead, and communicate with others in advance.

Neighborhoods and Apartment Buildings A community working together during an emergency also makes sense. Talk to your neighbors about how you can work together. Find out if anyone has specialized equipment, like a power generator, or expertise such as medical knowledge, that might help in a crisis. Decide who will check on elderly or disabled neighbors. Make backup plans for children in case you can't get home in an emergency. Sharing plans and communicating in advance is a good strategy.

Schools and Daycare If you are a parent, or guardian of an elderly or disabled adult, make sure schools or daycare providers have emergency response plans. Ask how they will communicate with families during a crisis. Do they store adequate food, water and other emergency supplies? Find out if they are prepared to shelter-in-place if need be, and where they plan to go if they must get away.

Employers If you are an employer, make sure your workplace has a building evacuation plan that is regularly practiced. Take a critical look at your heating ventilation and air-conditioning system to determine if it is secure or if it could be feasibly upgraded to better filter potential contaminants. Be sure you, and others, know how to turn off the system if necessary. Think about what to do if your employees can't go home, and make sure you have appropriate supplies on hand.
Specific Terrorist Threats

It is important to remember, there are significant differences among potential terrorist threats that will influence the decisions you make and the actions you take. By beginning a process of learning about these specific threats, you are preparing yourself to react in an emergency.

**Biological Threat** A biological attack is the deliberate release of germs or other biological substances that can make you sick. Many agents must be inhaled, enter through a cut in the skin or be eaten to make you sick. Some biological agents, such as anthrax, do not cause contagious diseases. Others, like the smallpox virus, can result in diseases you can catch from people.

Unlike an explosion, a biological attack may or may not be immediately obvious. While it is possible that you will see signs of a biological attack, as was sometimes the case with the anthrax mailings, it is perhaps more likely that local health care workers will report a pattern of unusual illness or there will be a wave of sick people seeking emergency medical attention. You will probably learn of the danger through an emergency radio or TV broadcast or some other signal used in your community. Perhaps you will get a phone call or emergency response workers may come door-to-door. If you become aware of an unusual or suspicious release of an unknown substance nearby, it doesn’t hurt to protect yourself. Quickly get away. Cover your mouth and nose with layers of fabric that can filter the air but still allow breathing. Examples include two to three layers of cotton such as a t-shirt, handkerchief or towel. Otherwise, several layers of tissue or paper towels may help. Wash with soap and water and contact authorities.

In the event of a biological attack, public health officials will provide information on what you should do as quickly as they can. However, it can take time for them to determine exactly what the illness is, how it should be treated and who is in danger. What you can do is watch TV, listen to the radio or check the Internet for official news including the following: Are you in the group or area authorities consider in danger? What are the signs and symptoms of the disease? Are medications or vaccines being distributed? Where? Who should get them? Where should you seek emergency medical care if you become sick?

At the time of a declared biological emergency, if a family member becomes sick, it is important to be suspicious. However, do not automatically assume you should go to a hospital emergency room or that any illness is the result of the biological attack. Symptoms of many common illnesses may overlap. Use common sense, practice good hygiene and cleanliness to avoid spreading germs, and seek medical advice.
Chemical Threat  A chemical attack is the deliberate release of a toxic gas, liquid or solid that can poison people and the environment. Watch for signs of a chemical attack such as many people suffering from watery eyes, twitching, choking, having trouble breathing or losing coordination. Many sick or dead birds, fish or small animals are also cause for suspicion. If you see signs of a chemical attack, quickly try to define the impacted area or where the chemical is coming from, if possible. Take immediate action to get away from the affected area.

If the chemical is inside a building where you are, try to get out of the building without passing through the contaminated area. Otherwise, it may be better to move as far away from where you suspect the chemical release is and seal the room. If you are outside when you see signs of a chemical attack, you must quickly decide what is the fastest way to get away from the chemical threat. Consider if you can get out of the area or if it would be better to go inside a building and follow your plan to shelter-in-place.

If your eyes are watering, your skin is stinging, you are having trouble breathing or you simply think you may have been exposed to a chemical, immediately strip and wash. Look for a hose, fountain or any source of water. Wash with soap, if possible, but do not scrub the chemical into your skin. Seek emergency medical attention.

Nuclear Blast  A nuclear blast is an explosion with intense light and heat, a damaging pressure wave and widespread radioactive material that can contaminate the air, water and ground surfaces for miles around. While experts may predict at this time that a nuclear attack is less likely than others, terrorism by its nature is unpredictable. If there is a flash or fireball, take cover immediately, below ground if possible, though any shield or shelter will help protect you from the immediate effects of the blast and the pressure wave. In order to limit the amount of radiation you are exposed to, think about shielding, distance and time. If you have a thick shield between yourself and the radioactive materials, it will absorb more of the radiation and you will be exposed to less. Similarly, the farther away you are from the blast and the fallout, the lower your exposure. Finally, minimizing time spent exposed will also reduce your risk.

Radiation Threat or “Dirty Bomb”  A radiation threat or “Dirty Bomb” is the use of common explosives to spread radioactive materials over a targeted area. It is not a nuclear blast. The force of the explosion and radioactive contamination will be more localized. While the blast will be immediately obvious, the presence of radiation may not be clearly defined until trained personnel with specialized equipment are on the scene. As with any radiation, you want to try to limit your exposure. Think about shielding, distance and time.
Some of the things you can do to prepare for the unexpected, such as making an emergency supply kit and developing a family communications plan, are the same for both a natural or man-made emergency. However, there are important differences among natural disasters that will impact the decisions you make and the actions you take. Some natural disasters are easily predicted, others happen without warning. Planning what to do in advance is an important part of being prepared.

Find out what natural disasters are most common in your area. You may be aware of some of your community’s risks: others may surprise you. Historically, flooding is the nation’s single most common natural disaster. Flooding can happen in every U.S. state and territory.

Earthquakes are often thought of as a West Coast phenomenon, yet 45 states and territories in the United States are at moderate to high risk from earthquakes and are located in every region of the country. Other disasters may be more common in certain areas. Tornadoes are nature’s most violent storms and can happen anywhere. However, states located in “Tornado Alley,” as well as areas in Pennsylvania, New York, Connecticut, and Florida are at the highest risk for tornado damage.

Hurricanes are severe tropical storms that form in the southern Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and in the eastern Pacific Ocean. Scientists can now predict hurricanes, but people who live in coastal communities should plan what they will do if they are told to evacuate.

Planning what to do in advance is an important part of being prepared. Find out what natural disasters are most common in your area.
Get Involved... Join Citizen Corps Today.

Citizen Corps actively involves citizens in making our communities and our nation safer, stronger, and better prepared. We all have a role to play in keeping our hometowns secure from emergencies of all kinds. Citizen Corps works hard to help people prepare, train, and volunteer in their communities.

**What role will you play?** Being ready starts with you, but it also takes everyone working together to make our communities safer. Citizen Corps provides a variety of opportunities for you to get involved.

You can provide valuable assistance to local fire stations, law enforcement, emergency medical services, and emergency management. Get connected to disaster volunteer groups through your local Citizen Corps Council, so that when something happens, you can help in an organized manner. Citizen Corps programs build on the successful efforts that are in place in many communities around the country to prevent crime and respond to emergencies.

You can join the Citizen Corps community by:

- Volunteering for local law enforcement agencies through the Volunteers in Police Service (VIPS) Program;

- Being part of a Community Emergency Response Team (CERT) to help people immediately after a disaster and to assist emergency responders;
Joining a Neighborhood Watch group to help with terrorism awareness and neighborhood emergency preparedness;

Volunteering with the Medical Reserve Corps to provide public health and medical support;

Providing fire safety and prevention education in the community and helping out at your local fire station through Fire Corps;

Helping others get prepared, especially those with special needs.

**It starts with you.**

There are no limits to how you can prepare and train for emergencies. All over America, communities have organized Citizen Corps Councils to inspire citizens to take action and get involved in hometown preparedness. Contact your local Council by going to www.citizencorps.gov and click on the homepage link to find the Council nearest you.

**Prepare. Train. Volunteer...**
In All Cases, Remain Calm.

Be prepared to adapt this information to your personal circumstances and make every effort to follow instructions received from authorities on the scene. Above all, stay calm, be patient and think before you act. With these simple preparations, you can be ready for the unexpected. If you have a working smoke detector, you understand that preparing makes sense. **Get ready now. Use the tool to the right to get started today.**

This common sense framework is designed to launch a process of learning about citizen preparedness. For the most current information and recommendations, go online to www.ready.gov.
Family Communications Plan

Your family may not be together when disaster strikes, so plan how you will contact one another and review what you will do in different situations.

Out of Town Contact Name: ________________________________
Email: ___________________________________________
Tel. Number 1: ___________________________ Tel. Number 2: ___________________________

Fill out the following information for each family member and keep it up to date.

Name: ____________________________________________
Social Security Number: ____________________________ Date of Birth: ____________________________
Important Medical Information: ______________________
Name: ____________________________________________
Social Security Number: ____________________________ Date of Birth: ____________________________
Important Medical Information: ______________________
Name: ____________________________________________
Social Security Number: ____________________________ Date of Birth: ____________________________
Important Medical Information: ______________________
Name: ____________________________________________
Social Security Number: ____________________________ Date of Birth: ____________________________
Important Medical Information: ______________________
Name: ____________________________________________
Social Security Number: ____________________________ Date of Birth: ____________________________
Important Medical Information: ______________________
Name: ____________________________________________
Social Security Number: ____________________________ Date of Birth: ____________________________
Important Medical Information: ______________________

Where to go in an emergency. Write down where your family spends the most time: work, school and other places you frequent. Schools, daycare providers, workplaces and apartment buildings should all have site-specific emergency plans. (over)
Home
Address:
Phone Number:
Neighborhood Meeting Place:
Regional Meeting Place:

Work
Address:
Phone Number:
Evacuation Location:

Work
Address:
Phone Number:
Evacuation Location:

School
Address:
Phone Number:
Evacuation Location:

School
Address:
Phone Number:
Evacuation Location:

Other place you frequent:
Address:
Phone Number:
Evacuation Location:

Other place you frequent:
Address:
Phone Number:
Evacuation Location:

<table>
<thead>
<tr>
<th>Important Information</th>
<th>Name</th>
<th>Telephone #</th>
<th>Policy #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacist:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Insurance:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homeowners/Rental Insurance:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veterinarian/Kennel (for pets):</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other useful phone numbers: 9-1-1 for emergencies
Police Non-Emergency Phone #: ___
Every family member should carry a copy of this important information:

Family Communications Plan

Contact Name: ____________________________ Telephone: ____________________________

Out-of-Town Contact Name: ____________________________ Telephone: ____________________________

Neighborhood Meeting Place: ____________________________ Meeting Place Telephone: ____________________________

Dial 9-1-1 for Emergencies!

Other Important Phone Numbers & Information:

Family Communications Plan

Contact Name: ____________________________ Telephone: ____________________________

Out-of-Town Contact Name: ____________________________ Telephone: ____________________________

Neighborhood Meeting Place: ____________________________ Meeting Place Telephone: ____________________________

Dial 9-1-1 for Emergencies!
Keeping Food Safe During an Emergency

Did you know that a flood, fire, national disaster, or the loss of power from high winds, snow, or ice could jeopardize the safety of your food? Knowing how to determine if food is safe and how to keep food safe will help minimize the potential loss of food and reduce the risk of foodborne illness. This fact sheet will help you make the right decisions for keeping your family safe during an emergency.

**ABCD’s of Keeping Food Safe in an Emergency**

Always keep meat, poultry, fish, and eggs refrigerated at or below 40 ºF and frozen food at or below 0 ºF. This may be difficult when the power is out.

Keep the refrigerator and freezer doors closed as much as possible to maintain the cold temperature. The refrigerator will keep food safely cold for about 4 hours if it is unopened. A full freezer will hold the temperature for approximately 48 hours (24 hours if it is half full) if the door remains closed. Obtain dry or block ice to keep your refrigerator as cold as possible if the power is going to be out for a prolonged period of time. Fifty pounds of dry ice should hold an 18-cubic foot full freezer for 2 days. Plan ahead and know where dry ice and block ice can be purchased.

**Be prepared for an emergency...**

... by having items on hand that don’t require refrigeration and can be eaten cold or heated on the outdoor grill. Shelf-stable food, boxed or canned milk, water, and canned goods should be part of a planned emergency food supply. Make sure you have ready-to-use baby formula for infants and pet food. Remember to use these items and replace them from time to time. Be sure to keep a hand-held can opener for an emergency.

Consider what you can do ahead of time to store your food safely in an emergency. If you live in a location that could be affected by a flood, plan your food storage on shelves that will be safely out of the way of contaminated water. Coolers are a great help for keeping food cold if the power will be out for more than 4 hours—have a couple on hand along with frozen gel packs. When your freezer is not full, keep items close together—this helps the food stay cold longer.

Digital, dial, or instant-read food thermometers and appliance thermometers will help you know if the food is at safe temperatures. Keep appliance thermometers in the refrigerator and freezer at all times. When the power is out, an appliance thermometer will always indicate the temperature in the refrigerator and freezer no matter how long the power has been out. The refrigerator temperature should be 40 ºF or below; the freezer, 0 ºF or lower. If you’re not sure a particular food is cold enough, take its temperature with a food thermometer.

**Frequently Asked Questions:**

**Q. Flood waters covered our food stored on shelves and in cabinets. What can I keep and what should I throw out?**

**A.** Do not eat any food that may have come into contact with flood water.

- Discard any food that is not in a waterproof container if there is any chance that it has come into contact with flood water. Food containers that are not waterproof include those with screw-caps, snap lids, pull tops, and crimped caps. Also, discard cardboard juice/milk/baby formula boxes and home canned foods if they have come in contact with flood water, because they cannot be effectively cleaned and sanitized.
- Inspect canned foods and discard any food in damaged cans. Can damage is shown by swelling, leakage, punctures, holes, fractures, extensive deep rusting, or crushing/denting severe enough to prevent normal stacking or opening with a manual, wheel-type can opener.

*Steps to Salvage All Metal Cans and Retort Pouches*
**Steps to Salvage All-Metal Cans and Retort Pouches**

Undamaged, commercially prepared foods in all-metal cans and retort pouches (for example, flexible, shelf-stable juice or seafood pouches) can be saved if you do the following:

- Remove the labels, if they are the removable kind, since they can harbor dirt and bacteria.
- Thoroughly wash the cans or retort pouches with soap and water, using hot water if it is available.
- Brush or wipe away any dirt or silt.
- Rinse the cans or retort pouches with water that is safe for drinking, if available, since dirt or residual soap will reduce the effectiveness of chlorine sanitation.
- Then, sanitize them by immersion in one of the two following ways:
  - Place in water and allow the water to come to a boil and continue boiling for 2 minutes, or
  - Place in a freshly made solution consisting of 1 tablespoon of unscented, liquid chlorine bleach per gallon of drinking water (or the cleanest, clearest water available) for 15 minutes.
- Air-dry cans or retort pouches for a minimum of 1 hour before opening or storing.
- If the labels were removable, then re-label your cans or retort pouches, including the expiration date (if available), with a marker.
- Food in reconditioned cans or retort pouches should be used as soon as possible, thereafter.
- Any concentrated baby formula in reconditioned, all-metal containers must be diluted with clean, drinking water.

**Q. How should I clean my dishes and pots and pans?**

**A.** Thoroughly wash metal pans, ceramic dishes, and utensils (including can openers) with soap and water, using hot water if available. Rinse and then sanitize them by boiling in clean water or immersing them for 15 minutes in a solution of 1 tablespoon of unscented, liquid chlorine bleach per gallon of drinking water (or the cleanest, clearest water available).

**Q. My home was flooded and I am worried about the safety of the drinking water. What should I do?**

**A.** Use bottled water that has not been exposed to flood waters if it is available.

- If you don't have bottled water, you should boil water to make sure it is safe. Boiling water will kill most types of disease-causing organisms that may be present. If the water is cloudy, filter it through clean cloths or allow it to settle, and draw off the clear water for boiling. Boil the water for one minute, let it cool, and store it in clean containers with covers.
- If you can't boil water, you can disinfect it using household bleach. Bleach will kill some, but not all, types of disease-causing organisms that may be in the water. If the water is cloudy, filter it through clean cloths or allow it to settle, and draw off the clear water for disinfection. Add 1/8 teaspoon (or 8 drops) of regular, unscented, liquid household bleach for each gallon of water, stir it well and let it stand for 30 minutes before you use it. Store disinfected water in clean containers with covers.
- If you have a well that had been flooded, the water should be tested and disinfected after flood waters recede. If you suspect that your well may be contaminated, contact your local or state health department or agriculture extension agent for specific advice.
Q. We had a fire in our home and I am worried about what food I can keep and what to throw away.

A. Discard food that has been near a fire. Food exposed to fire can be damaged by the heat of the fire, smoke fumes, and chemicals used to fight the fire. Food in cans or jars may appear to be okay, but the heat from a fire can activate food spoilage bacteria. If the heat is extreme, the cans or jars themselves can split or rupture, rendering the food unsafe.

One of the most dangerous elements of a fire is sometimes not the fire itself, but toxic fumes released from burning materials. Discard any raw food or food in permeable packaging—cardboard, plastic wrap, screw-topped jars, bottles, etc.—stored outside the refrigerator. Food stored in refrigerators or freezers can also become contaminated by fumes. The refrigerator seal isn’t airtight and fumes can get inside. Chemicals used to fight the fire contain toxic materials and can contaminate food and cookware. Food that is exposed to chemicals should be thrown away—the chemicals cannot be washed off the food. This includes food stored at room temperature, such as fruits and vegetables, as well as food stored in permeable containers like cardboard and screw-topped jars and bottles. Cookware exposed to fire-fighting chemicals can be decontaminated by washing in soap and hot water. Then submerge for 15 minutes in a solution of 1 tablespoon unscented, liquid chlorine bleach per gallon of water.

Q. A snowstorm knocked down the power lines, can I put the food from the refrigerator and freezer out in the snow?

A. No, frozen food can thaw if it is exposed to the sun's rays even when the temperature is very cold. Refrigerated food may become too warm and foodborne bacteria could grow. The outside temperature could vary hour by hour and the temperature outside will not protect refrigerated and frozen food. Additionally, perishable items could be exposed to unsanitary conditions or to animals. Animals may harbor bacteria or disease; never consume food that has come in contact with an animal. Rather than putting the food outside, consider taking advantage of the cold temperatures by making ice. Fill buckets, empty milk cartons or cans with water and leave them outside to freeze. Then put the homemade ice in your refrigerator, freezer, or coolers.

Q. Some of my food in the freezer started to thaw or had thawed when the power came back on. Is the food safe? How long will the food in the refrigerator be safe with the power off?

A. Never taste food to determine its safety! You will have to evaluate each item separately. If an appliance thermometer was kept in the freezer, read the temperature when the power comes back on. If the appliance thermometer stored in the freezer reads 40 °F or below, the food is safe and may be refrozen. If a thermometer has not been kept in the freezer, check each package of food to determine the safety. Remember you can’t rely on appearance or odor. If the food still contains ice crystals or is at 40 °F or below, it is safe to refreeze. Refrigerated food should be safe as long as power is out no more than 4 hours. Keep the door closed as much as possible. Discard any perishable food (such as meat, poultry, fish, eggs, and leftovers) that have been above 40 °F for 2 hours.

Q. May I refreeze the food in the freezer if it thawed or partially thawed?

A. Yes, the food may be safely refrozen if the food still contains ice crystals or is at 40 °F or below. You will have to evaluate each item separately. Be sure to discard any items in either the freezer or the refrigerator that have come into contact with raw meat juices. Partial thawing and refreezing may reduce the quality of some food, but the food will remain safe to eat. See the attached charts for specific recommendations.
Refrigerator Foods

<table>
<thead>
<tr>
<th>FOOD</th>
<th>Held above 40 °F for over 2 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MEAT, POULTRY, SEAFOOD</strong></td>
<td></td>
</tr>
<tr>
<td>Raw or leftover cooked meat, poultry, fish</td>
<td>Discard</td>
</tr>
<tr>
<td>Thawing meat or poultry</td>
<td>Discard</td>
</tr>
<tr>
<td>Meat, tuna, shrimp, chicken, or egg salad</td>
<td>Discard</td>
</tr>
<tr>
<td>Gravy, stuffing, broth</td>
<td>Discard</td>
</tr>
<tr>
<td>Lunchmeats, hot dogs, bacon, sausage, dried beef</td>
<td>Discard</td>
</tr>
<tr>
<td>Pizza – with any topping</td>
<td>Discard</td>
</tr>
<tr>
<td>Canned hams labeled &quot;Keep Refrigerated&quot;</td>
<td>Discard</td>
</tr>
<tr>
<td>Canned meats and fish, opened</td>
<td>Discard</td>
</tr>
<tr>
<td><strong>CHEESE</strong></td>
<td></td>
</tr>
<tr>
<td>Soft Cheeses: blue/bleu, Roquefort, Brie</td>
<td>Discard</td>
</tr>
<tr>
<td>Hard Cheeses: Cheddar, Colby, Swiss, Parmesan, provolone, Romano</td>
<td>Safe</td>
</tr>
<tr>
<td>Processed Cheeses</td>
<td>Safe</td>
</tr>
<tr>
<td>Shredded Cheeses</td>
<td>Discard</td>
</tr>
<tr>
<td>Low-fat Cheeses</td>
<td>Discard</td>
</tr>
<tr>
<td>Grated Parmesan, Romano, or combination (in can or jar)</td>
<td>Safe</td>
</tr>
<tr>
<td><strong>DAIRY</strong></td>
<td></td>
</tr>
<tr>
<td>Milk, cream, sour cream, buttermilk</td>
<td>Discard</td>
</tr>
<tr>
<td>Butter, margarine</td>
<td>Safe</td>
</tr>
<tr>
<td>Baby formula, opened</td>
<td>Discard</td>
</tr>
<tr>
<td><strong>EGGS</strong></td>
<td></td>
</tr>
<tr>
<td>Fresh eggs, hard-cooked in shell, egg</td>
<td>Discard</td>
</tr>
<tr>
<td>Custards and puddings</td>
<td>Discard</td>
</tr>
<tr>
<td>FRUITS</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Fresh fruits, cut</td>
<td></td>
</tr>
<tr>
<td>Fruit juices, opened</td>
<td></td>
</tr>
<tr>
<td>Canned fruits, opened</td>
<td></td>
</tr>
<tr>
<td>Fresh fruits, coconut, raisins, dried fruits, candied fruits, dates</td>
<td></td>
</tr>
<tr>
<td><strong>SAUCES, SPREADS, JAMS</strong></td>
<td></td>
</tr>
<tr>
<td>Opened mayonnaise, tartar sauce, horseradish</td>
<td></td>
</tr>
<tr>
<td>Peanut butter</td>
<td></td>
</tr>
<tr>
<td>Jelly, relish, taco sauce, mustard, catsup, olives, pickles</td>
<td></td>
</tr>
<tr>
<td>Worcestershire, soy, barbecue, Hoisin sauces</td>
<td></td>
</tr>
<tr>
<td>Fish sauces (oyster sauce)</td>
<td></td>
</tr>
<tr>
<td>Opened vinegar-based dressings</td>
<td></td>
</tr>
<tr>
<td>Opened creamy-based dressings</td>
<td></td>
</tr>
<tr>
<td>Spaghetti sauce, opened jar</td>
<td></td>
</tr>
<tr>
<td><strong>BREAD, CAKES, COOKIES, PASTA, GRAINS</strong></td>
<td></td>
</tr>
<tr>
<td>Bread, rolls, cakes, muffins, quick breads, tortillas</td>
<td></td>
</tr>
<tr>
<td>Refrigerator biscuits, rolls, cookie dough</td>
<td></td>
</tr>
<tr>
<td>Cooked pasta, rice, potatoes</td>
<td></td>
</tr>
<tr>
<td>Pasta salads with mayonnaise or vinaigrette</td>
<td></td>
</tr>
<tr>
<td>Fresh pasta</td>
<td></td>
</tr>
<tr>
<td>Cheesecake</td>
<td></td>
</tr>
<tr>
<td>Breakfast foods – waffles, pancakes, bagels</td>
<td></td>
</tr>
<tr>
<td><strong>PIES, PASTRY</strong></td>
<td></td>
</tr>
<tr>
<td>Pastries, cream filled</td>
<td></td>
</tr>
<tr>
<td>Pies – custard, cheese filled, or chiffon; quiche</td>
<td></td>
</tr>
<tr>
<td>Pies, fruit</td>
<td></td>
</tr>
<tr>
<td><strong>VEGETABLES</strong></td>
<td></td>
</tr>
<tr>
<td>Fresh mushrooms, herbs, spices</td>
<td></td>
</tr>
<tr>
<td>Greens, pre-cut, pre-washed, packaged</td>
<td></td>
</tr>
<tr>
<td>Vegetables, raw</td>
<td></td>
</tr>
<tr>
<td>FOOD</td>
<td>Still contains ice crystals and feels as cold as if refrigerated</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>MEAT, POULTRY, SEAFOOD</strong></td>
<td></td>
</tr>
<tr>
<td>Beef, veal, lamb, pork, and ground meats</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Poultry and ground poultry</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Variety meats (liver, kidney, heart, chitterlings)</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Casseroles, stews, soups</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Fish, shellfish, breaded seafood products</td>
<td>Refreeze. However, there will be some texture and flavor loss.</td>
</tr>
<tr>
<td><strong>DAIRY</strong></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>Refreeze. May lose some texture.</td>
</tr>
<tr>
<td>Eggs (out of shell) and egg products</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Ice cream, frozen yogurt</td>
<td>Discard</td>
</tr>
<tr>
<td>Cheese (soft and semi-soft)</td>
<td>Refreeze. May lose some texture.</td>
</tr>
<tr>
<td>Hard cheeses</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Shredded cheeses</td>
<td>Refreeze</td>
</tr>
</tbody>
</table>

**Frozen Food**

When *Food* and When To Throw It Out

- **Vegetables, cooked; tofu** Discard
- **Vegetable juice, opened** Discard
- **Baked potatoes** Discard
- **Commercial garlic in oil** Discard
- **Potato Salad** Discard

**FOOD**

- **MEAT, POULTRY, SEAFOOD**
  - Beef, veal, lamb, pork, and ground meats
  - Poultry and ground poultry
  - Variety meats (liver, kidney, heart, chitterlings)
  - Casseroles, stews, soups
  - Fish, shellfish, breaded seafood products

- **DAIRY**
  - Milk
  - Eggs (out of shell) and egg products
  - Ice cream, frozen yogurt
  - Cheese (soft and semi-soft)
  - Hard cheeses
  - Shredded cheeses
<table>
<thead>
<tr>
<th>Category</th>
<th>Refreeze Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Casseroles containing milk, cream, eggs, soft cheeses</strong></td>
<td>Refreeze</td>
</tr>
<tr>
<td>Cheesecake</td>
<td>Refreeze</td>
</tr>
<tr>
<td><strong>FRUITS</strong></td>
<td>Refreeze</td>
</tr>
<tr>
<td>Juices</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Home or commercially packaged</td>
<td>Refreeze. Will change texture and flavor.</td>
</tr>
<tr>
<td><strong>VEGETABLES</strong></td>
<td>Refreeze</td>
</tr>
<tr>
<td>Juices</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Home or commercially packaged or blanched</td>
<td>Refreeze. May suffer texture and flavor loss.</td>
</tr>
<tr>
<td><strong>BREADS, PASTRIES</strong></td>
<td>Refreeze</td>
</tr>
<tr>
<td>Breads, rolls, muffins, cakes (without custard fillings)</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Cakes, pies, pastries with custard or cheese filling</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Pie crusts, commercial and homemade bread dough</td>
<td>Refreeze. Some quality loss may occur.</td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td>Refreeze</td>
</tr>
<tr>
<td>Casseroles – pasta, rice based</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Flour, cornmeal, nuts</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Breakfast items – waffles, pancakes, bagels</td>
<td>Refreeze</td>
</tr>
<tr>
<td>Frozen meal, entree, specialty items (pizza, sausage and biscuit, meat pie, convenience foods)</td>
<td>Refreeze</td>
</tr>
</tbody>
</table>
Be a BAC Fighter

Make the meals and snacks from your kitchen as safe as possible: **CLEAN:** wash hands and surfaces often; **SEPARATE:** don’t cross-contaminate; **COOK:** to proper temperatures, and **CHILL:** refrigerate promptly. Be a BAC Fighter and Fight BAC®

For More Information about Safe Food Handling and Preparation

USDA’s Meat and Poultry Hotline
1-888-MPHotline (1-888-674-6854);
TTY 1-800-256-7072
www.foodsafety.gov

To locate food safety educators in your state or community:

Cooperative Extension Service, local offices:
www.csrees.usda.gov/Extension/index.htm

Food and Drug Administration Public Affairs Specialists:
www.fda.gov/ora/fed_state/dfsr_activities/dfsr_pas.html

See www.fightbac.org for free brochures, fact sheets, stickers, and other great stuff!

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Apply the heat... and Fight BAC®

Cooking food to the proper temperature kills harmful bacteria. So Fight BAC® by thoroughly cooking your food as follows:

### SAFE COOKING TEMPERATURES

<table>
<thead>
<tr>
<th>Ground Meat &amp; Meat Mixtures</th>
<th>Internal temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef, Pork, Veal, Lamb</td>
<td>160°F</td>
</tr>
<tr>
<td>Turkey, Chicken</td>
<td>165°F</td>
</tr>
<tr>
<td>Fresh Beef, Veal, Lamb</td>
<td>145°F, 160°F, 170°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Poultry</th>
<th>Internal temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken &amp; Turkey, whole</td>
<td>165°F</td>
</tr>
<tr>
<td>Poultry parts</td>
<td>165°F</td>
</tr>
<tr>
<td>Duck &amp; Goose</td>
<td>165°F</td>
</tr>
<tr>
<td>Stuffing (cooked alone or in bird)</td>
<td>165°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fresh Pork</th>
<th>Internal temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>160°F</td>
</tr>
<tr>
<td>Well Done</td>
<td>170°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ham</th>
<th>Internal temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh (raw)</td>
<td>160°F</td>
</tr>
<tr>
<td>Pre-cooked (to reheat)</td>
<td>140°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eggs &amp; Egg Dishes</th>
<th>Cook until yolk &amp; white are firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eggs</td>
<td>160°F</td>
</tr>
<tr>
<td>Egg dishes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seafood</th>
<th>Internal temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fin Fish</td>
<td>145°F or flesh is opaque &amp; separates easily with fork</td>
</tr>
<tr>
<td>Shrimp, Lobster &amp; Crabs</td>
<td>flesh pearly &amp; opaque</td>
</tr>
<tr>
<td>Clams, Oysters &amp; Mussels</td>
<td>Shells open during cooking</td>
</tr>
<tr>
<td>Scallops</td>
<td>milky white or opaque &amp; firm</td>
</tr>
<tr>
<td>Leftovers &amp; Casseroles</td>
<td>165°F</td>
</tr>
</tbody>
</table>

See www.fightbac.org for free brochures, fact sheets, stickers, and other great stuff!
SEPARATE: Don’t cross-contaminate

Cross-contamination is how bacteria can be spread. When handling raw meat, poultry, seafood and eggs, keep these foods and their juices away from ready-to-eat foods. Always start with a clean scene—wash hands with warm water and soap. Wash cutting boards, dishes, countertops and utensils with hot soapy water.

- Separate raw meat, poultry, seafood and eggs from other foods in your grocery shopping cart, grocery bags and in your refrigerator.
- Use one cutting board for fresh produce and a separate one for raw meat, poultry and seafood.
- Never place cooked food on a plate that previously held raw meat, poultry, seafood or eggs.

COOK: Cook to proper temperatures

Food is safely cooked when it reaches a high enough internal temperature to kill the harmful bacteria that cause illness. Refer to the chart on the back of this brochure for the proper internal temperatures.

- Use a food thermometer to measure the internal temperature of cooked foods. Make sure that meat, poultry, egg dishes, casseroles and other foods are cooked to the internal temperature shown in the chart on the back of this brochure.
- Cook ground meat or ground poultry until it reaches a safe internal temperature. Color is not a reliable indicator of doneness.
- Cook eggs until the yolk and white are firm. Only use recipes in which eggs are cooked or heated thoroughly.
- When cooking in a microwave oven, cover food, stir and rotate for even cooking. Food is done when it reaches the internal temperature shown on the back of this brochure.

- Bring sauces, soups and gravy to a boil when reheating.

CHILL: Refrigerate promptly

Refrigerate foods quickly because cold temperatures slow the growth of harmful bacteria. Do not over-stuff the refrigerator. Cold air must circulate to help keep food safe. Keeping a constant refrigerator temperature of 40ºF or below is one of the most effective ways to reduce the risk of foodborne illness. Use an appliance thermometer to be sure the temperature is consistently 40ºF or below. The freezer temperature should be 0ºF or below.

- Refrigerate or freeze meat, poultry, eggs and other perishables as soon as you get them home from the store.
- Never let raw meat, poultry, eggs, cooked food or cut fresh fruits or vegetables sit at room temperature more than two hours before putting them in the refrigerator or freezer (one hour when the temperature is above 90ºF).
- Never defrost food at room temperature. Food must be kept at a safe temperature during thawing. There are three safe ways to defrost food: in the refrigerator, in cold water, and in the microwave. Food thawed in cold water or in the microwave should be cooked immediately.
- Always marinate food in the refrigerator.
- Divide large amounts of leftovers into shallow containers for quicker cooling in the refrigerator.
- Use or discard refrigerated food on a regular basis. Check USDA cold storage information at www.fightbac.org for optimum storage times.

BAC (foodborne bacteria) could make you and those you care about sick. In fact, even though you can’t see BAC—or smell him, or feel him—he and millions more like him may have already invaded the food you eat. But you have the power to Fight BAC®.

Foodborne illness can strike anyone. Some people are at a higher risk for developing foodborne illness, including pregnant women, young children, older adults and people with weakened immune systems. For these people the following four simple steps are critically important:

CLEAN: Wash hands and surfaces often

Bacteria can be spread throughout the kitchen and get onto hands, cutting boards, utensils, counter tops and food. To Fight BAC®, always:

- Wash your hands with warm water and soap for at least 20 seconds before and after handling food and after using the bathroom, changing diapers and handling pets.
- Wash your cutting boards, dishes, utensils and counter tops with hot soapy water after preparing each food item and before you go on to the next food.
- Consider using paper towels to clean up kitchen surfaces. If you use cloth towels wash them often in the hot cycle of your washing machine.
- Rinse fresh fruits and vegetables under running tap water, including those with skins and rinds that are not eaten.
- Rub firm-skin fruits and vegetables under running tap water or scrub with a clean vegetable brush while rinsing with running tap water.
Emergency Disinfection of Drinking Water

In times of crisis, local health departments may urge consumers to use more caution or to follow additional measures. If local public health department information differs from this advice, the local information should prevail.

When the home water supply is interrupted by natural or other forms of disaster, you can obtain limited amounts of water by draining your hot water tank or melting ice cubes. In most cases, well water is the preferred source of drinking water. If it is not available and river or lake water must be used, avoid sources containing floating material and water with a dark color or an odor.

When emergency disinfection is necessary, examine the physical condition of the water. Disinfectants are less effective in cloudy water. Filter murky or colored water through clean cloths or allow it to settle, and draw off the clean water for disinfection. Water prepared for disinfection should be stored only in clean, tightly covered, containers, not subject to corrosion.

There are two general methods by which small quantities of water can be effectively disinfected. One method is boiling. It is the most positive method by which water can be made bacterially safe to drink. Another method is chemical treatment. If applied with care, certain chemicals will make most water free from harmful or pathogenic organisms.

METHODS OF EMERGENCY DISINFECTION

Boiling: Vigorous boiling for one minute will kill any disease-causing microorganisms present in water (at altitudes above one mile, boil for three minutes). The flat taste of boiled water can be improved by pouring it back and forth from one container to another (called aeration), by allowing it to stand for a few hours, or by adding a small pinch of salt for each quart of water boiled.

Chemical treatment: When boiling is not practical, chemical disinfection should be used. The two chemicals commonly used are chlorine and iodine. Chlorine and iodine are somewhat effective in protecting against exposure to \textit{Giardia}, but may not be effective in controlling \textit{Cryptosporidium}. Therefore, use iodine or chlorine only to disinfect well water (as opposed to surface water sources such as rivers, lakes, and springs), because well water is unlikely to contain these disease causing organisms. Chlorine is generally more effective than iodine in controlling \textit{Giardia}, and both disinfectants work much better in warmer water.

CHLORINE METHODS

Chlorine Bleach: When boiling is not practical, chemical disinfection should be used. Common household bleach contains a chlorine compound that will disinfect water. The procedure to be followed is usually written on the label. When the necessary procedure is not given, find the percentage of available chlorine on the label and use the information in the following tabulation as a guide.

<table>
<thead>
<tr>
<th>Available Chlorine</th>
<th>Drops per Quart of Clear Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>10</td>
</tr>
<tr>
<td>4-6%</td>
<td>2</td>
</tr>
<tr>
<td>7-10%</td>
<td>1</td>
</tr>
</tbody>
</table>

(If strength is unknown, add ten drops per quart of water. Double amount of chlorine for cloudy or colored water or water that is extremely cold.)
The treated water should be mixed thoroughly and allowed to stand, preferably covered, for 30 minutes. The water should have a slight chlorine odor; if not, repeat the dosage and allow the water to stand for an additional 15 minutes. If the treated water has too strong a chlorine taste, it can be made more pleasing by allowing the water to stand exposed to the air for a few hours or by pouring it from one clean container to another several times.

**Granular Calcium Hypochlorite:** Add and dissolve one heaping teaspoon of high-test granular calcium hypochlorite (approximately 1/4 ounce) for each two gallons of water. The mixture will produce a stock chlorine solution of approximately 500 mg/L, since the calcium hypochlorite has an available chlorine equal to 70 percent of its weight. To disinfect water, add the chlorine solution in the ratio of one part of chlorine solution to each 100 parts of water to be treated. This is roughly equal to adding 1 pint (16 oz.) of stock chlorine to each 12.5 gallons of water to be disinfected. To remove any objectionable chlorine odor, aerate the water as described above.

**Chlorine Tablets:** Chlorine tablets containing the necessary dosage for drinking water disinfection can be purchased in a commercially prepared form. These tablets are available from drug and sporting goods stores and should be used as stated in the instructions. When instructions are not available, use one tablet for each quart of water to be purified.

**TINCTURE OF IODINE**

Common household iodine from the medicine chest or first aid kit may be used to disinfect water. Add five drops of 2 percent United States Pharmacopeia (U.S.P.) Tincture of iodine to each quart of clear water. For cloudy water add ten drops and let the solution stand for at least 30 minutes.

**IODINE TABLETS**

Commercially prepared iodine tablets containing the necessary dosage for drinking water disinfection can be purchased at drug and sporting goods stores. They should be used as stated. When instructions are not available, use one tablet for each quart of water to be purified.

**WATER TO BE USED FOR DRINKING, COOKING, MAKING ANY PREPARED DRINK, OR BRUSHING THE TEETH SHOULD BE PROPERLY DISINFECTED.**
Children respond to trauma in many different ways. Some may have reactions very soon after the event; others may seem to be doing fine for weeks or months, and then begin to show worrisome behavior. Knowing the signs that are common at different ages can help parents and teachers to recognize problems and respond appropriately.

**Preschool Age**

Children from age 1 to 5 find it particularly hard to adjust to change and loss. These youngsters have not yet developed their own coping skills, so they must depend on parents, family members, and teachers to help them through difficult times.

Very young children may regress to an earlier behavioral stage after a traumatic event. Preschoolers may resume thumb sucking or bedwetting or may become afraid of strangers, animals, darkness, or “monsters.” They may cling to a parent or teacher, or become very attached to a place where they feel safe.

Changes in eating and sleeping habits are common, as are unexplainable aches and pains.

**Early Childhood**

Children age 5 to 11 may have some of the same reactions as younger children. They may also withdraw from play groups and friends, compete more for the attention of parents, fear going to school, allow school performance to drop, become aggressive, or find it hard to concentrate. These children may also return to more childish behaviors, such as asking to be fed or dressed.

**Adolescence**

Children age 12 to 14 are likely to have vague physical complaints when under stress and may abandon chores, schoolwork, and other responsibilities they previously handled. Though they may compete vigorously for attention from parents and teachers, they may also withdraw, resist authority, become disruptive at home or in the classroom, or even begin to experiment with high-risk behaviors such as alcohol or drug use.
These young people are at a developmental stage in which the opinions of others are very important. They need to be thought of as “normal” by their friends and are less concerned about relating well with adults or participating in recreation or family activities they once enjoyed.

In later adolescence, teens may experience feelings of helplessness and guilt because they are unable to assume full adult responsibilities as the community responds to the disaster. Older teens may also deny the extent of their emotional reactions to the traumatic event.

How to Help

Reassurance is the key to helping children through a traumatic time. Very young children need a lot of cuddling, as well as verbal support. Answer questions about the disaster honestly, but don’t dwell on frightening details or allow the subject to dominate family or classroom time indefinitely. Encourage children of all ages to express emotions through conversation, drawing, or painting and to find a way to help others who were affected by the disaster.

Try to maintain a normal household or classroom routine and encourage children to participate in recreational activity. Temporarily reduce your expectations about performance in school or at home, perhaps by substituting less demanding responsibilities for normal chores.

Acknowledge that you too may have reactions associated with the traumatic event, and take steps to promote your own physical and emotional healing.

Tips for Talking to Children After a Disaster

- Provide children with opportunities to talk about what they are seeing on television and to ask questions.
- Don’t be afraid to admit that you can’t answer all their questions.
- Answer questions at a level the child can understand.
- Provide ongoing opportunities for children to talk. They will probably have more questions as time goes on.
- Use this as an opportunity to establish a family emergency plan. Feeling that there is something you can do may be very comforting to both children and adults.
- Allow children to discuss other fears and concerns about unrelated issues. This is a good opportunity to explore these issues also.
- Monitor children’s television watching. Some parents may wish to limit their child’s exposure to graphic or troubling scenes. To the extent possible, watch reports of the disaster with children. It is at these times that questions might arise.
- Help children understand that there are no bad emotions and that a wide range of reactions is normal. Encourage children to express their feelings to adults (including teachers and parents) who can help them understand their sometimes strong and troubling emotions.
Try not to focus on blame.

In addition to the tragic things they see, help children identify good things, such as heroic actions, families who are grateful for being reunited, and the assistance offered by people throughout the country and the world.

**When Talking Isn’t Enough**

For children closer to the disaster scene, more active interventions may be required.

- The family as a unit might consider counseling. Disasters often reawaken a child’s fear of loss of parents (frequently their greatest fear) at a time when parents may be preoccupied with their own practical and emotional difficulties.

- Families may choose to permit temporary regressive behavior. Several arrangements may help children separate gradually after the agreed-upon time limit: spending extra time with parents immediately before bedtime, leaving the child’s bedroom door slightly ajar, and using a nightlight.

- Many parents have their own fears of leaving a child alone after a disaster or other fears they may be unable to acknowledge. Parents are often more able to seek help on the children’s behalf and may, in fact, use the children’s problems as a way of asking for help for themselves and other family members.

- Teachers can also help children with art and play activities, as well as by encouraging group discussions in the classroom and informational presentations about the disaster.

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**Note:** Some of this information in this brochure was gathered from a brochure developed by Project Heartland—a project of the Oklahoma Department of Mental Health and Substance Abuse Services in response to the 1995 bombing of the Murrah Federal Building in Oklahoma City. Project Heartland was developed with funds from the Federal Emergency Management Agency in consultation with the Federal Center for Mental Health Services.