Healthcare Associated Infection Surveillance in LTC
Learning Objectives

- Explain “what” is unique (“atypical”) about the presentation of infection in older adults
- Describe “why” older adults may present atypically when infected and why accepted definitions of infection do not fit this population
- Describe “how” older adults may present atypically when infected and how culture impacts that assessment
Despite advances in antibiotic therapy, infectious diseases continue to be a major cause of morbidity (illness) and mortality (death) in older adults.

Mortality rates are nine times higher in older adults than their younger counterparts (age 22-44).

Changes caused by infection in the elderly are subtle; non-specific (“atypical”).

Complaints may be the only clinical indication.
LTC isn’t rocket science...

- In addition to the medical knowledge in ‘main stream’ nursing, LTC professionals require:
  - Specific set of assessment skills
  - Understanding of:
    - Aging process
    - “Atypical” presentation
    - Complexity of multiple comorbidities
    - Dementia Care
  - Strategies to cope with limited resources
- Care is provided in a cultural context of ageism (racism, sizism, sexism)
Ageism

“Stereotyping or discriminating against people based on their age – Ageism is the most tolerated form of social prejudice in Canada” – Revera Report on Ageism 2012

http://everydayfeminism.com/2013/01/20-examples-of-age-privilege/
From 1983 to 2013, population estimates. From 2014 to 2036, Population Projections for Canada, Provinces and Territories, 2009-2036, medium-growth scenario (M1), Catalogue no. 91-520-X.
WHY?

“Atypical” presentation of infection in older adults
- Absence of usual defining symptoms
  - e.g., febrile response <38°C
- Altered spectrum of symptoms
  - e.g., falls
- Stereotyped presentation in another system
  - e.g., delirium

Content courtesy of, and adapted from, Rehabilitation & Geriatrics Program, WRHA – Dr. P. Montgomery
“Frailty”

frail·ty  
*noun* \ˈfrāl-tē\ : physical weakness : the quality or state of being frail : weakness of character that causes a person to do things that are morally wrong

**Synonyms**

demerit, dereliction, failing, foible, fault, shortcoming, sin, vice, want, weakness

**Antonyms**

merit, virtue

**Related Words**

blot, spot, stain; blemish, deficiency, flaw, imperfection, minus, nit; Achilles' heel, soft spot; corruption, depravity, evil, immorality, sinfulness, wickedness
Betty Neuman’s System Model

Primary prevention
Secondary prevention
Tertiary prevention
Stressors
Reaction
Interventions
Reconstitution
Basic structure and Line of Defense

The Neuman System Model (3rd edition, 1995)
Frailty Reality

- Age over 85 years (old-old)
- Multiple co-morbidities (chronic illnesses)
- Multiple medications
- Cognitive impairment
- Functional impairment
- Reduced mobility
- Poor nutrition

– Flaherty & Zwicker, N.D.; Rockwood et al., 1994)
WHY - Atypical presentation

- Normal age related changes
  - Alterations in cell replication (slower)
    - E.g., impaired wound healing, immunosenescence
  - Aging organs
    - Rates varies from person to person
    - Rates also differ within each person (e.g., heart may not be affected in a person with brain atrophy)
Skin

- Dry, atrophied, pruritic skin with a reduced capacity for immunologic defence and mechanical repair predispose the older adult to a variety of infections.
- These changes make the older adult’s skin more susceptible to both normal flora and pathogenic organisms.
WHY - Atypical presentation

- Multiple co-morbidities
  - Multiple diseases can interact with each other producing a cascade of clinical deterioration (Beloosesky et al., 2000)
    - e.g., OA predicts ambulation difficulty (OR 4.4) and IHD predicts difficulty (OR 2.3), but interaction is far stronger (OR 13.6)
WHY - Atypical presentation

Disease – Treatment Interactions

- Treatment of a disease can have an adverse effect on other disorders including polypharmacy issues (Beloosesky et al., 2000)
  - E.g., the treatment of arthritis (NSAIDS or prednisone) could impair wound healing.

“Most seniors take 5 or more drugs; numbers double in long-term care facilities” (CIHI, May 1, 2014)

– Content courtesy of, and adapted from, Rehabilitation & Geriatrics Program, WRHA – Dr. P. Montgomery
WHY - Atypical presentation

Disease – DEMENTIAS

- In Manitoba, 60% of residents in Residential Care (PCH/LTC) and 18.6% of residents in Hospital based Continuing Care had a diagnosis of dementia in 2015-16 (CCRS Quickstats 2015-16)

https://www.youtube.com/watch?v=u5QMeQpkPhA
Redefine typical

- Requires superior assessment skills
- Requires expertise in caring for individuals with cognitive impairment
- Requires adopting evidence informed practice juxtaposed against social/cultural norms
- C.S.I. “Clinical Scene Investigator”
HOW?

- Investigate/Asses for the individualized expression of the elderly person’s response to the stressor of an invading pathogen while simultaneously evaluating the effect that multiple complicating factors have exerted upon that expression.
Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria

Nimalie D. Stone, MD;1 Muhammad S. Ashraf, MD;2 Jennifer Calder, PhD;3 Christopher J. Crnich, MD;4 Kent Crossley, MD;5 Paul J. Drinka, MD;6 Carolyn V. Gould, MD;1 Manisha Juthani-Mehta, MD;7 Ebbing Lautenbach, MD;8 Mark Loeb, MD;9 Taranis MacCannell, PhD;1 Preeti N. Malani, MD;10,11 Lona Mody, MD;10,11 Joseph M. Mylotte, MD;12 Lindsay E. Nicolle, MD;13 Mary-Claire Roghmann, MD;14 Steven J. Schweon, MSN;15 Andrew E. Simor, MD;16 Philip W. Smith, MD;17 Kurt B. Stevenson, MD;18 Suzanne F. Bradley, MD10,11 for the Society for Healthcare Epidemiology Long-Term Care Special Interest Group

(See the commentary by Moro, on pages 978–980.)

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

*Infect Control Hosp Epidemiol* 2012;33(10):965-977
Signs and Symptoms

- Fever
  - Most common sign of infection in younger adults
  - Febrile response often minimal or absent in older adults
  - A febrile response in the elderly is:
    - Elevations of $1.1^0\text{C}$ from normal baseline
    - A single oral temp $>37.8^0\text{C}$ or
    - Repeated oral temps $>37.2^0\text{C}$

- Stone et al, Sept 2012
## External Factors & Temp

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>NURSING IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
<td>• Rectal temps are the most accurate, while the proximal auditory canal is also effective</td>
</tr>
<tr>
<td>how temperature is assessed</td>
<td></td>
</tr>
</tbody>
</table>
| **Environment**   | • A resident exposed to a cool environment such as a bath can have their temp affected up to 18 hours later  
| afebrile & hypothermic residents can become febrile in a warm environment | • Even an open window or walk on a cool day can affect temp |
| **Time**          | • Lower temps occur naturally from 6 am to 2 pm  
| Temps taken in the am may not indicate fever as readily as those taken later in the day | • Higher temps occur from 4 – 10 pm |
| **Medications**   | • Aspirin, ibuprofen, & acetaminophen can mask febrile response  
|                   | • Take temps at least 3.5 hrs after administration of these meds |
| **Definitions**   | • Fever can more accurately be defined as 1.1°C above individual baseline  
| ≥ 38°C            | • Establish a baseline, especially for those who are at risk for muted febrile response |
Leukocytosis refers to an increase in the total number of WBCs due to any cause.
- It can be caused by infection, inflammation, allergic reaction, malignancy, hereditary disorders, or other miscellaneous causes.

In general, WBC and neutrophil counts alone are not sensitive or specific enough to accurately predict bacterial infection. Although viral infections generally do not cause neutrophilia, it can occur during the early phases of infection.
Constitutional Criterion

Acute change in mental status from baseline =
1. New fluctuating behavior (e.g., that comes and goes or changes in severity during the assessment)
2. New onset of difficulty focusing attention (e.g., unable to keep track of discussion or easily distracted)
3. New onset of incoherent thinking (e.g., rambling conversation, unclear flow of ideas, unpredictable switches in subject)
4. Resident’s level of consciousness is described as different from baseline (e.g., hyperalert, sleepy, drowsy, difficult to arouse)
Signs and Symptoms

- Change in mental status
  - Frank delirium vs. dementia
- Anorexia
  - Loss of appetite
- Functional decline
  - Falls, decreased mobility
- Weight loss
- Slight increase in respiratory rate
Signs and Symptoms

- Other signs and symptoms of infection are typically specific to the site of infection.
- Atypical presentation in the elderly is not restricted to febrile response but is common with many infections.
- This challenges the Health Care Professional to develop excellent assessment and deductive skills.
- CSI “Clinical Scenario Investigator”
Cellulitis/Soft tissue/Wound infection

One of the following;
- Pus present at wound, skin or soft tissue site
- At least 4 of the following signs/symptoms
  - Heat
  - Redness
  - Swelling
  - Tenderness or pain
  - Serous drainage
  - One of the constitutional criteria
The PUS among us

- **Pus** is a protein-rich fluid called *liquor puris*, usually whitish-yellow, yellow, or yellow brown in color.
- Pus consists of a buildup of dead leukocytes (white blood cells) from the body's immune system in response to infection.
- It accumulates at the site of inflammation.
- When the buildup is on or very near the surface of the skin it is called a pustule or pimple. An accumulation of pus in an enclosed tissue space is called an abscess.

Not all pus is actually pus

- Melting slough in a wound can appear very similar to pus.
- Lab results from a pus filled wound will contain organisms outside the spectrum of normal flora but can also be mixed with flora that is inhabiting the wound but not causing infection.
- Swab wound bed NOT pus!
- Use clinical signs and symptoms in conjunction with lab results to put the puzzle pieces together.
Scabies

- Infestation with *Sarcoptes scabiei* mites
- Classically presents with excoriated papules typically in the web spaces of the fingers, around elbows, the axilla, flexor surface of wrists, and genitals
Scabies

Both of the following;
- Maculopapular rash and/or itching
- At least one of the following;
  - Physician dx
  - Lab confirmation
  - Epi link to a lab confirmed case
Pneumonia

- Pneumonia and Influenza are the 6\textsuperscript{th} leading cause of death
- 90% of these deaths occur in older adults
  - Decreased pulmonary reserve
  - Decreased cough reflex
  - Decreased mucociliary transport
  - Decreased elasticity of alveoli
  - Poorer ventilation
Subtle Signs and Symptoms

Difficult Diagnosis

Delayed Initiation of Antibiotics

Inappropriate Use of Antibiotics

Increased Antimicrobial Resistance

Increased Morbidity
Pneumonia

All of the following criteria must be met:

- Interpretation of a chest radiograph as demonstrating pneumonia or the presence of an infiltrate.

- at least one of the following signs or symptoms;
  - new or increased cough
  - new or increased sputum production
  - O2 saturation <94% on room air or a reduction in O2 sat of >3% from baseline
  - new or changed abnormalities on lung examination
  - pleuritic chest pain
  - respiratory rate >25 breaths/minute

- at least one of the constitutional criterion
Diagnosis

- **Chest X-ray**
  - Distinguishing presentation d/t underlying co-morbidities vs. acute infectious processes

- **Sputum Specimens**
  - Difficult to obtain from the elderly
  - Distinguish between oral flora and pneumopathogens

- **CLINICAL PRESENTATION**
  - Infection Surveillance definitions as guideline for investigation
I think I need antibiotics for my col... IT'S A VIRUS!
Influenza

- Of deaths resulting from Influenza, 80-90% occur in older adults
- The elderly are prone to severe and potentially fatal complications because of co-existing chronic diseases and weakened immunity
- The elderly can benefit most from herd immunity/vaccination, early detection and aggressive therapy
Influenza/Influenza Like Illness (ILI)

Acute onset of cough and fever $\geq 38^0C$ and at least one of the following;

- Sore throat
- Joint and or muscle pain
- Complete exhaustion
Diagnosis

- Nasopharyngeal swab for viral culture
- CLINICAL PRESENTATION
Common Cold Syndromes
Urinary Tract Infection

- Second most common type of Nosocomial infection in LTC
- The typical definition of UTI in the general population is the presence of significant amounts of a single microbe in the urine
- In the elderly significant bacteria even in the presence of pus is not a significant indicator of UTI
- What is??
Mr. Tinkle

- Mr. Tinkle is a 90 year old man
- IPNs indicate the following:
  - **Oct 2, 2013**: “Resident is receiving risperidone @ 1500 + 1900 which started 28.09.13. Behaviour changes reported, not sure if related to increased risperidone or possible medical problems - ? UTI”
  - **Oct 3, 2013**: “lethargy increased, foul urine, some urinary symptoms, r/o UTI”
  - **Oct 5, 2013**: “Urinalysis result arrived = urinary tract infection. Physician called & ordered a/b x 7days”
Mrs. Anita Pee

- Anita is an 82 year old woman with vascular dementia.
- Transferred to acute care with a head laceration for suture and diagnostics as she has been difficult to rouse and combative with care when she does rouse since falling and hitting her head at 11pm last evening. PERL, Right dominant grasp (long-standing from a previous stroke).
- Return dx from ED="urosepsis"
- Clinical separation sheet indicates no tests were performed dx based on “frank delirium in an elderly female”
Significant labs (urine specimens)

Significant labs (for surveillance purposes) are now defined as;
• At least $10^8$ cfu/L of no more than 2 organisms in a voided specimen
• Any number of organisms in a straight catheter specimen
• At least $10^5$ cfu/L of any organism (s) in a catheter specimen

Note: lab assigned significance and parameters on what is reported as significant may not be the same values or range of values as the surveillance definitions, this practice varies by laboratory
Bacteriuria

- **Colony counts**
  - Hallmark of a UTI is usually $\geq 10^5$ cfus/ml in a clean catch or MSU
  - MSUs and clean catches can be difficult to obtain in the elderly
  - Lower numbers usually indicating contamination
  - Low numbers could reflect; early stage of infection, recent use of antibiotics, use of antiseptic to clean the perineum etc
Polymicrobial Bacteriuria

- Contamination may be the most frequent cause of multiple microbes in the elderly
- However 25-33% of bacteriuria in the elderly are in fact polymicrobial
- Reasons for polymicrobia include; fistulas, urinary retention, infected stones, or catheters
Asymptomatic Bacteriuria

- The presence of microbes in the urine that causes **no signs and symptoms**
- ASB is common in the elderly and does **NOT** require antibiotic treatment
- Treatment of ASB does not decrease morbidity or mortality, does not maintain sterile urine, causes side effects, and increases the incidence of drug-resistant microbes

**DON’T ASK FOR ANTIBIOTICS BASED ON C&S RESULTS ALONE!**
Pyuria

- Literally meaning pus in the urine
- Usually indicates a host response to infecting bacteria but can be present in both symptomatic and asymptomatic UTIs in the elderly
- Other causes of pyuria include; tuberculosis, cancer, and acute glomerulonephritis
- Hence, cloudy urine alone is not indicative of symptomatic UTI
Mrs. Ipea Cloudee

- 82 year old female, T38.2°C (oral) this morning, her urine is cloudy and foul smelling, and she has been increasingly confused over night. Her foley has drained 60cc in the last eight hours.

- IPNs;
  - Sept 24, 2013 - Resident very confused over night and urine is foul smelling. Contacted Dr. who ordered Nitrofurantoin
  - Sept 26, 2013 – Resident A&O x3, improving nicely on antibiotics
  - Sept 30, 2013 – Blood work back, showing electrolyte imbalance – specifically serum sodium and potassium are high. Physician informed, subcut fluid ordered for re-hydration
  - Oct 8, 2013 – Resident has had 7 watery stools in the last 24 hours with abdominal cramping and nausea
Here’s the Beef!

D) “Is this the bus stop for Winnipeg, I want to go home to visit my kids”. Resident has been increasingly confused over the past few days and HCA’s report his urine is cloudy. A) Encouraged increased fluid intake. Resident denies any increased incontinence, frequency or urgency but he is not a good historian due to this increased confusion. No c/o pain on voiding. Assessment findings; palpation of costovertebral angle elicits wincing, palpation of the testes reveals they are tender and swollen. HCAs have noted increased incontinence for the past few days (suddenly leaking through brief despite q2 h changes). T 37.6 (axilla) (resident is on scheduled Tylenol 4x/day). P). Attending contacted re: assessment findings and has ordered Cipro 500mg orally, two times a day for 10 days. Will collect and send MSU for C&S before abx start. Continue to monitor for signs/symptoms and document to assess treatment efficacy. Lab results pending.
Urinary Tract Infection

Non catheter

Significant lab results and one of the following;

- Acute dysuria, or acute pain/swelling/tenderness of the testes, epididymis, or prostate
- Fever or leukocytosis and one of;
  - Acute CVA pain/tenderness, suprapubic pain, gross hematuria, new or increased; incontinence, urgency, frequency
Urinary Tract Infection

Non catheter cont’d…

- **No** fever or leukocytosis and at least 2 of:
  - suprapubic pain,
  - gross hematuria
  - new or increased incontinence
  - new or increased urgency
  - new or increased frequency
UTI Catheter

Significant lab results and one of the following;

- Fever, rigors, or new onset hypotension with no alternate site of infection
- Either acute change in mental status or acute functional decline with no alternate dx and leukocytosis
- New onset of suprapubic pain or CVA pain/tenderness
- Purulent discharge from around the catheter or acute pain/swelling/tenderness of the testes/epididymis or prostate
Symptom-Free Pee: LET IT BE

A national initiative to stop inappropriate antibiotic use for asymptomatic bacteriuria in long-term care residents.

For more direction and guidance:
www.ammi.ca
#SymptomFreeLetItBe

AMMI Canada

https://ammi.ca/?ID=127&Language=ENG
Gastroenteritis & CDAD

One of more of the following;

- 3 liquid stools above what is normal for the resident in a 24 hour period
- Presence of toxic megacolon (abnormal dilation of the large bowel, documented radiographically)
- A stool specimen positive for C.diff/C.diff toxin
- Pseudomembranous colitis identified during endoscopy, surgery, or in examination of a biopsy specimen
Conclusions

- Quantifying infection rates is an important piece of improving the quality and safety of care provided
- **You** can prevent infections and fight for social justice
- Use your “CSI” skills to deliver responsive and respectful care (and document it!)
- Sound assessments, early recognition and prompt treatment is key
- Be wise and immunize!!