Antibiotic Stewardship

Treatment Guidelines for Long-term Care Facilities
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1 INTRODUCTION

The publication “Antibiotic Stewardship and Treatment Guidelines for Long-term Care Facilities” was reviewed by our local Review Panel which represents a mix of health professionals with expertise in several fields from a variety of clinical settings. In addition, other clinical practice guidelines and relevant evidence were reviewed and integrated into this document. We sincerely thank all reviewers for their on-going support.

There are many guidelines and new anti-infectives available. The rise of drug-resistant organisms and the frequency of clostridium difficile outbreaks have made it difficult for health care providers to know the specific place in therapy of each of these anti-infectives in the treatment of infectious diseases.

Our local panel has revised the general guidelines to assist in the process of investigation of infections and selection of anti-infective therapy. The panel hopes that these guidelines, which have been updated with the latest evidence on anti-infectives and feedback from local health professionals, can be a complimentary, educational tool to promote the most appropriate investigations and use of medications in long-term care facilities. In addition we developed these guidelines with patient safety in mind. We intend to update these guidelines in an ongoing systematic fashion.

We would appreciate receiving feedback and recommendations for change to these guidelines. These guidelines are not intended to replace a health care provider’s judgement. While great effort has been taken to assure the accuracy of the information contained in these guidelines, the review panel, printer and others contributing to the preparation of these guidelines cannot accept liability for errors, omissions or any consequences arising from the use of this information. Since this document is not intended to replace other information, health care providers are urged to consult the manufacturers’ and other available drug information literature before prescribing.
Peer-reviewed Guideline Development Process

1. Reviewed evidence
   - Clinical Practice Guidelines
   - Literature review
2. Key informant interviews
   - Local best practice
3. Locally derived Clinical Guidelines
   - Expert Multidisciplinary Panel-review

Evidence-based Reviewer

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Family Medicine

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Antibiotic Prescribing Pearls

1. Antibiotic Resistance – Understand your Local Patterns
   a) Macrolide-resistance
   b) Fluoroquinolone-resistance

2. Importance of Antibiotic History in Past 3 Months to make Informed Prescribing Decisions

3. Penicillin – Cephalosporin Cross Allergy
   Penicillins and cephalosporins are often the safest and most effective drugs for treating infections. Patients reporting an allergy to them are often unnecessarily prescribed inferior drugs. Current information reveals that many penicillin-allergic patients can be safely treated with certain cephalosporins. The reluctance to prescribe cephalosporin antibiotics for these patients is based on historical data that suggested the rate of cross-reactivity may be as high as 10%; a revised estimate of 0.4% cross-reactivity between penicillins (including ampicillin and amoxicillin) and first-generation cephalosporins (cefazolin, cephalaxin, cefadroxil) is now suggested. The side chains, rather than the beta-lactam ring itself, induces allergic reaction\(^1\) so there is no cross-reactivity between penicillins and the 2nd-generation cephalosporin cefuroxime or 3rd-generation ceftriaxone, cefotaxime, ceftazidime and cefixime.\(^2\) Furthermore, a series of over 400 patients reporting a history of unspecified rash (without angioedema, bronchospasm, anaphylactic shock) on penicillin received IV cefazolin as surgical prophylaxis without any of them experiencing an allergic reaction to it.\(^2\)
Suggested Management of Patients who say they are Penicillin Allergic

a) If the “allergy” is vague and unspecified, or is a rash without angioedema, bronchospasm, anaphylactic shock, or the need for resuscitative measures, any sort of cephalosporin can be prescribed with relative safety. Such patients are at the same risk of anaphylaxis as patients reporting no history of penicillin allergy.

b) If the “allergy” includes angioedema, bronchospasm, anaphylactic shock, or the need for resuscitative measures, then ceftriaxone, cefotaxime, ceftazidime, cefixime and cefuroxime can be given safely with no greater risk of anaphylaxis than the general population. Cefazolin, cephalalexin, cefadroxil and Cefprozil are best avoided, or given under controlled conditions (epinephrine at the ready) because they carry a small risk of cross-reactivity.

c) If the patient tolerates the cephalosporin without allergic reaction, it is helpful to note the lack of reaction in the chart for the edification of future health care providers.

4. Probiotics

Live organisms thought to re-establish gastrointestinal flora are effective in decreasing the likelihood of antibiotic-associated diarrhea in adults and children. This approach is also effective when using multiple antibiotics to eradicate Helicobacter pylori. It is not clear from this analysis whether one type of bacterium is better than another.3

REFERENCES


2 GUIDELINES

Diagnosis and Management of Pneumonia in LTC

ISSUES

1. Pneumonia is the leading cause of hospitalization and mortality in LTC facilities.\(^1\)-\(^4\)
2. It is the second most common cause of infection in LTC.\(^5\)
3. Clinical presentation in the elderly is atypical.\(^5\)-\(^7\) Residents may present with non-specific symptoms such as a decline in mental status, deterioration of general health and changes in activity level or new onset of falls.\(^3\)-\(^4\),\(^8\)-\(^10\)
4. Microbiological diagnosis is of limited value.\(^11\)-\(^13\)
5. Empiric treatment often occurs in the absence of chest radiography.\(^14\)
6. Delayed empiric treatment may result in increased patient morbidity and mortality.\(^14\)

OBJECTIVES

1. To enhance early detection and treatment of pneumonia to reduce morbidity and mortality.
2. To increase the accuracy of clinical diagnosis of pneumonia in elderly residents in LTC.
3. To optimize the use of antibiotics in treatment.

PREVENTION

1. Annual influenza vaccination and pneumococcal vaccination at least once.\(^15\)-\(^19\)
2. Appropriate infection prevention and control practices with hand hygiene, etc. to limit spread.\(^14\)
3. Smoking cessation.\(^14\)
5. Re-evaluate periodically the need for Proton Pump Inhibitors (PPI) as they are associated with an increased risk of both hospital and community acquired pneumonia as well as C. difficile. The association is probably multifactorial and may be from increased bacterial colonization of the larynx, esophagus and lungs or from compromising the stomach’s acid mantle against gastric colonization.\(^20\),\(^21\)

DEFINITION

A clinical diagnosis made with confirmation on chest radiography when possible. Patients with cystic fibrosis, TB or bronchiectasis are excluded.
**RISK FACTORS**²⁰⁻²⁹

1. Increasing age
2. Male
3. Swallowing difficulty
4. Inability to take oral medications
5. Increasing co-morbidity
6. Poor baseline functional status
7. Urinary incontinence
8. Inadequate oral hygiene
9. Witnessed aspiration
10. Histamine receptor blockers and PPI

**ETIOLOGY**¹,⁵,⁸,¹²,¹³

S. pneumonia, H. Influenza, Gram negative Bacilli (Enterobacteraceae), S. Aureus, atypical organisms (Legionella spp., Chlamydia pneumonia), Viral including influenza.

**ASSESSMENT**³⁰

Physical examination should include temperature, blood pressure, heart rate, respiratory rate, auscultation of the respiratory system, as well as measurement of oxygen saturation.

**DIAGNOSIS**³¹

1. If CXR is unavailable then at least 2 of the following signs and symptoms of lower respiratory tract infection:
   a) Tachypnea, RR > 25 per minute

AND one or more of the following:

b) Fever, oral temperature > 37.9°C or a 1.5°C above baseline temperature.

c) New onset productive cough.

d) Pleuritic chest pain.

e) New or increased crackles, wheezes, rales, rhonchi or bronchial breath sounds.

f) New onset delirium and/or decreased level of consciousness.

g) O₂ saturation < than 94% on room air or a reduction in O₂ saturation > than 3% from baseline.
2. If CXR is available then confirmation of pneumonia on imaging with 1 clinical sign or symptom of:
   a) New onset productive cough.
   b) Fever, oral temperature > 37.9°C or a 1.5°C increase above baseline temperature.
   c) Tachypnea with a respiratory rate > 25 breaths per minute.

Consider Influenza as a possible cause of acute respiratory illness if both criteria 1 and 2 are met:

1. Fever
2. At least three of the following influenza like illness sub criteria:
   a) Chills
   b) New headache or eye pain
   c) Myalgias or body aches
   d) Malaise or a loss of appetite
   e) Sore throat
   f) New or increased dry cough

Tachypnea with a RR > 25 breaths per minute has a sensitivity of 90% and a specificity of 95% for the diagnosis of pneumonia.\textsuperscript{32-33} It is the only physical sign for which a predictive value can be determined for LTC residents.\textsuperscript{14} RR > 25 is associated with increased morbidity and mortality.\textsuperscript{33} In 44.5% of elderly patients with pneumonia, delirium or acute confusion is found.\textsuperscript{14} \textsuperscript{35} $O_2$ saturation < 90% is a strong predictor of a possible requirement for hospitalization.

\textit{All symptoms must be new or acutely worse}. Non-infectious causes such as congestive heart failure should always be considered.

\textbf{Diagnostic Imaging}

Chest radiograph is the gold standard for confirming the diagnosis of pneumonia.\textsuperscript{12} Many LTC facilities do not have easy accessibility to imaging facilities, hence the need for a clinical diagnosis.

\textbf{Laboratory}

\textbf{Gram stain of sputum is neither as sensitive nor specific in diagnosing the etiological agent in patients with community acquired pneumonia.}\textsuperscript{8,12,33} Routine sputum culture is also neither sensitive nor specific for diagnostic purposes. Local consensus was to not order this routinely.

\textbf{Public Health}

Contact Public Health if there is a concern regarding etiology, outbreak, or any change in background morbidity or mortality.
Mild-moderate Pneumonia in LTC: review prior antibiotic use in the past three months: if there has been significant exposure to a particular antibiotic class, then consider selecting from an alternate class. Use renal dosing where appropriate.

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Antibiotic Choice(s)</th>
<th>Usual Dosage</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Line</strong></td>
<td>Amoxicillin</td>
<td>1 g po TID</td>
<td>10 days</td>
<td>Provides best coverage against S. Pneumonia.</td>
</tr>
<tr>
<td></td>
<td>Amoxicillin / clavulanate</td>
<td>500mg po TID or 875mg po BID</td>
<td>10 days</td>
<td>Provides better coverage of H. Influenza and M. Catarrhalis in patients with COPD. May be preferred in patients post influenza as it provides coverage against S. Aureus.</td>
</tr>
<tr>
<td></td>
<td>Cefuroxime</td>
<td>500mg po BID</td>
<td>10 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cefprozil</td>
<td>500mg po BID</td>
<td>10 days</td>
<td></td>
</tr>
<tr>
<td><strong>ANY one of the above beta-lactam agents PLUS one of the following:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clarithromycin</td>
<td>500mg po BID or 1g XL po OD</td>
<td>10 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Azithromycin</td>
<td>500mg po OD on day 1 and then 250mg po OD, days 2-5</td>
<td>5 days</td>
<td>Monotherapy may not be as efficacious as combination therapy in the management of pneumonia. Quinolones should be given with caution if the resident has received quinolone therapy within the previous 6 months, especially if with ciprofloxacin.</td>
</tr>
<tr>
<td></td>
<td>Doxycycline</td>
<td>100mg po BID on day 1 and then 100mg po OD</td>
<td>10 days</td>
<td></td>
</tr>
<tr>
<td><strong>Or any ONE of the following:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second Line</strong></td>
<td>Levofoxacin</td>
<td>750mg po OD</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moxifloxacin</td>
<td>400mg po OD</td>
<td>10 days</td>
<td></td>
</tr>
<tr>
<td><strong>First Line Aspiration Pneumonia</strong></td>
<td>Amoxicillin / clavulanate</td>
<td>500 mg TID or 875 mg BID</td>
<td>10 days</td>
<td>Consider aspiration in patients with swallowing disorders, gingival disease, esophageal motility disorder.</td>
</tr>
<tr>
<td></td>
<td>Clindamycin</td>
<td>300-450 mg QID</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MANAGEMENT\textsuperscript{14}

1. Oxygen therapy if indicated for hypoxemia with O\textsubscript{2} saturation <90%.
2. Initiation of antibiotic therapy as soon as possible (< 4 hours) after diagnosis.
3. Ensure adequate hydration including the use of hypodermoclysis in the absence of CHF.
4. Use of analgesics/antipyretics for pain and fever respectively.
5. There is NO clinical benefit for use of antitussives or cough suppressants.
7. Review the clinical requirement for all medications during treatment including PPIs.
8. Patients should be treated for a minimum of 7 days, be afebrile for 48-72 hours and otherwise clinically stable before discontinuing therapy.
9. Take local antibiotic sensitivity into consideration when prescribing.
10. Use renal dosing for all antibiotics where appropriate.

For any failure of therapy, with no clinical improvement after 48-72 hours, consider a change in antibiotic treatment or transfer to acute care depending on resident’s level of care status.
REFERENCES


REFERENCES

Diagnosis Algorithm of Pneumonia in LTC

If CXR is unavailable then at least 2 of the following signs and symptoms of lower respiratory tract infection*:

a) Tachypnea, RR > 25 per minute
   AND at least one of the following:

b) Fever, Temperature > 37.9°C or a 1.5°C above baseline temperature
c) New onset productive cough
d) Pleuritic chest pain
e) New or increased crackles, wheezes, rales, ronchi or bronchial breath sounds
f) New onset delirium and/or decreased level of consciousness
g) O₂ saturation < 90% on room air or a reduction in O₂ saturation > 3% from baseline

* Consider possible viral etiology

1. Nursing staff to assess resident with blood pressure, temperature, oxygen saturation, heart rate, respiratory rate and auscultation of the respiratory system.
2. If symptoms and/or signs of pneumonia, nursing staff to contact primary health care provider for resident.
3. Primary health care provider to assess resident and order CXR if available.
4. If CXR unavailable, primary health care provider to empirically treat resident with antibiotics as soon as possible if indicated.
5. If indicated:
   • Oxygen therapy if indicated for hypoxemia with O₂ saturation <90%.
   • Consider parenteral (IM) treatment if patient is unable to swallow or appears more toxic, and is not a candidate for transfer to hospital.
   • Ensure adequate hydration including use of hypodermoclysis in the absence of CHF.
   • Use of analgesics/antipyretics for pain and fever respectively.
6. Reassess antibiotic therapy at 48 to 72 hours for evidence of response to treatment.
7. For any failure of therapy, consider change in antibiotic treatment or transfer to acute care depending on resident’s level of care status.
8. Review the need for all medications until clinical improvement.
9. Patients should be treated for a minimum of seven days, be afebrile for 48-72 hours and otherwise clinically stable before discontinuing therapy.

There is NO clinical benefit for the use of antitussives or cough suppressants. Ensure renal doses of antibiotics are prescribed.
Diagnosis and Management of Skin and Soft Tissue Infections (SSTIs) in LTC

ISSUES

1. SSTIs which are the third most common infection in LTC facilities\(^1\) are caused by inflammatory microbial invasions of the epidermis, dermis and subcutaneous tissue.\(^2,3\)

2. Superficial, uncomplicated SSTIs include furuncles, abscesses, carbuncles, impetigo, erysipelas and cellulitis.\(^2\) Cellulitis is one of the most common types of SSTIs in long-term care.\(^2,4\)

3. Management of furuncles, carbuncles and abscesses is surgical incision and drainage and when indicated the use of antibiotics.\(^2,5\)

4. Be aware that rapidly worsening SSTIs may be the symptoms and signs of necrotizing fasciitis caused by Group A \(\beta\)-hemolytic Streptococcus. Necrotizing fasciitis is a medico-surgical emergency.\(^2,6\)

5. Be aware of MRSA when managing SSTIs.\(^2,5,7\)

6. Clinically uninfected wounds do NOT require antibiotic therapy.\(^8\)

7. **Cultures of specimens obtained from superficial swabs cannot differentiate between colonization and infection.**\(^4\)

8. Follow the appropriate best practice clinical care guidelines of the RNAO.

OBJECTIVES

1. To increase the accuracy of clinical diagnosis of skin and soft tissue infections for residents in LTC.

2. To improve resident outcomes through decreased morbidity and mortality associated with soft tissue infections.

3. To optimize the use of laboratory services.

4. To optimize antibiotic therapy use (narrow spectrum antibiotic at the correct dose, and for the correct duration) to reduce the development of antibiotic resistance and nosocomial infections such as C. difficile.

5. To optimize the appropriate prescribing of antibiotics.

PREVENTION\(^3,8\)

1. Conduct skin breakdown risk assessments for all residents. Reassess risk on a regular basis.

2. Inspect skin daily.

3. Optimize nutrition and hydration.

4. Manage moisture.

5. Minimize pressure.
DEFINITIONS

Impetigo is a superficial skin infection of the epidermis which usually occurs on exposed areas of the body, most frequently the face and extremities. Shingles may appear initially like impetigo, but is at the outset a vesicular rash that follows an unilateral dermatomal distribution.

Cutaneous abscesses are collections of pus within the dermis and deeper skin tissues. A furuncle or "boil" is an infection of the hair follicle, in which suppuration extends through the dermis into the subcutaneous tissues where a small abscess forms. Extension of the infection involving several adjacent follicles producing a coalescent inflammatory mass with pus draining from multiple follicular orifices is referred to as a carbuncle. With folliculitis, the inflammation is more superficial and pus is present in the epidermis. Paronychia is an often tender bacterial infection where the nail and skin meet at the side or the base of a finger or toenail. If there is a pus collection, this is treated by incision and drainage.

Cellulitis and erysipelas refer to diffuse, spreading skin infections excluding infections associated with underlying suppurative foci such as cutaneous abscesses, necrotizing fasciitis, septic arthritis and osteomyelitis. Erysipelas affects the upper dermis including the superficial lymphatics. Lesions are raised above the level of the surrounding skin and there is a clear demarcation between involved and uninvolved tissue. It is more common among older adults. Cellulitis is an acute spreading infection that involves the deeper dermis as well as subcutaneous fat.

Complicated SSTIs are defined as those accompanied by signs and symptoms of systemic toxicity such as:

- Fever
- Hypothermia
- Tachycardia (HR > 100)
- Hypotension (sBP < 90 mmHg or sBP < 20 mmHg below baseline)

RISK FACTORS

1. Immobility and inability to reposition self
2. Pressure of skin with friction and shear
3. Exposure of skin to moisture
4. Urinary and fecal incontinence
5. Chronic steroid use
6. Malnutrition
7. Sensory deficiency such as diabetic neuropathy
8. Vascular compromise including peripheral vascular disease and edema
9. Systemic infection and immunocompromised state
ETIOLOGY\(^2,7,9\)

The vast majority are caused by:

1. *Staphylococcus aureus*.
2. \(\beta\)-hemolytic streptococci, usually Lancefield groups A, C and G with group B occurring in diabetics and the elderly.

Localized pus-producing lesions such as boils, abscesses, carbuncles and localized cellulitis are usually caused by *Staphylococci*. Rapidly spreading infections such as erysipelas, lymphangitis or cellulitis are usually caused by Group A \(\beta\)-hemolytic *Streptococci*.

**MRSA SSTIs will require implementation of the site specific LTC prevention and infection control measures.**

Most diabetic foot infections are polymicrobial with aerobic gram-positive cocci, especially *Staphylococci*, aerobic gram-negative bacilli such as enteric bacteria, *Proteus*, *Pseudomonas* and *E. Coli* and anerobes such as *Clostridium perfringens* and *bacteroides*.\(^4,10\)

DIAGNOSIS\(^6\)

New or increasing drainage at wound, skin or soft-tissue site.

**OR**

At least two of the following:

- Fever >37.9°C or 1.5°C increase above baseline temperature or constitutional symptoms
- Redness at the affected site
- Tenderness or pain at the affected site
- Warmth or heat at the affected site
- New or increasing swelling at the affected site

**Laboratory**

*For clinically uninfected wounds, there is no evidence to collect a specimen for culture.*\(^8\) Cultures may be unnecessary for mild SSTIs especially in a patient who has not recently received antibiotic therapy.

**Surface swab cultures are NOT indicated for the diagnosis of most bacterial SSTIs with the exception of conjunctivitis.**\(^4\)

Do **not** obtain a specimen for culture by swabbing the wound or wound exudate since these swabs are often contaminated with normal flora or colonizers yielding false-positive cultures.\(^10\) **It is acceptable to send aspirations of purulent secretions and wounds with a sterile needle and syringe for culture and sensitivity.**\(^4,10\) Tissue biopsy of a suspected wound for histopathological diagnosis is also acceptable.\(^4,10\)
**TREATMENT**

Antibiotic therapy is NOT appropriate for a positive surface swab culture without signs and symptoms of infection. Use renal dosing where required.

For clinically infected wounds, consider the following prior to initiation of antibiotics.

1. Is there a high risk of MRSA?
   - If so, include anti-MRSA therapy.

2. Has the resident received antibiotics in the past three (3) months?
   - If so, include antimicrobial agents against gram-negative bacilli.

3. Are there any risk factors for Pseudomonas infection e.g., recent hospitalization, intensive care stay, immunocompromise?
   - If so, consider an antibiotic to cover Pseudomonas such as ciprofloxacin.

4. How severe is the infection?
   - Mild, moderate or severe.

**Impetigo**

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Probable Organism</th>
<th>Antibiotic</th>
<th>Dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Line</td>
<td>S. aureus/Group A. Strep./S. pyogenes</td>
<td>Mupirocin 2% ung/cream</td>
<td>Topically TID</td>
<td>5-7 days</td>
</tr>
<tr>
<td></td>
<td>Topical therapy for less severe or localized cases</td>
<td>Fusidic acid 2% ung/cream</td>
<td>Topically TID-QID</td>
<td>5-7 days</td>
</tr>
<tr>
<td></td>
<td>Systemic antibiotics for significant soft tissue infections or during community outbreaks</td>
<td>Cloxacillin</td>
<td>250-500mg QID</td>
<td>7-10 days</td>
</tr>
<tr>
<td></td>
<td>For multiple drug allergies</td>
<td>Minocycline</td>
<td>100mg BID</td>
<td>7-10 days</td>
</tr>
<tr>
<td>Second Line</td>
<td>S. areus, Group A. Strep</td>
<td>Erythromycin</td>
<td>1 g/day ÷ BID, TID or QID</td>
<td>7-10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clarithromycin</td>
<td>250mg BID</td>
<td>7-10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Azithromycin</td>
<td>500mg OD, day and then 250mg OD x 4 days</td>
<td>5 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clindamycin</td>
<td>150-300mg QID</td>
<td>7-10 days</td>
</tr>
</tbody>
</table>
**Cutaneous Infections: Uncomplicated**

First line treatment of furuncles is the use of warm compresses. If not resolving, surgical incision and drainage of furuncles and carbuncles may be warranted. When indicated, add an antibiotic.

<table>
<thead>
<tr>
<th>Modifying Circumstances</th>
<th>Therapy</th>
<th>Organism</th>
<th>Antibiotic</th>
<th>Dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folliculitis and Furuncle (Boil)</td>
<td>First Line</td>
<td>S. Aureus</td>
<td>Usually none. Warm compresses and anti-septic cleanser.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Second Line</td>
<td>S. Aureus</td>
<td>Mupirocin 2% ung/cream</td>
<td>Topically TID</td>
<td>5-7 days</td>
</tr>
<tr>
<td></td>
<td>Topical therapy in less severe or localized cases</td>
<td>S. Aureus</td>
<td>Fusidic Acid 2% ung/cream</td>
<td>Topically TID-QID. If covered with occlusive dressing, then OD or BID.</td>
<td>5-7 days</td>
</tr>
<tr>
<td>Carbuncles (Moderate to Severe)</td>
<td>First Line</td>
<td>S. Aureus</td>
<td>Cephalexin</td>
<td>500mg QID</td>
<td>7-10 days</td>
</tr>
<tr>
<td></td>
<td>Second Line</td>
<td></td>
<td>Cloxacillin</td>
<td>500mg QID</td>
<td>7-10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clindamycin</td>
<td>300-450mg QID</td>
<td>7-10 days</td>
</tr>
<tr>
<td></td>
<td>Third Line</td>
<td>S. Aureus</td>
<td>Erythromycin</td>
<td>1 g/day ÷ BID or TID or QID</td>
<td>7-10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clarithromycin</td>
<td>250-500mg BID</td>
<td>7-10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Azithromycin</td>
<td>500mg OD, day 1 and then 250mg OD, days 2-5</td>
<td>5 days</td>
</tr>
</tbody>
</table>
Cutaneous Infections: Complicated (perirectal abscesses/decubitus ulcers)\(^5\)

These SSTIs will often require incision, surgical drainage and debridement in addition to antibiotics.

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Organism</th>
<th>Antibiotic</th>
<th>Dose</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Line</strong></td>
<td>Polymicrobial</td>
<td>TMP/SMX or Ciprofloxacin</td>
<td>1 tab DS BID or 500-750mg BID</td>
<td>7-10 days</td>
<td>Should not be used for Pseudomonas. Pseudomonas susceptible.</td>
</tr>
</tbody>
</table>

**\(\pm\) 1 of the following**

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Organism</th>
<th>Antibiotic</th>
<th>Dose</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Metronidazole</td>
<td>500mg BID</td>
<td>7-10 days</td>
<td>Add if anaerobes are present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clindamycin</td>
<td>300-450mg QID</td>
<td>7-10 days</td>
<td>Add if anaerobes are present.</td>
</tr>
<tr>
<td><strong>Second Line</strong></td>
<td>Polymicrobial</td>
<td>Amoxicillin / clavulanate Ceftriaxone IM/IV</td>
<td>500mg TID or 875mg BID 1 g Q24h</td>
<td>7-10 days</td>
<td>Should not be used for Pseudomonas. Can cover anaerobes on its’ own.</td>
</tr>
</tbody>
</table>

**\(\pm\) 1 of the following**

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Organism</th>
<th>Antibiotic</th>
<th>Dose</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Third Line</strong></td>
<td></td>
<td>Metronidazole</td>
<td>500mg BID</td>
<td>7-10 days</td>
<td>Add if anaerobes are present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clindamycin</td>
<td>300-450mg QID</td>
<td>7-10 days</td>
<td>Add if anaerobes are present.</td>
</tr>
</tbody>
</table>
Cellulitis – Uncomplicated: Mild

There is no clinical benefit in this group for topical antibiotics. Vascular disorders such as DVT, contact dermatitis, insect bites and gouty arthritis may masquerade as infectious cellulitis amongst others.

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Organism</th>
<th>Antibiotic</th>
<th>Dose</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Line</td>
<td>S. Aureus</td>
<td>Cephalexin</td>
<td>500mg QID</td>
<td>7-10 days</td>
<td>Covers both S. Aureus and GAS.</td>
</tr>
<tr>
<td></td>
<td>Group A. Strep.</td>
<td>Penicillin V</td>
<td>300mg TID or 600mg BID</td>
<td>7-10 days</td>
<td>Use if GAS cultured.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amoxicillin</td>
<td>500mg TID or 875mg BID</td>
<td>7-10 days</td>
<td>Use if GAS cultured.</td>
</tr>
<tr>
<td>Second Line</td>
<td>S. Aureus</td>
<td>Cloxacillin</td>
<td>500mg QID</td>
<td>7-10 days</td>
<td>If S. Aureus cultured, then can use as first line antibiotic. Doesn’t cover MRSA.</td>
</tr>
<tr>
<td></td>
<td>GAS</td>
<td>Clindamycin</td>
<td>300mg QID</td>
<td>7-10 days</td>
<td></td>
</tr>
<tr>
<td>Third Line</td>
<td>S. Aureus</td>
<td>Erythromycin</td>
<td>1g/day ÷ BID, TID or QID</td>
<td>7-10 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GAS</td>
<td>Clarithromycin</td>
<td>250-500mg BID</td>
<td>7-10 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Azithromycin</td>
<td>500mg OD, day 1 and then 250mg OD, days 2-5</td>
<td>5 days</td>
<td></td>
</tr>
</tbody>
</table>

**MANAGEMENT**

1. Analgesics for pain management.
2. Warm compresses.
3. Relief of pressure and redistribution of pressure with special mattresses, kinetic beds or foam protectors.
4. Use appropriate skin care based on RNAO best practice guidelines.
5. Regular turning of resident.
6. Use of wound management protocol specific for LTC facility.
7. Infection prevention and control measures including hand hygiene and glove use.
8. Optimize hydration and nutritional status.
9. Antibiotic therapy as indicated.
REFERENCES


Diagnosis and Management of UTI in LTC

ISSUES

1. Confirmed UTIs are the commonest infection in LTC\(^1\) and the most common cause for use of antibiotics in LTC.\(^2\)\(^-\)\(^4\)

2. Diagnosis of UTIs in the elderly based on classical signs and symptoms is more difficult.\(^5\)\(^,\)\(^6\) Non-specific and non-localizing signs and symptoms are seldom due to a UTI in a non-catheterized resident.

3. UTIs are the most common source of bacteremia and 40 times more likely to occur in the catheterized resident than non-catheterized resident.\(^6\)\(^-\)\(^8\)

4. **Routine screening of asymptomatic residents is NOT necessary.**\(^9\) Asymptomatic bacteriuria does NOT require treatment.\(^10\)\(^-\)\(^12\)

5. The renal function of the elderly often decreases and this needs to be considered when selecting the appropriate antibiotic and dose.\(^6\)\(^,\)\(^13\)

OBJECTIVES

1. To increase the accuracy of clinical diagnosis of UTIs for residents in LTC.

2. To improve resident outcomes through decreased morbidity and mortality associated with UTIs and bacteremia.

3. To optimize the use of laboratory services.

4. To optimize antibiotic therapy use (narrow spectrum antibiotic at the correct dose, and for the correct duration) to reduce the development of antibiotic resistance and nosocomial infections such as C. difficile.

5. To reduce inappropriate prescribing of antibiotics for asymptomatic bacteriuria.

GOALS

1. To increase the accuracy of clinical diagnosis of UTIs for residents in LTC.

2. To improve resident outcomes and safety through decreased morbidity and mortality.

3. To optimise the use of testing and laboratory services.

4. To optimise inappropriate prescribing of antibiotics for residents with asymptomatic bacteriuria.

5. To optimise antibiotic therapy for residents with UTIs.

PREVENTION

1. Limit use of catheters.\(^14\)\(^,\)\(^15\)

2. Maintain good perineal hygiene.\(^6\)\(^,\)\(^16\)

3. Ensure proper hydration.

4. Follow the RNAO practice guidelines for perineal care, catheters etc.
DEFINITIONS

**UTI**: A significant bacterial count ($10^5$ cfu/mL or $10^8$ cfu/L) confirmed by urine C&S from a midstream or in and out catheterized urine sample accompanied by symptoms of a UTI.9

**Asymptomatic Bacteriuria**: The confirmed presence of bacteria on two urine cultures obtained from clean catch specimens of a resident who has no UTI symptoms.17

**Recurrent UTIs**: >3 culture confirmed UTIs in 1 year with the same or different organisms18 or >2 culture confirmed UTIs in 6 months with the same or different organisms.6

**Relapse UTIs**: Repeat infection with the same infecting organism, usually occurring within 4 weeks of a previous culture confirmed UTI.6

**Complicated UTIs**:6

Any UTI in an elderly male

UTIs in women if associated with any of the following:

1. Structural abnormalities
2. Urinary catheters
3. Kidney stones
4. Urinary retention including neurogenic bladder
5. Renal and perinephric abscess formation
6. Diabetes mellitus

**RISK FACTORS**18

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-70</td>
<td>History of UTIs</td>
<td>Prostatic obstruction</td>
</tr>
<tr>
<td></td>
<td>Diabetes mellitus</td>
<td>Urological or surgical procedures</td>
</tr>
<tr>
<td></td>
<td>Gynecological disease such as cystocele and related gynecological surgeries</td>
<td></td>
</tr>
<tr>
<td>&gt;70</td>
<td>Gynecological disease such as cystocele and related gynecological surgeries</td>
<td>Prostatic obstruction</td>
</tr>
<tr>
<td></td>
<td>Urological disease (incontinence, cystopathy) and related urological surgeries</td>
<td>Urological or surgical procedures</td>
</tr>
<tr>
<td></td>
<td>Urinary catheter</td>
<td>Urinary catheter</td>
</tr>
<tr>
<td></td>
<td>Reduced mental status</td>
<td>Reduced mental status</td>
</tr>
<tr>
<td></td>
<td>Co-morbid diseases</td>
<td>Co-morbid diseases</td>
</tr>
<tr>
<td></td>
<td>Immunological changes</td>
<td>Immunological changes</td>
</tr>
</tbody>
</table>
DIAGNOSIS

Signs and Symptoms of UTI (see Table 1)

No Indwelling Catheter

Acute dysuria

OR

Fever oral temperature > 37.9°C or an increase of 1.5°C above baseline on 2 consecutive occasions or chills PLUS any of the following:

- New or increased urinary frequency, urinary urgency, incontinence
- New flank/CVA or suprapubic pain or tenderness
- Hematuria

Indwelling Catheter

- Fever (oral T > 37.9°C) or an increase of 1.5°C above baseline on 2 consecutive occasions or new onset hypotension with no alternative site of infection
- New flank/CVA or suprapubic pain or tenderness
- Rigors
- New onset delirium
- Purulent discharge from around the catheter or acute pain, swelling or tenderness of the testes, epididymis or prostate

1. Chronic genitourinary symptoms are common in LTC and only acute changes are relevant for the diagnosis of a symptomatic UTI.6,9
2. Functional incontinence is common in LTC residents but new onset or exacerbation of urinary or fecal incontinence may be a symptom of a UTI.20
3. Fever is a marker for serious infection and the most important clinical indicator for antibiotic initiation.6 However, elderly may not present with a fever and may even be hypothermic.21 Medications can often mask fevers and lower baseline temperature.

Signs and Symptoms NOT Specific for a UTI—need to be put in clinical context

1. Cloudy, milky or turbid urine is NOT an indicator of a UTI.19
2. Malodorous urine is NOT a valid indicator of a UTI. It may be caused by diet or poor hygiene.6
3. Acute confusional states (decline in mental status or functional status) may be associated with any infection but a diagnosis of UTI depends on the typical symptoms (see Table 1).6
4. In the absence of localizing genitourinary symptoms, increased behavioural and psychological symptoms of dementia is unlikely attributable to a UTI. However, delirium may impair the ability to report or observe genitourinary signs or symptoms.6
5. Increased or new onset falls are NOT specific for UTIs.22-24
LABORATORY

1. **A clean catch or midstream urine sample for urine C&S testing is required.** When a voided sample cannot be collected, in and out catheterization is acceptable.

2. For long term catheterized residents, replace the catheter and collect the urine specimen through the freshly placed catheter.5

3. For short term catheterized residents, a sample can be obtained by aspiration of the catheter tubing port.

4. **A positive urine dipstick for leukocyte esterase, blood or nitrite is NOT diagnostic for a UTI.**16,18

5. A recent calculated Creatinine clearance (CrCl) based on a Creatinine taken within the past 3 months is required for the appropriate dosing of antibiotics especially given that renal function is commonly decreased in the elderly.6,13,25

6. A urine C&S of > 3 organisms indicates contamination of the sample.

7. No repeat urine C&S post antibiotic therapy is necessary unless typical UTI signs and symptoms persist.6

ETIOLOGY

The most common bacterial agent responsible for UTIs in both catheterized and non-catheterized residents is Escherichia coli.14 Other Enterobacteriaceae such as Proteus, Klebsiella, Providencia or Enterobacter species as well as enterococci and Pseudomonas aeruginosa, especially in patients previously treated with antibiotics14. Other common pathogens for UTIs in LTC include Group B Streptococcus (GBS) especially with diabetics and coagulase negative Staphylococci. E. coli accounts for about 40% of pathogens of UTI in older residents with indwelling catheters.26

TREATMENT13

1. **No antibiotic is indicated for asymptomatic bacteriuria.**10-12 Pyuria is found in > 90 percent of cases of asymptomatic bacteriuria and 100 percent of UTIs. If pyuria is absent, a UTI can be ruled out. A positive dip stick does not mean there is a UTI.

2. Consider antibiotic resistance patterns when available.

3. **Uncomplicated**13
   
   This refers to lower tract UTI excluding those secondary to neurogenic bladder regardless of etiology or instrumentation.

4. **Complicated-mild/moderate**13
   
   This includes UTIs involving the upper tract (ascending, pyelonephritis) and those secondary to neurogenic bladders regardless of etiology and instrumentation.

5. **For Medically Stable residents with non-specific signs and symptoms, there is no evidence of increased morbidity and mortality associated with waiting 24 hours before initiating antibiotic therapy.** With good hydration, symptoms often resolve.

6. Use renal dosing where required.
### UNCOMPPLICATED\(^\text{13}\)

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Antibiotic</th>
<th>Dose</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Line</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TMP/SMX (Trimethoprim / sulfamethoxazole)</td>
<td>1 DS tab po BID or 2 tabs BID</td>
<td>If lower tract symptoms, treat for 7-10 days. If upper tract symptoms, treat for 10-14 days.</td>
<td>No activity against Enterococcus spp. or GBS</td>
</tr>
<tr>
<td></td>
<td>Trimethoprim</td>
<td>100mg po BID or 200mg OD</td>
<td>As above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Macrobid Nitrofurantoin</td>
<td>100mg po BID 100mg po QID</td>
<td>As above</td>
<td>Should not be used if CrCl&lt; 60mL/min. Not active against P. Aeruginosa and certain strains of Klebsiella and Proteus species</td>
</tr>
<tr>
<td></td>
<td>Amoxicillin</td>
<td>500mg po TID</td>
<td>As above</td>
<td>Be aware of E. coli resistance.</td>
</tr>
<tr>
<td><strong>Second Line</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ciprofloxacin</td>
<td>250mg po BID or 500mg XL po OD</td>
<td>If lower tract symptoms, treat for 7-10 days. If upper tract symptoms, treat for 10-14 days.</td>
<td>Has activity towards Pseudomonas Aeruginosa. Be aware of fluorquinolone resistance.</td>
</tr>
<tr>
<td></td>
<td>Amoxicillin / clavulanate</td>
<td>500mg po TID or 875mg po BID</td>
<td>As above</td>
<td>Has no activity against Pseudomonas aeruginosa.</td>
</tr>
<tr>
<td></td>
<td>Levofloxacin</td>
<td>250mg po OD</td>
<td>As above</td>
<td>Be aware of fluorquinolone resistance.</td>
</tr>
</tbody>
</table>

### COMPLICATED-mild/moderate\(^\text{13}\)

This includes UTIs involving the upper tract (ascending, pyelonephritis) and those secondary to neurogenic bladders regardless of etiology and instrumentation.

<table>
<thead>
<tr>
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<tr>
<td></td>
<td>TMP/SMX</td>
<td>1 DS tab po BID or 2 tabs BID</td>
<td>If lower tract symptoms, treat for 7-10 days. If upper tract symptoms, treat for 10-14 days.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trimethoprim</td>
<td>200mg po BID</td>
<td>As above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Norfloxacin</td>
<td>400mg po BID</td>
<td>As above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ciprofloxacin</td>
<td>500mg po BID or 1g XL po OD</td>
<td>As above</td>
<td>Has activity towards Pseudomonas Aeruginosa. Be aware of fluorquinolone resistance.</td>
</tr>
<tr>
<td></td>
<td>Levofloxacin</td>
<td>500mg po OD</td>
<td>As above</td>
<td>Be aware of fluorquinolone resistance.</td>
</tr>
<tr>
<td><strong>Second Line</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amoxicillin / clavulanate</td>
<td>500mg po TID or 875mg po BID</td>
<td>If lower tract symptoms, treat for 7-10 days. If upper tract symptoms, treat for 10-14 days.</td>
<td></td>
</tr>
</tbody>
</table>

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Revised: Dec-14-2012
REFERENCES


REFERENCES (Continued)


Diagnosis Algorithm of Urinary Tract Infection

### Typical Symptoms (1)

#### No Indwelling Catheter

Indications (check all that apply):
- Acute Dysuria (painful urination)

OR
- Oral Temp > 37.9°C or 1.5° above baseline on 2 consecutive occasions

PLUS one or more of the following:
- New or increased urinary frequency, urgency, incontinence
- New flank pain or suprapublic pain or tenderness
- Hematuria

#### Indwelling Catheter

Indications (check all that apply):
- Oral Temp > 37.9°C or 1.5° above baseline on 2 consecutive occasions
- New flank pain or Suprapublic pain or tenderness
- Rigors (chills/shakes)
- New onset delirium

### PUSH FLUIDS over 24 hours if approved by physician or nurse practitioner (2)

- and no contraindications ONLY in medically stable patient

### Orders Obtained (3)

- Urine C&S (3)
- Antibiotic Therapy if S&S of upper tract UTI

### Alternate Diagnosis (4)

- Continue to monitor resident status

### Urine C&S

- Urine specimen collected

### Urine C&S Results (5)

- Significant
- Not Significant

**C&S Results not significant**
- STOP or DO NOT INITIATE ANTIBIOTIC

**C&S Results are significant**
- Antibiotic is consistent with recommendations in Anti-Infective Guidelines for Community-acquired Infections (2012 edition)
- Organism is susceptible to prescribed antibiotic
- CrCl values reviewed. Therapy appropriate for renal function
- Pharmacy consulted (if N/A initial here: _____)
- Findings discussed with physician or Nurse Practitioner
**Typical Symptoms Practice Point**

Non-specific symptoms **are not specific for a UTI**. Residents who are cognitively impaired may not be able to verbalize symptoms of a UTI. Non-specific symptoms which may indicate a UTI include:
- Worsening functional status
- Worsening mental status, increase confusion, delirium or agitation
- Falls (new or more often)

Unless medical status is declining rapidly, PUSH FLUIDS FOR 24 Hours if no medical contraindication and then REASSES:
- If typical symptoms develop, treat as for UTI after urine C&S collected and sent
- If non-specific symptoms continue without development of typical symptoms, consider an alternate diagnosis
- If symptoms resolve, no further intervention is required

For Medically Stable residents with non-specific signs and symptoms, there is no evidence of increased morbidity and mortality associated with waiting 24 hours before initiating antibiotic therapy. With good hydration, symptoms often resolve.

**Hydration Practice Point**

- Unless on Fluid Restriction or a medical contraindication

**Orders Practice Point**

- Antibiotic therapy may or may not be ordered depending on medical status
- Urine specimens should be collected **BEFORE** antibiotic therapy is initiated
- Urine specimens should be refrigerated immediately until pick-up by laboratory – up to 72 hours
- Communicate **current Creatinine Clearance Level** – use renal dosing where required and Recent Antibiotic Treatment to physician or nurse practitioner
- For non-catheterized resident, midstream or I&O catheterization urine C&S

**Alternate Diagnosis Practice Point**

- Delirium
- Constipation
- Respiratory Illness
- Vaginitis/vaginal pathology

**Urine C&S Results Practice Point**

- Bacterial count $\geq 10^5$ cfu/mL or $10^8$ cfu/L is significant
- More than 3 different organisms usually indicates contamination
- Clinical correlation is necessary for a diagnosis of UTI

**NOTE**: Repeat C&S after antibiotic therapy is **NOT** necessary unless typical UTI signs and symptoms persist.
Diagnosis and Management of Clostridium Difficile in LTC

BACKGROUND

Clostridium difficile (C. difficile) is an opportunistic bacterial infection which is the most common etiology of healthcare (nosocomial) associated diarrhea in acute-care and long-term care settings. The rates of C. difficile infection (CDI) in Canada and USA are increasing with the emergence of a new epidemic strain (NAP-1/B1) which is associated with increased disease morbidity and mortality. CDI occurs as a result of both the acquisition of C. difficile and disruption of the normal bowel flora most commonly as the result of antibiotic use resulting in overgrowth of the spore forming gram positive bacilli. The increase in CDI in Canada is thought to be due to the selection of the fluoroquinolone resistant NAP-1/B1 strain associated with high fluoroquinolone use.

RISK FACTORS

1. Increasing age especially > 65 years
2. History of antibiotic use, particularly fluoroquinolones, cephalosporins and clindamycin
3. Use of proton pump inhibitors (PPI)
4. Prolonged hospitalization
5. Immunocompromised conditions such as illness, immunosuppressive therapy
6. Bowel disease such as IBD and bowel surgery

RISK FACTORS (for more severe CDI)

1. History of CDI especially if with NAP-1/B1 strain
2. Increasing age
3. Recent surgery
4. Immunosuppressive therapy

SYMPTOMS

1. Three (3) or more liquid or watery stool above what is normal for the resident within a 24-hour period with no identified etiology. It may be watery, mucus or bloody.
2. Abdominal pain, cramping or tenderness. Beware of toxic megacolon associated with C. difficile which is the abnormal dilatation of the large bowel documented radiologically, since this is a medical and surgical emergency. The patient will have abdominal pain, distension and usually absent bowel sounds with no diarrhea.
3. Nausea, anorexia, fever.

DIAGNOSIS (for clinically suspicious cases)

Non-formed stools for cytotoxin A and B which may require more than 1 sample for confirmation. Do not send stool that does not conform to the shape of the container. PCR may also be available.
TREATMENT

For **mild-moderate** (WBC < 15 x 10^9/L and serum Cr < 1.5 baseline) CDI:

- Adults: oral metronidazole (Flagyl) 500mg TID or 250mg QID x 10 days

For **severe** (WBC ≥ 15 x 10^9/L and serum Cr ≥ 1.5 baseline) CDI:

- Adults: oral vancomycin 125mg QID x 10-14 days

Severe CDI may require hospitalization with IV antibiotics. Serious sequelae of CDI such as pseudo-membranous colitis or toxic megacolon may also need to be ruled out. Consider contacting public health if you have 2 or more cases.

Consider treatment of high risk suspicious symptomatic clinical cases with antibiotic pending results and discontinue once confirmed negative on at least 2 separate occasions. There is NO need to test for cure. If symptoms persist after completion of antibiotic treatment then samples should be submitted for retesting.

MANAGEMENT (confirmed C. difficile cases)

1. Discontinue use of the implicated/inciting antibiotic.
2. Discontinue use of any laxatives and/or stool softeners.
3. Review all other medications until clinically improved including PPI.
4. Symptomatic treatment including rehydration and potentially hypodermoclysis.
5. Avoid use of anti-motility/peristaltic agents.
6. Implementation of the LTC’s site-specific infection control protocol for CDI including identification, isolation and contact precautions.
7. The use of gloves when providing care to residents with CDI. After glove removal, hand hygiene with preferably soap and water in the presence of a dedicated hand wash sink or alcohol based detergents in the absence of a dedicated hand wash sink.

PREVENTION (Please refer to algorithms for antibiotic use in LTC for UTI, pneumonia and skin and soft tissue infections)

1. Use antibiotics judiciously for bacterial infections considering the local epidemiology of bacterial organisms.
2. Use the RIGHT rule (antibiotic, dose, duration, and route).
3. Use narrow spectrum antibiotics specific for the organism.
4. Encourage one-time only pneumococcal vaccination and annual influenza vaccinations.
5. Use PPI judiciously.
REFERENCES


5. PIDAC. Testing, Surveillance and Management of Clostridium difficile in All Health Care Settings. MOHLTC 2010.


**Clostridium difficile MANAGEMENT ALGORITHM**

**CDI Definition:** New onset of diarrhea* that is unusual or different for the patient/resident and there is no other recognized etiology for diarrhea, such as laxative use or other etiology.

* Loose/watery: if the stool were to be poured into a container, it would conform to the shape of the container.

Sample collection should be done as soon as possible after onset of symptoms.

---

**INSTITUTE CONTACT PRECAUTIONS IN ADDITION TO ROUTINE PRACTICES**

- Stool for *C. difficile* toxin (not done on rectal swab or formed stools).
- Stool cultures not done on asymptomatic patient/residents.
- Do not collect stool sample on children under 1 year of age (normal flora in this age group).

---

**POSITIVE**

- Maintain Contact Precautions (see below)
- Inform Infection Prevention and Control/alternate IC contact at site where specimen was collected

---

**NEGATIVE**

- Send second specimen if patient is symptomatic
- Continue with Contact Precautions

---

**POSITIVE**

- If high suspicion for *C. difficile*

---

**Contact Precautions**

- Single room with dedicated toilet facilities or cohort with patient with confirmed CDI
- Post signage at door of the room
- Gloves and gown to be worn on entry to the room
- Observe meticulous hand hygiene with either alcohol-based hand rub or soap and water
- Dedicate equipment – if equipment must be shared, thorough cleaning and disinfection must occur before use with another patient
- Handle commodes and bed pans carefully to reduce spread of contamination

---

**RISK FACTORS for Clostridium difficile**

1. History of antibiotic usage
2. Bowel surgery
3. Chemotherapy
4. Prolonged hospitalization
5. Increased age

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Adapted from RICN *Clostridium difficile* algorithm.

Revised: Dec-14-2012
Diagnosis and Management of Scabies in LTC

ISSUES
1. Scabies is a parasitic infection that can occur in long-term care facilities.\textsuperscript{1-3}
2. It is highly contagious and can result in outbreaks in LTC if not contained.\textsuperscript{1-3}
3. The diagnosis of scabies is often based on clinical history and skin lesions in the absence of microbiological diagnosis.\textsuperscript{1,2,4}
4. Scabies \textit{should} be considered as the cause of any undiagnosed pruritic skin rash.
5. An outbreak is an increase incidence over the baseline rate.

OBJECTIVES
1. Prompt diagnosis of scabies based on history and examination of skin lesions.
2. Prompt treatment of scabies to prevent outbreaks.
3. Implementation of infection prevention and control measures to contain the spread of scabies in LTC.

ETIOLOGY\textsuperscript{1-4}
Scabies is caused by infestation of the skin by a mite, \textit{Sarcoptes scabiei var. hominis} which belongs to the arthropod class. It is an obligate parasite that completes its entire life cycle on humans. \textit{Sarcoptes scabiei} undergoes four stages in its life cycle with only female mites burrowing into the skin. The maturation process lasts about 15 days with larvae appearing approximately 3-4 days after the eggs are hatched.

TRANSMISSION\textsuperscript{1,2,4}
1. Scabies is passed primarily by direct skin-to-skin contact with an infested person. However, crusted (Norwegian) scabies can spread with only brief skin-to-skin contact due to its high volume of mites.
2. Avoid direct skin-to-skin contact with any infested resident.
3. Contact with items such as bedding, clothing and furniture of infested residents is also a source of transmission.

RISK FACTORS\textsuperscript{1,2,4}
1. Elderly
2. Institutionalized
3. Immunocompromised
4. Failure to recognize an infestation
5. Failure to treat close contacts including health care workers
DIAGNOSIS$^{1,2,4}$

The most common symptoms of non-crustured or typical scabies are pruritus with a skin rash and possibly visualization of burrows. The pruritus is usually worse at night.

Tiny burrows sometimes are seen on the skin caused by the female scabies mite tunneling just underneath the skin surface. Burrows appear as tiny, raised and crooked grayish-white or skin-coloured lines on the skin surface. They are often found in the webbing between the fingers, in skin folds on the flexor surfaces of the wrist, elbow or knees and on the breasts and penis.

For a primary infestation with scabies mites, symptoms may not appear for 2-6 weeks after being infested. For a secondary re-infestation with scabies, symptoms appear as soon as 1-4 days after exposure.

An infected person can transmit scabies while being asymptomatic.

The pruritus caused by scabies is due to a hypersensitivity reaction to both the mites and their feces. Itching may continue for several weeks after treatment even if all the mites and eggs are killed. It is important to continue to monitor the rash areas for continuation of spread as this will indicate that the treatment has been unsuccessful and needs to be repeated.

**Crusted (Norwegian) Scabies**$^{1,2,4}$

This was initially described in Norwegian leprosy patients. It is a more severe presentation of infestation that often affects the elderly, the immunocompromised or those with neurological conditions such as neuropathies or being cognitively challenged that prevent them from noticing pruritus and/or scratching. It is characterized by marked thickening and crusting of the skin (hyperkeratosis dermatosis$^5$), particularly on the hands, although the entire body including the face and scalp can be affected. The mites in crusted scabies are much more numerous (up to 2 million mites per patient$^4$) resulting in those who are infected being much more contagious. It is a common cause of institutional outbreaks of scabies.

Definite diagnosis occurs with skin scrapings identifying mites, mite eggs or mite fecal matter (scybala) under low light microscopy.$^{1,2,4}$ In order to obtain a sample, scrape the skin with razor blade and place skin specimens in a sterile container with 70% rubbing alcohol (just enough alcohol to cover bottom of jar). Place the labelled container with a public health requisition in a specimen bag and have it transported to a public health laboratory.

A negative skin scraping from a person with typical scabies does **not** rule out scabies infestation; mites are easily recovered, however, in skin scrapings from persons with crusted scabies.
TREATMENT\textsuperscript{1,2,4,5}

First Line

The first line drug is topical permethrin cream 5\% which is the most effective topical agent with minimal treatment failures and low toxicity\textsuperscript{5}. The cream must be applied to the whole body from the neck down to the feet and toes including skin folds, finger and toenails, behind the ears and the groin. Do not apply the cream to the head or face. If the patient washes any area where the cream has been applied during the treatment period, it must be reapplied.

Apply 1 application topically to the skin and wash off thoroughly after at least 8 hours, but no more than 14 hours. A second application may be repeated 1 week later.

Do not use permethrin 1\% solution which is used to treat head lice since this has been shown to be ineffective in treating scabies.

Second Line

Oral ivermectin\textsuperscript{6} appears to be more effective than both placebo and lindane but less effective than topical permethrin\textsuperscript{5}. It is given as a single dose of usually 3-12 µg (150-200 µg/kg) on an empty stomach. Ivermectin is contraindicated in children under the age of five, those that weigh less than 15 kg\textsuperscript{7}, those who are breastfeeding, and those who have a hepatic or renal disease. In Canada, ivermectin is a special access drug (http://www.hc-sc.gc.ca/dhp-mps/acces/drugs-drogues/index-eng.php).

Oral anti-histamines may be used to control the itching as needed. Topical and oral antibiotics may be used to treat skin infections such as impetigo and cellulitis as indicated.

MANAGEMENT\textsuperscript{1,2,4}

1. The infested resident, his or her family and any close contacts including health care workers must be treated at the same time, regardless of whether they are symptomatic.
2. If there are 2 or more cases of scabies identified on a particular unit, strong consideration should be given to prophylactically treating all residents and staff on the unit.
3. Initiate Contact Precautions (gowns, gloves) for residents diagnosed with scabies. Precautions must remain in place until effective treatment has been completed.
4. Identify all family members, friends and staff including health care workers who have had direct contact and exposure with the infested resident(s) and/or to clothing, bedding and furniture for the 6 weeks prior to the diagnosis of scabies. Inform them about the diagnosis and the need to watch for symptoms. If they have had several contacts with the resident, they should receive prophylactic treatment.
5. Visitors should use the same contact precautions and protective clothing as staff, when providing direct care.
6. Clean hands thoroughly after providing care to any infested resident.
MANAGEMENT\textsuperscript{1,2,4} (continued)

7. Asymptomatic staff can return to work the day after receiving prophylactic treatment.

8. Symptomatic staff can return to work the day after receiving treatment.

9. Ensure bedding and clothing used by an infested resident within the last 3 days is collected and transported in a plastic bag. These need to be machine washed using hot water and dried using high heat cycles ($T \geq 50^\circ C$ for at least 10 minutes).\textsuperscript{4} If hot water is unavailable, place all linen and clothing into plastic bags for one week. \textbf{Cleaning of clothing and linens needs to be done at the same time as treatment to effectively manage the spread of scabies.}

10. Thoroughly clean and vacuum the room of the infested residents. Disinfect furniture and surfaces in the resident rooms. Steam cleaning of upholstered furniture may be necessary.

11. Continue to monitor all residents for rashes for the next 6 weeks (incubation period of scabies).

12. Consult Infection Control at Public Health for further guidance on management of scabies.

13. There may be reimbursement for staff treatment through WSIB and the HIN program.

REFERENCES


For primary infestation, symptoms are noticeable in 2 to 6 weeks. With re-infestation the person is sensitized and itching starts within 1 to 4 days. The areas involved are hands, webs of fingers, wrists, elbows, knees, outer surfaces of feet, armpits, buttocks and/or waist, shoulders blades with red raised itchy lesions. Other areas involved later include arms, back and legs, nipples, genitalia. Itching is worse at night, and scratching may produce bleeding and eventual infection.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Resident Name and Room #</th>
<th>Date of Assessment</th>
<th>Rash? (Y/N)</th>
<th>If yes, Body Site</th>
<th>If yes, MD informed?</th>
<th>Nurse Initials</th>
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