INTERACT
Version 4.5 Tool

INTERACT Guidance on Identification and Management of Infections

Some facilities have asked why criteria in INTERACT Care Paths and Change in Condition guidance ("File Cards") for clinician notification are not the same as other published criteria for specific infections.

The primary reasons are as follows:

1. The purpose of the INTERACT criteria is to provide a set of clinically sound criteria that is consistent with most published guidelines about when to notify a clinician (MD, NP or PA) about a change in condition. The INTERACT criteria are not designed to define any specific infection or to indicate the need for antibiotic therapy.

2. The purpose of published criteria for infections is to establish standards for diagnosis and to guide therapy. In general, antibiotic therapy should not be initiated unless a patient/resident meets criteria for an infection.

As illustrated in the tables below, there is no consensus on various published criteria for specific infections.

For INTERACT Care Paths Change in Condition guidance, we have chosen criteria that are internally consistent, with the goal of simplifying implementation. It would be very difficult for facilities to use multiple criteria for notification of clinicians based on specific clinical circumstances.

Individual facilities should select specific criteria for Infections and criteria for when to notify clinicians of changes in condition and use them consistently.

When antibiotics are prescribed, principles of antibiotic stewardship should be followed (see References).

VITAL SIGNS

Vital Sign Criteria	INTERACT 4.0 Criteria for Clinician Notification	McGeer Criteria 2012 for Surveillance[1]	AHRQ Minimum Criteria for Common Infections Toolkit [2]
Temperature/Fever	> 100.5˚F INTERACT Fever Care Path uses McGeer definition	• Single oral temperature >37.8 ˚C (100 ˚F) • Repeated oral temperatures >37.2 ˚C (99 ˚F) or rectal temperatures >37.5 ˚C (99.5 ˚F) • Single temperature >1.1 ˚C (2 ˚F) over baseline from any site (oral, tympanic, axillary)	**Suspected Lower Respiratory Infection:** ≥ 102 ˚F (38.9 ˚C) (need to check RR and O2 sat) 100 ˚F (37.9 ˚C) and less than 102 ˚F (38.9 ˚C) (need to check RR and pulse) **Suspected Urinary Tract Infection:** **With indwelling catheter:** See McGeer criteria. **Without indwelling catheter:** Single temperature of 100°F (37.8°C)
Apical heart rate or pulse	> 100 or < 50	N/A	**Suspected Lower Respiratory Infection:** Pulse >100
Respiratory rate	> 28/min or < 10/min	**Pneumonia and Lower respiratory tract (bronchitis/ tracheobronchitis) criteria:** ≥25 breaths/min	**Lower Respiratory Infection:** ≥25 breaths/min
Blood Pressure	< 90 or > 200 systolic	N/A	**Urinary Tract Infection:** **With indwelling catheter.** Hypotension (significant change from baseline BP or a systolic BP <90)
Oxygen saturation	< 90%	**Pneumonia and Lower respiratory tract (bronchitis or tracheobronchitis) criteria:** O2 saturation <94% on room air or a reduction in O2 saturation of >3% from baseline	**Lower Respiratory Infection:** O2 saturation <94% on room air or a reduction in O2 saturation of >3% from baseline

LOWER RESPIRATORY INFECTION

INTERACT 4.0 CARE PATH Symptoms of Lower Respiratory Infection	McGeer Criteria 2012 for Surveillance[1]	AHRQ Minimum Criteria for Common Infections Toolkit [2]	Loeb criteria Minimum Criteria for Initiation of Antibiotics in Long-Term Care Residents [3]
Symptoms or Lower Respiratory Infection • New or worsened cough • New or increased sputum production	**Pneumonia (all 3 criteria must be present)** **1.** Interpretation of a chest radiograph as demonstrating pneumonia or the presence of a new infiltrate	**Criteria are met if one of the four situations are met:** **1.** Resident with a fever of 102 ˚F (38.9 ˚C) or higher and one of the following:	**1.** Fever >38.9 ˚C (102 ˚F) **2.** and at least one of the **3.** following: **a.** Respiratory rate >25

• New or worsening shortness of breath • Chest pain with inspiration or coughing • New or increased findings on lung exam (rales, wheezes)	**2.** At least 1 of the following: **a.** New or increased cough **b.** New or increased sputum production **c.** O2 saturation <94% on room air or a reduction in O2 saturation of >3% from baseline **d.** New or changed lung examination abnormalities **e.** Pleuritic chest pain **f.** Respiratory rate of ≥25 breaths/min. **3.** At least 1 of the "constitutional" criteria: **a.** Fever **b.** Acute mental status change **c.** Acute functional decline **d.** Neutrophilia (>14,000 leukocytes/mm3) or a left shift (>6% bands or ≥1,500 bands/mm3)	**a.** Respiratory rate of >25 breaths per minute **b.** New or worsened cough **c.** New or increased sputum Production **d.** O2 saturation <94% on room air or a reduction in O2 saturation of >3% from baseline **2.** Resident with a **fever** of 100 ˚F (37.8 ˚C) and less than 102 ˚F (38.9 ˚C); **Cough** and at least one of the following: **a.** Pulse >100 **b.** Delirium **c.** Rigors (shaking chills) **d.** Respiratory rate >25 breaths per minute	**b.** Productive cough **4.** Fever (>37.9 ˚C (100 ˚F) or a 1.5 ˚C (2.4 ˚F) increase above baseline temperature, but ≤38.9 ˚C (102 ˚F) and cough and at least one of the following: **a.** Pulse >100 **b.** Rigors **c.** Delirium **d.** Respiratory rate >25 **5.** Afebrile resident with COPD and >65 years and new or increased cough with purulent sputum production
Symptoms and Signs for Immediate Notification • Cough with or without sputum production • Abnormal lung sounds • Edema • Change in mental status **Laboratory Results for Notification** • Critical values in blood count or Metabolic panel • WBC > 14,000 or neutrophils > 90% • Infiltrate or pneumonia on chest X-ray	**Bronchitis or tracheobronchitis (all 3 criteria must be present):** **1.** Chest radiograph not performed or negative results for pneumonia or new infiltrate **2.** At least 2 of the respiratory subcriteria (a–f) listed above **3.** At least 1 of the "constitutional" criteria above	**3.** Afebrile resident with COPD and age >65 and new or increased cough with purulent sputum production **4.** Afebrile resident **without COPD** and age >65 and **new or increased cough with purulent sputum** production **and at least one of the following:** **a.** Respiratory rate >25 **b.** Delirium (sudden onset of confusion, disorientation, dramatic change in mental status)	**6.** Afebrile resident without COPD and new cough with purulent sputum production and at least one of the following: **a.** Respiratory rate >25 **b.** Delirium **7.** New infiltrate on chest X-ray thought to represent pneumonia and at least one of the following: **a.** Fever >37.8 ˚C (100 ˚F) or a 1.5 ˚C (2.4 ˚F) increase above baseline temperature) **b.** Respiratory rate >25 **c.** Productive cough

URINARY TRACT INFECTION

INTERACT 4.0 CARE PATH Symptoms of Urinary Tract Infection (UTI) (in residents without a catheter)	McGeer Criteria 2012 for Surveillance[1]	AHRQ Minimum Criteria for Common Infections Toolkit [2]	Loeb criteria Minimum Criteria for Initiation of Antibiotics in Long-Term Care Residents [3]
In residents without an indwelling catheter: **Symptoms or Signs of UTI** • Painful urination (dysuria) • Lower abdominal (suprapubic) pain or tenderness • Blood in urine • New or worsening urinary urgency, frequency, incontinence **Symptoms and Signs for Immediate Notification** • Abdominal distension • New or worsened incontinence • Suprapubic tenderness • Pain/tenderness in testes suggesting epididymitis • Gross blood in urine • Not eating or drinking **Laboratory Results for Notification** • Critical values in blood count or metabolic panel • WBC > 14,000 or neutrophils > 90% • PVR > 350 ml • Urine results suggest infection and • symptoms or signs present	**Residents <u>without</u> an indwelling catheter:** One of the signs or symptom subcriteria and one of the microbiologic subcriteria must be present: **Signs or symptoms subcriteria include**: **1.** Acute dysuria or acute pain, swelling or tenderness of the testes, epididymis, or prostate **2.** **If fever or leukocytosis are present one of the signs or symptoms localizing subcriteria must be present:** Acute costovertebral angle pain or tenderness, suprapubic pain gross hematuria, new or marked increase in incontinence, new or marked increase in urgency, or new or marked increase in frequency **3.** **In the absence of fever or leukocytosis,** two or more of the signs or symptoms localizing subcriteria in item 2 must be present **Microbiologic subcriteria include:** **1.** At least 10^5 cfu/mL of no more than 2 species of microorganisms in a voided urine sample **2.** At least 10^2 cfu/mL of any number of organisms in a specimen collected by in-and-out catheter	**Resident <u>without</u> an indwelling catheter** **Criteria are met if one of these are present:** **1.** Acute dysuria alone **2.** Single temperature of 100°F (37.8°C) and at least one new or worsening of the following: urgency, suprapubic pain, frequency, gross hematuria, back or flank pain, urinary incontinence **3.** No fever, but two or more of the signs above **Resident <u>with</u> an indwelling catheter** The criteria are met to initiate antibiotics if one of the below is met: **1.** Fever of 100°F (37.8°C) or repeated temperatures of 99°F (37°C) **2.** New back or flank pain **3.** Rigors /shaking chills **4.** New dramatic change in mental status	**Resident <u>without</u> an indwelling catheter** • Acute dysuria **or** • Fever (>37.8°C (100°F) or a 1.5°C (2.4°F) increase above baseline temperature) **and** at least one of the following: New or worsening: Urgency Frequency Suprapubic pain Gross hematuria Costovertebral angle tenderness Urinary incontinence **Resident <u>with</u> an indwelling catheter** At least one of the following: • Fever (>37.8°C (100°F) or a 1.5°C (2.4°F) increase above baseline temperature) • New costovertebral tenderness • Rigors • New onset of delirium **Note:** Foul smelling or cloudy urine is not a valid indication for initiating antibiotics

	Residents <u>with</u> an indwelling catheter: At least 1 of the following sign or symptoms and urinary catheter specimen culture with at least 10^5 cfu/mL of any organism(s) • Fever, rigors, or new-onset hypotension, with no alternate site of infection • Either acute change in mental status or acute functional decline, with no alternate diagnosis and leukocytosis • New-onset suprapubic pain or costovertebral angle pain or tenderness • Purulent discharge from around the catheter or acute pain, swelling, or tenderness	**5.** Hypotension (significant change from baseline BP or a systolic BP <90)	Asymptomatic bacteriuria should not be treated with antibiotics

GASTROINTESTINAL TRACT INFECTIONS

INTERACT 4.0 CARE PATH Gastrointestinal Symptoms (Not exclusive for GI Infection)	McGeer Criteria 2012 for Surveillance[1]
New or Worsening GI Symptoms or Signs • Nausea and/or vomiting • Diarrhea (3 or more loose or liquid bowel movements per day) • Constipation (no bowel movement in 3 days) • Abdominal pain • Distended abdomen **Symptoms and Signs for Immediate Notification** • Abdominal tenderness or distention • Absent or hyperactive bowel sounds • Jaundice • Blood in stool or vomitus • Recurrent diarrhea after treatment for C. difficile • Other residents with similar symptoms suggesting outbreak of a GI virus • Recent initiation or adjustment of enteral tube feeding (diarrhea) • Recent initiation or adjustment of narcotic medication (constipation) **Laboratory Results for Notification** • Results of abdominal X-ray/ ultrasound suggests ileus, obstruction, mass, or perforation • Critical values in blood work • Stool analysis suggests infection	Definition of diarrhea substitutes “liquid or watery stools” for “loose or watery stools”. 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. Definition of vomiting: 2 or more episodes in a 24-h period **Gastroenteritis (at least 1 of the following criteria must be present)** **1.** Diarrhea **2.** Vomiting **3.** Both of the following signs or symptoms subcriteria: a. A stool specimen testing positive for a pathogen (eg,Salmonella, Shigella, Escherichia coli O157 : H7, Campylobacter species, rotavirus) b. At least 1 of the following GI subcriteria i. Nausea ii. Vomiting iii. Abdominal pain or tenderness iv. Diarrhea **Norovirus gastroenteritis (both criteria 1 and 2 must be present):** **1. At least 1 of the following GI subcriteria:** a. Diarrhea b. Vomiting **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).** (Note: The Kaplan Criteria, which have been useful in identifying outbreaks of acute gastroenteritis due to norovirus. In the absence of laboratory confirmation, (“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.)

	Clostridium difficile infection (both criteria 1 and 2 must be present): 1. **One of the following GI subcriteria:** a. Diarrhea**:** b. Presence of toxic megacolon (abnormal dilatation of the large bowel, documented radiologically) 2. **One of the following diagnostic subcriteria:** 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. b. **Pseudomembranous colitis** is identified during endoscopic examination or surgery or in histopathologic examination of a biopsy specimen. **Note** **"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 weeks after the onset of a previous episode of C. difficile infection. **"Recurrent episode"** of C. difficile infection is defined as an episode of C. difficile infection that occurs 8 weeks 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.

References on Infections

1. Stone ND, Ashraf MS, Calder J, et al. Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria. *Infection Control & Hospital Epidemiology*. 2012;33(10):965-977. doi:10.1086/667743.

2. Toolkit 3. Minimum Criteria for Common Infections Toolkit. Content last reviewed September 2017. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/nhguide/toolkits/determine-whether-to-treat/toolkit3-minimum-criteria.html

3. Loeb M, Bentley DW, Bradley S, et al. Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term–Care Facilities: Results of a Consensus Conference. *Infection Control & Hospital Epidemiology*. 2001;22 (2):120-124. doi:10.1086/501875.

References on Antibiotic Stewardship

1. Jump, RLP, Gaur, S, Katz, MJ et al. Template for an Antibiotic Stewardship Policy for Post-Acute and Long-Term Care Settings. *J Amer Med Dir Assn* 2017; 18:913-920.

2. https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html (accessed September 24, 2017)

3. https://nursinghomeinfections.unc.edu/ (accessed October 13, 2017)

4. Zarowitz, FJ, Allen, C, Tangalos, E, and Ouslander, JG. Algorithms Promoting Antimicrobial Stewardship in Long-Term Care. *J Amer Med Dir Assn* 2016; 17: 173-178.