Tips for Applying CDC’s Infection Surveillance Guidance in Long-term Care Facilities (LTCF)

This summary of surveillance tips may be useful for infection preventionists (IPs) applying infection surveillance definitions to resident conditions. The Centers for Disease Control and Prevention (CDC), along with experts in long-term care, developed a national standard for infection surveillance in LTCF entitled, *Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria* (Stone et al., 2012), which defines the resident symptoms and other clinical criteria that are used to meet infection surveillance definitions. Infection surveillance definitions are essential for consistently monitoring infections over time and to determine where infection prevention efforts are needed. A log or linelist can help organize information about resident infections.

Infection Linelist

The linelist should be monitored and updated regularly to identify clusters, outbreaks, and other unusual infection patterns. Infection cues that an IP can use to determine whether a resident may have an infection include:

- Antibiotic starts; while this can be a helpful trigger for tracking possible infections, it is not enough information to determine if an infection is present or the type of infection.
- Residents’ signs and symptoms of infection: nursing personnel’s recognition, assessment, documentation, and communication of resident symptoms impact the IP’s ability to apply infection surveillance definitions, as they are based on specific symptom criteria.

Criteria needed to meet standardized infection definitions

Clinical information

Infection surveillance definitions require clear, descriptive symptom documentation. See the table below for examples.

<table>
<thead>
<tr>
<th>Less descriptive symptom documentation</th>
<th>More descriptive symptom documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Specific temperature reading (e.g. 100.1˚F)</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>Respiratory rate, oxygen saturation</td>
</tr>
<tr>
<td>Cough</td>
<td>Dry cough; productive cough</td>
</tr>
</tbody>
</table>

- If multiple symptoms are present, the onset date of each symptom should be noted.
- Many infection definitions require a change from baseline (e.g. symptom is new or increasing). Consider establishing a protocol for determining and documenting baseline values.
- If symptoms documented on the linelist suggest a potential infection, an IP should complete a worksheet to determine if infection surveillance criteria have been met (see Appendix X).
- Infection surveillance definitions should not be based on a single piece of evidence; clinical presentation and microbiologic/radiologic evidence must be considered if available.

Sources of resident data

- Sources of resident data are often documented in a variety of locations (e.g. electronic medical record progress notes, paper logs, 24-hour board). Ensure all relevant data sources are reviewed for evidence of resident infection.

Device use

- Clearly document the presence of urinary catheters. Note that CDC surveillance definitions for urinary tract infections (UTI) are different for residents with urinary catheters compared to those without.
Microbiology cultures

- The microorganism species and colony counts from urine cultures should be included on a UTI linelist, as CDC UTI definitions use different parameters based on the method of urine specimen collection:
  - At least $10^5$ colony-forming units (cfu)/mL of no more than 2 species of microorganisms in a voided urine sample
  - At least $10^2$ cfu/mL of any number of organisms in a urine sample collected by in-and-out catheter
  - At least $10^5$ cfu/mL of any organism(s) in a urine sample collected by an indwelling urinary catheter

Criteria not used to meet standardized infection surveillance definitions

Some changes in resident status, including signs and symptoms, have historically been included on infection linelists, because they were thought to be indicative of a potential infection. The updated infection surveillance definitions are largely based on symptoms localizing to a specific body system (e.g. urinary tract, respiratory tract) or site (e.g. ear, skin). The examples below illustrate change in resident status documentation that should not be used to meet infection surveillance definitions.

- **Behavior and mental status changes.** While behavior and mental status changes can be important health indicators that require evaluation and follow-up, mental status changes without additional clinical symptoms will not meet infection surveillance definitions.

- **Falls.** A resident experiencing falls should be evaluated and interventions to promote safety implemented, but published studies indicate that a resident fall without additional signs or symptoms of infection is not included as a criterion that meets infection surveillance definitions (Stone et al. 2012).

- **Foul-smelling urine.** Malodorous urine can be caused by several factors, including dehydration, diet, medication, or the presence of specific bacteria. Foul-smelling urine alone does not indicate the presence of UTI as described in the CDC infection surveillance definition.

- **History of UTI.** Knowledge of a resident’s UTI history may be helpful when making care decisions (e.g. teaching regarding perineal hygiene). However, a resident’s current clinical signs and symptoms should be considered when assessing for a UTI.

- **Positive urinalysis (UA) or urine culture (UC).** Urine does not typically contain bacteria, yeast, or white blood cells (pus or pyuria) in younger, healthy people. However, bacteria and pus are frequently found in the urine of elderly and debilitated people due to increased age, chronic disease, functional impairment, invasive devices, dehydration, and other risk factors. A positive UA or UC in the absence of other clinical symptoms of UTI does not meet the CDC infection surveillance definitions.

Keep in mind that infection surveillance definitions are different than criteria used for clinical decision-making. According to CDC, “the criteria that define infections for surveillance purposes were selected to increase the likelihood that the events captured by application of the definitions are true infections. Presentations of infection in older residents of LTCFs may be atypical, so failure to meet surveillance definitions may not fully exclude the presence of infection.”

For additional resources for infection surveillance in LTCF, visit the CDC website for long-term care facilities at:

http://www.cdc.gov/longtermcare/staff.html


Available at: http://www.jstor.org/stable/10.1086/667743
An example of control techniques (by level). Each circumstance will vary. UNIT(s) affected_________

Outbreak Illness Control Plan: Date of Start of Control Plan: ________________________________

RESIDENT/PATIENT
☐ Identify symptoms in resident/patient/personnel
☐ Take resident/patient temperatures twice a day to establish baseline and quickly identify fever.
☐ Residents/patients who show symptoms should be placed in Transmission-based Precautions. The healthcare personnel who discover symptoms may place patients in Precautions temporarily until order is received.
☐ Appropriate isolation precautions will be utilized. (Droplet/Contact Precautions will be considered). If there is more than one confirmed strain of virus circulating, or the cause of the outbreak is unknown, Droplet/Contact Precautions should be utilized.
☐ Supervisors will notify Infection Preventionist at: (email/phone) __________________________
☐ Ill residents/patients should stay in their room or apartment, unless transport is necessary, in which case they should wear a surgical/procedure mask.
☐ Contact Primary Healthcare Providers and work with department of public health.
☐ Antivirals and antibacterial agents should be used in a manner consistent with CDC recommendations and applicable law.
☐ Employee PPE use (Droplet/Contact Precautions) may be done without an order.

PERSONNEL
☐ All employees should promptly notify supervisor of any symptoms of respiratory illness in themselves, or individuals in their care. Employees who are ill will exclude themselves from work environments and will seek the advice of their healthcare providers.
☐ Staff may utilize extended use techniques with masks and goggles when caring for resident.
☐ Do not wear PPE off affected units and areas unless directed as an enhanced control measure.

UNIT/AREA CONTROL: Units and areas symptoms (fever, sore throat, headache, respiratory/gastrointestinal symptoms, aches and pains)
☐ Main unit entry doors should remain closed. Sign should be placed on area doors explaining that there is a respiratory/gastrointestinal illness, and traffic should be limited.
☐ Therapists to do in-room therapy
☐ Individual activities only. Work with Life Enrichment Department.
☐ Limit residents/clients to beauty shop. Limit transport of residents/clients to Beauty Shop. Wash hair in shower.
☐ Limit residents/clients mingling with others.
☐ Limit Volunteer traffic and activity
☐ Limit/restrict intergenerational activities and those with community participants.

FACILITY CONTROL
☐ Infection Preventionist will contact department of public health
☐ Send letter out to all families (in consultation with Corporate Communications) describing control plan to prevent the spread of respiratory illness/gastroenteritis.
☐ Essential visitors only if there is sustained transmission of respiratory/gastrointestinal illness on a unit. Families are essential visitors, but will be screened before entry, and should be encouraged to wear a mask while on the unit.
☐ Nasal/pharyngeal swab for influenza, RSV, viral panel or prevailing respiratory consideration
☐ This action plan will cease when the infection rate has returned to a situation of no new targeted infections in 10 days.

Comments:

RESTRICTIONS LIFTED (Date)________SIGNED____________________________________________
An example of control techniques (by level). Each circumstance will vary. UNIT(s) affected__________

Outbreak Illness Control Plan: Date of Start of Control Plan: ________________________________

RESIDENT/PATIENT

☐ Identify symptoms in resident/patient/personnel.
☐ Residents/patients who show symptoms should be placed in Transmission-based Precautions. The healthcare personnel who discover symptoms may place patients in Precautions temporarily until order is received.
☐ Appropriate isolation precautions will be utilized. (Droplet/Contact Precautions will be considered). If there is more than one confirmed strain of virus circulating, or the cause of the outbreak is unknown, Droplet/Contact Precautions should be utilized.
☐ Supervisors will notify Infection Preventionist at:(email/phone) __________________________
☐ Ill residents/patients should stay in their room or apartment, unless transport is necessary, in which case, they should wear a surgical/procedure mask.
☐ Document resident/patient education.
☐ Contact Primary Healthcare Providers and work with department of public health.
☐ Consider nasal/pharyngeal swab for influenza, RSV, viral panel or prevailing respiratory or gastrointestinal symptoms.
☐ Antivirals and antibacterial agents should be used in a manner consistent with CDC recommendations and applicable law.
☐ Take unit resident/patient temperatures twice a day to establish baseline and quickly identify fever.

PERSONNEL

☐ All personnel should promptly notify supervisor of any symptoms of respiratory illness in themselves, or individuals in their care. Personnel who are ill will exclude themselves from work environments and will seek the advice of their healthcare providers. Consider screening personnel with daily temperatures.
☐ Do not rotate or “float” staff off the affected unit.
☐ Personnel may utilize extended use techniques with masks and goggles when caring for residents.
☐ Personnel should not wear PPE off affected units and areas unless directed as an enhanced control measure.
☐ Start interdisciplinary cleaning/disinfecting (ensure competency of IDT with product) of all frequently touched surfaces every 1-2 hours and as needed with appropriate cleaner/disinfectant.

UNIT/AREA CONTROL: Units and areas symptoms (fever, sore throat, headache, respiratory/gastrointestinal symptoms, aches and pains)

☐ Main unit entry doors should remain closed. Sign should be placed on area doors explaining that there is a respiratory/gastrointestinal illness, and traffic should be limited.
☐ Ensure appropriate supplies of personal protective equipment (PPE) and cleaner/disinfectant.
☐ Actively look for other people with similar symptoms.
☐ In-room therapy and meals.
☐ Individual activities only. Work with Life Enrichment department. Limit/restrict intergenerational activities and volunteers and community participants.
☐ Limit/restrict transport of residents/clients to Beauty Shop. Wash hair in shower if appropriate.
☐ Limit Volunteer traffic.

FACILITY CONTROL

☐ Infection Preventionist will contact department of public health.
☐ Send letter out to all families (in consultation with Corporate Communications) describing control plan to prevent the spread of respiratory illness/gastroenteritis.
☐ Essential visitors only if there is sustained transmission of respiratory/gastrointestinal illness on a unit. Families are essential visitors, screen before entry, and encourage to wear a mask while on the unit.

This action plan will cease when the infection rate has returned to a situation of no new targeted infections in 10 days.
Comments:

RESTRICTIONS LIFTED (Date)________SIGNED __________________________________________
An example of control techniques (by level). Each circumstance will vary. UNIT(s) affected____________

Outbreak Illness Control Plan: Date of Start of Control Plan: ________________________________

☐ Identify symptoms in resident/patient/personnel.
☐ Residents/patients who show symptoms should be placed in Transmission-based Precautions. The healthcare personnel who discover symptoms may place patients in Precautions temporarily until order is received.
☐ Appropriate isolation precautions will be utilized. (Droplet/Contact Precautions will be considered). If there is more than one confirmed strain of virus circulating, or the cause of the outbreak is unknown, Droplet/Contact Precautions should be utilized.
☐ Ensure appropriate supplies of personal protective equipment (PPE) and cleaner/disinfectant.
☐ Start interdisciplinary cleaning/disinfecting (ensure competency of IDT with product) of all frequently touched surfaces every 1-2 hours and as needed with appropriate cleaner/disinfectant.
☐ Document resident/patient education.
☐ All personnel should promptly notify supervisor of any symptoms of respiratory illness in themselves, or individuals in their care. Personnel who are ill will be sent home, and will exclude themselves from work environments and will seek the advice of their healthcare providers if requested.
☐ Actively look for other people with similar symptoms.
☐ Do not rotate or “float” staff off the affected unit.
☐ Supervisors will notify Infection Preventionist at:(email/phone) __________________________
☐ Infection Preventionist will contact department of public health.
☐ Ill residents/patients should stay in their room or apartment, unless transport is necessary, in which case, they should wear a surgical/procedure mask.
☐ Contact Primary Healthcare Providers for orders. and work with department of public health.
☐ Consider nasal/pharyngeal swab for influenza, RSV, viral panel or prevailing respiratory consideration, or stool cultures for gastroenteritis.
☐ Antivirals and antibacterial agents should be used in a manner consistent with CDC recommendations and applicable law.
☐ Main unit entry doors should remain closed. Sign should be placed on area doors explaining that there is a respiratory/gastrointestinal illness, and traffic should be limited.
☐ Send letter out to all resident, patients, families (in consultation with Corporate Communications) describing control plan to prevent the spread of respiratory illness/gastroenteritis.
☐ Essential visitors only if there is sustained transmission of respiratory/gastrointestinal illness on a unit. Families are essential visitors, but will be screened before entry, and should be encouraged to wear a mask while on the unit.
☐ Take resident/patient temperatures twice a day on entire unit to establish baseline and quickly identify fever. Consider screening personnel every shift.
☐ Staff may utilize extended use techniques with masks and goggles when caring for residents.
☐ Do not wear PPE off affected units and areas unless directed as an enhanced control measure.
☐ In-room therapy and meals.
☐ Individual activities only. Work with Life Enrichment Department.
☐ Limit/restrict transport of residents/clients to Beauty Shop. Wash hair in shower if appropriate.
☐ Limit/restrict Volunteer traffic and activity
☐ Limit/restrict intergenerational activities and those with community participants.

This action plan will cease when the infection rate has returned to a situation of no new targeted infections in 10 days.

Comments:

RESTRICITONS LIFTED (Date)_________SIGNED_____________________________________________
### Infection Criteria Checklist

*Please check symptoms and lab results*

<table>
<thead>
<tr>
<th>Resident: _____________________________</th>
<th>Room #: ___________</th>
<th>Date: ___________</th>
</tr>
</thead>
</table>

#### Urinary Tract Infection WITHOUT indwelling catheter

**AT Least ONE of the following must be present With a fever and/or leukocytosis. IF NO fever OR leukocytosis then two or more must be present:**
- [ ] Painful urination or acute pain
- [ ] Swelling of testes or prostate
- [ ] New or increase in frequency
- [ ] New or increase urgency
- [ ] New/Increase incontinence
- [ ] New flank pain or tenderness
- [ ] Supra-pubic pain
- [ ] Gross hematuria

If the above criteria are met, then ONE of the following microbiological must also be met.
- [ ] Clean catch sample $10^6$ organisms/ml (100,000) of no more than 2 organisms
- [ ] Straight cath $10^2$ organisms/ml (100) of any organism

#### Urinary Tract Infection WITH indwelling catheter

**AT Least ONE of the following must be present with no other sign of infection:**
- [ ] Fever
- [ ] Rigors
- [ ] New onset hypotension
- [ ] Change in mental status or functional decline (with no alternate diagnosis and leukocytosis)
- [ ] New flank pain or tenderness
- [ ] Supra-pubic pain
- [ ] Purulent discharge from around the catheter
- [ ] Acute pain Swelling of testes or prostate

If the above criteria are met, then ONE of the following microbiological must also be met.

**Any of the following:**

**If catheter removed within past 2 calendar days:**
- Clean catch (voided) urine culture with 100,000 or more colonies ($\geq 10^5$ CFU/ml) of no more than 2 species of microorganisms
- In/Out catheter urine culture with 100 or more colonies ($\geq 10^3$ CFU/ml) of any number of microorganisms

**If indwelling urinary catheter in place:**
- Positive urine culture with 100,000 colonies or more ($\geq 10^5$ CFU/ml) of any number of microorganisms

---

#### Respiratory / Common Cold Syndromes / Pharyngitis:

*Resident must have TWO new signs or symptoms:*
- [ ] Runny nose, sneezing, stuffy nose (congestion)
- [ ] Dry cough
- [ ] Swollen or tender glands in neck
- [ ] Sore throat, hoarseness, or difficulty swallowing

#### Pneumonia or lower respiratory.

*MUST HAVE ONE of the following:*
- [ ] Fever
- [ ] Leukocytosis
- [ ] New onset confusion
- [ ] New onset functional decline

**If YES, then Chest X-ray with new infiltrate or pneumonia and with at least one of the following:**
- [ ] New or increased cough
- [ ] New or increased O$_2$ sat < 94% on room air or > 3% of baseline
- [ ] New or changed lung sounds
- [ ] Pleuritic chest pain
- [ ] Respiratory rate > 25
Infection Criteria Checklist

*Please check symptoms and lab results*

<table>
<thead>
<tr>
<th>Cellulitis/Soft Tissue/Wound Infection at least ONE criteria must be present:</th>
<th>Herpes Simplex and Zoster TWO criteria must be present</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Pus at wound, skin, or soft tissue site plus FOUR of the following:</td>
<td>- A vesicular rash</td>
</tr>
<tr>
<td>- Fever (&gt;38°C/100°F)</td>
<td>- Diagnosis by MD</td>
</tr>
<tr>
<td>- New onset confusion</td>
<td>- Laboratory confirmation</td>
</tr>
<tr>
<td>- Leukocytosis</td>
<td></td>
</tr>
<tr>
<td>- At the site of infection</td>
<td></td>
</tr>
<tr>
<td>- Heat</td>
<td></td>
</tr>
<tr>
<td>- Redness</td>
<td></td>
</tr>
<tr>
<td>- Swelling</td>
<td></td>
</tr>
<tr>
<td>- Tenderness or pain</td>
<td></td>
</tr>
<tr>
<td>- Serous drainage</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conjunctivitis resident must have ONE criteria present:</th>
<th>Fungal Oral/Perioral and Skin Infections for all TWO criteria must be present:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Pus from one or both eyes for at least 24 hours</td>
<td>- Oral candidiasis</td>
</tr>
<tr>
<td>- New or increased conjunctival redness, with or without</td>
<td>- Presence of raised white patches on inflamed mucosa</td>
</tr>
<tr>
<td>- Itching new or increased pain, for at least 24 hours</td>
<td>- Plaques on oral mucosa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gastroenteritis Infections</th>
<th>Clostridium difficile resident must have one criteria present:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastroenteritis resident must have ONE criteria present:</td>
<td>- Diarrhea: with three or more liquid/watery stools above resident baseline in a 24 hour period</td>
</tr>
<tr>
<td>- Diarrhea: with three or more liquid/watery stools above resident baseline in a 24 hour period</td>
<td>- Presence of toxic megacolon (abnormal dilation of the large bowel, documented radiology** AND ONE OF**</td>
</tr>
<tr>
<td>- Vomiting with two or more episodes in a 24 hour period</td>
<td>- A C-diff positive stool specimen + by PCR, or toxin test</td>
</tr>
<tr>
<td>- A stool culture positive for Salmonella, Shigella, shiga-toxin</td>
<td>- Pseudomembranous colitis is identified during endoscopic exam or surgery, or in histopathologic exam of a biopsy specimen</td>
</tr>
<tr>
<td>producing E-coll, or Campylobacter with 1 of nausea, vomiting,</td>
<td></td>
</tr>
<tr>
<td>abdominal pain, tenderness or diarrhea</td>
<td></td>
</tr>
</tbody>
</table>

Norovirus resident must have ONE criteria present:

- Diarrhea: with three or more liquid/watery stools above resident baseline in a 24 hour period
- Vomiting: with two or more episodes in a 24 hour period if ONE of the above then must also have:
  - Stool specimen for which norovirus is + by PCR, electron microscopy or enzyme immunoassay

Please write in ALL ANTIBIOTICS resident is taking

__________________________________________________________

Organism_________________________________________Fever?__________Usual Temp____

Mental Status changes?________________________________Labs________________________________________

Care Plan Updated__________________________Resident/Patient Teaching Done____________________

Nurse Signature__________________________Date____________________
Objectives of an Outbreak Investigation

The objectives at the beginning of an outbreak investigation are to define the problem and establish that the problem is real. The immediate goal is to prevent further cases if possible. There is always something to learn from an investigation.

Steps in an Outbreak Investigation*

1. Verify diagnosis
2. Research the disease
3. Confirm the existence of an outbreak; establish the background rate of the disease
4. If the existence of an outbreak is established, begin a binder or folder to contain all pertinent information related to the outbreak investigation
5. Define a case and conduct case finding
6. Relate outbreak to person, place, time; Prepare an epidemic curve
7. Formulate and evaluate a hypothesis
8. Implement control measures
9. Carry out additional studies
10. Analyze and interpret data
11. Formulate conclusions
12. Put additional control measures in place if necessary
13. Make a final report

These steps may occur simultaneously or be repeated as new information is received, especially Step 8--the implementing of control measures. This step may occur throughout the investigation until the outbreak ceases.

*The infection preventionist (IP) along with the Hospital Epidemiologist or designee should communicate as needed and at least weekly about the progress of the investigation.
Step 1: Verify the Diagnosis

1. Confirm the laboratory testing.

   **ALWAYS** physically check the results. Never rely on “hearsay” or word of mouth to begin an outbreak investigation.

2. Rule out misdiagnosis or laboratory error.

   Ensure that the problem has been properly diagnosed (i.e., that it really is what it is reported to be).

   Make sure that the increase in diagnosed cases is not the result of a mistake in the laboratory (ex: linezolid-intermediate VRE isolates due to mistaken E-test results).

3. Review clinical findings to assess the symptoms and features of the illness.

4. Review the other laboratory findings for people who are affected to make sure that they fit.

5. If you expect a need for specialized laboratory testing such as special cultures or molecular analyses, you should begin obtaining the appropriate isolates, specimens, or other laboratory material from a sufficient number of patients/places as soon as possible.

6. With the Hospital Epidemiologist, generate a list of questions in preparation for conducting interviews of patients and staff. Conversations with patients and staff can be very helpful in generating hypotheses about the cause, source, and spread of disease.

Step 2: Research the Disease

1. Conduct a literature search to learn as much as you can about the disease or condition.

2. Specifically check the literature for details of other outbreaks of this disease.

3. Summarize the literature findings in one or two paragraphs.

4. File the literature and the summary in the binder/folder.

Step 3: Confirm the Existence of the Outbreak and Establish the Background Rate of the Disease

1. Verify that a suspected outbreak is indeed a real outbreak. Molecular epidemiologic studies may be necessary at this point to help determine the existence of an outbreak.

   A first step is to determine if the observed number of cases exceeds the expected number. To determine the expected number:

   i. Compare the current number of cases with the number from the previous few weeks or months, or from a comparable period during the previous few years.
ii. Sources of this data can be from local, in-hospital data; health department surveillance records if the disease is a reportable disease; national data; or telephone surveys of other institutions to see if they are also seeing more cases than usual.

2. Even if the current number exceeds the expected number, the excess may not indicate an outbreak. Other possibilities include:
   A. Reasons you might see real increases
      i. Increase in the size of the population
      ii. Changes in population characteristics
      iii. Random variation
   B. Reasons you might see artificial increases:
      i. Changes in reporting procedures—for instance, if 4 rather than 2 IPs are in a Department and are reporting, the incidence may increase just because of increased manpower
      ii. Changes in case definitions
      iii. Increased interest because of local or national awareness
      iv. Improvements or changes in diagnostic procedures

3. Whether or not you should investigate an apparent problem further is not strictly tied to verifying that an epidemic exists. Other factors may come into play, including the severity of the illness, the potential for spread, political considerations, public relations, and the availability of resources. This is a critical step. Proceeding before making sure that a real outbreak exists and that an investigation is warranted will utilize valuable time and resources that could have been used more effectively elsewhere. Therefore, before proceeding further, the Hospital Epidemiologist should be contacted.

**Step 4: Begin a Binder**

The binder will help to keep the investigation organized, will help your colleagues if they have to cover for you, and will be useful for final reports and/or manuscripts that may result from the investigation.

**Step 5: Define a Case and Conduct Case Finding**

Establish a case definition

1. The case definition is a standard set of criteria that are established and used to determine whether a person will be classified as having the disease that is under study. A case definition usually includes 4 components:
   A. Clinical information about the disease. The clinical criteria should be based on simple, objective measures.
   B. Characteristics about the people who are affected.
   C. Information about the location or place.
   D. A specification of time during which the outbreak occurred.

2. Ideally, the case definition should be broad enough to include most, if not all, of the actual cases, without capturing “false positives”. Cases might be classified as confirmed (usually
relies on laboratory confirmation), probable, or possible depending on the clinical situation due to the uncertainty of some diagnoses.

3. Early in an investigation, a loose case definition is often used to allow for the capture of as many cases as possible. Later, when hypotheses have come into sharper focus, the “possible” category might be dropped. This strategy is particularly helpful for large outbreak investigations, as it may prevent having to go back to collect more data later. It is important to get the data while you can.

Conduct Case Finding

1. The first cases to be recognized are usually only a small proportion of the total number. The true size and geographic extent of the problem must be identified.

2. Use as many sources as possible to help find cases. Surveillance of the entire exposed population is one approach.

3. Collect the following information from everyone who meets the case definition:
   A. Identifying information such as name and medical record number.
   B. Demographic information such as age, sex and race.
   C. Clinical information.
   D. Risk factor information

4. This information should be collected on a standardized data collection form.

5. The information from the data collection form should be entered into an electronic database (usually Microsoft Excel) in a line listing format for ease of viewing and comparing cases (Table 1).

**Step 6: Relate the outbreak to person, place and time. Prepare an epidemic curve.**

Characterizing the Outbreak

1. Characterizing by Person

   This step determines the population at risk. This is usually defined by personal characteristics such as age, race, sex, or medical status or by exposures like occupation, leisure activities, or medication use. This is important because it relates to susceptibility to disease and to opportunities for exposure.

2. Characterizing by Place

   Include the patient location or locations on the line listing. An assessment of an outbreak by place provides information on the extent of a problem and may also demonstrate clusters or patterns that provide clues to the identity and origins of a problem. A bar graph of cases by location that demonstrates clustering usually relates to either a focal source of an outbreak or person-to-person spread. Scattering of cases is more consistent with a common source.

3. Characterizing by Time
Construct an epidemiologic curve. An epidemic curve is essentially a histogram that shows the course of a disease outbreak or epidemic by plotting the number of cases by time of onset. The time course of an epidemic is usually best demonstrated by drawing a graph of the number of cases (y-axis) by their date of onset (x-axis). An epidemic curve provides a great deal of information such as:

A. Where in the course the epidemic currently is.
B. The probable time period of exposure if the disease and its usual incubation period are known. Allowing the investigation to focus on the identified time period.
C. The epidemic pattern of common source, person-to-person spread, or both.

Constructing an Epidemic Curve

1. Identify the time of onset of illness for each person. Day of onset is usually sufficient. For some rapidly incubating diseases, hour of onset may be necessary.

2. The number of cases is plotted on the y-axis and the unit of time on the x-axis.

3. Selecting the unit of time for the x-axis is based on the incubation period of the disease (if known) and the length of time over which cases are distributed. As a rule of thumb, select a unit that is one-fourth to one-third as long as the incubation period. Ex: *Clostridium perfringens* food poisoning has an incubation period of 10 to 12 hours with cases usually appearing over only a few days. Therefore use an x-axis unit of 2 or 3 hours.

4. When the incubation period and/or the disease are unknown, draw several epi curves using different time measures for the x-axis to find one that fits the data best.

5. Make sure you show both the pre- and post-epidemic period on the curve to illustrate the activity of the disease during those periods.

Interpreting an Epidemic Curve

1. When interpreting the epi curve, look at the overall shape, the period of time over which susceptible people are exposed, and the minimum, average, and maximum incubation periods for the disease.

2. An epi curve with a steep upslope and a gradual down slope indicates a single source or point source epidemic in which people are exposed to the same source over a relatively brief period. Classic examples are food poisoning at an event like a picnic or reunion. An extension of this is the sudden rise in the number of cases suggesting sudden exposure to a common source. In a point source epidemic, all the cases occur within one incubation period.

3. If the duration of the exposure is prolonged, the epi curve is called a continuous common source epidemic. The epidemic curve will have a plateau instead of a peak. Example: food handler with hepatitis A
4. Person-to-person spread is called a propagated epidemic. The pattern will demonstrate a series of progressively taller peaks. The time period between the peaks will represent one incubation period. Example: smallpox epidemic

5. Cases that stand apart (outliers) may be just as informative as the overall pattern. An early case may represent a background (unrelated) case, a source of the epidemic, or a person who was exposed earlier than most of the people affected (e.g., the cook who tasted her dish hours before bringing it to the picnic). Similarly, late cases may be unrelated, may have especially long incubation periods, may indicate exposure later than most of the people affected, or may be secondary cases. All outliers are worth examining carefully because if they are part of the outbreak, their unusual exposures may point directly to the source. For a disease such as hepatitis A, for instance, one of the early cases may be the food handler who is the source of the epidemic.

6. In a point-source epidemic of a known disease with a known incubation period, you can use the epi curve to identify a likely period of exposure. This is critical to asking the right questions to identify the source of the epidemic.

**Step 7: Formulate and Evaluate a Hypothesis**

1. Most often, hypotheses generating to explain why and how the outbreak occurred begins when the problem is first identified. Once people have been interviewed and the outbreak has been characterized by person, place, and time, the hypothesis will be more accurately focused.

2. The hypothesis should address the source of the agent, the mode of transmission, and the exposures that caused the disease (Example: water=source, spread through the dialysis apparatus=mode, during dialysis=exposure). The hypothesis should be proposed in a way that can be tested.

3. After the hypothesis is generated, evaluate its credibility. Compare the hypothesis with established facts and perform analytic epidemiology which allows statistical testing of the hypothesis.

4. The two types of analytic approaches are cohort studies and case-control studies.
   
   i. A cohort study starts with exposure and follows to disease. This is the best method to use when analyzing an outbreak in a small, well-defined population. An example would be an outbreak of gastroenteritis in people who attended a wedding and a list of wedding guests is known. Ask each attendee the same set of questions (food exposures) and whether or not he/she became ill (disease). You would then calculate an attack rate for people who did and did not eat a particular food to narrow down the item. You can also calculate a relative risk (attack rate for people who were exposed to the item divided by attack rate for those who were not exposed to the item) to quantify the relationship between exposure and disease.

   ii. A case-control study starts with a group with (cases) and a group without (controls) disease and back tracks to exposure. This is the methodology used for most outbreaks because often the entire exposed population is not known. Determine
exposures of both cases and controls and then calculate an odds ratio to quantify the relationship between exposure and disease.

Choosing controls is the trickiest part of this process. The controls must not have the disease in question (obviously—or they would be cases), but should come from the same population as the case patients. In other words, they should be similar to the case patients except that they do not have the disease.

In general, the more cases and controls there are, the easier it will be to find an association. Often, however, you are limited because the outbreak is small. In a hospital, 4 or 5 cases may constitute an outbreak. Fortunately, the number of potential controls will usually be more than you need. In an outbreak of 50 or more cases, 1 control per case is usually sufficient. In smaller outbreaks, two, three, or four controls per case might be used. More than four controls per case will rarely be worth your effort. Attack rates cannot be calculated in a case-control study and therefore relative risks cannot be calculated. The association used for a case-control study is the odds ratio.

To calculate an odds ratio, put the data in a 2x2 table as follows:

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Cases</th>
<th>Controls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>A</td>
<td>B</td>
<td>A+B</td>
</tr>
<tr>
<td>No</td>
<td>C</td>
<td>D</td>
<td>C+D</td>
</tr>
<tr>
<td>Total</td>
<td>A+C</td>
<td>B+D</td>
<td>A+B+C+D</td>
</tr>
</tbody>
</table>

The Odds Ratio= \( \frac{AD}{BC} \)

After this, conduct a test of statistical significance. This is done to determine how likely it is that your study results could have occurred by chance alone. The first step in testing for statistical significance is to assume that the exposure is not related to the disease. This is the Null Hypothesis.

5. After calculating a relative risk (cohort study) or odds ratio (case-control study), you use these to calculate a chi-square test (the statistical test most commonly used in studying an outbreak) or other statistical test. Once you have a chi-square value, you look up its corresponding p-value in a table of chi-squares. In interpreting a p-value, set the level of significance ahead of time. By convention, this is usually 0.05. When a p-value is below the predetermined cutoff point, the finding is considered statistically significant. Thus you reject the null hypothesis and conclude that the exposure is associated with the disease. The smaller the p-value, the stronger the evidence that your finding is statistically significant. For more information on the Chi-square test, refer to the following websites:

http://www2.chass.ncsu.edu/garson/pa765/chisq.htm

http://www.mste.uiuc.edu/patel/chisquare/intro.html
**Step 8: Implement Control Measures**

1. As with hypothesis generation, this step is probably happening before this point in the investigation; however, after the hypothesis has been tested, the control measures can be refined and focused.

2. Never forget that time is of the essence in an outbreak investigation. Implement common sense control measures at any point in the investigation.

3. Repeat steps 1 through 8 until the cases stop.

**Step 9: Carry Out Additional Studies**

1. Additional epidemiologic studies may be necessary when your original hypothesis is refuted. You may need to reconsider the hypothesis and look for new modes of transmission.

2. Even if the hypothesis is confirmed, it may need to be refined. You may need more specific information about your exposure source. For example, if you determine that CVVH machines are responsible for an outbreak, you may want to determine what exactly about the CVVH machine/procedure is responsible.

3. When an outbreak occurs, whether it is routine or unusual, you should consider what questions remain unanswered about the disease and what kind of study you might use to answer some of these questions. The circumstances may allow you to learn more about the disease, its modes of transmission, the characteristics of the agent, and host factors.

4. Laboratory studies: Although epidemiology studies can implicate certain modes of exposure, laboratory evidence can prove the findings. If molecular epidemiology needs to be employed or other laboratory tests (Example HCV PCR on a surgical container) need to be conducted, this is the time to make sure that all outstanding laboratory tests are followed up and that the results are obtained.

5. Traceback studies may be necessary to determine the exact source of the problem. For instance, if a certain GI scope is implicated, a traceback study might prove that a manufacturer’s defect is responsible for an outbreak.

6. Applied research can result from the results of an outbreak investigation. This could be basic science research to explain a phenomenon, such as the exact mechanism of *E.coli*’s ability to survive on alfalfa sprouts.

**Step 10: Analyze and Interpret Data**

This is the step that is called “putting it all together”. This is in anticipation of the final control measures and conclusions. During this stage:

1. Review results of the epidemiologic studies
2. Review results of laboratory studies
3. Review results of any additional studies
4. Evaluate initial control measures
5. Evaluate status of the outbreak
6. Formulate plans for additional control measures

**Step 11: Put Additional Control Measures in Place**

Once the mode of exposure is known, evaluate control measures and decide if any additional measures are necessary for this outbreak. Also evaluate the need for additional measures to prevent recurrence of a similar situation.

**Step 12: Formulate Conclusions and Communicate Findings**

A summary of all findings should occur at this point. The final task in an investigation is to communicate your findings to others who need to know. The communications usually takes two forms (1) oral briefings and (2) written reports.

The oral briefing should include what you found, what you did, and what you think should be done about it now and in the future. Present the findings in a scientifically objective fashion and be able to defend your conclusions and recommendations.

The written report should follow the usual scientific format with an introduction, background, methods, results, discussion, and recommendations. This formal presentation provides a blueprint for action. It also serves as a record of performance, a document for potential legal issues, and a reference for similar situations in the future. Finally, if this report is published in the literature, it will serve the broader purpose of contributing to the scientific knowledge base of epidemiology and Infection Control and Prevention.
Checklist for an Outbreak Investigation

☐ 1. Verify diagnosis

☐ 2. Research the disease

☐ 3. Confirm the existence of outbreak; establish the background rate of the disease

☐ 4. If the existence of an outbreak is established, begin a binder or folder to contain all pertinent information related to the outbreak investigation

☐ 5. Define a case and conduct case finding

☐ 6. Relate outbreak to person, place, time; Prepare an epidemic curve

☐ 7. Formulate and evaluate a hypothesis

☐ 8. Implement control measures

☐ 9. Carry out additional studies

☐ 10. Analyze and interpret data

☐ 11. Formulate conclusions

☐ 12. Put additional control measures in place if necessary

☐ 13. Make a final report
Table 1. Example of a line listing for acute Hepatitis A*

<table>
<thead>
<tr>
<th>Case #</th>
<th>Report Date</th>
<th>Onset</th>
<th>Physician Diagnosis</th>
<th>Signs/Symptoms</th>
<th>Labs</th>
<th>Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N  V  A  F  D  J</td>
<td>HAIGM</td>
<td>Other</td>
</tr>
<tr>
<td>1</td>
<td>10/12/02</td>
<td>10/5/02</td>
<td>Hepatitis A</td>
<td>1  1  1  1  1  1</td>
<td>1</td>
<td>Low SGOT</td>
</tr>
<tr>
<td>2</td>
<td>10/12/02</td>
<td>10/4/02</td>
<td>Hepatitis A</td>
<td>1  0  1  1  1  1</td>
<td>1</td>
<td>Low Alt</td>
</tr>
<tr>
<td>3</td>
<td>10/13/02</td>
<td>10/4/02</td>
<td>Hepatitis A</td>
<td>1  0  1  1  1  1</td>
<td>1</td>
<td>Low SGOT</td>
</tr>
<tr>
<td>4</td>
<td>10/13/02</td>
<td>10/9/02</td>
<td>NA</td>
<td>0  0  1  0  ?  0</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>5</td>
<td>10/15/02</td>
<td></td>
<td>Hepatitis A</td>
<td>1  1  1  1  1  0</td>
<td>1</td>
<td>Hbs/Ag</td>
</tr>
<tr>
<td>6</td>
<td>10/16/02</td>
<td>10/6/02</td>
<td>Hepatitis A</td>
<td>0  0  1  1  1  1</td>
<td>1</td>
<td>SGOT=24</td>
</tr>
</tbody>
</table>

N=nausea V=vomiting A=elevated aminotransferase F=fever D=discreet onset J=jaundice HAIGM=hepatitis A IgM antibody test SGOT=serum glutamic oxaloacetic transaminase ALT=alanine aminotransferase Hbs=hepatitis B surface antigen Ag=antigen negative

1="yes"; 0="no"

* This table illustrates a line listing that might be used during an outbreak of hepatitis A. It was adapted from the CDC’s “Excellence in Curriculum Integration through Teaching Epidemiology” program. Additional variables that might be helpful to include are drug use, occupation, meal at restaurant X, neighborhood of residence and sexual orientation.
Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria

Nimalie D. Stone, MD; Muhammad S. Ashraf, MD; Jennifer Calder, PhD; Christopher J. Crnich, MD; Kent Crossley, MD; Paul J. Drinka, MD; Carolyn V. Gould, MD; Manisha Juthani-Mehta, MD; Ebbing Lautenbach, MD; Mark Loeb, MD; Taranisia MacCannell, PhD; Preeti N. Malani, MD; Lona Mody, MD; Joseph M. Mylotte, MD; Lindsay E. Nicolle, MD; Mary-Claire Roghmann, MD; Steven J. Schweon, MSN; Andrew E. Simor, MD; Philip W. Smith, MD; Kurt B. Stevenson, MD; Suzanne F. Bradley, MD

for the Society for Healthcare Epidemiology Long-Term Care Special Interest Group

Infection surveillance definitions for long-term care facilities (ie, the McGeer Criteria) have not been updated since 1991. An expert consensus panel modified these definitions on the basis of a structured review of the literature. Significant changes were made to the criteria defining urinary tract and respiratory tract infections. New definitions were added for norovirus gastroenteritis and Clostridium difficile infections.

When McGeer and colleagues proposed the first set of infection surveillance definitions specifically for use by long-term care facilities (LTCFs), their intent was to provide standardized guidance for infection surveillance activities and research studies in nursing homes and similar institutions. These definitions were adapted from existing surveillance definitions (such as those of the Centers for Disease Control and Prevention [CDC] National Nosocomial Infection Surveillance) that are used in acute care hospitals and with modifications determined by consensus discussions among infectious diseases physicians, geriatricians, and infection control nurses with experience in LTCFs, using an unstructured review of the limited literature available at the time. These consensus definitions, also known as the McGeer Criteria, have not been validated or updated despite their ongoing use by infection prevention and control programs and in research studies of nursing homes.

The original surveillance definitions were specifically developed for use in LTCFs with older adults who required (1) supervision and care for impaired cognition, (2) assistance with activities of daily living (ADLs), or (3) skilled nursing care, such as the use of indwelling devices (eg, urinary catheters or enteral feeding tubes). At the time the McGeer Criteria were developed, these facilities rarely provided intravenous therapy or had on-site laboratory or radiology services for the diagnosis of new clinical problems. Now, 20 years later, these definitions should still be applied in skilled nursing facilities and nursing homes that care for the postacute and frail elder populations, as well as in other long-term residential care environments that deliver medical and skilled nursing services if appropriate clinical and diagnostic evaluations can be provided. However, the McGeer Criteria were not designed for use in long-term acute care hospitals, acute inpatient rehabilitation facilities, or pediatric LTCFs.

In March 2009, members of the Society for Healthcare Epidemiology of America (SHEA) Long-Term Care Special Interest Group (LTC SIG) agreed that the surveillance definitions of infections in LTCFs should be updated in light of
(1) a substantial increase in the body of evidence-based literature about infections in the elderly in LTCF settings, (2) the availability of improved diagnostics for infection surveillance, (3) the changing populations of patients who are cared for in nonhospital settings, and (4) the updated acute care hospital surveillance definitions of the CDC’s National Healthcare Safety Network (NHSN). The process of updating the McGeer Criteria included an evidence-based structured review of the literature in addition to consensus opinions from industry leaders including infectious diseases physicians and epidemiologists, infection preventionsists, geriatricians, and public health officials.

METHODS

Review of Clinical Syndromes

We systematically reviewed the definitions of clinical syndromes that commonly occur in LTCF residents, including respiratory tract infections (RTIs), urinary tract infections (UTIs), skin and soft tissue infections (SSTIs), and gastrointestinal (GI) tract infections. Because of a lack of recent, relevant research pertaining to systemic infections (bloodstream infections [BSIs] and unexplained febrile episodes), revisions to the definitions in these categories were not pursued. Specific criteria for defining nasal and otic infections have been removed; categorizing these events should be based on evaluation by a clinical provider. Oropharyngeal and conjunctival infections were included with SSTIs as mucosal infections. For the infection surveillance definitions of each clinical syndrome undergoing revision, a team of SHEA LTCSIG members was assigned to review the literature and provide updated surveillance criteria. The definitions were reviewed, modified where appropriate on the basis of the review, and approved by the LTCSIG and a panel of outside reviewers selected by the SHEA Board of Directors.

Search Procedure

First we searched for relevant guidelines, using Medline, National Guideline Clearinghouse, Cochrane Health Technology Assessment, National Institutes of Health Consensus Development, and the US Preventative Services Task Force. On the basis of a review of those guidelines, each team developed a series of key questions. Examples of key questions are: “What is the utility of examination of urine for pyuria for the diagnosis of symptomatic urinary tract infection?” and “What is the diagnostic accuracy of pulse oximetry for nursing home pneumonia?” These key questions further guided the evidence review used to revise the existing surveillance criteria. Next, a search of the primary literature was performed, using Medline, CINAHL, Embase, Cochrane Systematic Reviews, and the Cochrane Controlled Clinical Trials Registry. Examples of key search terms include the following: nursing home, long-term care, aged, skilled nursing facility, older adults, elderly, fever, healthcare-associated infection, pneumonia, influenza, respiratory tract infection, functional impairment, confusion, leukocyte count, pulse oximetry, urinary tract infection, bacteriuria, urine culture, gastroenteritis, diarrhea, Clostridium difficile, norovirus, cellulitis, soft tissue infection, pressure ulcer, scabies. A line listing of articles that met the search criteria and were included in the final analyses is available upon request from the authors.

Evidence Review

A reference was included if it was (1) relevant to key questions; (2) a systematic review, meta-analysis, or primary research report; and (3) written in English. For each clinical syndrome, a standardized evidence table was prepared that summarized the data from each relevant article. Information on the type(s) of LTCF and the specific resident population(s) was included in the evidence tables. The strategy for review of the literature by asking key questions and summarizing the evidence was based on a standard methodology developed by the CDC’s Healthcare Infection Control Practices Advisory Committee and the University of Pennsylvania Center for Evidence-Based Practice.7 When evidence was limited or unavailable to inform changes to the definitions, expert consensus guided any modifications.

Most of the studies we evaluated were small observational or uncontrolled case series that primarily addressed questions related to the utility of signs and symptoms for the purpose of diagnosing infection in older people. The majority of these studies did not clearly address questions about the utility of 1 or more clinical findings in the context of infection detection and surveillance in LTCFs or other healthcare facilities. Because the evidence was generally indirect and judged to be of low quality, a decision was made to not grade proposed additions or changes in clinical parameters according to standardized methods that are typically applied to recommendations and guidelines.

GUIDING PRINCIPLES

The criteria that define infections for surveillance purposes were selected to increase the likelihood that the events captured by application of the definitions are true infections. Presentations of infection in older residents of LTCFs may be atypical, so failure to meet surveillance definitions may not fully exclude the presence of infection. For this reason, the surveillance definitions presented here may not be adequate for real-time case finding, diagnosis, or clinical decision making (eg, antibiotic initiation). Separate clinical guidelines address early identification of infections and appropriate initiation of antibiotic therapy in LTCF residents,6,8 which are both important for impacting resident outcomes.

The syndromes included here represent a variety of clinically relevant infections that can occur in the LTCF population. Surveillance should be performed for infections for which there are clear strategies that can be implemented for prevention and control of transmission (Table 1). However, for completeness and consistency with the original surveil-
As outlined in the original McGeer Criteria, 3 important conditions should be met when applying these surveillance definitions:

1. **All symptoms must be new or acutely worse.** Many residents have chronic symptoms, such as cough or urinary urgency, that are not associated with infection; however, a new symptom or a change from baseline may be an indication that an infection is developing.

2. **Alternative noninfectious causes of signs and symptoms (eg, dehydration, medications) should generally be considered and evaluated before an event is deemed an infection.**

3. **Identification of infection should not be based on a single piece of evidence but should always consider the clinical presentation and any microbiologic or radiologic information that is available.** Microbiologic and radiologic findings should not be the sole criteria for defining an event as an infection. Similarly, diagnosis by a physician alone is not sufficient for a surveillance definition of infection and must be accompanied by documentation of compatible signs and symptoms.

The feasibility of implementation and the validity of these surveillance definitions would benefit from further assessment in different types of LTCFs. As with the original article by McGeer and colleagues, these definitions have not been tested in advance of their publication. Data from a French study demonstrated that application of the original surveillance definitions underestimated the number of nursing home–associated infections when compared with provider diagnoses of infection. This finding highlights the need for future studies to determine the sensitivity and specificity of criteria used within the surveillance definitions and to validate their application in this setting.

### Table 1. Considerations for Inclusion of Infections in Long-Term Care Facilities (LTCFs) into Facility Infection Surveillance Programs

<table>
<thead>
<tr>
<th>Points to consider</th>
<th>Infections</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Infections that should be included in routine surveillance</td>
<td>Viral respiratory tract infections, viral gastroenteritis, and viral conjunctivitis</td>
<td>Associated with outbreaks among residents and healthcare personnel in LTCFs.</td>
</tr>
<tr>
<td>1. Evidence of transmissibility in a healthcare setting</td>
<td>Pneumonia, urinary tract infection, gastrointestinal tract infections including <em>Clostridium difficile</em>, and skin and soft tissue infections</td>
<td>Associated with hospitalization and functional decline in LTCF residents.</td>
</tr>
<tr>
<td>2. Processes available to prevent acquisition of infection</td>
<td>Any invasive group <em>A Streptococcus</em> infection, acute viral hepatitis, norovirus, scabies, influenza</td>
<td>A single laboratory-confirmed case should prompt further investigation.</td>
</tr>
<tr>
<td>3. Clinically significant cause of morbidity or mortality</td>
<td>Ear and sinus infections, fungal oral and skin infections, and herpetic skin infections</td>
<td>Associated with underlying comorbid conditions and reactivation of endogenous infection.</td>
</tr>
<tr>
<td>4. Specific pathogens causing serious outbreaks</td>
<td>Surgical site infections, central-line-associated bloodstream infections, and ventilator-associated pneumonia</td>
<td>LTCF-specific definitions were not developed. Refer to the National Healthcare Safety Network’s criteria (<a href="http://www.cdc.gov/nhsn/TOC_PSCManual.html">http://www.cdc.gov/nhsn/TOC_PSCManual.html</a>).</td>
</tr>
<tr>
<td>B. Infections that could be considered in surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Infections with limited transmissibility in a healthcare setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Infections with limited preventability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Infections for which other accepted definitions should be applied in LTCF surveillance (may apply to only specific at-risk residents)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Several infections that may occur because of underlying host factors rather than transmission within the facility have also been included in this document, so that both infection prevention programs and research studies have a standard set of criteria. Given the limited infection prevention and control resources that are currently available in most LTCFs, surveillance activities may need to target those infections in a facility that have the most potential for prevention. In addition, some infections are associated with a higher likelihood of transmission and development of outbreaks (eg, norovirus, influenza, group A *Streptococcus*, acute viral hepatitis). For these infections, identification of even a single case in a LTCF should trigger a more intensive investigation.

For infection surveillance purposes, infections should be attributed to a LTCF onset if (a) there is no evidence of an incubating infection at the time of admission to the facility (on the basis of clinical documentation of appropriate signs and symptoms and not solely on screening microbiologic data) and (b) onset of clinical manifestation occurs >2 calendar days after admission. Although debate exists about the use of this time frame to determine a LTCF onset for *C. difficile* infections, it is consistent with acute care infection surveillance reporting and surveillance methodology, and there is currently no evidence to support changing this standard for LTCFs.

As outlined in the original McGeer Criteria, 3 important conditions should be met when applying these surveillance definitions:
Definitions

Constitutional Criteria for Infection

In an effort to standardize terminology across the clinical syndromes defined in this article, we agreed on common definitions for fever, acute change in mental status, and acute functional decline (Table 2). The definition of fever was changed from a temperature of greater than 38°C (100.4°F), as in the original McGeer Criteria, to a definition consistent with the 2008 Infectious Diseases Society of America (IDSA) guideline for evaluating fever and infection in older adults residing in LTCFs: either (1) a single oral temperature greater than 37.8°C (100°F) or (2) repeated oral temperatures greater than 37.2°C (99°F) or rectal temperatures greater than 37.5°C (99.5°F) or (3) a single temperature greater than 1.1°C (2°F) over baseline from any site. The rationale for this recommendation includes:

1. A desire to maintain consistency across different guidelines.
2. Recognition that although the IDSA guideline is based on data from small numbers of participants in studies performed nearly 2 decades ago, no recent evidence has provided any rationale to modify them.
3. The lower threshold will increase sensitivity for detecting infection given the greater likelihood of a lower febrile response in the elderly.

Although both the IDSA guideline and the original McGeer Criteria note that “worsening mental or functional status” can be a nonspecific manifestation of acute infection in an elderly resident of a LTCF, there are relatively few studies that have defined a standard assessment of mental status or functional change in the context of acute infection. Mehr et al., in their prospective study involving 36 nursing homes and 2,334 episodes of pneumonia in 1,474 residents, showed that residents with either probable or possible pneumonia were more likely to be somnolent and confused when compared with those with no pneumonia. Lim and MacFarlane compared 397 patients with community-acquired pneumonia (CAP) with 40 patients who had nursing home–acquired pneumonia and found that the patients with nursing home–acquired pneumonia were more likely to be confused when compared with patients who had CAP. Integrated into the recently released Minimum Data Set (MDS), version 3.0, is an assessment of delirium that is based on the confusion assessment method (CAM) criteria. In order to standardize an assessment of acute mental status across LTCFs, the CAM criteria are adopted here for the definition of acute confusion or altered mental status (Table 3). For similar reasons, the definition of acute functional decline is also based on changes in ADLs according to the scoring system in MDS 3.0.

Respiratory Tract Infections

Relative to the original surveillance definitions, few changes were made to the definitions of RTIs, which include 4 subcategories: (1) common cold syndromes or pharyngitis, (2)
influenza-like illness, (3) pneumonia, and (4) lower RTI (Table 4). No changes were made to the definitions of cold syndromes or pharyngitis.

The only change to the definition of influenza-like illness was the removal of seasonal restrictions for the identification of this infection. In the past, seasonal influenza activity in the United States typically peaked in January or February. However, on occasion, seasonal influenza activity has extended into May. In 2009, the H1N1 influenza A virus strain caused increased hospitalization, morbidity, and mortality from influenza-related illnesses during the summer months. Because of increasing uncertainty surrounding the timing of the start of influenza season, the peak of influenza activity, and the length of the season, “seasonality” is no longer a criterion to define influenza-like illness.

Changes to the surveillance definitions of pneumonia and lower RTI were made to increase the specificity of the criteria. Several recent studies have used at least 1 respiratory and 1 constitutional sign or symptom, along with radiographic findings, to define pneumonia. The definition of lower RTI requires the presence of 2 respiratory criteria and 1 constitutional sign or symptom without radiographic findings that is suggestive of pneumonia. The respiratory signs and symptoms are unchanged in this article from the original criteria except for the addition of oxygen saturation in the lower RTI and pneumonia definitions, because of increased access to pulse oximeters in most facilities.

Given that the initial respiratory examination of a L TCF resident who has suspected pneumonia is rarely performed by a physician, the literature was reviewed to determine the role of a physical examination by a nurse or paramedic in predicting pneumonia. Mehr et al demonstrated that a nurse’s assessment for the presence of crackles and the absence of wheezing was highly predictive of identifying radiographic evidence of pneumonia. Ackerman and Waldron retrospectively reviewed 244 ambulance reports of breathing difficulty to determine whether paramedic physical examinations, patient history, and clinical judgment correlated with emergency room physician diagnoses. In that study, the classification of respiratory disease included aspiration, asthma, chronic obstructive pulmonary disease, dyspnea, pleurisy, pneumonia, and upper respiratory tract infection (URI). The paramedic respiratory diagnoses had a sensitivity of 71% (range, 58%–82%) and a specificity of 94% (range, 89%–96%). These 2 studies suggest that nonphysician assessments can assist with the determination of pneumonia, and therefore we retained in our definitions the criterion of abnormal findings on lung examination.

The structure of the new pneumonia and lower RTI definitions should facilitate surveillance by segregating criteria into 3 categories (radiography results, respiratory signs or symptoms, and constitutional criteria) and explicitly requiring the exclusion of alternative explanations for respiratory signs or symptoms such as congestive heart failure, atelectasis, and other noninfectious respiratory conditions.

**Urinary Tract Infections**

The definitions for UTI presented here differ substantially from the original surveillance definitions for both (A) residents without an indwelling catheter and (B) residents with an indwelling catheter (Table 5). The revised definitions take into account the low probability of UTI in residents without indwelling catheters if localizing symptoms are not present, as well as the need for microbiologic confirmation for diagnosis.

For residents without an indwelling catheter, the clinical criterion “acute dysuria” and the urinary tract subcriterion are derived from a prospective randomized trial showing efficacy and safety. The criterion “acute pain, swelling, or tenderness of the testes, epididymis, or prostate” was added by expert consensus during the review. Fever or leukocytosis plus 1 localizing urinary tract subcriterion or the presence of 2 or more new or increased localizing urinary tract subcriteria could be used to meet the definition for symptomatic UTI. Acute change in mental status and change in the character of the urine (eg, change in color or odor) were each independently associated with bacteriuria (≥10^5 colony-forming units [cfu]/mL) plus pyuria (≥10 white blood cells per high-power field) in a prospective study of L TCF residents with clinically suspected UTI; however, these 2 symptoms are frequently demonstrated in the presence of asymptomatic bacteriuria due to other confounding clinical conditions.

### Table 3. Confusion Assessment Method Criteria

<table>
<thead>
<tr>
<th>Acute onset</th>
<th>Evidence of acute change in resident’s mental status from baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluctuating</td>
<td>Behavior fluctuating (eg, coming and going or changing in severity during the assessment)</td>
</tr>
<tr>
<td>Inattention</td>
<td>Resident has difficulty focusing attention (eg, unable to keep track of discussion or easily distracted)</td>
</tr>
<tr>
<td>Disorganized thinking</td>
<td>Resident’s thinking is incoherent (eg, rambling conversation, unclear flow of ideas, unpredictable switches in subject)</td>
</tr>
<tr>
<td>Altered level of consciousness</td>
<td>Resident’s level of consciousness is described as different from baseline (eg, hyperalert, sleepy, drowsy, difficult to arouse, nonresponsive)</td>
</tr>
</tbody>
</table>

**Note.** Criteria are adapted from a study by Lim and MacFarlane.
### Table 4. Surveillance Definitions for Respiratory Tract Infections (RTIs)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Common cold syndrome or pharyngitis (at least 2 criteria must be present)</strong></td>
<td>Fever may or may not be present. Symptoms must be new and not attributable to allergies.</td>
</tr>
<tr>
<td>1. Runny nose or sneezing</td>
<td></td>
</tr>
<tr>
<td>2. Stuffy nose (ie, congestion)</td>
<td></td>
</tr>
<tr>
<td>3. Sore throat or hoarseness or difficulty in swallowing</td>
<td></td>
</tr>
<tr>
<td>4. Dry cough</td>
<td></td>
</tr>
<tr>
<td>5. Swollen or tender glands in the neck (cervical lymphadenopathy)</td>
<td></td>
</tr>
<tr>
<td><strong>B. Influenza-like illness (both criteria 1 and 2 must be present)</strong></td>
<td>If criteria for influenza-like illness and another upper or lower RTI are met at the same time, only the diagnosis of influenza-like illness should be recorded. Because of increasing uncertainty surrounding the timing of the start of influenza season, the peak of influenza activity, and the length of the season, &quot;seasonality&quot; is no longer a criterion to define influenza-like illness.</td>
</tr>
<tr>
<td>1. Fever</td>
<td></td>
</tr>
<tr>
<td>2. At least 3 of the following influenza-like illness subcriteria</td>
<td></td>
</tr>
<tr>
<td>a. Chills</td>
<td></td>
</tr>
<tr>
<td>b. New headache or eye pain</td>
<td></td>
</tr>
<tr>
<td>c. Myalgias or body aches</td>
<td></td>
</tr>
<tr>
<td>d. Malaise or loss of appetite</td>
<td></td>
</tr>
<tr>
<td>e. Sore throat</td>
<td></td>
</tr>
<tr>
<td>f. New or increased dry cough</td>
<td></td>
</tr>
<tr>
<td><strong>C. Pneumonia (all 3 criteria must be present)</strong></td>
<td>For both pneumonia and lower RTI, the presence of underlying conditions that could mimic the presentation of a RTI (eg, congestive heart failure or interstitial lung diseases) should be excluded by a review of clinical records and an assessment of presenting symptoms and signs.</td>
</tr>
<tr>
<td>1. Interpretation of a chest radiograph as demonstrating pneumonia or the presence of a new infiltrate</td>
<td></td>
</tr>
<tr>
<td>2. At least 1 of the following respiratory subcriteria</td>
<td></td>
</tr>
<tr>
<td>a. New or increased cough</td>
<td></td>
</tr>
<tr>
<td>b. New or increased sputum production</td>
<td></td>
</tr>
<tr>
<td>c. $O_2$ saturation &lt;94% on room air or a reduction in $O_2$ saturation of $&gt;3%$ from baseline</td>
<td></td>
</tr>
<tr>
<td>d. New or changed lung examination abnormalities</td>
<td></td>
</tr>
<tr>
<td>e. Pleuritic chest pain</td>
<td></td>
</tr>
<tr>
<td>f. Respiratory rate of $\geq 25$ breaths/min</td>
<td></td>
</tr>
<tr>
<td>3. At least 1 of the constitutional criteria (see Table 2)</td>
<td>(See comment for section C above.)</td>
</tr>
<tr>
<td><strong>D. Lower respiratory tract (bronchitis or tracheobronchitis; all 3 criteria must be present)</strong></td>
<td></td>
</tr>
<tr>
<td>1. Chest radiograph not performed or negative results for pneumonia or new infiltrate</td>
<td></td>
</tr>
<tr>
<td>2. At least 2 of the respiratory subcriteria (a–f) listed in section C above</td>
<td></td>
</tr>
<tr>
<td>3. At least 1 of the constitutional criteria (see Table 2)</td>
<td></td>
</tr>
</tbody>
</table>

Conditions, such as dehydration. Other nonspecific signs and symptoms (eg, falls) without localizing lower urinary tract findings were not associated with bacteriuria plus pyuria.

For residents with an indwelling catheter, the first clinical criterion, “fever, rigors, or new-onset hypotension with no alternate site of infection” is consistent with the criteria of Loeb et al. Localizing urinary tract symptoms for residents with an indwelling catheter include “new-onset suprapubic pain,” “costovertebral angle tenderness,” and “purulent discharge from around the catheter.” “Acute pain, swelling, or tenderness of the testes, epididymis, or prostate” is included for both catheterized and noncatheterized men as recognized complications of UTI in males, particularly when an indwelling urinary catheter is present. The additional criterion “acute change in mental status or acute functional decline with no alternate diagnosis and leukocytosis” has been included. Acute mental status change and functional decline are nonspecific manifestations of many conditions including hypoxia, dehydration, and adverse effects of medication. The additional requirement of concomitant leukocytosis, a marker of a systemic inflammatory reaction, provides support that the clinical deterioration has an infectious etiology. However, symptomatic UTI in the catheterized resident should always be a diagnosis of exclusion in the absence of localizing urinary tract findings.

A positive urine culture is necessary for diagnosis of UTI and is applied in the revised surveillance definitions for both subcategories (residents without and with an indwelling catheter). For individuals without an indwelling catheter, at least 10$^5$ cfu/mL of no more than 2 species of microorganisms is the recommended quantitative count from a voided specimen, and for a specimen collected by in-and-out catheter-
**Table 5. Surveillance Definitions for Urinary Tract Infections (UTIs)**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. For residents without an indwelling catheter</strong>&lt;br&gt;1. At least 1 of the following sign or symptom subcriteria&lt;br&gt;   a. Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate&lt;br&gt;   b. Fever or leukocytosis (see Table 2) and at least 1 of the following localizing urinary tract subcriteria&lt;br&gt;      i. Acute costovertebral angle pain or tenderness&lt;br&gt;      ii. Suprapubic pain&lt;br&gt;      iii. Gross hematuria&lt;br&gt;   iv. New or marked increase in incontinence&lt;br&gt;   v. New or marked increase in urgency&lt;br&gt;   vi. New or marked increase in frequency&lt;br&gt;2. One of the following microbiologic subcriteria&lt;br&gt;   a. At least 10^5 cfu/mL of no more than 2 species of microorganisms in a voided urine sample&lt;br&gt;   b. At least 10^2 cfu/mL of any number of organisms in a specimen collected by in-and-out catheter&lt;br&gt;</td>
<td>UTI should be diagnosed when there are localizing genitourinary signs and symptoms and a positive urine culture result. A diagnosis of UTI can be made without localizing symptoms if a blood culture isolate is the same as the organism isolated from the urine and there is no alternate site of infection. In the absence of a clear alternate source of infection, fever or rigors with a positive urine culture result in the noncatheterized resident or acute confusion in the catheterized resident will often be treated as UTI. However, evidence suggests that most of these episodes are likely not due to infection of a urinary source.</td>
</tr>
<tr>
<td><strong>B. For residents with an indwelling catheter</strong>&lt;br&gt;1. At least 1 of the following sign or symptom subcriteria&lt;br&gt;   a. Fever, rigors, or new-onset hypotension, with no alternate site of infection&lt;br&gt;   b. Either acute change in mental status or acute functional decline, with no alternate diagnosis and leukocytosis&lt;br&gt;   c. New-onset suprapubic pain or costovertebral angle pain or tenderness&lt;br&gt;   d. Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate&lt;br&gt;2. Urinary catheter specimen culture with at least 10^5 cfu/mL of any organism(s)&lt;br&gt;</td>
<td>Urinary catheter specimens for culture should be collected following replacement of the catheter (if current catheter has been in place for &gt;14 d).</td>
</tr>
</tbody>
</table>

**Note.** Pyuria does not differentiate symptomatic UTI from asymptomatic bacteriuria. Absence of pyuria in diagnostic tests excludes symptomatic UTI in residents of long-term care facilities. cfu, colony-forming units.
of an alternate source, a UTI becomes the presumptive diagnosis.

Skin, Soft Tissue, and Mucosal Infections

Consistent with the original surveillance definitions, this section includes definitions for (A) skin (cellulitis/soft tissue/wound) infections, (B) scabies, (C) fungal oral/perioral and skin infections (fungal mucocutaneous infections), (D) herpesvirus skin infections, and (E) conjunctivitis (Table 6). The review of the literature revealed that because diagnoses of infections of the skin, soft tissue, and mucous membranes are heavily dependent on clinical criteria, developing definitions with specificity is challenging. Additionally, there was no original research literature that described the validation of a surveillance definition for soft tissue infections.

The original definitions for SSTIs include clinical but not microbiological criteria, whereas the definitions used by NHSN for infection surveillance include a laboratory component. At this time, there is insufficient evidence to support changing the criteria. However, for LTCF residents who have undergone recent surgical procedures, it would be appropriate to utilize the NHSN criteria for defining surgical site infections.

The review of the literature did not identify studies describing the validation of a surveillance definition for scabies. A criterion for identification of an epidemiological linkage to a known case has been added to the definition because (a) residents with scabies, particularly heavily infested residents, are highly infectious and (b) skin scraping, which remains the dominant diagnostic test, has low sensitivity.

The original surveillance definitions of fungal mucocutaneous infections, including those caused by Candida species, require diagnosis by a physician or dentist. Definitions of mucocutaneous candidiasis are based on vague clinical descriptions, and there is insufficient basis for changing the criteria; however, a description of typical lesions has been added to increase the specificity of the definition. Although fungal skin infections other than mucocutaneous candidiasis are rare, the original definition for these required both a maculopapular rash and either physician diagnosis or laboratory confirmation. The minor change in the definition substitutes “characteristic rash or lesions” for “maculopapular rash,” since dermatophyte lesions may be macular. No data were found to support revisions in the definitions of herpesvirus skin infections (herpes simplex and herpes zoster) or conjunctivitis.

Gastrointestinal Tract Infections

This section includes infection definitions for (A) gastroenteritis, (B) norovirus gastroenteritis, and (C) C. difficile infection (Table 7). The general surveillance definition for gastroenteritis was unchanged from that proposed in the original surveillance definitions. Two new surveillance definitions have been added: (a) criteria for determining the presence of norovirus gastroenteritis and (b) criteria for C. difficile infection. These new GI infection definitions were developed because it is now recognized that norovirus is highly transmissible, causing frequent and often large outbreaks in healthcare institutions including LTCFs, and C. difficile is the major infectious cause of healthcare-associated and antibiotic-associated diarrhea, contributing to significant morbidity and mortality among elderly institutionalized individuals.

The gastroenteritis criteria were deemed appropriate and adequate for identifying sporadic or outbreak-associated cases of GI infection caused by common bacterial enteric pathogens. A minor change in the definition of diarrhea substitutes “liquid or watery stools” for “loose or watery stools,” since the concept of liquid stools (ie, conforming to the shape of the specimen collection container) is consistent with other surveillance definitions for diarrheal illness. Additionally, the definition of diarrhea as “3 or more stools above what is normal for a resident in a 24-hour period” was standardized across GI infections to simplify surveillance activity.

The definition for norovirus gastroenteritis requires the presence of both a compatible clinical presentation and a laboratory confirmation with detection of the infectious agent by one of several accepted laboratory methods. This definition is based on numerous descriptions of norovirus outbreaks and studies of the clinical manifestations of norovirus gastroenteritis in healthcare settings. The norovirus definition can be used to identify either sporadic or outbreak-associated cases. However, sporadic cases would require laboratory confirmation, whereas outbreak cases may not if either a subset of cases involved in the outbreak have laboratory-confirmed diagnosis or the “Kaplan Criteria” are met. The Kaplan Criteria, which have been useful in identifying outbreaks of acute gastroenteritis due to norovirus, provide a surveillance definition to detect a presumed norovirus-like outbreak in a LTCF even in the absence of laboratory confirmation.

C. difficile has been associated with severe, life-threatening disease, especially in the elderly, and infection with this organism can be acquired or transmitted in LTCFs. C. difficile infection may be endemic in some healthcare facilities, as well as a cause of outbreaks. Consequently, it is recommended that surveillance for C. difficile infection be done in LTC settings. Surveillance should include prompt clinical and appropriate laboratory evaluation of LTCF residents who have antibiotic-associated diarrhea or an acute diarrheal illness that is not otherwise explained. A surveillance definition for C. difficile infection is proposed that includes clinical and microbiology laboratory test criteria. Importantly, because LTCF residents may be colonized with this organism, tests for C. difficile or its toxins should be performed only on diarrheal (liquid) stool specimens, unless ileus is suspected. Laboratory surveillance of asymptotically colonized residents or repeat testing for the presence of C. difficile toxins following treatment is not recommended. The proposed definition includes criteria for determining whether the C. difficile infection is a primary episode or whether it represents...
TABLE 6.  Surveillance Definitions for Skin, Soft Tissue, and Mucosal Infections

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Cellulitis, soft tissue, or wound infection (at least 1 of the following criteria must be present)</td>
<td></td>
</tr>
<tr>
<td>1. Purp present at a wound, skin, or soft tissue site</td>
<td></td>
</tr>
<tr>
<td>2. New or increasing presence of at least 4 of the following signs or symptom subcriteria</td>
<td></td>
</tr>
<tr>
<td>a. Heat at the affected site</td>
<td></td>
</tr>
<tr>
<td>b. Redness at the affected site</td>
<td></td>
</tr>
<tr>
<td>c. Swelling at the affected site</td>
<td></td>
</tr>
<tr>
<td>d. Tenderness or pain at the affected site</td>
<td></td>
</tr>
<tr>
<td>e. Serous drainage at the affected site</td>
<td></td>
</tr>
<tr>
<td>f. One constitutional criterion (see Table 2)</td>
<td></td>
</tr>
<tr>
<td>Presence of organisms cultured from the surface (e.g., superficial swab sample) of a wound is not sufficient evidence that the wound is infected. More than 1 resident with streptococcal skin infection from the same serogroup (e.g., A, B, C, G) in a long-term care facility (LTCF) may indicate an outbreak.</td>
<td></td>
</tr>
<tr>
<td>B. Scabies (both criteria 1 and 2 must be present)</td>
<td></td>
</tr>
<tr>
<td>1. A maculopapular and/or itching rash</td>
<td></td>
</tr>
<tr>
<td>2. At least 1 of the following scabies subcriteria</td>
<td></td>
</tr>
<tr>
<td>a. Physician diagnosis</td>
<td></td>
</tr>
<tr>
<td>b. Laboratory confirmation (scraping or biopsy)</td>
<td></td>
</tr>
<tr>
<td>c. Epidemiologic linkage to a case of scabies with laboratory confirmation</td>
<td></td>
</tr>
<tr>
<td>An epidemiologic linkage to a case can be considered if there is evidence of geographic proximity in the facility, temporal relationship to the onset of symptoms, or evidence of common source of exposure (i.e., shared caregiver). Care must be taken to rule out rashes due to skin irritation, allergic reactions, eczema, and other noninfectious skin conditions</td>
<td></td>
</tr>
<tr>
<td>C. Fungal oral or perioral and skin infections</td>
<td></td>
</tr>
<tr>
<td>1. Oral candidiasis (both criteria a and b must be present)</td>
<td></td>
</tr>
<tr>
<td>a. Presence of raised white patches on inflamed mucosa or plaques on oral mucosa</td>
<td></td>
</tr>
<tr>
<td>b. Diagnosis by a medical or dental provider</td>
<td></td>
</tr>
<tr>
<td>Mucocutaneous Candida infections are usually due to underlying clinical conditions such as poorly controlled diabetes or severe immunosuppression. Although they are not transmissible infections in the healthcare setting, they can be a marker for increased antibiotic exposure.</td>
<td></td>
</tr>
<tr>
<td>2. Fungal skin infection (both criteria a and b must be present)</td>
<td></td>
</tr>
<tr>
<td>a. Characteristic rash or lesions</td>
<td></td>
</tr>
<tr>
<td>b. Either a diagnosis by a medical provider or a laboratory-confirmed fungal pathogen from a scraping or a medical biopsy</td>
<td></td>
</tr>
<tr>
<td>Dermatophytes have been known to cause occasional infections and rare outbreaks in the LTCF setting.</td>
<td></td>
</tr>
<tr>
<td>D. Herpesvirus skin infections</td>
<td></td>
</tr>
<tr>
<td>1. Herpes simplex infection (both criteria a and b must be present)</td>
<td></td>
</tr>
<tr>
<td>a. A vesicular rash</td>
<td></td>
</tr>
<tr>
<td>b. Either physician diagnosis or laboratory confirmation</td>
<td></td>
</tr>
<tr>
<td>2. Herpes zoster infection (both criteria a and b must be present)</td>
<td></td>
</tr>
<tr>
<td>a. A vesicular rash</td>
<td></td>
</tr>
<tr>
<td>b. Either physician diagnosis or laboratory confirmation</td>
<td></td>
</tr>
<tr>
<td>Reactivation of herpes simplex (“cold sores”) or herpes zoster (“shingles”) is not considered a healthcare-associated infection. Primary herpesvirus skin infections are very uncommon in a LTCF except in pediatric populations, where it should be considered healthcare associated.</td>
<td></td>
</tr>
<tr>
<td>E. Conjunctivitis (at least 1 of the following criteria must be present)</td>
<td></td>
</tr>
<tr>
<td>1. Purp appearing from 1 or both eyes, present for at least 24 h</td>
<td></td>
</tr>
<tr>
<td>2. New or increased conjunctival erythema, with or without itching</td>
<td></td>
</tr>
<tr>
<td>3. New or increased conjunctival pain, present for at least 24 h</td>
<td></td>
</tr>
<tr>
<td>Conjunctivitis symptoms (“pink eye”) should not be due to allergic reaction or trauma.</td>
<td></td>
</tr>
<tr>
<td>NOTE. For wound infections related to surgical procedures, LTCFs should use the Centers for Disease Control and Prevention’s National Healthcare Safety Network Surgical Site Infection criteria and report these infections back to the institution where the original surgery was performed.</td>
<td></td>
</tr>
</tbody>
</table>
likely to have been acquired; however, there is controversy attempted to determine the setting in which the infection was explained febrile episodes in this section. However, there has

The original surveillance definitions included BSI and un-

Systemic Infections

C. difficile

in “most” residents in LTFs, but they qualified this by saying that in facilities with quick access to laboratory facilities, physicians available to respond to results, and capacity to ad-

infection

A “primary episode” of C. difficile infection is defined as one that has occurred without any previous history of C. difficile infection or that has occurred ≥8 wk after the onset of a previous episode of C. difficile infection. A “recurrent episode” of C. difficile infection is defined as an episode of C. difficile infection that occurs 8 wk or sooner after the onset of a previous episode, provided that the symptoms from the earlier (previous) episode have resolved. Individuals previously infected with C. difficile may continue to remain colonized even after symptoms resolve. In the setting of an outbreak of GI infection, individuals could have positive test results for presence of C. difficile toxin because of ongoing colonization and also be coinfected with another pathogen. It is important that other surveillance criteria be used to differentiate infections in this situation.

infection have also

BSI. Only 1 reported on the total numbers of blood cultures from 2000. Since the Mylotte review, a single study from Israel

obtained during the study period,38 and 1 reported the pro-

TABLE 7. Surveillance Definitions for Gastrointestinal (GI) Tract Infections

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Gastroenteritis (at least 1 of the following criteria must be present)</td>
<td>Care must be taken to exclude noninfectious causes of symptoms. For instance, new medications may cause diarrhea, nausea, or vomiting; initiation of new enteral feeding may be associated with diarrhea; and nausea or vomiting may be associated with gallbladder disease. Presence of new GI symptoms in a single resident may prompt enhanced surveillance for additional cases. In the presence of an outbreak, stool specimens should be sent to confirm the presence of norovirus or other pathogens (eg, rotavirus or E. coli O157 : H7).</td>
</tr>
<tr>
<td>1. Diarrhea: 3 or more liquid or watery stools above what is normal for the resident within a 24-h period</td>
<td></td>
</tr>
<tr>
<td>2. Vomiting: 2 or more episodes in a 24-h period</td>
<td></td>
</tr>
<tr>
<td>3. Both of the following sign or symptom subcriteria</td>
<td>In the absence of laboratory confirmation, an outbreak (2 or more cases occurring in a long-term care facility [LTCF]) of acute gastroenteritis due to norovirus infection may be assumed to be present if all of the following criteria are present (“Kaplan Criteria”): (a) vomiting in more than half of affected persons; (b) a mean (or median) incubation period of 24–48 h; (c) a mean (or median) duration of illness of 12–60 h; and (d) no bacterial pathogen is identified in stool culture.</td>
</tr>
<tr>
<td>a. A stool specimen testing positive for a pathogen (eg, Salmonella, Shigella, Escherichia coli O157 : H7, Campylobacter species, rotavirus)</td>
<td>A “primary episode” of C. difficile infection is defined as one that has occurred without any previous history of C. difficile infection or that has occurred ≥8 wk after the onset of a previous episode of C. difficile infection. A “recurrent episode” of C. difficile infection is defined as an episode of C. difficile infection that occurs 8 wk or sooner after the onset of a previous episode, provided that the symptoms from the earlier (previous) episode have resolved. Individuals previously infected with C. difficile may continue to remain colonized even after symptoms resolve. In the setting of an outbreak of GI infection, individuals could have positive test results for presence of C. difficile toxin because of ongoing colonization and also be coinfected with another pathogen. It is important that other surveillance criteria be used to differentiate infections in this situation.</td>
</tr>
<tr>
<td>b. At least 1 of the following GI subcriteria</td>
<td></td>
</tr>
<tr>
<td>i. Nausea</td>
<td></td>
</tr>
<tr>
<td>ii. Vomiting</td>
<td></td>
</tr>
<tr>
<td>iii. Abdominal pain or tenderness</td>
<td></td>
</tr>
<tr>
<td>iv. Diarrhea</td>
<td></td>
</tr>
<tr>
<td>B. Norovirus gastroenteritis (both criteria 1 and 2 must be present)</td>
<td></td>
</tr>
<tr>
<td>1. At least 1 of the following GI subcriteria</td>
<td></td>
</tr>
<tr>
<td>a. Diarrhea: 3 or more liquid or watery stools above what is normal for the resident within a 24-h period</td>
<td></td>
</tr>
<tr>
<td>b. Vomiting: 2 or more episodes in a 24-h period</td>
<td></td>
</tr>
<tr>
<td>2. A stool specimen for which norovirus is positively detected by electron microscopy, enzyme immunoassay, or molecular diagnostic testing such as polymerase chain reaction (PCR)</td>
<td></td>
</tr>
<tr>
<td>C. Clostridium difficile infection (both criteria 1 and 2 must be present)</td>
<td></td>
</tr>
<tr>
<td>1. One of the following GI subcriteria</td>
<td></td>
</tr>
<tr>
<td>a. Diarrhea: 3 or more liquid or watery stools above what is normal for the resident within a 24-h period</td>
<td></td>
</tr>
<tr>
<td>b. Presence of toxic megacolon (abnormal dilatation of the large bowel, documented radiologically)</td>
<td></td>
</tr>
<tr>
<td>2. One of the following diagnostic subcriteria</td>
<td></td>
</tr>
<tr>
<td>a. A stool sample yields a positive laboratory test result for C. difficile toxin A or B, or a toxin-producing C. difficile organism is identified from a stool sample culture or by a molecular diagnostic test such as PCR</td>
<td></td>
</tr>
<tr>
<td>b. Pseudomembranous colitis is identified during histopathologic examination of a biopsy specimen</td>
<td></td>
</tr>
<tr>
<td>d. no bacterial pathogen is identified in stool culture. A “primary episode” of C. difficile infection is defined as one that has occurred without any previous history of C. difficile infection or that has occurred ≥8 wk after the onset of a previous episode of C. difficile infection. A “recurrent episode” of C. difficile infection is defined as an episode of C. difficile infection that occurs 8 wk or sooner after the onset of a previous episode, provided that the symptoms from the earlier (previous) episode have resolved. Individuals previously infected with C. difficile may continue to remain colonized even after symptoms resolve. In the setting of an outbreak of GI infection, individuals could have positive test results for presence of C. difficile toxin because of ongoing colonization and also be coinfected with another pathogen. It is important that other surveillance criteria be used to differentiate infections in this situation.</td>
<td></td>
</tr>
<tr>
<td>e. Presence of toxic megacolon (abnormal dilatation of the large bowel)</td>
<td></td>
</tr>
<tr>
<td>f. Vomiting: 2 or more episodes in a 24-h period</td>
<td></td>
</tr>
<tr>
<td>g. Diarrhea: 3 or more liquid or watery stools above what is normal for the resident within a 24-h period</td>
<td></td>
</tr>
<tr>
<td>h. Abdominal pain or tenderness</td>
<td></td>
</tr>
<tr>
<td>i. Nausea</td>
<td></td>
</tr>
<tr>
<td>j. Vomiting</td>
<td></td>
</tr>
<tr>
<td>k. Diarrhea</td>
<td></td>
</tr>
<tr>
<td>l. Culture or by a molecular diagnostic test such as PCR</td>
<td></td>
</tr>
<tr>
<td>m. Presence of new GI symptoms in a single resident may</td>
<td></td>
</tr>
<tr>
<td>n. Vomiting may be associated with gallbladder disease.</td>
<td></td>
</tr>
<tr>
<td>o. Diarrhea, nausea, or vomiting; initiation of new enteral feeding may be associated with diarrhea; and nausea or vomiting may be associated with gallbladder disease. Presence of new GI symptoms in a single resident may prompt enhanced surveillance for additional cases. In the presence of an outbreak, stool specimens should be sent to confirm the presence of norovirus or other pathogens (eg, rotavirus or E. coli O157 : H7).</td>
<td></td>
</tr>
<tr>
<td>p. Fever or higher</td>
<td></td>
</tr>
<tr>
<td>q. Initiation of new enteral feeding may be associated with diarrhea; and nausea or vomiting may be associated with gallbladder disease. Presence of new GI symptoms in a single resident may prompt enhanced surveillance for additional cases. In the presence of an outbreak, stool specimens should be sent to confirm the presence of norovirus or other pathogens (eg, rotavirus or E. coli O157 : H7).</td>
<td></td>
</tr>
</tbody>
</table>
has reported on results from blood cultures performed on samples from a multilevel geriatric facility over a 2-year period from 2002 to 2004.40 In this study, 252 (15.8%) of 1,588 cultures had positive results, which indicates an incidence of BSI of 0.46 per 1,000 resident-days. The study did not provide data on episodes of suspected contaminated cultures. However, in a cohort of 100 bacteremic residents, only 58% had received adequate empiric antibiotic therapy and the mortality rate was 34%, compared with 13% in nonbacteremic matched controls. The incidence of BSI and the prevalence of positive cultures were much higher in this study compared with earlier studies, suggesting that those LTCFs with the capacity to perform blood cultures and respond to results should include blood cultures in the diagnostic evaluation of infection.

Given the limited evidence addressing the effectiveness of blood cultures in LTCFs, we did not attempt to propose a revised surveillance definition for BSI. Instead, consideration should be given to an application of the NHSN criteria for central line–associated BSI in those LTCFs who care for residents with indwelling vascular catheters including peripherally inserted central catheters (PICCs) and hemodialysis catheters.27

CONCLUSIONS

These infection surveillance definitions for LTCFs update the consensus definitions proposed by McGeer et al, incorporating evidence published over the interim 20 years. The majority of definitions and criteria were retained with only minor revisions except for those for UTI, where the criteria were made more specific, and GI infection, where 2 new infections were added to the surveillance definitions (norovirus and C. difficile).

These updated definitions are intended to serve as a national standard for infection surveillance in LTCFs. Because they are implemented in this setting, feedback from providers and efforts to validate the definitions will guide subsequent modifications as appropriate.

CONTRIBUTORS

McGeer Study Steering Committee

Nimalie D. Stone and Suzanne F. Bradley (co–project leaders), Lindsay E. Nicolle, Andrew E. Simor, Philip W. Smith, Kurt B. Stevenson; Gastrointestinal Writing Group: Andrew E. Simor (group leader), Muhammad S. Ashraf, Carolyn V. Gould, Taranisia MacCannell, Preeti N. Malani; Respiratory Tract Infection Writing Group: Mark Loeb and Lona Mody (co–group leaders), Christopher C. Shen, Joseph P. Mylotte, Steven J. Schweon; Skin and Soft Tissue Writing Group: Philip W. Smith (group leader), Jennifer Calder, Kent Crossley, Mary-Claire Roghmann; Urinary Tract Infection Writing Group: Lindsay E. Nicolle (group leader), Paul J. Drinka, Ebbing Lautenbach, Manisha Juthani-Meha; Fever and Delirium Standards Sub-committee: Suzanne F. Bradley, Kent Crossley, Paul Drinka, Preeti Malani, Lona Mody, Lindsay Nicolle, Mary-Claire Roghmann, Nimalie D. Stone.

SHEA Long-Term Care Special Interest Group

Kurt B. Stevenson (chair; Ohio State University Hospitals, Columbus, OH), Nimalie D. Stone (vice-chair; Centers for Disease Control and Prevention, Atlanta, GA), Muhammad S. Ashraf (East Carolina University, Greenville, NC), Suzanne F. Bradley (University of Michigan Medical School and Geriatric Research Education and Clinical Center [GRECC], VA Ann Arbor Healthcare System, Ann Arbor, MI), Mike Brown (Evergreen Hospital Medical Center, Kirkland, WA), Chris Cahill (California Department of Public Health [retired], Richmond, CA), Jennifer Calder (New York Medical College, Valhalla, NY), Christopher J. Crnich (University of Wisconsin and William S. Middleton VA Medical Center, Madison, WI), Kent Crossley (University of Minnesota and Minneapolis VA Medical Center, Minneapolis, MN), Paul J. Drinka (Medical College of Wisconsin, Milwaukee, WI), Jon P. Furuno (Oregon State University, Portland, OR), Rosemary Ikram (Christchurch, New Zealand), Jennie Johnstone (McMaster University, Hamilton, ON), Manisha Juthani-Meha (Yale University School of Medicine, New Haven, CT), Keith S. Kaye (Wayne State University School of Medicine, Detroit, MI), Ebbing Lautenbach (University of Pennsylvania School of Medicine, Philadelphia, PA), Donna R. Lewis (Atlanta Veterans Affairs Medical Center, Atlanta, GA), Mark Loeb (McMaster University, Hamilton, ON), Anurag N. Malani (St. Joseph Mercy Hospital, Ypsilanti, MI), Preeti N. Malani (University of Michigan Medical School and GRECC, VA Ann Arbor Healthcare System, Ann Arbor, MI), James Marx (University of Phoenix, San Diego, CA), Allison McGeer (University of Toronto School of Medicine, Toronto, ON), Lona Mody (University of Michigan Medical School and GRECC, VA Ann Arbor Healthcare System, Ann Arbor, MI), Joseph P. Mylotte (University at Buffalo School of Medicine and Biomedical Sciences, Buffalo, NY), Lindsay E. Nicolle (University of Manitoba, Winnipeg, MB), Joseph F. Perez (Centers for Disease Control and Prevention, Atlanta, GA), Chesley Richards (Centers for Disease Control and Prevention, Atlanta, GA), Mary-Claire Roghmann (University of Maryland School of Medicine and Baltimore VA Medical Center, Baltimore, MD), Brenda J. Roup (Maryland Department of Health and Mental Hygiene, Baltimore, MD), Steven J. Schweon (Pleasant Valley Manor Nursing Home, Stroudsburg, PA), Joseph Segal (Drake Center, Cincinnati, OH), Andrew E. Simor (University of Toronto School of Medicine, Toronto, ON), Michael R. Spence (Kalispell Regional Medical Center, Kalispell, MT), Philip W. Smith (University of Nebraska Medical Center, Omaha, NE), Laurie D. Thrupp (University of California, Irvine, CA), Kavita Trivedi (California Department of Public Health, Richmond, CA), Constanze Wendt (University of Heidelberg, Heidelberg, Germany).
ENDORSEMENTS

These definitions have been endorsed by the American Medical Directors Association, the Association of Medical Microbiology and Infectious Disease–Canada, the Association for Professionals in Infection Control and Epidemiology, the Community and Hospital Infection Control Association–Canada, and the National Association of Directors of Nursing Administration in Long Term Care.

ACKNOWLEDGMENTS

Special thanks to Malinda McCarthy and Elizabeth Bolyard from the Centers for Disease Control and Prevention for their administrative and organizational support of this writing project.

Potential conflicts of interest. All authors report no conflicts of interest relevant to this article. All authors submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest, and the conflicts that the editors consider relevant to this article are disclosed here.

Address correspondence to Dr. Nimalie D. Stone, 1600 Clifton Road NE, DHQP/CDC, Mailstop A-31, Atlanta, GA 30333 (nstone@cdc.gov).

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the Department of Veterans Affairs.

REFERENCES


RECOMMENDATIONS FOR THE PREVENTION AND CONTROL OF VIRAL GASTROENTERITIS OUTBREAKS IN WISCONSIN LONG-TERM CARE FACILITIES

Wisconsin Division of Public Health
Bureau of Communicable Diseases
Bureau of Communicable Disease and Emergency Response
In Cooperation with the Bureau of Occupational and Environmental Health and the Division of Quality Assurance

Revised 10/20/2009
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Frequently Asked Questions</td>
<td>2-4</td>
</tr>
<tr>
<td>I. Limit transmission when initial cases of viral gastroenteritis are suspected</td>
<td>4</td>
</tr>
<tr>
<td>A. Notification</td>
<td>4</td>
</tr>
<tr>
<td>B. Management of Residents and Staff</td>
<td>4</td>
</tr>
<tr>
<td>II. Institute control measures when a viral gastroenteritis outbreak is suspected without waiting for diagnostic confirmation</td>
<td>5-8</td>
</tr>
<tr>
<td>A. Notification</td>
<td>5</td>
</tr>
<tr>
<td>B. Management of Residents</td>
<td>5</td>
</tr>
<tr>
<td>C. Management of Staff</td>
<td>5-6</td>
</tr>
<tr>
<td>D. Management of Ill Staff</td>
<td>6-7</td>
</tr>
<tr>
<td>E. Management of Environment</td>
<td>7-8</td>
</tr>
<tr>
<td>F. Laundry Concerns</td>
<td>8</td>
</tr>
<tr>
<td>G. Management of Visitors</td>
<td>8</td>
</tr>
<tr>
<td>References</td>
<td>9</td>
</tr>
<tr>
<td>Appendix 1 Disinfection and Preparation of Chlorine Solutions</td>
<td>10</td>
</tr>
<tr>
<td>A. Examples of items to disinfect</td>
<td>10</td>
</tr>
<tr>
<td>B. What works best</td>
<td>10</td>
</tr>
<tr>
<td>C. Chlorine bleach concentrations and mixing instructions</td>
<td>10</td>
</tr>
<tr>
<td>Appendix 2 Example of signage that can be used during an outbreak</td>
<td>11</td>
</tr>
<tr>
<td>Appendix 3 Sample Case Log (Line list) of Residents during outbreaks of gastrointestinal illness</td>
<td>12</td>
</tr>
<tr>
<td>Appendix 4 Sample Case Log (Line list) of Staff during outbreaks</td>
<td>13</td>
</tr>
<tr>
<td>of gastrointestinal illness</td>
<td></td>
</tr>
</tbody>
</table>
Introduction
Outbreaks of gastroenteritis in long-term care facilities (LTCFs) are not uncommon, and can become epidemic during the winter and early spring. Viruses (norovirus specifically) cause most of these outbreaks, and they are almost always transmitted from person-to-person (including residents, staff, visitors and volunteers). Norovirus can persist in the environment and is resistant to most disinfectants, and as a result contamination of the environment plays a key role in transmission. Only occasionally is an outbreak in a LTCF caused by contaminated food.

While norovirus infection is usually mild in otherwise healthy adults, illness can be severe in the elderly, particularly in those with underlying medical problems. In one recent 2-year period (2006-2007), Wisconsin had 113 reported non-foodborne outbreaks of viral gastroenteritis and 88 (78%) occurred in LTCFs. In these nursing homes 3705 residents were reported ill, 65 were hospitalized, and 6 residents died.

Norovirus outbreaks can be detected early by recognizing the typical symptoms of illness, and can be controlled by promptly implementing aggressive infection control measures to prevent the virus from being transmitted from person to person. When appropriate prevention and control measures are not implemented immediately, outbreaks can continue for weeks causing many illnesses, some hospitalizations and the occasional death from dehydration and other complications of vomiting and diarrhea.

The Wisconsin Division of Public Health (DPH), Bureau of Communicable Disease and Emergency Response (BCDER) developed these recommendations in cooperation with the Division of Quality Assurance (DQA). This information was developed to assist facility staff assigned to infection control with the development of a rational approach to the prevention and control of viral gastroenteritis outbreaks in LTCFs.

It is the responsibility of the LTCF to implement aggressive infection control measures quickly and to notify the appropriate agencies of the outbreak or suspected outbreak. Local Health Departments, the BCDER and DQA staff are available to provide guidance during the outbreak. Public health can approve laboratory testing of stool specimens free of charge in order to confirm the etiology of the outbreak. In return, LTCFs are expected to follow infection control standards of practice and to provide public health with copies of line lists (See Appendices 3, 4) detailing the extent of the outbreak among both residents and staff.
Frequently Asked Questions

What causes viral gastroenteritis in LTCFs?
Gastroenteritis is an inflammation of the stomach and intestines. This usually results in vomiting and/or diarrhea. Outbreaks of gastroenteritis in LTCFs are almost always due to a group of viruses called caliciviruses, which includes norovirus. Bacteria such as Salmonella, Shigella, or Campylobacter also occasionally cause gastroenteritis in LTCFs, but are more likely to be foodborne and the patterns of illness that occur are usually different from viral gastroenteritis.

What are the signs and symptoms of viral gastroenteritis?
The main symptoms of viral gastroenteritis are sudden onset of vomiting and diarrhea. Vomiting is usually prominent but may be infrequent or absent. Diarrhea tends to be watery, short-lived and less severe than that which results from gastroenteritis caused by bacteria. Vomiting is more common in the young, and diarrhea is more common in adults. The affected person may also have headache, fever (usually low-grade), chills and abdominal cramps ("stomach ache"). These symptoms can occur in various combinations during an outbreak. When viral gastroenteritis occurs during the winter it is often referred to as “intestinal influenza” or “stomach flu”, although it has no relationship to respiratory infections caused by the influenza virus.

Illness begins between one to two days following exposure to the virus. Unless complicated by underlying illness, age, or dehydration, the illness is generally mild and of short duration (one to two days), although some individuals may continue to feel weak for several days. Immunity occurs following infection but lasts only a short time, so that everyone is at risk of becoming infected again, from the same virus, three or four months later, although the substantial strain variability of norovirus and the lack of cross-protective immunity, exposure to and infection with one strain dies not seem to afford any protection from a different strain.

How is viral gastroenteritis spread?
Norovirus is extremely contagious and is primarily spread when microscopic viral particles are transferred from contaminated hands to the mouth and ingested (fecal-oral). Norovirus can also spread via a droplet route from vomitus (CDC, 2006). Millions of particles are present in the stool and vomitus and it takes only a small number to cause illness. Excretion of virus in the stool begins a few hours before the onset of symptoms and reaches a maximum 24–72 hours after exposure and the duration of shedding may last up to 4 weeks. The virus can continue to be present in the stool of infected persons for a week or more after symptoms have subsided. Persons who have been infected but do not develop symptoms may also shed the virus in their stool. Vomiting may also disperse viral particles through the air, resulting in exposure of persons nearby and in contamination of environmental surfaces and objects. Noroviruses are relatively stable in the environment and can survive on inanimate surfaces for up to a week or more and are relatively resistant to common disinfecting products, heat, and cold. Transmission can occur when individuals touch environmental surfaces or objects contaminated with these viruses and then touch their mouth (CDC, 2006).
In a healthcare facility the virus is spread primarily when ill persons (Residents, healthcare workers, visitors) contaminate their hands with feces or vomitus containing the viral particles. It is impossible to be sure that hand hygiene eliminates the virus from the hands of symptomatic persons. Ill healthcare workers dispensing medication have been responsible for person-to-person transmission in some outbreaks.

**Can viral gastroenteritis be spread by food and water?**

Norovirus can also be transmitted by food and water, however, the extent to which this occurs in LTCFs is unknown. Food preparers or handlers who have viral gastroenteritis may contaminate food, especially if they do not wash their hands thoroughly after using the bathroom or do not wear gloves while handling food. Cold foods such as salad and sandwiches have been implicated in many outbreaks. Contamination of drinking water with norovirus is typically associated with the breakdown of routine chlorination for municipal water supplies and sewage or other fecal contamination of well water sources.

**How is viral gastroenteritis diagnosed?**

Viral gastroenteritis cannot be diagnosed by traditional stool cultures (for bacteria) or by examination of stool for ova and parasites. Norovirus can be more reliably identified by reverse transcription-polymerase chain reaction (RT-PCR), which is available through the Wisconsin State Laboratory of Hygiene (WSLH), Milwaukee City Health Department Laboratory and some private laboratories.

The same Kit #10 (Cary Blair Transport Media), routinely used for enteric bacterial pathogens, can also be used for norovirus testing. Ideally, stool samples should be obtained from 4 to 6 ill persons within 48-72 hours after the onset of symptoms. However RT-PCR testing can often detect viral particles for up to a week after the symptoms have resolved. While PCR can be completed within one day of receiving a specimen, **decisions to institute aggressive infection control measures should not be delayed while waiting for results.** Decisions regarding testing for norovirus should be made after consultation with the facility medical director and your local health department.

**How can an outbreak of viral gastroenteritis be identified?**

Facilities are required to maintain an infection prevention and control program that includes a surveillance program for infections common to LTCFs including viral gastrointestinal disease. **An outbreak of viral gastroenteritis should be suspected when two or more residents and/or staff develop new onset of vomiting and/or diarrhea within one to two days.** Vomiting may be present in at least half of the ill persons. Other symptoms may include nausea with or without vomiting, abdominal cramping, fatigue, body aches and occasionally a
low grade fever. Facilities should immediately institute aggressive infection control measures anytime an outbreak is suspected.

How is an outbreak of viral gastroenteritis controlled?
Despite all the control measures and precautions that a facility may have in place, there is usually little that can be done to prevent the initial introduction of the virus into the facility by an infected healthcare worker or visitor who may be shedding the virus even before they are ill. In addition, infected individuals may never be symptomatic, although immediate implementation of precautions for signs/symptoms of acute gastrointestinal illness may limit the extent of the outbreak. The following recommendations may assist facility personnel in controlling an outbreak of viral gastroenteritis.

I. Limit transmission when initial cases of viral gastroenteritis are suspected

A. Notification
   1. Each resident unit should immediately report any resident(s) or staff member(s) with a sudden onset of symptoms suggestive of viral gastroenteritis to the person in-charge and infection control practitioner who should immediately take appropriate action. The medical director should be consulted anytime the facility suspects an outbreak.
   2. New cases should be recorded daily using a line list (see Appendix 3 & 4).
   3. Notify the local health department of any suspected or confirmed outbreak. Consult with the local health department about laboratory testing.
   4. Notify “sister” facilities that may share staff/resources with the affected facility so they can put proper control measures in place and monitor for illness.

B. Management of Residents and Staff
   1. Immediate isolation of the resident and restricting access to affected areas is essential.
   2. Confine symptomatic residents to their rooms until 48 hours after symptoms cease. Symptomatic residents should be cohorted (e.g., residents with the same infection may share a room).
   3. Exclude non-essential staff from entering room.
   4. Require symptomatic staff, visitors and volunteers to stay home until they are symptom-free for at least 48 hours.
   5. Discontinue "floating" staff from the affected unit to non-affected units, if possible.
   6. Discontinue “floating” staff from affected units to food service.
   7. Consider discontinuing use of common dining areas and instituting in-room dining.
8. If the outbreak continues, facility staff in consultation with their medical director should consider closing the unit/neighborhood or facility to new admissions as well as referring facilities such as other nursing homes or hospitals.

9. Suspend discharges/transfers to other facilities.

II. Institute control measures when a viral gastroenteritis outbreak is suspected without waiting for diagnostic confirmation

A. Notification: see above. All suspected/confirmed outbreaks must be reported immediately to the local health department.

B. Management of Residents

1. Minimize movement of residents. Asymptomatic, exposed residents should not be moved from an affected to an unaffected resident unit. The value in moving asymptomatic residents who have been exposed (e.g., to a symptomatic roommate) is uncertain since they may already be infected.

2. Cancel or postpone group activities for at least 48 hours after the last identified case.

3. Clean and disinfect all equipment including, but not limited to: blood pressure cuffs, stethoscopes, electronic thermometers and transfer lifts before using for another resident.

4. Consider dedicating commonly used equipment for use in affected areas.

5. Ensure health care providers managing a symptomatic resident’s medical care are aware of their resident’s illness to determine if any changes to medical management are warranted.
   a. Consult with health care provider for residents experiencing vomiting and/or diarrhea who are also taking fluid depleting drugs and/or laxatives.
   b. Consider use of anti-emetics for patients with vomiting.

6. For residents experiencing vomiting and/or diarrhea, monitor hydration status to include implementation of intake and output monitoring.

7. Limit new admissions until the incidence of new cases has reached zero for at least 48 hours. If new admissions are being considered, consult with the infection control practitioner and the facility medical advisor first. Consider admitting resident(s) to an unaffected unit or to a unit that has no new cases for 48 hours.

8. If any resident, regardless of symptoms, is transferred to a hospital or other facility, notify the facility (and EMS or private ambulance service if used) that the resident is coming from a facility at which an outbreak of viral gastroenteritis is occurring.

9. Eliminate the storage and sharing of resident’s personal food supplies for the duration of the outbreak.
C. Management of Staff

1. Staff assignments
   a. Maintain the same staff to resident assignments, if possible.
   b. Limit staff from moving between affected and unaffected units.
   c. Discontinue “floating” staff from affected units and other facilities to food service.
   d. Provide education and DPH Disease Fact Sheets on viral gastroenteritis to all staff. Include symptoms, transmission prevention precautions, and work exclusion guidelines.

2. Implement “contact precautions”:
   a. Wear personal protective equipment to include gloves, and gown (mask and goggles or face shield if vomitus present) upon entry to the room and when in contact with the symptomatic resident (CDC, 2004).
   b. Remove gloves, goggles or face shield, gown, mask, and then perform hand hygiene immediately after removing all personal protective equipment and before contact with an unaffected resident in the same room or when exiting the resident’s room (CDC, 2004).
      i. If gloves or hands are visibly soiled with feces or vomitus, wash hands with soap and water.
      ii. Alcohol hand gels may be used if gloves or hands have not been visibly soiled. Given the variability in reported effectiveness of alcohol-based hand sanitizers in inactivating various norovirus strains, the CDC generally recommends washing with soap and water as the preferred method of hand hygiene. Use of alcohol hand gels after washing with soap and water or in a situation when such facilities are not available, may be helpful in outbreak settings.
   c. After glove and gown removal and hand hygiene, ensure that hands and clothes do not touch potentially contaminated environmental surfaces or items in the resident’s room, such as bed rails, light switches, door knobs and tables.

D. Management of Ill Staff

1. A staff illness policy outlining the duty to inform requirements for exclusion and the circumstances for returning to work (48 hours) should be developed and implemented and all employees should be educated about the policy. Consider developing a sick leave policy that provides compensation or other non-punitive approaches to encourage self-reporting of ill staff and appropriate exclusion.

2. During an outbreak, staff should exclude themselves from resident care and/or food service duties at the onset of symptoms including nausea, vomiting, abdominal pain and/or diarrhea. Such exclusions shall remain in effect until the
employee is asymptomatic and free of symptoms for 48 hours. Testing for norovirus is not required before staff return to work.

a. Virus may be excreted in stool for 2 or more weeks. Because of continued excretion of virus, the need for meticulous hand hygiene should be stressed to staff returning from illness.

3. The loss of a large number of staff may place a significant burden on those remaining at work but exclusion of the ill staff is still an essential transmission control strategy.

4. Educate staff about the need to maintain strict hand hygiene and a clean environment to minimize the risk of household transmission of norovirus infection. Facility management staff should conduct surveillance rounds to ensure staff are complying with appropriate infection control measures.

5. A log should be maintained to record ill staff symptoms, date when they became ill, date they became well, and when they returned to work (See appendix 4).

6. During the outbreak, in order to avoid transmission to food service personnel, staff from the affected unit should deliver food items to the affected area. Food service personnel should consult with infection control personnel before resuming routine food service delivery to the affected unit. Carts used for food or drug distribution should be continually disinfected immediately before and after usage since they are handled by more than just food staff, including CNAs or LPNs.

7. Educate food service personnel about the need to adhere to strict hand washing regimens and cleanliness of the kitchen area and food service equipment used outside the kitchen area (e.g., tray containers). Any food service employee experiencing symptoms of acute gastrointestinal illness resembling norovirus shall be excluded from working until 48 hours after symptoms end.

E. Management of Environment

1. Increase the frequency of routine environmental cleaning including bathrooms and the area surrounding the resident’s living space. Particular attention should be given to cleaning objects that are frequently touched such as faucets, door handles, light switches and bed rails.

2. Clean and disinfect vomit and fecal spills promptly. All individuals cleaning surfaces soiled with vomitus or fecal material should wear a gown, gloves, and a surgical or procedure mask. After glove and gown removal and hand hygiene, ensure that hands and clothes do not touch potentially contaminated environmental surfaces or items in the resident’s room. Exposed food items such as candy, fruit, cups or glasses with straws should be discarded.

3. CDC recommends that chlorine bleach should be applied to hard, non-porous, environmental surfaces at a minimum concentration of 1000 ppm. This concentration has been demonstrated in the laboratory to be effective against
surrogate viruses with properties similar to those of norovirus. Healthcare facility staff should use appropriate PPE (e.g., gloves and goggles) when working with bleach. In areas with high levels of soiling and resistant surfaces, up to 5000 ppm chlorine bleach may be used. (See Appendix 1, page 11). The reliability of disinfectants other than those containing chlorine to kill norovirus is uncertain, although recent studies by the Nebraska Cooperative Extension and the USDA have shown that certain oxidizing agents registered by the U.S. EPA (e.g., Virkon), are effective virucidal agents. The effectiveness of other EPA-approved disinfectants or norovirus clean-up is uncertain.

4. Norovirus may remain viable for up to 12 days in carpeting or other environmental surfaces. Therefore, a thorough cleaning of carpets, curtains, walls, and all equipment is essential. Steam cleaning should be used for all carpeting and soft furnishings. Dry vacuuming has the potential to re-circulate the viruses and is not recommended.

5. Enhanced cleaning and disinfection should continue for at least 72 hours after the last documented case.

F. Laundry Concerns

1. Do not shake soiled linens and laundry. Aerosols created may pose a risk for transmission. Soiled linens should be placed directly into a bag at the point of removal. Minimize the number of staff handling this material.

2. Contaminated pillows should be laundered as infected linen unless they are covered with an impermeable cover, in which case they should be disinfected with a hypochlorite solution (See Appendix 1).

3. Ensure proper segregation of clean and soiled laundry.

4. Ensure laundry personnel are made aware of the potentially infected linen and are provided with appropriate PPE.

G. Management of Visitors

1. Post signage that the facility is experiencing an increase in gastrointestinal illness.

2. Visits to symptomatic residents should be discouraged, especially by children, the elderly and persons with underlying medical conditions.

3. If visitation is necessary, health care workers should instruct visitors on the appropriate procedure for putting on and removing gowns, gloves and masks (if the resident is vomiting) and hand hygiene, and provide education and DPH Norovirus Disease Fact Sheets.
**References**


CDC. Personal Protective Equipment (PPE) in Healthcare Setting  

CDC. Norovirus in Healthcare Facilities.  
[http://www.cdc.gov/ncidod/dhqp/id_norovirusFS.html](http://www.cdc.gov/ncidod/dhqp/id_norovirusFS.html)


[http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5009a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5009a1.htm)
Appendix 1

Disinfection and Preparation of Chlorine Solutions

A. Examples of items to disinfect:
   Doorknobs, faucets, sinks, toilets, commodes, bath rails, phones, counters, chairs, bottles, hand rails, food and drug delivery carts, elevator buttons, light switches, mattress covers, aprons, uniforms, bedding and computer keyboards.

B. What works best: Chlorine bleach and Virkon

C. Chlorine bleach concentrations and mixing instructions:

   **1000 ppm**
   - Use for non-porous surfaces, tile floors, counter-tops, sinks, toilets
   - 1/3 cup bleach in 1-gallon of water (1:50 dilution).

   **5000 ppm**
   - Use for porous surfaces, wooden floors
   - 1 2/3 cup bleach in 1-gallon water (1:10 dilution)

   Ineffective disinfectants: Quaternary compounds, ethanol anionic compounds.

The following page is an example of signage that your facility may wish to use during a suspected gastrointestinal outbreak.
Because we are currently experiencing an increase in the number of residents with gastrointestinal illness in our facility, we ask that you please check in at the front desk before visiting with your family member or friend.

-- Thank you for your cooperation
Appendix 3. Sample Case Log (Line list) of Residents during outbreaks of gastrointestinal illness.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Building or Unit</th>
<th>Room</th>
<th>Onset</th>
<th>N</th>
<th>V</th>
<th>D</th>
<th>AC</th>
<th>Fe</th>
<th>Ch</th>
<th>Well day / Died</th>
<th>Hosp.</th>
<th>Lab Results</th>
</tr>
</thead>
</table>

Onset=Onset of Illness; N=Nausea, V=Vomiting, D=Diarrhea; AC=Abdominal Cramping; Fe=Fever; Ch=Chills; Hosp=Hospitalization
### Appendix 4. Sample Case Log (Line list) of Staff during outbreaks of gastrointestinal illness.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Assignment</th>
<th>Onset</th>
<th>Well</th>
<th>N</th>
<th>V</th>
<th>D</th>
<th>AC</th>
<th>Fe</th>
<th>Ch</th>
<th>Ret - Wk</th>
<th>Hosp.</th>
<th>Lab Results</th>
</tr>
</thead>
</table>

Onset=Onset of Illness; Well=Well Day; N=Nausea, V=Vomiting, D=Diarrhea; AC=Abdominal Cramping; Fe=Fever; Ch=Chills; Rt-Wk=Return to Work date; Hosp=Hospitalization
<table>
<thead>
<tr>
<th>Wipes</th>
<th>YES- USE HERE!!!</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advanced hydrogen peroxide</strong></td>
<td>WASHING MACHINES AND DRYERS CARTS and TABLES</td>
</tr>
<tr>
<td>1 MINUTE CONTACT FOR BACTERIA AND VIRUSES</td>
<td>EQUIPMENT</td>
</tr>
<tr>
<td>______ (Lid/Label/package color)</td>
<td>COMPUTER TOUCH SCREENS AND TERMINALS</td>
</tr>
<tr>
<td><em>(Insert photo here)</em></td>
<td>DIARRHEA, NAUSEA, VOMITING</td>
</tr>
<tr>
<td></td>
<td>SAFE FOR SURFACES EXCEPT FOR MARBLE</td>
</tr>
<tr>
<td><strong>BLEACH DETERGENT WIPES</strong></td>
<td>WASHING MACHINES</td>
</tr>
<tr>
<td>1 MINUTE CONTACT TIME FOR BACTERIA AND VIRUSES</td>
<td>BLOOD TESTING EQUIPMENT</td>
</tr>
<tr>
<td>______ (Lid/Label/package color)</td>
<td>ISOLATION ROOMS</td>
</tr>
<tr>
<td><em>(Insert photo here)</em></td>
<td>(INCLUDING C-DIFF)</td>
</tr>
<tr>
<td>USE CAREFULLY</td>
<td>ROOMS WHERE INDIVIDUAL HAS HAD</td>
</tr>
<tr>
<td>WILL DAMAGE SURFACES</td>
<td>DIARRHEA, NAUSEA, VOMITING</td>
</tr>
<tr>
<td>USE GLOVES</td>
<td></td>
</tr>
<tr>
<td><strong>Alcohol-based hand sanitizer wipes</strong></td>
<td><strong>HANDS OF RESIDENTS</strong></td>
</tr>
<tr>
<td><em>(Insert photo here)</em></td>
<td>STAFF</td>
</tr>
<tr>
<td>______ (Lid/Label/package color)</td>
<td>EMPLOYEES</td>
</tr>
<tr>
<td></td>
<td>VISITORS</td>
</tr>
<tr>
<td></td>
<td>CHILDREN</td>
</tr>
<tr>
<td><strong>PERSONAL CLEANSING CLOTHS</strong></td>
<td>WIPE 15- 30 SECONDS</td>
</tr>
<tr>
<td><strong>THESE WIPES DO NOT KILL GERMS</strong></td>
<td><strong>RESIDENT/PATIENT/CLIENT SKIN</strong></td>
</tr>
<tr>
<td>______ (Lid/Label/package color)</td>
<td>EVERY DAY CLEAN UP</td>
</tr>
<tr>
<td><em>(Insert photo here)</em></td>
<td>PERSONAL CARE</td>
</tr>
<tr>
<td></td>
<td>INCONTINENCE CARE</td>
</tr>
</tbody>
</table>
**Case Identification for all Category I and II Diseases**

<table>
<thead>
<tr>
<th>Patient’s Name (Last)</th>
<th>(M.I.)</th>
<th>Date of Birth (mm/dd/yyyy)</th>
<th>Age</th>
<th>Sex</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Patient’s Address</th>
<th>City</th>
<th>State</th>
<th>Zip Code</th>
</tr>
</thead>
</table>

**Demographic Data Patient Information**

<table>
<thead>
<tr>
<th>County of Residence</th>
<th>Home Telephone</th>
<th>Work Telephone</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Patient’s Parent / Guardian if patient is a minor (not needed for STD)</th>
<th>Patient’s Employer &amp; Occupation or School, Day Care, Institution</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Race:</th>
<th>American Indian or Alaskan Native</th>
<th>Asian</th>
<th>Black or African American</th>
<th>Hawaiian or Pacific Islander</th>
<th>White</th>
<th>Other</th>
<th>Specify:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Patient Pregnant?</th>
<th>If yes, Due date (mm/dd/yyyy)</th>
<th>Patient Died of This Illness?</th>
<th>Patient Hospitalized?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date arrived in U.S.</th>
</tr>
</thead>
</table>

**Morbidity Data**

<table>
<thead>
<tr>
<th>Disease / Organism</th>
<th>Date of Onset</th>
<th>Specimen Type</th>
<th>Outbreak Related?</th>
<th>Underlying Medical Condition?</th>
<th>Unknown</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Lab data (test name, test date, test result; include confirmatory tests)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Immunization data (immunization name and date(s))</th>
</tr>
</thead>
</table>

**Complete appropriate section for specific disease(s)**

<table>
<thead>
<tr>
<th>SFHLS</th>
<th>Gonorrhea</th>
<th>Chlamydia</th>
<th>Chancroid</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Primary (chancre present)</th>
<th>Secondary (skin lesions, rash, etc.)</th>
<th>Early Late (asymptomatic, &lt;1 yr)</th>
<th>Late Late (over 1 yr duration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurosyphilis</td>
<td>Cardiovascular</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Congenital</th>
<th>Cardiovascular</th>
<th>Other</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Type and Amount of Treatment</th>
</tr>
</thead>
</table>

**Sexually Transmitted Diseases**

<table>
<thead>
<tr>
<th>Campylobacter, Cryptosporidia, E. coli, Giardia, Hepatitis A, Salmonella, Shigella, Yersinia</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Check below if patient:</th>
<th>Other:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>is a food handler.</th>
<th>attends or works at a day care center.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>is a health care worker.</th>
<th>is in contact with animals. Specify animal:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>drinks unpasteurized milk.</th>
<th>traveled out-of-state. Location / dates:</th>
</tr>
</thead>
</table>

**Enteric Diseases and Hepatitis**

<table>
<thead>
<tr>
<th>Campylobacter, Cryptosporidia, E. coli, Giardia, Hepatitis A, Salmonella, Shigella, Yersinia</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Check below if patient:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>is a food handler.</th>
<th>attends or works at a day care center.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>is a health care worker.</th>
<th>is in contact with animals. Specify animal:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>drinks unpasteurized milk.</th>
<th>traveled out-of-state. Location / dates:</th>
</tr>
</thead>
</table>

**Mycobacteriology**

<table>
<thead>
<tr>
<th>Specimen type and date collected (mm/dd/yyyy)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Smear</th>
<th>Positive</th>
<th>Negative</th>
<th>Pending</th>
<th>Not done</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Nucleic acid amplification</th>
<th>Positive</th>
<th>Negative</th>
<th>Pending</th>
<th>Not done</th>
<th>Indeterminate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Culture</th>
<th>Positive</th>
<th>Negative</th>
<th>Pending</th>
<th>Not done</th>
<th>Indeterminate</th>
</tr>
</thead>
</table>

If culture positive:

- M. tuberculosis complex
- Atypical Mycobacteria, Specify:

<table>
<thead>
<tr>
<th>Patient’s country of origin</th>
</tr>
</thead>
</table>

**Varicella and Comments**

<table>
<thead>
<tr>
<th>Varicella Severity Estimate:</th>
<th>Mild (&lt;50 lesions)</th>
<th>Moderate (Approx. 50-499 lesions)</th>
<th>Severe (Approx. 500+ lesions)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Epi-Linked to Another Varicella Case?</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
</table>

**Comments:**

<table>
<thead>
<tr>
<th>Date rec’dby LHD</th>
<th>Date sent to DPH</th>
</tr>
</thead>
</table>

**Reporting Source (Required)**

<table>
<thead>
<tr>
<th>Agency Reporting (Name &amp; Address)</th>
<th>Date reported</th>
<th>Telephone No.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Attending Physician (Name &amp; Address)</th>
<th>Interviewer Initials</th>
<th>Telephone No.</th>
</tr>
</thead>
</table>
Information for Completing

ACUTE AND COMMUNICABLE DISEASE CASE REPORT

WISCONSIN STATUTE CHAPTER 252.05 AND ADMINISTRATIVE RULE CHAPTER HFS 145 REQUIRE REPORTING OF COMMUNICABLE DISEASES.

Persons required to report include any person licensed under ch. 441 and 448, Wis. Stats., or any other person having knowledge that a person has a communicable disease such as:

- A person in charge of infection control at a health care facility
- Laboratory directors
- School nurses, principals of schools and day care center directors

For further information see Wisconsin Administrative Rule HFS 145.

Diseases listed under categories I and II are to be reported to the local city or county health officer located in the local public health department of the patient’s place of residence. Category III conditions must be reported directly to the state epidemiologist. Complete the “Demographic Data”, “Morbidity Data” and “Reporting Source” sections for ALL diseases. For diseases preceded by an asterisk (*), provide immunization history. Follow-up epidemiologic information may be requested by local or state public health officials. Send copy "A" and copy "B" to the local health officer. Copy "C" may be retained with the patient’s record.

REPORT THE FOLLOWING DISEASES TO YOUR LOCAL HEALTH AGENCY

CATEGORY I:
The following diseases are of urgent public health importance and shall be reported IMMEDIATELY by telephone or fax to the patient's local health officer upon identification of a case or suspected case. In addition to the immediate report, within 24 hours complete and mail an Acute and Communicable Diseases Case Report (DPH 4151) or enter the report into the Wisconsin Electronic Disease Surveillance System. Public health intervention is expected as indicated. See s. HFS 145.04 (3) (a).

Anthrax1,4,5
Butyrium1,4
Botulism, infant1,2,4
Cholera1,3,4
*Diabetes1,3,4,5
*Haemophilus influenzae invasive disease, (including epiglottitis)1,3,5
Hantavirus infection1,2,4,5
*Hepatitis A1,2,3,4,5
*Hepatitis B1,2,3,4,5
Hepatitis C1,2
Meningococcal disease1,2,3,4,5
Meningococcal disease1,2,3,4,5
Meningococcal infection1,2,3,4,5
Meningitis, bacterial (other than Haemophilus influenzae, meningococcal or streptococcal, which are reportable as distinct diseases)2
*Pertussis (whooping cough)1,2,3,4,5
Plague1,4,5
*Poliovirus infection (paralytic or nonparalytic)1,4,5
Rabies (human)1,4,5
Ricin toxin1,4,5
*Rubella1,2,4,5
*Rubella (congenital syndrome)1,4,5
Severe Acute Respiratory Syndrome-associated Coronavirus (SARS-COV)1,2,3,4
Smallpox1,2,3,4
Tuberculosis1,2,3,4
Vancomycin-resistant Staphylococcus aureus (VISA) and Vancomycin-resistant Staphylococcus aureus (VRSA) infection1,2,4,5
*Yellow fever1,4
*Any illness caused by an agent that is foreign, exotic or unusual to Wisconsin, and that has public health implications4

CATEGORY II:
The following diseases shall be reported to the local health officer on an Acute and Communicable Diseases Case Report (DPH 4151) or by other means or by entering the data into the Wisconsin Electronic Disease Surveillance System within 72 hours of the identification of a case or suspected case. See s. HFS 145.04 (3) (b).

Arboviral disease1,2,4
Babesiosis1,2,4
Blastomyocosis6
Brucellosis1,4
Campylobacteriosis (campylobacter infection)1,2,4
Chancroid1,2,4,5
Chlamydia trachomatis infection1,2,4,5
Cryptosporidiosis1,2,3,4
Cyclosporiasis1,2,3,4
Ehrlichiosis (anaplasmosis)1,5
E. coli 0157:H7, other Shiga toxin-producing E. coli (STEC), enteropathogenic E. coli, enteroinvasive E. coli, and enterotoxigenic E. coli,1,2,3,4
Giardia1,3,4
Gonorrhea1,2,4,5
Hemolytic uremic syndrome1,2,4
*Hepatitis B1,2,3,4,5
Hepatitis C1,2,3,4,5
Hepatitis D1,3,4,5
Hepatitis E1,4
Histoplasmosis5
Influenza-associated pediatric death1,2
Influenza A virus infection, novel subtypes1,2
Kawasaki disease2
Legionellosis1,2,4
Leprosy (Hansen Disease)1,2,3,4,5
Leprosis1,2,4,5
Listeriosis1,2,4
Lyme disease1,2
Lymphocytic Choriomeningitis Virus (LCMV) infection4
Malaria1,2,4
Meningitis, bacterial (other than Haemophilus influenzae, meningococcal or streptococcal, which are reportable as distinct diseases)2
*Mumps1,2,4,5
Mycobacterial disease (nontuberculous)2
Psittacosis1,2,4
Pelvic inflammatory disease1,2,4
Q Fever1,2,4
Rheumatic fever (newly diagnosed and meeting the Jones criteria)5
Rocky Mountain spotted fever1,2,4,5
Salmonellosis1,3,4
Syphilis1,2,4,5
Shigellosis1,3,4
Streptococcal disease (all invasive disease caused by Groups A and B streptococci)1,2
Streptococcus pneumoniae invasive disease (invasive pneumococcal)1
*Tetanus1,2,5
Toxic shock syndrome1,2
Toxic substance related diseases: Infant methemoglobinemia Lead intoxication (specific Pb levels) Other metal and pesticide poisonings
Toxoplasmosis
Transmissible spongiform encephalopathy (TSE, human; CJD)
Trichinosis1,2,4
Tularaemia1,2,4
Typhoid fever1,2,3,4
*Varicella (chickenpox)1,3,5
Vibriosis1,3,4
Yersiniosis1,3,4

CATEGORY III:
The following diseases shall be reported to the state epidemiologist on an AIDS case report (DPH 4264) or a Wisconsin Human Immunodeficiency Virus (HIV) Infection Confidential Case Report (DPH 4338) or by other means within 72 hours after identification of a case or suspected case. See s. 252.15 (7) (b), Stats., and s. HFS 145.04 (3) (b).

Acquired Immune Deficiency Syndrome (AIDS)1,2,4
Human immunodeficiency virus (HIV) infection2,4
CD4+ T-lymphocyte <200/uL, or CD4+ T-lymphocyte percentage of total lymphocytes <14

KEY:
1For diseases preceded by an (*), indicate immunization history in the “Immunization data” box in the “Morbidity data” section.
2Infectious diseases designated as notifiable at the national level.
3Wisconsin or CDC follow-up form is required. Local health departments have templates of these forms in the Epinet manual.
4Risk assessment by local health department is needed to determine if patient or member of patient’s household is employed in food handling, day care or health care.
5Case investigation by local health department is needed.
6Immediate treatment is recommended, i.e., antibiotic or biologic for the patient or contact or both.