Guideline for the 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 control with hand hygiene, etc. to limit spread.[14]
3. Smoking cessation.[14]
4. Maintain adequate oral hygiene.
5. Re-evaluate periodically the need for PPI.[20,21]

DEFINITION

A clinical diagnosis made with confirmation on chest radiography when possible. Aspiration pneumonias are excluded as are patients with cystic fibrosis, TB or bronchiectasis.

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)

ASSESSMENT[30]

Physical examination must include blood pressure, heart rate, respiratory rate and auscultation of the respiratory system.

DIAGNOSIS[31]

1. If CXR is <u>unavailable</u> then at least 2 of the following signs and symptoms of lower respiratory tract infection:

    a) Tachypnea, RR $\geq$ 25 per minute

AND/OR

    b) Fever, oral temperature > 37.9^{o}c or a 1.5^{o}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

2. If CXR is <u>available</u> then confirmation of pneumonia on imaging with 1 clinical sign or symptom of:

    a) New onset productive cough
    b) Fever, oral temperature > 37.9^{o}C or a 1.5^{o}C increase above baseline temperature
    c) Tachypnea with a respiratory rate $\geq$ 25 breaths per minute

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

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

Diagnostic Imaging

Chest radiograph is the gold standard for confirming the diagnosis of pneumonia.[12] However, it is less sensitive than high resolution CT scans for the detection of pulmonary infiltrates.[12] Many LTC facilities do not have easy accessibility to imaging facilities.

Laboratory

Gram stain of sputum is neither as sensitive nor specific in diagnosing the etiological agent in patients with community acquired pneumonia.[8,12,33] Routine sputum culture is also neither sensitive nor specific for diagnostic purposes.

TREATMENT[35]

Mild-moderate Pneumonia in LTC

First Line	Amoxicillin	1 g po TID	10 days	Provides best coverage against S. Pneumonia.
	Amoxicillin/clavulanate	500mg po TID or 875mg po BID	10 days	
	Cefuroxime	500mg po BID	10 days	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.
	Cefprozil	500mg po BID	10 days	
	ANY one of the above beta-lactam agents PLUS one of the following:			
	Clarithromycin	500mg po BID or 1g XL po OD	10 days	
	Azithromycin	500mg po OD on day 1 & then 250mg po OD, days 2-5	5 days	
	Doxycycline	100mg po BID on day 1 & then 100mg po OD	10 days	
	Or any ONE of the following:			
	Levofloxacin	750mg po OD	5 days	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.
	Moxifloxacin	400mg po OD	10 days	As above.

MANAGEMENT[14]

1. Oxygen therapy if indicated for hypoxemia with O_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/anti-pyretics for pain and fever respectively.
5. There is NO indication for use of anti-tussives or cough suppressants.
6. Reassess antibiotic therapy between 48 and 72 hours for evidence of response to treatment.

For any failure of therapy, consider change in antibiotic treatment or transfer to acute care depending on resident's level of care status.

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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:

Tachypnea, RR ≥ 25 per minute

AND/OR

Fever, Temperature > 37.9ºc or a 1.5ºC above baseline temperature
New onset productive cough
Pleuritic chest pain
New or increased crackles, wheezes, rales, ronchi or bronchial breath sounds
New onset delirium and/or decreased level of consciousness

1. Nursing staff to assess resident with blood pressure, 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. As indicated:
    -Oxygen therapy if indicated for hypoxemia with O_2 saturation <90%.
    -Consider parenteral (IM) treatment if possible is unable to swallow or appears more toxic, not a candidate for transfer to hospital.
    -Ensure adequate hydration including use of hypodermoclysis in the absence of CHF.
    -Use of analgesics/anti-pyretics for pain and fever respectively.

6. Reassess antibiotic therapy at 48 and 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.

There is NO indication for use of anti-tussives or cough suppressants.

Guideline for the 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 β-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]

OBJCTIVES

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[7]

Impetigo is a superficial skin infection of the epidermis which usually occurs on exposed areas of the body, most frequently the face and extremities[7].

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[7]. 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*[7]. With *folliculitis*, the inflammation is more superficial and pus is present in the epidermis[7].

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.[7] 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[7].

Complicated SSTIs are defined as those accompanied by signs and symptoms of systemic toxicity such as:[2]

-fever
-hypothermia
-tachycardia (HR > 100)
-hypotension (sBP <90 mm Hg or sBP < 20 mm Hg below baseline)

RISK FACTORS[7,8]

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. β-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 β-hemolytic Streptococci.

MRSA SSTIs will require implementation of the 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 purulent drainage at wound, skin or soft-tissue site

OR

At least two of the following:

- Fever >37.9^{o}C or 1.5^{o}c increase above baseline temperature
- Redness
- Tenderness
- Warmth
- New or increasing swelling

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 histo-pathological diagnosis is also acceptable.[4,10]

TREATMENT[5]

Antibiotic therapy is NOT appropriate for a positive surface swab culture without signs and symptoms of infection.[8,10]

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 month?
   -If so, included antimicrobial agents against gram-negative bacilli
3. Are there any risk factors for Pseudomonas infection?
   -if so, consider an antibiotic to cover Pseudomonas such as ciprofloxacin
4. How severe is the infection?
   -mild, moderate or severe

Impetigo[5]

	Probable Organism	Antibiotic	Dose	Duration
First Line	S. aureus/Group A. Strep./S. pyogenes	Mupirocin 2% ung/cream	Topically TID	5-7 days
	Topical therapy for less severe or localized cases	Fusidic acid 2% ung/cream	Topically TID-QID If covered with occlusive dressing, then OD or BID.	5-7 days
	Systemic antibiotics for significant soft tissue infections or during community outbreaks	Cloxacillin	250-500mg QID	7-10 days
		Cephalexin	250-500mg QID	7-10 days
	For multiple drug allergies	Minocycline	100mg BID	7-10 days
Second Line	S. areus, Group A. Strep	Erythromycin	1 g/day ÷ BID, TID or QID	7-10 days
		Clarithromycin	250mg BID	7-10 days
		Azithromycin	500mg OD, day & then 250mg OD x 4 days	5 days
		Clindamycin	150-300mg QID	7-10 days

Cutaneous Infections: Uncomplicated[5]

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.

		Organism	Antibiotic	Dose	Duration
Folliculitis & Furuncle (Boil)	First Line	S. Aureus	Usually none. Warm compresses and anti-septic cleanser.		
	Second Line	S. Aureus	Mupirocin 2% ung/cream	Topically TID	5-7 days
	Topical therapy in less severe or localized cases		Fusidic Acid 2% ung/cream	Topically TID-QID. If covered with occlusive dressing, then OD or BID.	5-7 days
Carbuncles	First Line	S. Aureus	Cephalexin	500mg QID	7-10 days
Moderate-severe	Second Line		Cloxacillin	500mg QID	7-10 days
			Clindamycin	300-450mg QID	7-10 days
	Third Line	S. Aureus	Erythromycin	1 g/day ÷ BID or TID or QID	7-10 days
			Clarithromycin	250-500mg BID	7-10 days
			Azithromycin	500mg OD, day 1 & then 250mg OD, days 2-5	5 days

Cutaneous Infections: Complicated (perirectal abscesses/decubitus ulcers)[5]

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

	Organism	Antibiotic	Dose	Duration	
First Line	polymicrobial	TMP/SMX	1 tab DS BID	7-10 days	Should not be used for Pseudomonas.
		Ciprofloxacin	500-750mg BID	7-10 days	Pseudomonas susceptible.
		+ 1 of the following			
		Metronidazole	500mg BID	7-10 days	Add if anaerobes are present
		Clindamycin	300-450mg	7-10 days	Add if anaerobes are present

			QID		
Second Line	polymicrobial	Amoxicillin/clavulanate	500mg TID or 875mg BID	7-10 days	Should not be used for Pseudomonas. Can cover anaerobes on its' own.
		Ceftriaxone IM/IV	1 g Q24h	7-10 days	
		+ 1 of the following			
		Metronidazole	500mg BID	7-10 days	Add if anaerobes are present
		Clindamycin	300-450mg QID	7-10 days	Add if anaerobes are present

Cellulitis: Uncomplicated-mild[5]

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

MANAGEMENT[3,8]

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 of products to protect the skin such as films, hydrocolloids and foams.
5. Regular turning of resident.
6. Use of wound management protocol specific for LTC.
7. Infection control measures including hand hygiene and glove use.
8. Optimize hydration and nutritional status.
9. Antibiotic therapy as indicated.

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Guideline for the Diagnosis and Management of UTI in LTC

ISSUES

1. UTIs are the leading cause of infections 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 more 40x's 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.

PREVENTION

1. Limit use of catheters.[14,15]
2. Maintain good perineal hygiene.[6,16]
3. Ensure proper hydration.

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 organisms[18] 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
5. Renal and perinephric abscess formation
6. Diabetes mellitus

RISK FACTORS[18]

Age Group	Female	Male
50-70	History of UTIs	Prostatic obstruction
	Diabetes mellitus	Urological or surgical procedures
	Gynecological disease such as cystocele & related gynecological surgeries	
>70	Gynecological disease such as cystocele & related gynecological surgeries	Prostatic obstruction
	Urological disease (incontinence, cystopathy) & related urological surgeries	Urological or surgical procedures
	Urinary catheter	Urinary catheter
	Reduced mental status	Reduced mental status
	Co-morbid diseases	Co-morbid diseases
	Immunological changes	Immunological changes

DIAGNOSIS

Signs and Symptoms of UTI (see Table 1)

No Indwelling Catheter[19]

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

Indwelling Catheter[19]

-Fever (oral T > 37.9°C) or an increase of 1.5°C above baseline on 2 consecutive occasions
-New flank/CVA or suprapubic pain or tenderness
-Rigors
-New onset delirium

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

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 (decline in mental status or functional status) states 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. For this, a sterile bed pan can be used. When a voided sample cannot be collected, in and out catheterization is acceptable. A freshly applied condom catheter can be used for men if the appropriate technique minimizes contamination.[5]

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 if commonly decreased in the elderly.[6,13,25]
6. A urine C&S of $\geq$ 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 antibiotics[14]. 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]

TREATMENT[13]

1. No antibiotic is indicated for asymptomatic bacteriuria.[10-12]
2. Uncomplicated[13]
   This refers to lower tract UTI excluding those secondary to neurogenic bladder regardless of etiology or instrumentation.

Uncomplicated	Antibiotic	Dose	Duration	
First Line	TMP/SMX (Trimethoprim/sulfamethoxazole)	1 DS tab po BID	If lower tract symptoms, treat for 7-10 days. If upper tract symptoms, treat for 10-14 days.	No activity against Enterococcus spp. or GBS
	Trimethoprim	100mg po	As above	

		BID		
	Macrobid	100mg po BID	As above	Should not be used if CrCl< 60mL/min. Not active against P. Aeruginosa and certain strains of Klebsiella and Proteus species
	Amoxicillin	500mg po TID	As above	Be aware of E. coli resistance.
Second Line	Ciprofloxacin	250mg po BID or 500mg XL po OD	If lower tract symptoms, treat for 7-10 days. If upper tract symptoms, treat for 10-14 days.	Has activity towards Pseudomonas Aeruginosa. Be aware of fluoroquinolone resistance.
	Amoxicillin/clavulanate	500mg po TID or 875mg po BID	As above	Has no activity against Pseudomonas aeruginosa.
	Levofloxacin	250mg po OD	As above	Be aware of fluoroquinolone resistance.

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

Complicated (mild-moderate)	Antibiotic	Dose	Duration	
First Line	TMP/SMX	1 DS tab po BID	If lower tract symptoms, treat for 7-10 days. If upper	

			tract symptoms, treat for 10-14 days.	
	Trimethoprim	200mg po BID	As above.	
	Macrobid	100mg po BID	As above.	Not active against P. Aeruginosa or certain strains of Klebsiella and Proteus species. Don't use if CrCL< 60mL/min)
	Norfloxacin	400mg po BID	As above.	
	Ciprofloxacin	500mg po BID or 1g XL po OD	As above.	Has activity towards Pseudomonas Aeruginosa. Be aware of fluorquinolone resistance.
	Levofloxacin	500mg po OD	As above.	Be aware of fluoroquinolone resistance.
Second Line	Amoxicillin/clavulanate	500mg po TID or 875mg po BID	If lower tract symptoms, treat for 7-10 days. If upper tract symptoms, treat for 10-14 days.	

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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 suprapubic pain or tenderness
- Hematuria

Date/Time _____ Initial _____

Typical Symptoms (1)
(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 Suprapubic pain or tenderness
- Rigors (chills/shakes)
- New onset delirium

Date/Time _____ Initial _____

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

Date/Time _____ Initial _____

Orders Obtained (3)

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

Date/Time _____ Initial _____

Alternate Diagnosis (4)

- Continue to monitor resident status

Date/Time _____ Initial _____

Urine C & S

- Urine specimen collected

Date/Time _____ Initial _____

Urine C&S Results (5)

- Significant
- Not Significant

Date/Time _____ Initial _____

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

Date/Time _____ Initial _____

August 2012

Diagnosis Algorithm of Urinary Tract Infection

(1) 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 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

(2) Hydration Practice Point

- Unless on Fluid Restriction

(3) Orders Practice Point

- Antibiotic therapy may or may not be ordered depending on medical status
- Urine specimens should be collected BEFORE antibiotic therapy in initiated
- Urine specimens should be refrigerated until pick-up by lab
- Communicate current Creatinine Clearance Level and Recent Antibiotic Treatment to physician or nurse practitioner
- For non-catheterized resident, midstream or I&O catheterization urine C&S

(4) Alternate Diagnosis Practice Point

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

(5) Urine C&S Results Practice Point

- Bacterial count $\geq 10^5$ cfu/mL or 10^8 cfu/L is significant
- More than 3 organism 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[1]. The rates of C. difficile infection (CDI) in Canada and USA are increasing with the emergence of a new epidemic strain (NAP-1/BI) which is associated with increased disease morbidity and mortality.[1,2] 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[3]. 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.[1,3]

RISK FACTORS[4,5]

1. Increasing age especially $\geq$ 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[4,5]

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

SYMPTOMS[6,7]

1. New onset diarrhea that is unusual or different for the patient with no identified etiology. It may be watery, mucus or bloody.
2. Abdominal pain, cramping or tenderness
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.[4]

TREATMENT[7]

For mild-moderate (WBC < 15 x 10^9/L and serum Cr < 1.5 baseline) CDI[7]:

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[7]:

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 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.[3,6]

MANAGEMENT of confirmed C. difficile cases[3-7]

1. Discontinue use of the implicated/inciting antibiotic.
2. Discontinue use of any laxatives and/or stool softeners.
3. Symptomatic treatment including rehydration.
4. Avoid use of anti-motility/peristaltic agents.
5. Implementation of the LTC's site-specific infection control protocol for CDI including identification and isolation.
6. 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.[8]

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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**

Contact Precautions

- Single room with dedicated toileting 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 bedpans carefully to reduce spread of contamination

NEGATIVE

↓

Send second specimen if patient is symptomatic

→ **POSITIVE** → (Maintain Contact Precautions)

↓

NEGATIVE → **Continue with Contact Precautions**

↓

- **If high suspicion for *C. difficile***

→ (Maintain Contact Precautions)

RISK FACTORS for *Clostridium difficile*

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

September 2009

Ontario

Adapted from RICN *Clostridium difficile* algorithm.

Guideline for the Diagnosis and Management of Scabies in LTC

ISSUES

1. Scabies is a parasitic infection that can occur in long-term care facilities[1-3].
2. It is highly contagious and can result in outbreaks in LTC if not contained[1-3].
3. The diagnosis of scabies is often based on clinical history and skin lesions in the absence of microbiological diagnosis[1,2,4].
4. Scabies *should* be considered as the cause of any undiagnosed pruritic skin rash.

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[1-4]

Scabies is caused by infestation of the skin by a mite, *Sarcoptes scabiei var*. *Hominis* which belongs to the arthropod class. It is an obligate parasite that completes its entire life cycle on humans. *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[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[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-crusted 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]

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[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[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[6] appears to be more effective than both placebo and lindane but less effective than topical permethrin.[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[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[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 ore 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.
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 ($T \geq 50^{o}C$ for at least 10 minutes).[4] If hot water is unavailable, place all linen and clothing into plastic bags for one week. **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 andsurfaces 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 for further guidance on management of scabies.

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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, shoulder 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.

Unit	Resident Name And Room #	Date of Assessment	Rash ? (Y/N)	If yes, Body Site	If yes, MD informed?	Nurse Initials