

# Guidelines for Prevention and Control of Upper and Lower Acute Respiratory Illnesses (including Influenza and Pneumonia) in Healthcare Settings

Maryland Department of Health and Mental Hygiene  
Office of Infectious Disease Epidemiology and Outbreak Response  
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## Introduction

Respiratory illness outbreaks are an important cause of illness and death. Many different agents can cause these outbreaks, including influenza. Outbreaks can include cases of cough or sore throat with fever and cases of pneumonia with or without fever. Influenza like illness (ILI), influenza, and pneumonia will be discussed.

The number of respiratory outbreaks often increases during the winter influenza season. In addition to influenza, other respiratory viruses, such as rhinovirus, parainfluenza, and respiratory syncytial virus (RSV) usually circulate around the same time and can cause outbreaks. (1)

People with medical conditions such as asthma, COPD, heart disease, diabetes, morbid obesity, neurologic disorders, developmental delays, and immune suppression are at high risk of influenza complications. (2) Young children, people over the age of 65, and pregnant women are also at increased risk. The prevention and rapid control of respiratory outbreaks in long term care facilities (LTCF) and other settings that include high risk individuals is important due to the elevated risk of severe disease in residents and patients of these facilities.

Pneumonia outbreaks can also cause severe disease and death in residents of long term care facilities and other facilities that serve high risk individuals. People over age 65 and those with underlying medical conditions are at increased risk of developing pneumonia. (3) Many diverse viral and bacterial agents can cause these outbreaks, such as influenza, *Streptococcus pneumoniae*, adenovirus and *Legionella*. Outbreaks caused by *Mycoplasma pneumoniae* sometimes occur among children and young adults in congregate settings. Prevention and control strategies for pneumonia outbreaks can vary depending on the etiology.

This document was written to provide guidance on the investigation of respiratory illness outbreaks in healthcare settings such as nursing homes, assisted living facilities, and hospitals. The recommendations in this document are intended to provide general guidance. Respiratory illness outbreaks should be evaluated on an individual basis, with the consultation of local and state public health professionals to determine the appropriate steps for prevention and control.

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## Disease description

**Mode of Transmission:** Agents that cause respiratory infections are generally spread by respiratory droplets, which are released from the mouth and nose by coughing, sneezing, singing, and talking, and by indirect contact with hands or objects contaminated with respiratory secretions. (4) Fecal-oral transmission also occurs with certain viruses that can cause respiratory illness. (5) Legionnaires' disease, a form of pneumonia, is caused by the inhalation of aerosolized water contaminated with *Legionella* bacteria.

### **Clinical Characteristics:**

Influenza illness in adults is characterized by the abrupt onset of respiratory and constitutional signs and symptoms, such as fever, cough, sore throat, nasal congestion, headache, muscle aches, and malaise.(6) Children more often also

experience ear infections, nausea, and vomiting. The illness usually lasts 3 to 7 days.(6) Complications of influenza can occur and lead to hospitalization or death. Influenza virus infections can cause viral pneumonia and lead to secondary bacterial pneumonia or contribute to co-infections with other viral or bacterial pathogens. They can also exacerbate underlying medical conditions such as lung or heart disease.

It is not possible to distinguish illness caused by influenza from illness caused by other respiratory viruses based on clinical presentation alone. Laboratory testing can help differentiate illness caused by influenza from that caused by other agents. (6)

Pneumonia can be a mild or severe illness. Signs and symptoms can include cough, shortness of breath, rapid breathing, chest pain, fever, fatigue, vomiting, and nausea. (3) The duration of symptoms can vary. Pneumonias are usually, though not always, detectable by radiographs such as chest X-rays or chest CT scans. In people who have abnormal chest X-rays at baseline, X-ray changes indicating pneumonia can sometimes be difficult to discern. And sometimes early in illness, the chest X-ray can appear normal, so a “negative” chest radiograph does not always rule out pneumonia.

**Incubation Period:** The average incubation period of influenza is 2 days (range: 1 to 4 days). The incubation periods of respiratory illness caused by other pathogens vary, (Table 1) but the incubation periods for viruses that cause respiratory illness are generally 1 to 10 days. (5)

Table 1. Incubation periods for agents that cause respiratory illness.

Agent	Incubation period, average	Incubation period, range	Period of communicability
Influenza	2 days <sup>(5)</sup>	1-4 days <sup>(5)</sup>	The day before onset until 5 to 10 days after onset. The amount of virus shed is highest during the first 3 to 5 days of symptoms. Children and people who are immunocompromised may shed virus for a longer time period. <sup>(6)</sup>
Parainfluenza virus	3-5 days <sup>(5)</sup>	2-7 days <sup>(7)</sup>	Most contagious during the early stage of illness <sup>(7)</sup> , but children with primary infection can shed virus up to 1 week before onset and up to 1 to 3 weeks after symptoms have ended. <sup>(8)</sup>
Respiratory syncytial virus (RSV) <sup>(8)</sup>	4-6 days	2 to 8 days	3 to 8 days, but can be 3 to 4 weeks in immunocompromised people
Human metapneumovirus	3-5 days <sup>(8)</sup>	Possibly up to 9 days <sup>(9)</sup>	1 to 2 weeks in healthy infants, can be weeks to months in immunocompromised people <sup>(8)</sup>
Rhinovirus <sup>(8)</sup>	2-3 days	Up to 7 days	Shedding is highest the first 2 to 3 days of infection and usually stops by 7 to 10 days, but can last up to 3 weeks.
<i>Strep pneumoniae</i> <sup>(5)</sup>	As short as 1 to 3 days	Unknown, infection can be preceded by asymptomatic carriage	No longer communicable within 24 hours after starting effective antibiotic therapy
<i>Legionella</i> <sup>(5)</sup>	5-6 days	2-10 days	Not communicable from person to person
<i>Mycoplasma pneumoniae</i>	2-3 weeks <sup>(8)</sup>	6-32 days <sup>(5)</sup>	Probably less than 20 days. Treatment reduces carriage but the organism can still persist. <sup>(5)</sup>

## Definitions and case classification

### 1) Clinical Case Definitions:

Influenza-like illness (ILI): A respiratory illness with a temperature of 37.8°C (100°F) or greater orally **PLUS cough or sore throat**.

Influenza: An illness with laboratory confirmation of influenza, regardless of signs and symptoms.

Pneumonia: A clinically compatible illness\*, **PLUS** a new X-ray finding of pneumonia or a new infiltrate that is not felt to be aspiration pneumonia. (10) Surveillance definitions of infections in LTCF: revisiting the McGeer criteria)

\*Signs and symptoms of pneumonia include a new or increased cough, increased sputum production, decreased oxygen saturation, increased respiratory rate, pleuritic chest pain, or new or changed abnormalities on auscultation of the lungs.

### 2) Outbreak Definitions:

An outbreak of ILI is defined as **three or more** clinically defined cases in patients/residents /staff (see above) in a facility within a 7 day period.

An outbreak of influenza is defined as **2 patients/residents /staff having onsets of ILI or pneumonia within 3 days of each other** and **at least one person has influenza confirmed by any test**.

An outbreak of pneumonia is defined as **two or more** cases of pneumonia in a ward/unit within a 7 day period.

Outbreaks can also consist of a combination of ILI, influenza, and pneumonia cases.

**All outbreaks should be reported immediately to your local health department (LHD).**

An outbreak is considered resolved when there have been no new onsets for 4 consecutive days, or as determined by the LHD.

## Testing/laboratory diagnosis

Several types of laboratory tests are used to help determine the cause of a respiratory illness outbreak. The types of tests requested for an outbreak depend on the setting and the presentations of the cases. In general, for cases of ILI, and pneumonia, the following tests are requested:

Table 2. Specimens and tests requested for respiratory illness outbreaks.

What to collect	Tests	Laboratory or place analyzed	Comment
<i>For all, ILI, and pneumonia outbreaks</i>			
Follow directions for the test kit	Rapid influenza test	Healthcare provider’s office, private or hospital laboratory	
Nasopharyngeal or throat swab	PCR influenza test	DHMH Laboratories Administration, sometimes private or hospital laboratories	Specimen can be used to test for other respiratory pathogens at DHMH by PCR and viral culture
<i>For patients with pneumonia</i>			
Chest radiography	Chest x-ray or CT	Nursing home, hospital, radiology center, healthcare provider’s office	
Sputum	Sputum Gram stain, regular bacterial culture, and Legionella culture*	Usually hospital or private laboratory	Can be sent to DHMH
Urine	Legionella urinary antigen test	Usually hospital or private laboratory	Can be sent to DHMH

\* Note that Legionella are not detected by routine clinical respiratory cultures and must be specially ordered

**Recommended steps for testing:**

**For PCR influenza testing at DHMH (11), (12):**

- Obtain viral throat swab kits or nasopharyngeal swab kits that include universal transport media (UTM) or viral transport media (VTM). Store kits at room temperature until the specimen has been collected. Kits are available from your LHD. LHDs should call DHMH Laboratories Administration, Specimen Mailing Assemblies (Outfit Room) at 410-767-6120 to obtain kits.
- Collect the specimen from the patient using the swabs. A nasopharyngeal swab or combined nasopharyngeal swab with oropharyngeal swab are the preferred specimens to be collected using the kits. An oropharyngeal swab or nasal swab is acceptable. For patients who are intubated, an endotracheal aspirate should also be collected. If kits are not available, only collect specimens using swabs with a synthetic tip (e.g. polyester or Dacron®) and an aluminum or plastic shaft. Swabs with cotton tips and wooden shafts are not recommended. Specimens collected with swabs made of calcium alginate are not acceptable. Nasal aspirates and washes are also acceptable if specimens are being collected without kits.
- Place the swab in the media. *Do not collect any specimens using expired media!*
- Break off the swab on the snap point on its shaft so that the swab fits in tube. Close the lid of the tube, making sure that it is securely screwed onto tube.
- Label specimen tube with patient’s name – exactly as it appears on the lab slip.
- Place the tube in a clear plastic biohazard bag.
- Fill out the lab slip, making sure to complete the submitter information box, patient name, outbreak number, date of birth, and date of collection.

- Place the lab slip in the secondary pouch on the outside of the clear plastic bag.
- Place assembled collection kits in refrigerator or cooler with cold gel packs until transport to the laboratory. Specimens can be kept refrigerated for up to 72 hours and should be shipped on ice packs.

**For Legionella urine antigen testing and sputum culture:**

Urine and sputum specimens should be collected in empty sterile containers and shipped on ice packs.

For detailed information on specimen submission, see the Guide to Public Health Laboratory Services <http://dhmh.maryland.gov/laboratories/docs/guide.pdf>

**Prevention of outbreaks (13), (14)**

**Facilities should maintain an infection control program.** The program should include surveillance for respiratory illnesses. Each LTCF must have a trained infection preventionist (IP), but it is advisable that assisted living facilities also have personnel who are trained and knowledgeable and/or have access to a knowledgeable IP consultant.

Each LTCF must maintain an effective infection control program that promotes the prevention of communicable diseases and covers the investigation and control of cases and outbreaks, as required by COMAR 10.07.02.21. Each LTCF must have at least one designated IP to be responsible for approving actions to prevent and control infections. The IP must have the proper education from an approved basic infection control training course in infection surveillance, prevention, and control. Currently approved basic courses are offered by the Beacon Institute and the Association for Professionals in Infection Control and Epidemiology (APIC). The LTCF IP collaborates with LHD and DHMH investigator(s) to control and prevent outbreaks, including respiratory illness outbreaks.

The IP routinely maintains records on the occurrence of fever and illness in residents and employees. Employees should report respiratory illness **in residents or staff** (as well as other acute illnesses such as diarrhea or vomiting) to the IP. Line list forms and questionnaires are available in the appendix.

It is recommended that assisted living facilities without staff trained and knowledgeable about infection prevention and control make arrangements to have access to an IP consultant who is knowledgeable about infection prevention in that setting. Infectious disease outbreaks in assisted living facilities cause employee call-outs, disruptions to the routines of residents, hospitalizations, and even deaths. An IP consultant can provide knowledge of infection prevention and control best practices and may help to prevent and mitigate outbreaks.

**Facilities should monitor influenza activity.**

- Facilities should establish mechanisms and policies by which staff are promptly alerted about increased influenza activity in the community, or if a case or outbreak of ILI, influenza, or pneumonia occurs within the facility.
- Open communication and collaboration with LHDs is recommended. Policies should include designations of specific persons within the healthcare facility (IP and possibly others) who are responsible for communication with public health officials and dissemination of information to staff.

**Facilities should maintain a vaccination program for residents/patients and staff.** All facilities should offer influenza vaccine to staff and residents annually. LTCF and assisted living facilities must offer influenza vaccine to staff annually (Health General Article §18-404) and should offer influenza and pneumococcal vaccine to eligible residents. Acute care facilities should offer influenza vaccine to staff every year and offer influenza and pneumococcal vaccine to eligible patients when appropriate.

- Facilities should actively promote vaccination and educate staff.
- Establish a standing order program (SOP) for the administration of pneumococcal and influenza vaccines to residents.
- If possible, all residents should receive inactivated influenza vaccine annually before influenza season, as soon as vaccine becomes available. Newly admitted residents should be offered vaccine as soon as possible after admission (Health General Article §18-404).
- All eligible residents of LTCFs should receive a dose of the 23-valent pneumococcal polysaccharide vaccine. (15) Certain individuals should receive a second dose 5 years after the first dose. More information is available at <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/ppv.pdf> “Pneumococcal Polysaccharide Vaccine What You Need to Know.”
- The pneumococcal vaccination and yearly influenza vaccination status of each current resident should be recorded in the resident’s chart and employee information should be recorded in the employee’s record.
- The IP **should** maintain a separate log or database documenting the vaccination status of each resident and employee. These methods will enable rapid identification of unvaccinated individuals in the event of an outbreak.

**Promote respiratory hygiene/ cough etiquette.** Respiratory hygiene and cough etiquette are steps people can take to help contain their respiratory secretions and reduce the chance of spreading pathogens that cause illness to others. Steps include covering the mouth and nose with a tissue while sneezing and coughing, throwing the tissue into the closest trash can after use, and performing hand hygiene using soap and water or alcohol based hand sanitizer after disposing of the tissue. (16) If tissues are not immediately available, people should cough and sneeze into their upper sleeves or elbows. Respiratory hygiene and cough etiquette can also include measures such as having people who are coughing stay at least 3 feet away from others and having them wear face masks while in common areas. Visual aids such as a “Cover Your Cough” poster can be used as reminders <http://www.cdc.gov/flu/protect/covercough.htm>

**Encourage frequent hand hygiene.** Hand hygiene should be performed before and after all patient/resident contact, contact with potentially infectious material, and before putting on and upon removal of gloves. Alcohol based hand sanitizer is an acceptable alternative to hand washing, as long as hands are not visibly soiled.

- Facilities should ensure that soap, paper towels, and alcohol based hand sanitizer are readily available throughout the facility, including at the entrance for use by visitors.
- Posters can be used to encourage hand washing.

**Use standard precautions at all times when caring for all residents/patients.** Standard precautions include the use of personal protective equipment such as gloves, gowns, eye and face protection when contact with excretions and secretions is anticipated.

- Additional information about standard precautions can be found in the CDC Healthcare Infection Control Practices Advisory Committee (HICPAC) guideline titled [Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, Guidelines for Preventing Healthcare-Associated Pneumonia and Guidelines for Hand Hygiene in Healthcare Settings Published 2002](#)  [495 KB, 56 pages]

**Screen visitors for signs of illness** before they enter the facility. Discourage people with signs of illness from visiting.

**Maintain an environmental cleaning regimen that includes regular cleaning and disinfection of frequently touched surfaces.** Use standard cleaning and disinfection procedures (e.g., using cleaners and water to pre-clean surfaces prior to applying disinfectants to frequently touched surfaces or objects for indicated contact times) and adhere to regular cleaning schedules. Standard procedures are adequate for influenza virus environmental control. Management of laundry, food service utensils, and medical waste should also be performed in accordance with standard procedures.

- Detailed information on environmental cleaning in healthcare settings can be found in CDC's [Guidelines for Environmental Infection Control in Health-Care Facilities](#) and [Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings \[section IV.F. Care of the environment\]](#).

**Employees should be trained in general infection control and in best practices for the prevention and control of respiratory illness outbreaks.** All staff should receive job- or task-specific education and training on preventing transmission of infectious diseases, including respiratory illnesses, on hire and on a regular schedule. Competency should be documented after each training session. A system should be in place to ensure that staff employed by outside employers meet these education and training requirements through programs offered by the outside employer or by participation in the facility's program.

- Key areas for training include:
  - Influenza signs, symptoms, complications, and risk factors for complications.
  - Central role of administrative controls such as vaccination, respiratory hygiene and cough etiquette, and sick leave policies.
  - Appropriate use of personal protective equipment.
  - Use of work practices including infection control procedures to reduce exposure.

**Track employee absences in order to detect ILI and influenza cases and outbreaks.**

- Promptly identify employees who may have ILI or influenza and ensure that they have access to medical consultation and, if necessary early treatment with antivirals.

**Non-punitive, flexible sick leave policies should be in place to prevent ill employees from spreading respiratory illness and other infectious diseases in the facility.**

- Policies and procedures should ensure the exclusion of employees with ILI or influenza for at least 24 hours after they no longer have a fever, without the use of fever-reducing medicines.
- Ensure that all staff, including staff who are not directly employed by the healthcare facility but provide essential daily services, are aware of the sick leave policies.

## **Management of cases of respiratory illness (Influenza, ILI, or pneumonia) (13), (14)**

### **Management of employees with respiratory illness: (14)**

- Employees with fever should stay home at least until they have not had fever for 24 hours without the use of fever-reducing medications such as acetaminophen (Tylenol®), aspirin, or ibuprofen (Advil® and Motrin®).
- Employees with respiratory illness and no fever should be evaluated for appropriateness of patient care duties. They may still have influenza, even if laboratory tests are negative.

- Employees who are coughing or sneezing and have no fever and remain at work should wear a facemask during patient/resident care activities, perform frequent hand hygiene, and adhere to respiratory hygiene and cough etiquette.

*For staff with pneumonia*

- The LHD should attempt to verify the diagnosis of pneumonia by obtaining chest x-ray results.
- Exclude from the facility until completion of first 48 hours of antibiotic therapy if given and until the employee does not have fever and symptoms have improved.
- Pneumonia in a healthcare worker resulting in hospitalization is a reportable condition under COMAR 10.06.01.03(b)(41-1).

**Management of residents/patients with respiratory illness:**

**Use standard and droplet precautions.**

**Droplet precautions should be implemented for residents/patients with suspected or confirmed influenza for 7 days after illness onset or until 24 hours after the resolution of fever and respiratory symptoms, whichever is longer.** In some cases, facilities may choose to apply droplet precautions for longer periods based on clinical judgment, such as in the case of severely immunocompromised patients, who may shed influenza virus for longer periods of time.

- **Staff should put on a facemask when entering the room of a resident/patient with suspected or confirmed influenza.** Remove the facemask when leaving the resident's room, dispose of the facemask in a waste container, and perform hand hygiene.
- Staff with severe or unstable chronic diseases who are at high risk of influenza complications should avoid performing aerosol-generating procedures on residents/patients with suspected or confirmed influenza. Those procedures should be done by staff who are not at high risk of flu complications while wearing appropriate PPE.

**Place symptomatic patients/residents in private rooms.** If a private room is not available, place (cohort) residents/patients suspected of having influenza with one another, **but do not move symptomatic residents/patients between units.** (13) **Often, keeping symptomatic residents/patients in their own rooms is the best choice** since private rooms are rarely available, and current roommates have already been exposed.

**Residents/patients with respiratory illness should stay in their rooms and out of common areas,** if possible. If a resident/patient under droplet precautions requires movement or transport outside of the room:

- Have the resident wear a facemask, if tolerated, and use respiratory hygiene and cough etiquette. The resident should perform hand hygiene often.
- Communicate information about residents/patients with respiratory illness to appropriate personnel who might come into contact with them, such as therapists or dialysis staff so that they can take appropriate precautions. Also notify receiving facilities and emergency medical personnel if a resident needs to be transferred while potentially infectious.

**Test for influenza and other pathogens as clinically appropriate.**

**Administer antiviral treatment and chemoprophylaxis to residents/patients and staff when appropriate.**

- **All residents/patients who have confirmed or suspected influenza should receive antiviral treatment immediately.** (13) Treatment should not wait for laboratory confirmation of influenza.
- Persons taking antiviral medications continue to shed influenza virus while on treatment. All control measures should continue during treatment.
- Refer to the CDC web site for the most current recommendations on the use of antiviral agents for treatment and chemoprophylaxis. <http://www.cdc.gov/flu/professionals/antivirals/>

**Physicians should use clinical judgment and laboratory results to determine other appropriate treatments for individuals with respiratory illness.**

**Discourage people visiting an ill resident/patient from spending time with other residents/patients during their visits.** Visitors should be instructed to limit their movement within the facility. Visitors who have been in contact with the ill resident are a possible source of influenza for other residents/patients, visitors, and staff.

**Provide instruction, before visitors enter residents'/patients' rooms, on hand hygiene, limiting surfaces touched, and use of personal protective equipment (PPE) according to current facility policy while in the resident's room.**

*For residents/patients with pneumonia:*

**Perform appropriate diagnostic testing to establish the diagnosis and to determine the cause of pneumonia.**

**Restrict the resident/patient with pneumonia to his or her room until completion of first 48 hours of antibiotic therapy if treated with antibiotics. If pneumonia is suspected to be caused by influenza or other respiratory viruses, follow the isolation recommendations for ILI, and influenza cases.**

**Report individual cases of pneumonia caused by organisms listed in COMAR 10.06.01.03 (e.g., *Legionella pneumophila*), to your LHD.**

**If the pneumonia is caused by *Streptococcus pneumoniae*, attempt vaccination of residents/patients who have previously waived pneumococcal vaccination.**

## **Outbreak investigation and management:** (13)

### **Outbreak of ILI, or Influenza:**

When an outbreak of ILI, or influenza is recognized in a facility, the control measures for a single case should be instituted immediately for each case. In addition, the following control measures should be implemented and maintained for the duration of the outbreak. **All outbreak control measures can be lifted when no new cases in residents/patients or staff have occurred for 4 consecutive days or as determined by the Health Officer.**

### **Report outbreaks to your LHD immediately.**

According to COMAR 10.06.01, all licensed healthcare providers and administrators of facilities must report outbreaks of diseases of public health importance including outbreaks as defined in these guidelines [COMAR]. A report should be made immediately within 24 hours to the LHD. Please contact your LHD for an emergency telephone number for use during non-business hours, weekends, and holidays in the event of an outbreak.

*Note: Outbreaks of respiratory illness where no patients/residents or staff have ILI, influenza, or pneumonia (i.e. colds) are not reportable to the LHD. The facility may call the LHD if consultation is needed.*

Your LHD will likely request the following information when you report an ILI, or pneumonia outbreak. Attempt to gather as much information as possible, but do not delay notification if this information is not available.

- Number of residents/patients and employees with symptoms of respiratory illness;
- Number of residents/patients and employees on the affected unit and in the facility;
- Signs and symptoms of cases;
- Date of onset of symptoms;
- Duration of illness;
- X-ray results if taken and applicable;
- Hospitalizations;
- Any deaths related to the outbreak;
- Lab results if available;
- Antiviral chemoprophylaxis and treatment if done;
- Outbreak control measures in place currently; and
- Vaccination rates

**Notify all staff and residents of the outbreak.**

**Conduct daily active surveillance until at least 1 week after the last case occurs. Active surveillance includes monitoring illness in residents/patients as well as staff. Keep track of illnesses using a line list (Appendix 2). Fill out the line list as completely as possible.**

- Examples of methods for conducting active daily surveillance include having the IP call each unit every day to ask about new onsets and status of previous cases and asking staff who call out if they are experiencing symptoms of respiratory illness.
- Update the line list daily and share it with the LHD every day during an outbreak.

**During outbreaks in non-acute care settings, new admissions are not allowed.** The Health Officer may allow new admissions to units that do not have symptomatic residents or staff, based on the progression of the outbreak. Readmissions are usually allowed, preferably to an unaffected area of the facility.

## **Testing:**

### **For all respiratory outbreaks:**

**Test for influenza by rapid test as soon as possible and by PCR at DHMH.** Collect specimens from 3 symptomatic persons for each type of test, if possible. However, there is no minimum required number of specimens for testing.

Influenza testing should occur when any resident has signs and symptoms that could be due to influenza (people with influenza do not always have fever), and especially when two or more residents/patients develop respiratory illness within 72 hours of each other. Testing should occur even if it is not influenza season.

- The following individuals are preferred candidates for PCR influenza testing at DHMH during an outbreak:
  - Residents/patients or staff with the most recent onsets.
  - Symptomatic persons from newly affected units.
  - Persons who develop acute respiratory illness symptoms more than 72 hours after beginning antiviral chemoprophylaxis.

- If a private laboratory is used, the facility should notify the LHD of the results as soon as possible. For ILI and pneumonia outbreaks, test for pathogens other than influenza as indicated clinically.

#### **For outbreaks that include pneumonia cases:**

Collect sputum for Gram stain, routine bacterial culture and for *Legionella* culture, and urine for *Legionella* urine antigen testing from 3 to 5 persons with chest x-ray confirmed pneumonia.

If legionellosis is diagnosed, contact your LHD for further recommendations.

#### **Antivirals:**

**Administer influenza antiviral treatment and chemoprophylaxis to residents and staff according to current CDC recommendations.**

**All well residents/patients in the entire facility (not just currently impacted wards), regardless of vaccination status, should receive antiviral chemoprophylaxis immediately when at least 2 residents are ill within 72 hours of each other and at least one resident has influenza confirmed by any test.** Antiviral chemoprophylaxis may also be recommended by your LHD under other circumstances, such as when influenza is suspected but testing cannot be done right away.

- Antiviral chemoprophylaxis can be offered to unvaccinated staff during all outbreaks and can be offered to all staff when the outbreak flu strain is suspected to not be a good match to the vaccine strain.
- Antiviral chemoprophylaxis should be given for a minimum of 2 weeks, and should continue for at least 7 to 10 days after the last onset of illness.
- Having preapproved orders from physicians and plans to obtain orders for antiviral medications on short notice can substantially expedite administration of antiviral medications.
- For more information on antivirals see:

[Recommended Dosage and Duration of Treatment or Chemoprophylaxis for Influenza Antiviral Medications.](http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm#dosage)  
<http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm#dosage>

[IDSA guidelines !\[\]\(e10db9d69cb0b265e01951fb48872059\_img.jpg\) !\[\]\(cdd97d15740254ace3c28b640982d102\_img.jpg\)](http://www.idsociety.org/uploadedFiles/IDSA/Guidelines-Patient_Care/PDF_Library/Infuenza.pdf) [http://www.idsociety.org/uploadedFiles/IDSA/Guidelines-Patient\\_Care/PDF\\_Library/Infuenza.pdf](http://www.idsociety.org/uploadedFiles/IDSA/Guidelines-Patient_Care/PDF_Library/Infuenza.pdf)

[CDC's influenza antiviral drugs page for health professionals.](http://www.cdc.gov/flu/professionals/antivirals/index.htm)  
<http://www.cdc.gov/flu/professionals/antivirals/index.htm>

- It is possible for flu viruses to become resistant to antiviral drugs. However, in most cases the benefits of using antivirals for treatment and prophylaxis far outweigh this risk. Be aware of the potential for the development of antiviral resistant viruses. Evidence might include failure to respond to therapy or worsening of symptoms while on therapy.
- Notify the health department if a resident becomes sick while on or after receiving antiviral chemoprophylaxis.

#### **Other control measures:**

**Limit the number of large group activities in the facility and consider serving all meals in resident/patient rooms if possible when the outbreak is widespread (involving multiple units of the facility).** Activities should be limited to the

smallest groups possible and be held within units. If the outbreak continues to spread or is severe, it may be necessary to cancel activities. Ill residents/patients should not participate in group activities.

**Limit traffic of staff and residents/patients between units and between affected and unaffected areas of the facility.**

- **Cohort staff-** Personnel should not go back and forth between areas of the facility with ill residents/patients and staff and areas of the facility that do not have ill residents/patients and staff. Staff should not float between units. Assign employees to care for the same group of patients each shift.
- **Do not allow movement of residents/patients between units.** Residents/patients should not be relocated to other units during an outbreak. They should not travel around the building for activities, dining, etc.

**Start visitor precautions.** Post signs to alert visitors that an outbreak is occurring (Appendix 1); advise visitors to refrain from visiting if they have respiratory symptoms or are at high risk of complications if they become ill. Have hand sanitizer and tissues available for visitors. A ban on visitors is not necessary. Visitors should be discouraged from visiting multiple residents/patients or traveling to more than one area of the facility.

**Administer influenza vaccine to unvaccinated residents/patients and staff.** For the latest information on influenza vaccination, see [CDC's seasonal influenza vaccination resources for health professionals page](#).

**Use Respiratory hygiene and cough etiquette.** Visual aids such as a "Cover Your Cough" poster can be used as reminders <http://www.cdc.gov/flu/protect/covercough.htm> In-services may help to remind and educate employees.

**Remind staff and residents/patients to increase hand hygiene during an outbreak.** Make sure that supplies for hand washing and hand sanitizer are readily available. In-services may help remind staff to be extra vigilant about hand hygiene.

**Adhere to routine cleaning procedures.** Cleaning of surfaces that are frequently touched, such as hand rails, elevator buttons, and door knobs may help prevent transmission. (14) Environmental staff should be made aware of the outbreak so that they can concentrate on cleaning these surfaces, especially if time or resources are limited. They should also protect themselves through frequent hand hygiene, respiratory etiquette, and vaccination.

**During pneumonia outbreaks, in addition to the recommendations made for the management of a single case with pneumonia, follow the recommendations listed above for all respiratory outbreaks.**

## Local Health Department (LHD) actions during an outbreak

### 1. Case Management

- Provide guidance to the facility IP.
- Liaison to DHMH for questions about laboratory testing, infection control, and any other topics of concern..

### 2. Outbreak Management

When an outbreak of ILI, influenza, or pneumonia is reported, the LHD will do the following:

- Review all submitted information about the outbreak
- Verify the existence and scope of an outbreak.
  - Verify that illnesses are not caused by non-infectious sources (e. g. aspiration pneumonia) and exclude anyone with such illnesses from the line list.
- Inform DHMH immediately, within 24 hours of outbreak recognition by calling OIDEOR, Division of Outbreak

Investigation, at 410-767-6700. When an outbreak is reported on a holiday or during the weekend, call the DHMH on-call pager.

- Obtain the following preliminary information before reporting an outbreak to Division of Outbreak Investigation. However, do not delay notification if not all information is available:
  - Reporting person's name, position, and phone number
  - Name of IP or other person coordinating the outbreak response at the facility and if trained at APIC or DHMH course in infection control
  - Name and address of the facility
  - Date of onset of first case
  - Suspect or confirmed disease (ILI, influenza or pneumonia)
  - Symptoms
  - Number of hospitalized cases and deaths
  - Number of resident and employee cases
  - Total number of residents/patients and employees in the facility
  - Number of residents/patients and employees in each affected unit
  - Types of control measures recommended to the facility
  - Any other pertinent information to the outbreak investigation
- Provide guidance to the facility with verbal and/or written control measures and educational materials, if needed.
- Coordinate specimen collection for testing.
  - LHD is responsible for filling out the lab slips, as well as handling and transporting specimens to DHMH. Please see the Testing/Laboratory Diagnosis section for more information.
- Communicate daily with facility IP. Review daily line lists. Update the designated DHMH outbreak investigator.
- When the outbreak is over, complete an Outbreak Summary Report (OSR) form for Respiratory Illnesses (Appendix 3) and submit it to DOOI within **2** months from the report date. If more than 10 cases were associated with an outbreak, attach an Epidemic Curve (Epi-curve) with the OSR. OSRs may be submitted by mail, fax, or e-mail.
- Send a copy of OSR to the affected facility. Document that this was done in the cc list at the end of the OSR.

## State Health Department (SHD) actions during an outbreak

### Outbreak Management

- At the time an outbreak is determined provide an outbreak number to the LHD.
- Provide information about CDC's current recommendations on vaccination, chemoprophylaxis, and/or antiviral treatment options as requested.
- Provide guidance to LHD on the management and analysis of epidemiological data, infection control practices, and environmental control procedures as needed.
- Act as liaison to the DHMH Laboratory Administration on inquiries about laboratory submission, testing procedures, and results.
- Become the lead investigator for multi-jurisdictional outbreaks.
- Notify other state and federal agencies if necessary.
- Find additional information and materials to assist in investigation.
- Assist the LHD and facility IP in the management and control of the outbreak if requested. This may include on-site assistance as approved by Division Chief of the Division of Outbreak Investigation.

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## **Appendix - Tools for long term care, assisted living, and health care facilities.**

### **Appendix 1: Sample visitor sign:**

# **We are experiencing an outbreak of Influenza/Pneumonia/Respiratory illness.**

- Only visit with the person you are here to see.
  - People going to different rooms and areas of the building can spread germs that cause illness.
- Use hand sanitizer or wash your hands before and after your visit.
- If the person you are visiting is sick, please check in at the nurse's station before entering the room.
- If you are sick, please do not visit today.
- People at high risk of severe illness if they become sick with influenza/pneumonia/respiratory illness should consider visiting at another time.
  - People at high risk include those with chronic medical conditions, young children, and adults over the age of 65.



**Appendix 3: Outbreak Summary Report**

**Office of Infectious Disease Epidemiology and Outbreak Response**

**Division of Outbreak Investigation**

**Outbreak Summary Report: RESPIRATORY ILLNESSES at a HEALTHCARE FACILITY**

DHMH Outbreak # \_\_\_\_\_

Facility Name \_\_\_\_\_ County \_\_\_\_\_

Circle facility type: Nursing home Assisted Living Other: \_\_\_\_\_

Illness \_\_\_\_\_ Date of Final Report \_\_\_\_\_

(NOTE: If there are several types of illnesses (e.g. pneumonia, ILI, etc.), please indicate the most prevalent illness in this outbreak—see DHMH Guidelines for definitions.)

**I. INTRODUCTION:**

Date outbreak reported to LHD \_\_\_\_\_

Who reported outbreak to LHD \_\_\_\_\_

Name of facility's IP \_\_\_\_\_ Has the IP taken a training course? Y N

Who at LHD conducted the investigation \_\_\_\_\_

Date infection control recommendations were given to facility by LHD \_\_\_\_\_

Date LHD reported outbreak to DHMH \_\_\_\_\_

Primary contact for outbreak at DHMH \_\_\_\_\_

**II. BACKGROUND:**

Total number of residents at facility \_\_\_\_\_

If outbreak was in one unit, number of residents in that unit \_\_\_\_\_

Total number of staff at facility \_\_\_\_\_

If outbreak was in one unit, number of staff in that unit \_\_\_\_\_

Influenza vaccination coverage rate among residents \_\_\_\_\_ (express as a fraction or %)

Pneumococcal vaccination coverage rate among residents \_\_\_\_\_ (express as a fraction or %)

Influenza vaccination rate among staff \_\_\_\_\_ (express as a fraction or %)

**III. CLINICAL RESULTS:**

**RESIDENTS:**

# of cases (TOTAL\*) \_\_\_\_\_

# with lab-confirmed influenza \_\_\_\_\_

# with ILI \_\_\_\_\_

# with pneumonia \_\_\_\_\_

# of hospital admissions \_\_\_\_\_

# of ER visits \_\_\_\_\_

# of deaths related to outbreak \_\_\_\_\_

\*Total = number with ILI, influenza, or pneumonia.

**STAFF:**

# of cases (TOTAL\*) \_\_\_\_\_

# with lab-confirmed influenza \_\_\_\_\_

# with ILI \_\_\_\_\_

# with pneumonia \_\_\_\_\_

# of hospital admissions \_\_\_\_\_

# of ER visits \_\_\_\_\_

# of deaths related to outbreak \_\_\_\_\_

Onset date range for entire facility, i.e. residents and staff (first to last) \_\_\_\_\_

Onset date range for residents only (first to last) \_\_\_\_\_

Onset date range for staff only (first to last) \_\_\_\_\_

*-Please attach an epi curve*

Duration of symptoms for cases: shortest: \_\_\_\_\_ longest: \_\_\_\_\_ median: \_\_\_\_\_

Was the outbreak limited to one floor or wing? YES NO  
 If YES, please list floor/wing # and/or name \_\_\_\_\_

Were antivirals (e.g. oseltamivir) given as part of this outbreak? YES NO  
 If YES, please list which antiviral(s) \_\_\_\_\_

Which categories of individuals received antivirals? (circle)  
 Residents with lab confirmed influenza Residents with ILI or other respiratory illness  
 All well residents Some well residents  
 Ill staff Well staff  
 Other: \_\_\_\_\_  
 Duration of antiviral prophylaxis: \_\_\_\_\_

**Symptom frequency for cases:**

**Residents:**

Symptom	Number with Symptom
Fever	
Cough	
Sore Throat	
Runny Nose	
Congestion – Nasal	
Congestion - Chest	
Shortness of breath	
Muscle Aches	
Vomiting	
Diarrhea	

**Staff:**

Symptom	Number with Symptom
Fever	
Cough	
Sore Throat	
Runny Nose	
Congestion – Nasal	
Congestion - Chest	
Shortness of breath	
Muscle Aches	
Vomiting	
Diarrhea	

If symptom frequency is unavailable, please list predominant symptoms of this outbreak.  
 \_\_\_\_\_

**IV. RADIOLOGY AND LABORATORY RESULTS:**

	Number performed	Number positive
Chest X-ray (CXR)		

Please provide any notes relating to findings of any positive CXRs \_\_\_\_\_  
 \_\_\_\_\_

Test	Number Collected	Number Positive	Agent identified
PCR for influenza (Viral throat or NP swab)			
Rapid influenza test			
Bacterial sputum culture			
<i>Legionella</i> urine antigen			
<i>Legionella</i> culture			
Blood culture			
Other _____			

**V. CONCLUSION(S):** (Please complete *either* #1a or #1b, and #2-6)

1a. Please list the lab-confirmed etiology of the outbreak \_\_\_\_\_

Is the above etiologic agent consistent with the observed course of this outbreak?

YES

NO

UNKNOWN

1b. If an etiology was not lab-confirmed, the etiology of the outbreak is believed to be:

\_\_\_\_\_

Briefly, the evidence for this conclusion includes: \_\_\_\_\_

\_\_\_\_\_

2. How do you think the outbreak was initiated?

\_\_\_\_\_

3. Please describe changes (if any) in infection control practices at the conclusion of the outbreak.

\_\_\_\_\_

\_\_\_\_\_

4. Was a site visit done? YES NO Date: \_\_\_\_\_

Observations made during the visit:

\_\_\_\_\_

\_\_\_\_\_

5. What recommendations were issued at the beginning and conclusion of the outbreak investigation?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Were admissions to the facility restricted? YES NO

Entire facility Dates restricted: \_\_\_\_\_ to \_\_\_\_\_ Unit: \_\_\_\_\_ Dates restricted: \_\_\_\_\_ to \_\_\_\_\_

Unit: \_\_\_\_\_ Dates restricted: \_\_\_\_\_ to \_\_\_\_\_ Unit: \_\_\_\_\_ Dates restricted: \_\_\_\_\_ to \_\_\_\_\_

Unit: \_\_\_\_\_ Dates restricted: \_\_\_\_\_ to \_\_\_\_\_ Unit: \_\_\_\_\_ Dates restricted: \_\_\_\_\_ to \_\_\_\_\_

6. Please note any other pertinent information.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

CC LIST \_\_\_\_\_

\_\_\_\_\_

LTCF Official: \_\_\_\_\_ Date Sent: \_\_/\_\_/\_\_

**Appendix 4: Respiratory illness questionnaires for employees and residents**

**Respiratory Illness Employee Questionnaire**

---

Please fill out this questionnaire as completely as possible. You do not have to answer any question that you do not want to answer.

Name: \_\_\_\_\_ Sex: \_\_\_\_\_ Age: \_\_\_\_\_

Your department:      Nursing      Dietary      Housekeeping      Laundry Facilities  
Maintenance      Other: \_\_\_\_\_

Unit(s), floor(s), or area(s) of the building where you work: \_\_\_\_\_

Have you had a flu vaccine this season?      yes       no

Have you had any symptoms of respiratory illness?      yes       no       If yes,

Date of onset: \_\_\_\_\_      Duration of symptoms: \_\_\_\_\_

Did you miss work because of these symptoms?      yes       no       Dates: \_\_\_\_\_

Signs and symptoms:

Fever:      yes       no

Highest temp. \_\_\_\_\_

Cough:      yes       no

Sore throat:      yes       no

Runny nose:      yes       no

Nasal congestion:      yes       no

Chest congestion:      yes       no

Muscle aches:      yes       no

Vomiting:      yes       no

Diarrhea      yes       no

Chills:      yes       no

Headache:      yes       no

Other: \_\_\_\_\_

Did you go to a health care provider for these symptoms?      yes       no

If yes,

What was the physician's diagnosis? \_\_\_\_\_

What was the prescribed treatment? \_\_\_\_\_

Comments:

---

To prevent the spread of illness to others, staff should not return to work until 24 hours after fever has resolved without the use of medications that reduce fever, such as Tylenol® or Advil®.

Today's date: \_\_\_\_\_

Thank you for your cooperation.

# Respiratory Illness Resident Questionnaire

---

Name: \_\_\_\_\_ Sex: \_\_\_\_\_ Age: \_\_\_\_\_  
Unit: \_\_\_\_\_ Room number: \_\_\_\_\_

## Vaccines:

Influenza: Date given: \_\_\_\_\_ or  refused  
Pneumococcal: Date given: \_\_\_\_\_ or  refused

## Symptoms:

Date and shift of onset: \_\_\_\_\_ Duration of symptoms: \_\_\_\_\_

Fever: <input type="checkbox"/>	Muscle aches: <input type="checkbox"/>
Highest temp. _____	Vomiting: <input type="checkbox"/>
Cough: <input type="checkbox"/>	Diarrhea: <input type="checkbox"/>
Sore throat: <input type="checkbox"/>	Chills: <input type="checkbox"/>
Runny nose: <input type="checkbox"/>	Headache: <input type="checkbox"/>
Nasal congestion: <input type="checkbox"/>	Other: _____

ER visit for these symptoms:  ER visit Date: \_\_\_\_\_  
Hospitalization:  Dates \_\_\_\_\_ to \_\_\_\_\_

## Labs and tests:

Test	date	result
Chest x-ray		
PCR for influenza (throat or NP swab usually sent to health dept.)		
Rapid flu		
Gram stain of sputum		
Sputum culture		
<i>Legionella</i> urine antigen test		
Blood culture		
Other: _____		

## Treatments:

Oseltamivir or other antiviral  Dates: \_\_\_\_\_ to \_\_\_\_\_  
Antibiotic  Dates: \_\_\_\_\_ to \_\_\_\_\_ Name of antibiotic: \_\_\_\_\_  
Other: \_\_\_\_\_

Comments: \_\_\_\_\_

Today's date: \_\_\_\_\_  
Person completing this form: \_\_\_\_\_