INFECTION SURVEILLANCE IN LONG-TERM CARE

5TH ANNUAL WYOMING INFECTION PREVENTION CONFERENCE, 2015

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Infection surveillance is a tough job, especially in the LTC setting.
Lack of standardized/validated metrics

- Applicable to all LTC facilities
- Targeted type of infection or specific high-risk groups
- Feasible across variety of facilities

Lack of national infrastructure

- No established benchmark for comparison
- No data repository
- No systematic approach to adjust HAI data for size, type, or characteristics of resident population
INFECTION DEFINITIONS

Standardizing the surveillance process

• Consistent
• Objective
• Demonstrable
• Relevant (population, setting)
• Make sense - understand and apply

Can be Measured!

CDC: Count, Divide, Compare (Surveillance is Quantitative)
Intended as Surveillance tools, not …

• diagnostic criteria
• definitions for case finding
• decision making algorithms for clinical intervention

When applied as Surveillance tools …

• highly specific
• retrospective (after-the-fact)
• focus on infection prevention, seek to minimize transmission
CRITERIA TO DEFINE INFECTIONS


• Consensus, multidisciplinary
• Adapted form CDC data: National Nosocomial Infections Surveillance (NNIS) system
• Generally accepted and used in research, initial publication not systematically validated

Allison McGeer, et al. APIC, 1996 (reprint)
Long-term care setting

- Older adults
- Skilled nursing care required
- Need assistance with Activities of Daily Living (ADLs)
- Safety supervision & cognitive impairment
- Limited options for…
  - Therapeutics (IVs)
  - Rapid diagnostic support
“McGeer Criteria” Updated

Nimalie Stone, et al. ICHE, 2012; 33: 995-977

- CDC/SHEA
- Endorsements: medical and professional societies, US and Canada
- Definitions revised based on published literature & expert opinion (not systematically validated)
- **Change:** Urinary tract infection & respiratory tract infections
- **Added:** Norovirus gastroenteritis & *C. diff* infections
Infection surveillance definitions for LTC

- **Constitutional criteria**: fever, leukocytosis, acute change in mental or functional status
- **Urinary tract**: revised criteria, with & without an indwelling urinary catheter
- **Respiratory tract**: cold, influenza-like, lower respiratory tract infections, pneumonia
- **Skin & soft tissue**: cellulitis, wounds, scabies, fungal oral, herpesvirus, conjunctivitis
- **Gastrointestinal tract**: norovirus, C. difficile
Fever

• Single oral >37.8°C (>100 ° F), or
• Repeated oral >37.2°C (>99°F), rectal >37.5°C (>99.5°F), or
• Single temperature >1.1C (2F) over baseline from any site (oral, rectal, axillary, tympanic)

Leukocytosis

• WBC >14,000 WBC/mm³, or
• Left shift (>6% bands or > 2,500 bands/mm³)
Mental status change

- Acute onset
- Fluctuating course
- Inattention and
- Disorganized thinking or altered levels of consciousness

Acute functional status decline

- 3 point increase in ADL score from baseline, based on 7 ADL items:
  - Bed mobility
  - Transfer
  - Locomotion w/in LTCF
  - Dressing
  - Toilet use
  - Personal hygiene
  - Eating

Minimum Data Set (MDS) 3.0:

- C1300: Signs and Symptoms of Delirium
- Section G: Functional status, G0110 ADL assistance
Symptoms are new or acutely worsening

- First consider non-infectious causes
- Must know baseline (normal) to evaluate change

All criteria must be meet

- No infection based on a single piece of evidence
- Surveillance is not exclusively determined by physician diagnosis
Example: UTI definitions

- Most frequent LTC infections
- Models application of definitions and inclusion criteria

Compare & contrast original and revised criteria:

- Variations in definitions
- Demonstrate the utility of defined criteria for infection surveillance activities
CRITERIA: UTI WITHOUT CATHETER

McGeer (1991) – No catheter, 3 of the following:

- Fever (>38°C) or chills
- New or increased burning pain on urination, frequency or urgency
- New flank or suprapubic pain or tenderness
- *Change in character of urine
- Worsening of mental or functional status (may be new or increased incontinence)

*clinical (blood, odor, sediment) or lab-based changes
Criteria: UTI without Catheter

CDC/SHEA (2012) – No catheter, both criteria 1 and 2 must be present:

- Criteria 1: At least 1 sign or symptom -
  - Acute dysuria or pain, swelling, tenderness (testes, epididymis, prostate)
  - Fever or leukocytosis and at least 1 of the following
    - Acute costovertebral angle pain
    - Suprapubic pain
    - New/increase incontinence
    - Gross hematuria
    - New/increase urgency
  - In the absence of fever or leukocytosis: 2 or more of the localizing urinary tract criteria shown above

- Criteria 2: At least 1 microbiology criteria:
  - $ \geq 10^5$ CFU/ml of no more than 2 organisms in a voided urine sample
  - $>10^2$ CFU/ml of any number of organisms in-and-out catheter sample
UTI: McGeer Criteria

- Fever: ≥38.0°C (100.4°F)
- Mental status change or functional decline criteria for UTIs for both catheter and no catheter

UTI: CDC/SHEA Criteria

- Fever: Single temp >37.8°C (100°F), repeat temp >37.2°C (99°F), or 1.1°C (2°F) over baseline
- Urine culture required to define UTI
- Add: Leukocytosis
- Delete: Change in urine character

Acute changes in mental or functional status defined using resident assessment scales; CDC/SHEA 2012 **REMOVED** criteria for residents without a catheter
CASE STUDY #1: CLINICAL HISTORY

Resident BT is 81 y/o male

- Hx: stroke and COPD
- Admitted 2 months prior for falls at home

Occasionally incontinence of bladder noted prior to admission

- Recently noted to have increased agitation
- BT sleeps at meal times, eats ≤50%, receives dietary supplements

Clinical findings

- Vitals: temperature of 100.1°F, respiratory rate 19 breaths per minute
- BT recently began complaining of “burning pain” on urination
- RN documentation in the chart notes BT stated “It feels like someone punched me in the back [rubs hand over lower back, flank, kidneys]”
CASE STUDY #1: LAB RESULTS

Hematology
- WBC 14,500 leukocytes/mm³
- WBC differential includes 7% bands

Urinalysis
- Pyuria (WBCs in urine, 2-3 WBC/hpf)
- Dipstick positive (+) for LE (leukocyte esterase)

Urine culture
- Preliminary: Gram negative bacteria >100,000 CFU/ml
- Final: >100,000 CFU/ml *E. coli*

Course of action
- Bactrim DS x 7 days for “presumptive UTI”
# Case Study #1: Criteria Review

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Does this resident meet criteria for a UTI?
CASE STUDY #1: CRITERIA REVIEW

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This resident meets the McGeer Criteria for UTI

This resident meets the CDC/SHEA Criteria UTI
Resident AB is 76 y/o female
- Hx: stroke and poorly controlled diabetes mellitus
- Admitted 8 months prior for worsening dementia and acute renal failure

Catheter placed at hospital prior to nursing home transfer
- Catheter removed 1 week after nursing home admission
- Recently noted to have increased confusion
- Husband reports that lately AB is sleeping during his visits

Clinical findings
- Vitals: temperature 97.4°F, respiratory rate 18 breaths per minute
- No further MD or RN documentation in the chart
Urinalysis
- Pyuria (WBCs in urine, 2-3 WBC/hpf)
- Dipstick essentially normal

Urine culture
- Preliminary: Gram positive bacteria >10,000 CFU/ml from a voided urine sample
- Final: >10,000 CFU/ml *Staphylococcus aureus* (MSSA)

Course of action
- Cipro x 4 days for “possible UTI”
## Case Study #2: Criteria Review

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**Does this resident meet criteria for a UTI?**
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Criteria: UTI with Catheter

McGeer (1991) – Indwelling catheter, at least 2 of the following signs:

• Fever (>38°C) or chills
• New flank or suprapubic pain or tenderness
• *Change in character of urine
• Worsening of mental or functional status (may be new or increased incontinence)

*clinical (blood, odor, sediment) or lab-based changes
CRITERIA: UTI WITH CATHETER

CDC/SHEA (2012) – Indwelling catheter, both criteria 1 and 2 must be present:

• Criteria 1: At least 1 sign or symptom -
  • Fever, rigors, new onset hypotension, with no alternative site of infection
  • Either acute change in mental status or acute functional decline, with no alternative site of infection
  • New onset suprapubic pain or costovertebral angle pain or tenderness
  • Purulent discharge from around catheter, or acute pain, swelling, or tenderness of the testes, epididymis, or prostate

• Criteria 2: Culture result:
  • Urinary catheter specimen with at least $10^5$ CFU/ml of any organism
## Compare McGeer & CDC/SHEA

### UTI: McGeer Criteria
- Fever: $\geq 38.0^\circ C (100.4^\circ F)$
- Mental status change or functional decline criteria for catheter-associated UTIs
- New flank or suprapubic pain or tenderness

### UTI: CDC/SHEA Criteria
- Fever: Single temp $>37.8^\circ C (100^\circ F)$, repeat temp $>37.2^\circ C (99^\circ F)$, or 1.1$^\circ C (2^\circ F)$ over baseline
- Urine culture required to define UTI; $>10^5$ CFU/ml of any organism
- No alternate site of infection
- Remove: change in character of urine
- No criteria for leukocytosis
Resident RF is 60 y/o female

- Hx: diabetes mellitus, hemiplegia, VRE, *C. diff*, spinal hardware infection
- Requires extensive assistance with mobility

**Foley catheter present prior to admission**

- In place “a few months”
- Catheter remained in places after admission

**3 Weeks post-admission**

- CNA noted RF’s urine had become increasingly cloudy and foul-smelling
- RF’s complained of new suprapubic pain
- Vitals not recorded, unable to determine is resident was febrile
CASE STUDY #3: LAB RESULTS

Urinalysis
• Pyuria (WBCs in urine, 10-15 WBC/hpf)
• Nitrates positive (+) on urine dipstick

Urine culture
• Preliminary: Gram negative bacteria >100,000 CFU/ml
• Final: not recorded in resident’s chart

Course of action
• Bactrim DS x 7 days, presumed UTI
**Case Study #3: Criteria Review**

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**Does this resident meet criteria for a catheter-associated UTI?**
**Case Study #3: Criteria Review**

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The Important Things…

• Surveillance definitions may not be the same clinical criteria used to make diagnostic or therapeutic decisions
  • Diagnosis/treatment might begin before all the data is available
  • Insufficient documentation might hamper surveillance plans

• Surveillance criteria may be more detailed than events reported on the MDS

• Discrepancies between surveillance data and clinical or MDS data might be good topics for process improvement projects
CHALLENGES TO SURVEILLANCE

• Some events not meet surveillance criteria
  • Incomplete assessment or documentation
  • Inappropriate diagnostic testing (asymptomatic, non-clinical pressure to treat)
  • Poor specimen collection techniques

• Do you include diagnosis/treatment of a UTI that does not meet definitions in your surveillance plan

• Integrating surveillance criteria into resident assessments
AND NOW...

...time for your questions
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