North Carolina SPICE
Statewide Program for Infection Control & Epidemiology

SURVEILLANCE FOR INFECTIONS IN LONG-TERM CARE

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Associate Director

Objectives

- Discuss the importance of surveillance
- Discuss analysis and presentation of surveillance data
- Discuss standardized surveillance definitions for LTCFs
- Discuss application of surveillance definitions

Definition cont'd

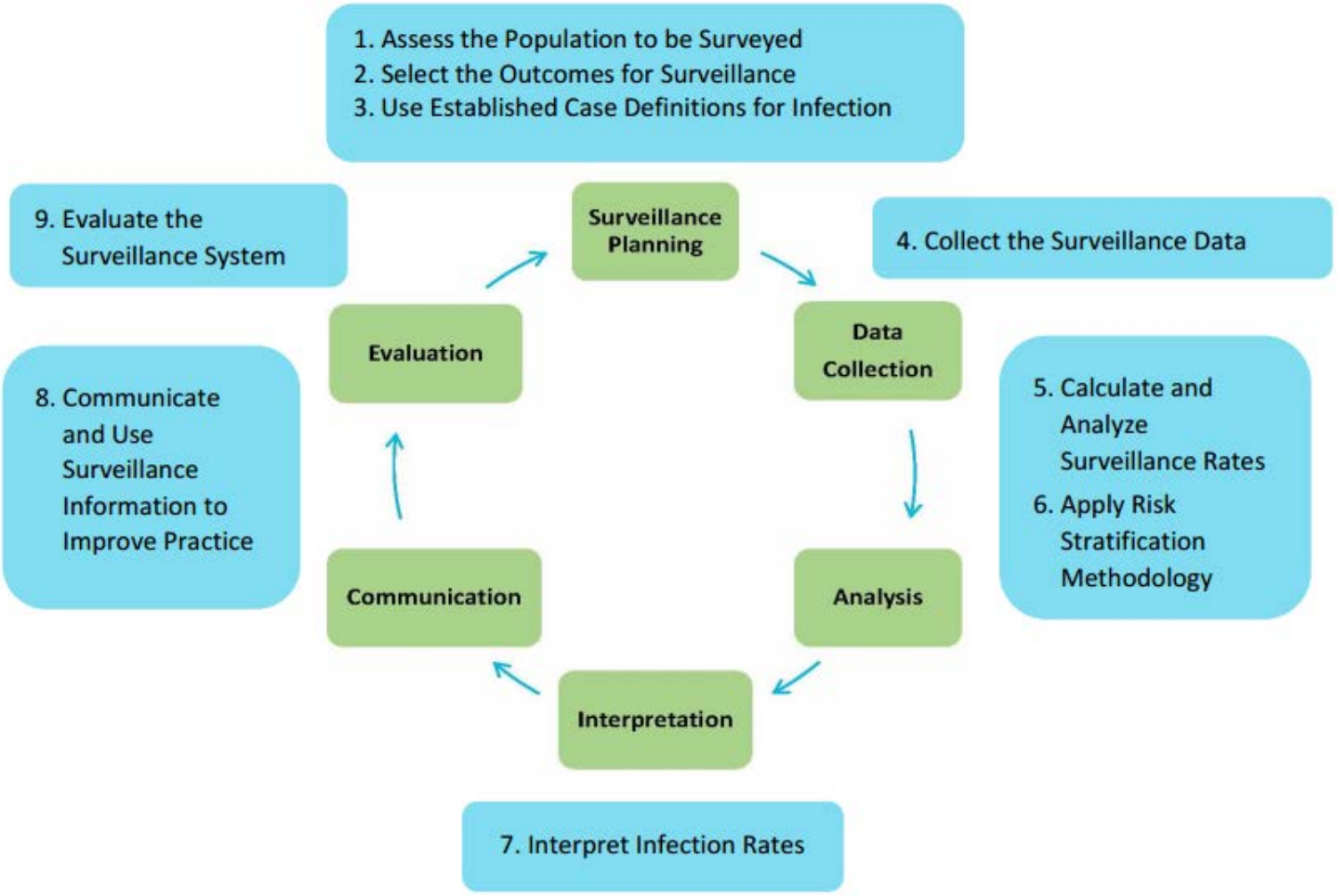
- "Surveillance is a comprehensive method of measuring outcomes and related processes of care, analyzing the data, and providing information to members of the healthcare team to assist in improving those outcomes and processes"

2015

Why do Surveillance?

- Reduce infection rates
- Establish baseline data
- Detection of outbreaks
- Monitor effectiveness of preventative and infection control interventions
- Education of personnel
- Required as a component of your IP program

How is Surveillance Performed?



Assess the Population

- What is the geographic location of the long-term care facility?
- What types of residents are served?
- What are the most common diagnoses?
- What are the most frequently performed invasive procedures?
- Which services or treatments are utilized most frequently?
- What types of residents are at greatest risk of infection?
- Are there any health concerns emerging from the community?

Approaches to Surveillance

- Facility-wide (Total) surveillance
- Targeted (Focused) surveillance
- Combination of both (total surveillance for MRSA and focused for UTI in one area)

Selection of Surveillance Metrics

Process

- Hand hygiene
- Urinary Catheter insertion/maintenance

Outcome

- Acute respiratory infections
- Urinary tract infections
- Skin/Soft Tissue Infections
- Gastroenteritis

Consideration for Choosing Surveillance Metric

- Mandatory/required
- Frequency (incidence) of the infection
- Communicability
- System/resident cost (↑mortality, hospitalization)
- Early Detection

Metric selected for surveillance should be re-evaluated annually as a component of the IP risk assessment

Infections that should be included in routine surveillance

Points to Consider	Infections	Comments
Evidence of transmissibility in a healthcare setting	Viral respiratory tract infections, viral GE, and viral conjunctivitis	Associated with outbreaks among residents and HCP in LTCFs
Processes available to prevent acquisition of infection		
Clinically significant cause of morbidity or mortality	Pneumonia, UTI, GI tract infections, (including C. *difficile)* and SSTI	Associated with hospitalization and functional decline in LTCF residents
Specific pathogens causing serious outbreaks	Any invasive group A *Streptococcus* infection, acute viral hepatitis, norovirus, scabies, influenza	A single laboratory-confirmed case should prompt further investigation

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Infections that could be included in routine surveillance

Points to Consider	Infections	Comments
Infections with limited transmissibility in a healthcare settings	Ear and sinus infections, fungal oral and skin infections and herpetic skin infections	Associated with underlying comorbid conditions and reactivation of endogenous infection
Infections with limited preventability		

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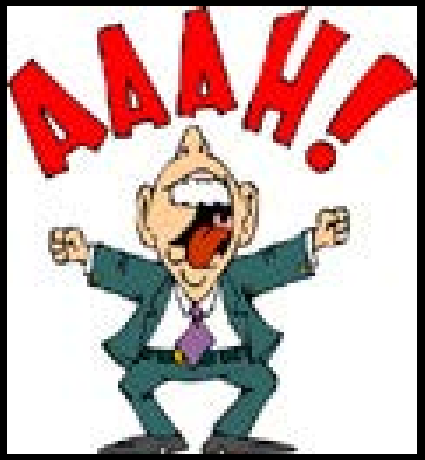
Infections for which other accepted definitions should be applied in LTCF surveillance

Points to Consider	Infections	Comments
Infections with other accepted definitions (may apply to only specific at-risk residents)	Surgical site infections, central-line- associated bloodstream infections and ventilator-associated pneumonia	LTCF-specific definitions were not developed. Refer to the National Healthcare Safety Network's criteria

Sources of Data for Surveillance

- Clinical ward/unit rounds
- Medical Chart
- Lab reports
- Kardex/Patient Profile/Temperature logs
- Antibiotic Starts

Surveillance Data Analysis



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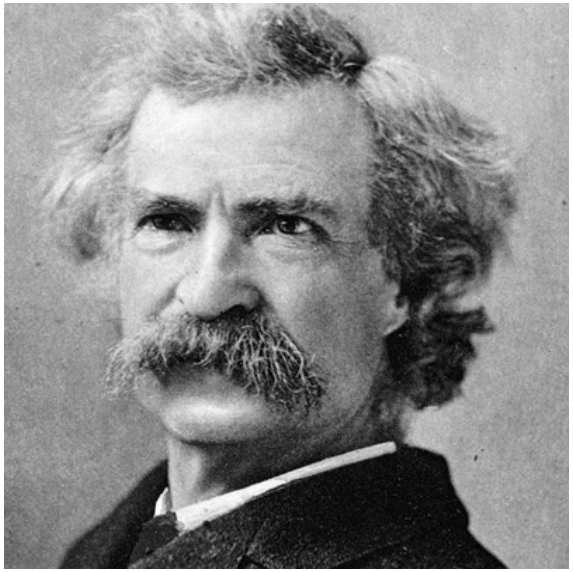


“There are 3 kinds of lies. Lies, damned lies, and statistics.”

~Popularized by Mark Twain

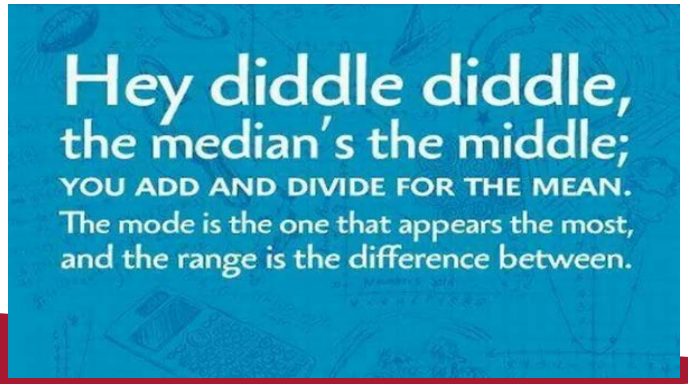
- Describes the persuasive power of numbers, particularly the use of statistics, to bolster weak arguments, and the tendency of people to disparage statistics that do not support their positions.

Descriptive Statistics

- Measures of Rates and Ratios
  - *Rate: How fast disease occurs in a population.*
  - *Ratio: How much disease compared to standard.*
- Measures of Central Tendency
  - *Central Tendency: How well the data clusters around an average value*.
- Measures of Dispersion
  - *Dispersion: How widely your data is spread from the average.*

Measures of Central Tendency

- Mean: average of a group of numbers
- Median: middle number in an ordered group of numbers
- Mode: most common value in a group of numbers



Example :

- For the past year, once a month, you have been conducting hand hygiene audits in your facility – these are your compliance results:

- 55%, 92%, 86%, 94%, 91%, 89%, 79%, 93%, 92%, 88%, 34%, 90%

- You decide as a first step to calculate the mean, median, mode and range of the monthly data to help describe hand hygiene compliance at your facility

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Measures of Dispersion

- Range: the largest value minus the smallest value

- Standard deviation: describes the variability or dispersion in the data set

Example :

- What is the:
  - Mean?
    - 34%, 92%, 86%, 94%, 91%, 89%, 79%, 93%, 92%, 88%, 55%, 90% = 983/12= 81.9%
  - Median?
    - 34%, 55%, 79%, 86%, 88%, 89%, 90%, 91%, 92%, 92%, 93%, 94% = 89.5%
  - Mode?
    - 92%
  - Range?
    - 34%-94% = 60%

Absolute Measures

- Simplest type of measurement
- Also known as counts or frequencies
- Example:
  - LTC A: 25 residents with norovirus
  - LTC B: 10 residents with norovirus
- Is norovirus worse at LTC A?

Relative Measures

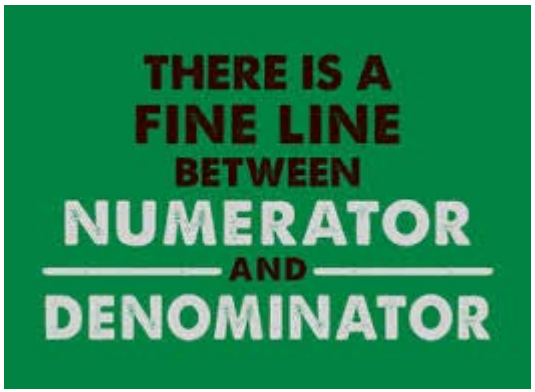
- Includes a denominator
- Useful for comparisons
- Examples:
  - 16 cases of *C. difficile* out of 1000 residents
  - 1 positive *C. difficile* test out of 7 samples tested

Absolute versus Relative

Example: Norovirus among LTC facility residents

- Absolute measures
  - LTC A: 25 residents ill
  - LTC B: 10 residents ill
- Relative measures
  - LTC A: 25 ill per 100 residents = 0.25 or 25%
  - LTC B: 10 ill per 25 residents = 0.40 or 40%

What Makes a Rate?

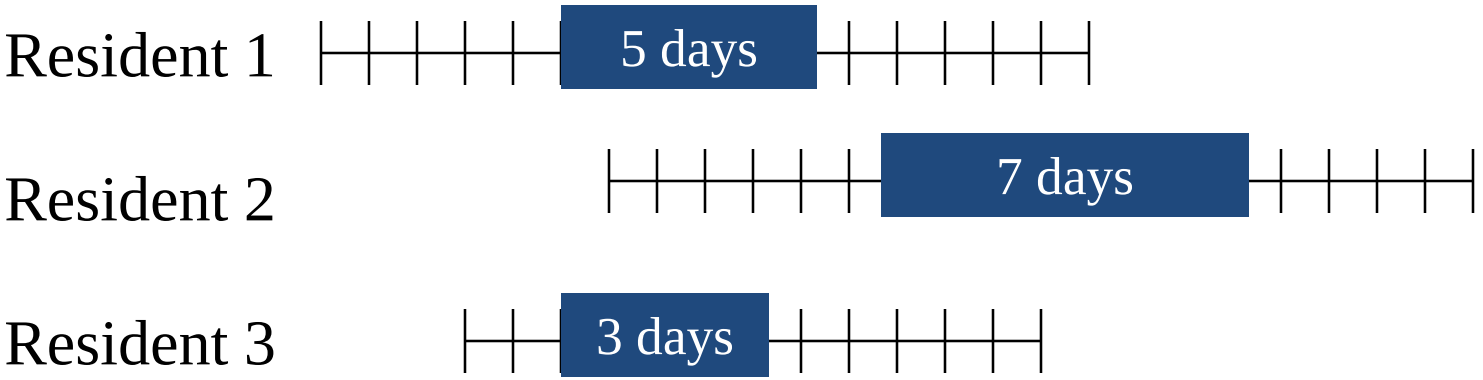


1. Numerator (top number)
   - *e.g., number of infections*
2. Denominator (bottom number)
   - *e.g., number of residents [proportion]*
   - *e.g., number of resident-days, number of device-days [incidence density/rate]*
3. Time Frame
   - *e.g., day, week, month*

Denominators

- Represent the population *at risk* of becoming part of the numerator
- Often, the most difficult data to obtain, but essential for comparisons
- Ideally, should incorporate time and can account for risk factors such as device use (e.g., device-days), length of stay (e.g., resident-days)

What is a Resident/Device-Day?



=15 resident-days, device-days, etc.

- More informative than simply saying “3 residents”

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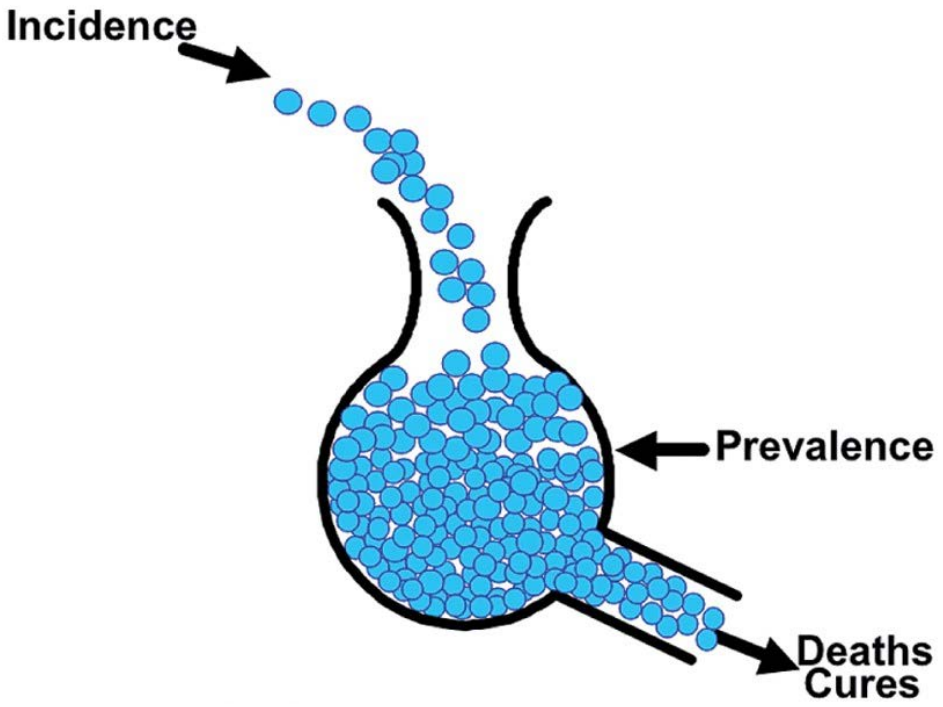
Rate Measures

- Prevalence
- Incidence
- Attack Rate



Prevalence

- Prevalence: the total number of cases of disease existing in a population at a **point** in time.
  - *e.g., # of MRSA cases per population **on** March 8*

Count of **existing** cases x constant (e.g., 100 or 1000) =
Number of people at risk

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Incidence

- Incidence: the number of <u>new</u> cases of disease in a population <u>over a **period** of time</u>.
  - *e.g., # of **<u>new</u>** MRSA cases per population **<u>during</u>** March*

<u>Count of **new** cases</u> x constant (e.g., 100 or 1000) =
Number of people at risk

Attack Rate

- Attack Rate: the number of <u>new</u> cases of disease out of the population at risk.
  - Related to incidence but always uses 100 as the constant, so it is expressed as a <u>percent</u>.
  - Often used for outbreaks or clusters that occur over a short period of time
  - *e.g., <u>**%**</u> of residents with MRSA during outbreak in LTC A in March*

$$\frac{\text{Count of new cases}}{\text{Number of people at risk}} \times \mathbf{100} =$$

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Displaying and Interpreting Surveillance Data

- Line lists
- Graphs: a visual representation of data on a coordinate system (e.g., two axes)
- Tables: a set of data arranged in rows and columns

Line Lists

- Allow for record-level review of data
- Helpful way to standardize the data you want to routinely collect
- Helpful in pinpointing issues in data quality
- Can help inform rates or other summarized measures
- Can help identify trends

Pt #	Name	Room #	Source	Organism	Culture date	Antibiotic	Date
3685632		EW	Ucc U~Mnd	Prot mir	3-14		
		EW 322	Ucc U+M+	Prot mir			
0532210		EW 316	cellulitis			cephalexin	3-9
		EW 356	Ucc – outside doc			cephalexin	3-2
		EW 324	ucc			cephalexin	3-30
		EW 346	pneum			amox	3-10
		EW 308	ucc	ecoli			
7802490		JW 234	Ucc U~Mnd	Kleb pn, psea	3-6		
		JW 202	wound	stau			
		PW	eyes			tobra	3-2
3887077		PW	Ucc U~M+	ecoli	3-2		
		PW 122	Cellulitis foot			clinda	3-12
2475260		PW	Ucc U+Mnd	Ecoli, ent	3-12		
4417105		PW	Ucc U-Mnd	steno	3-22		
2259700		PW	wound	Prot mir	3-5	Ssi reported to FX	
7809247		PW	Ucc U+M+	ecoli	3-30		

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Data Types

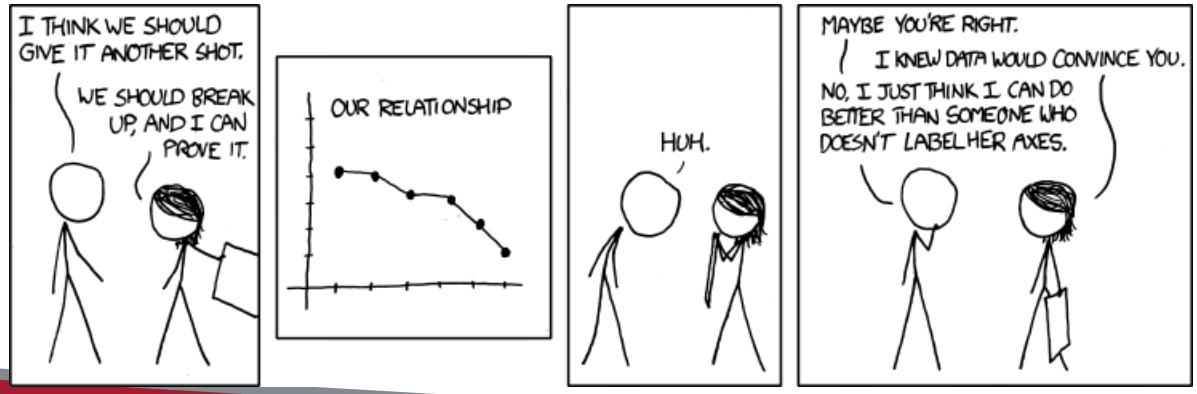
- Quantitative variables: numerical values
  - *(e.g., number of infections, number of residents)*

- Categorical variables: descriptive groups or categories
  - *(e.g., areas of the facility, gender, occupational groups)*

Features of Graphs and Tables

Graphs and tables should be self-explanatory!

- Clear, concise title: describes person, place, time
- Informative labels: axes, rows, columns
- Appropriate intervals for axes
- Coded and labeled legends or keys
- Use footnotes to:
  - Explain codes, abbreviations, and symbols
  - Note exclusions
  - Note data source



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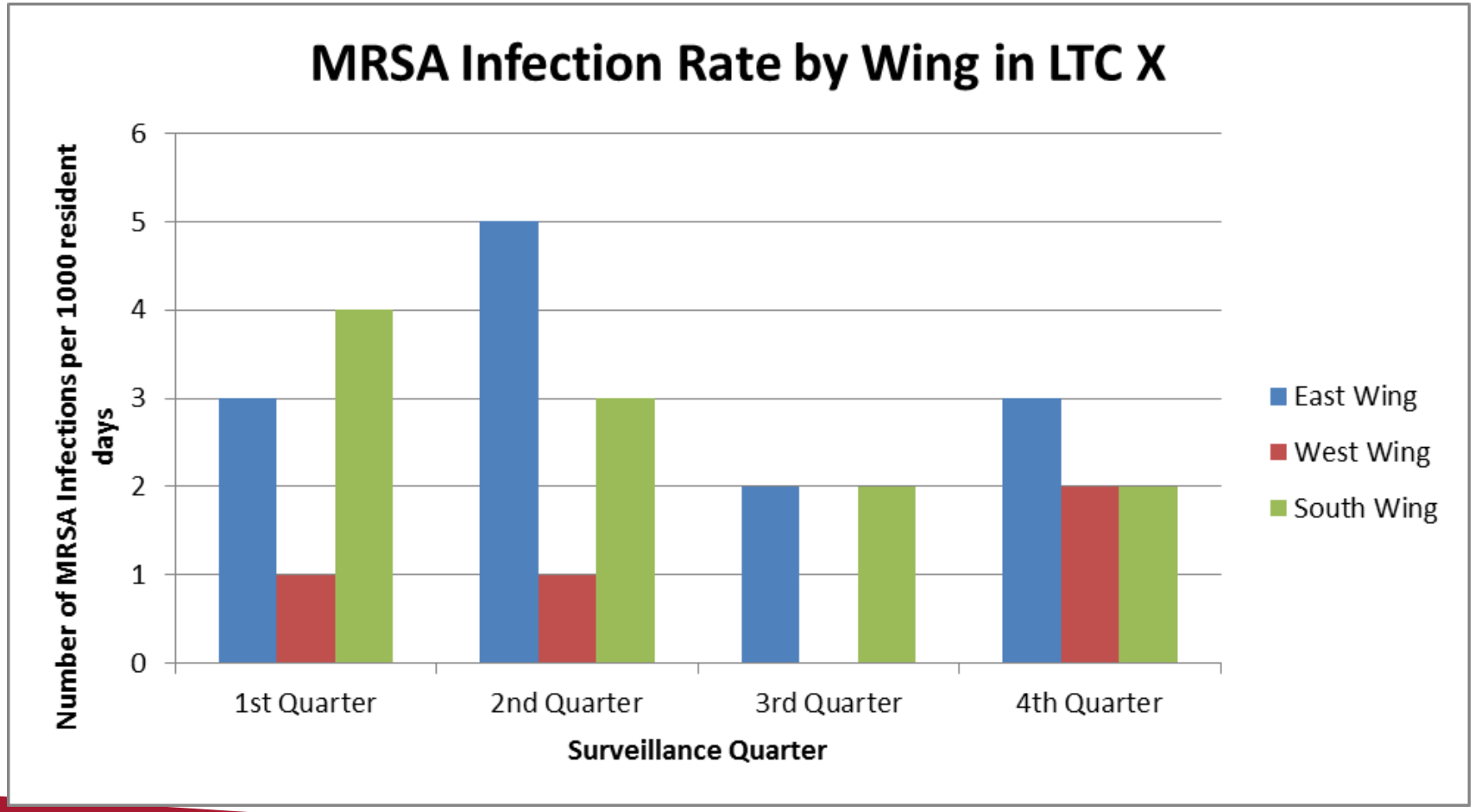
Graph Types

- Bar Graphs
  - *E.g., Histograms*
  - *E.g., Comparison between categories*
  - *E.g., Epidemic Curves*
- Line Graphs
  - *E.g., To show trends over time*
- Pie Charts
  - *E.g., As a percentage of a whole*

Bar Graph



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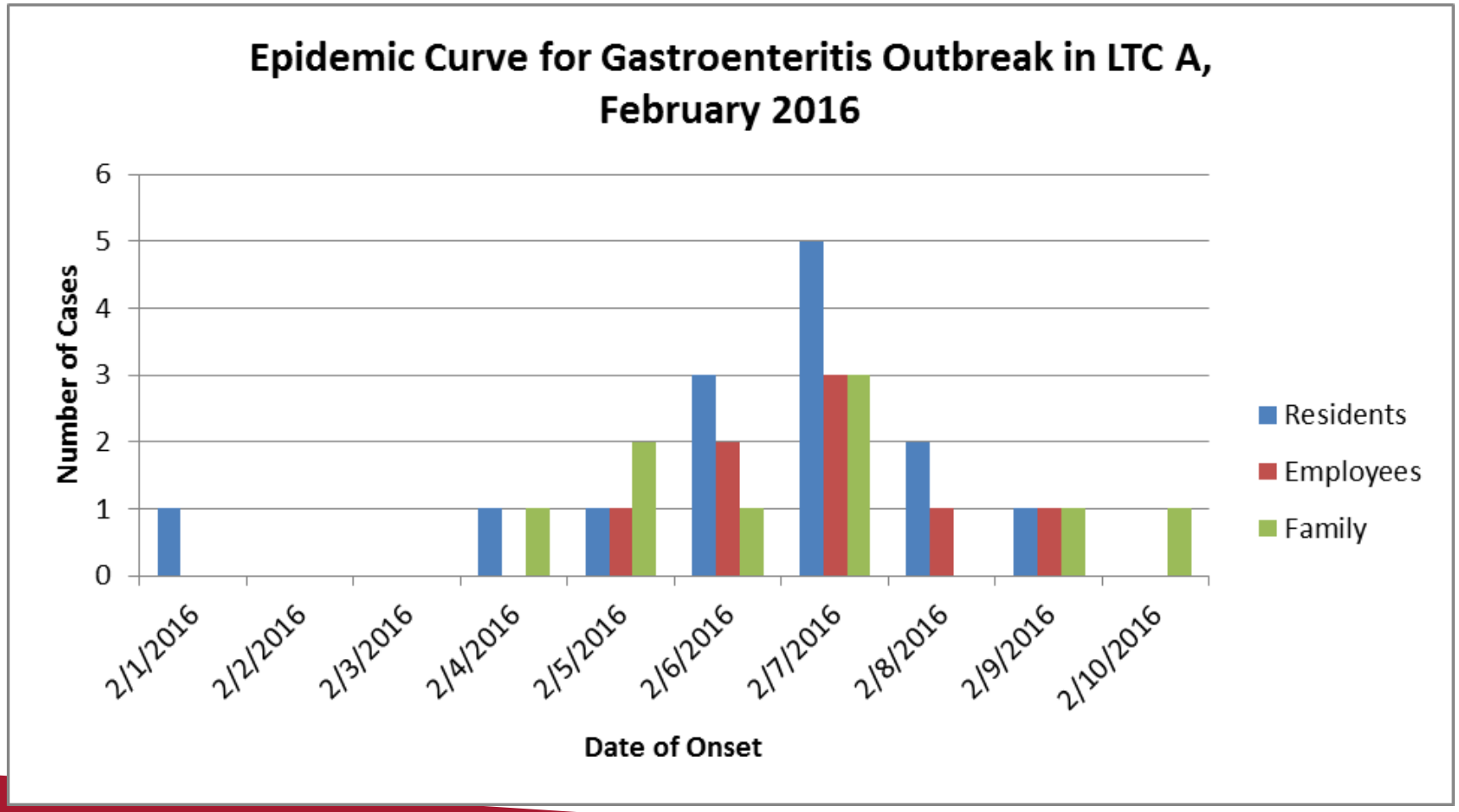
Epi Curve



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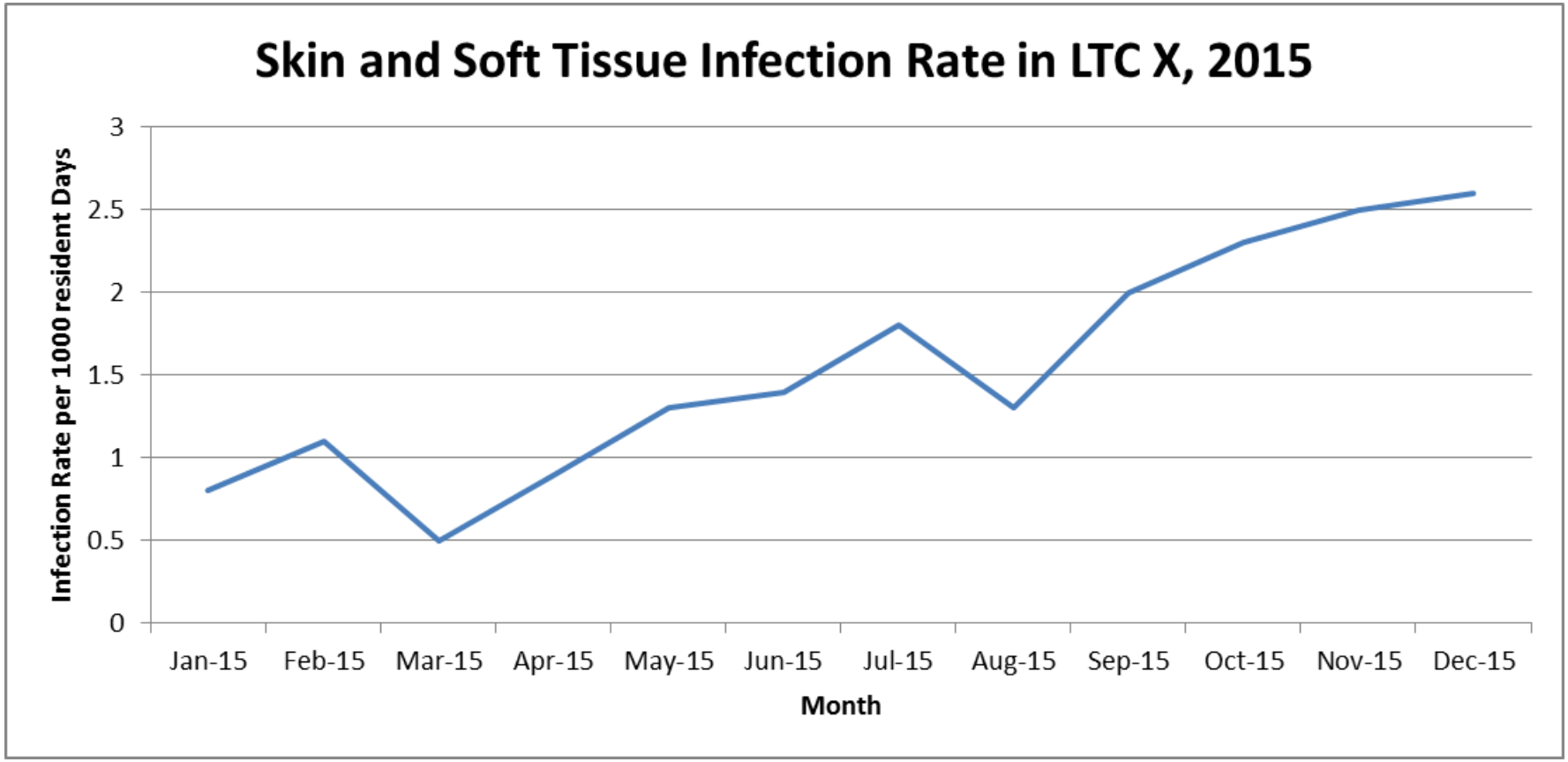
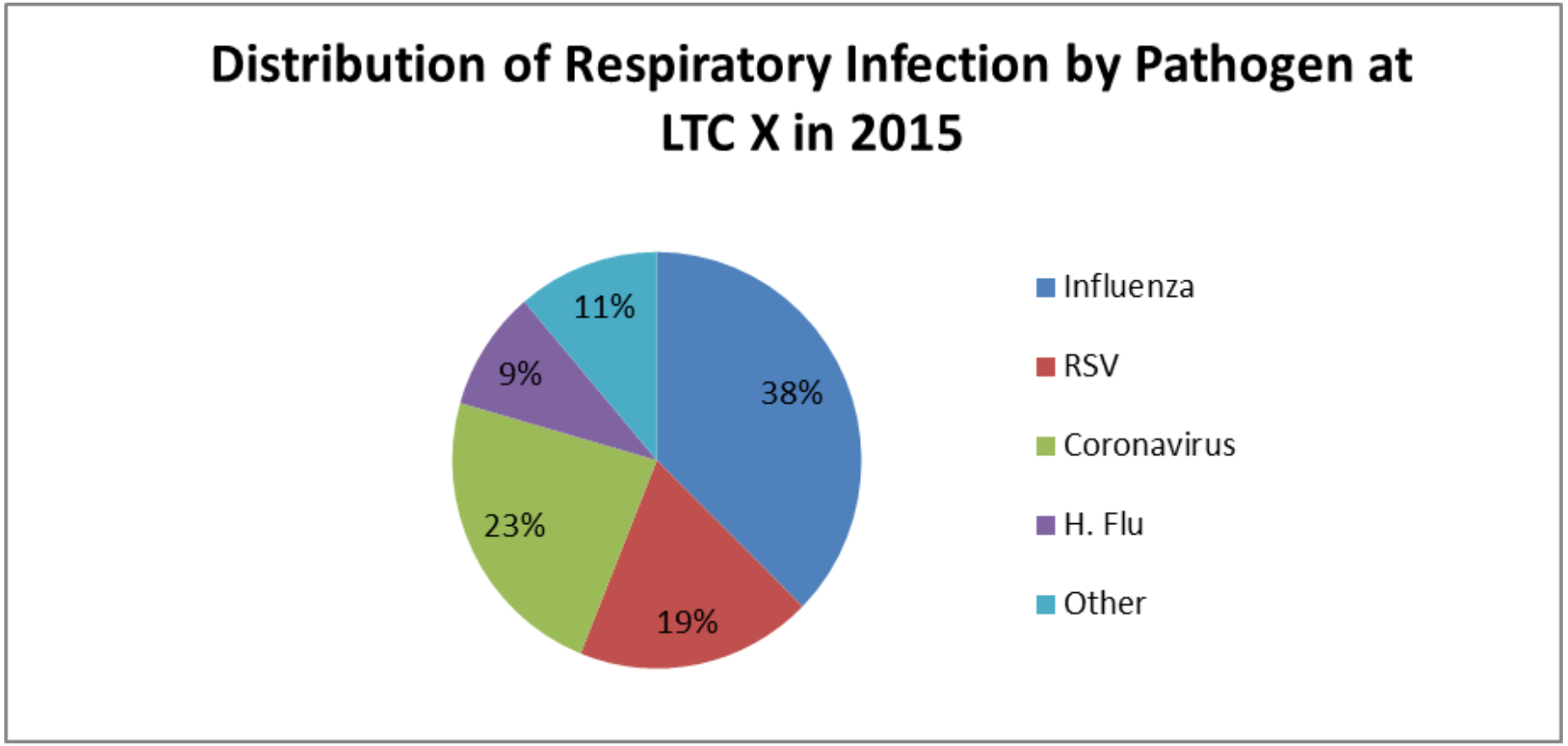
Line Graph



Pie Chart



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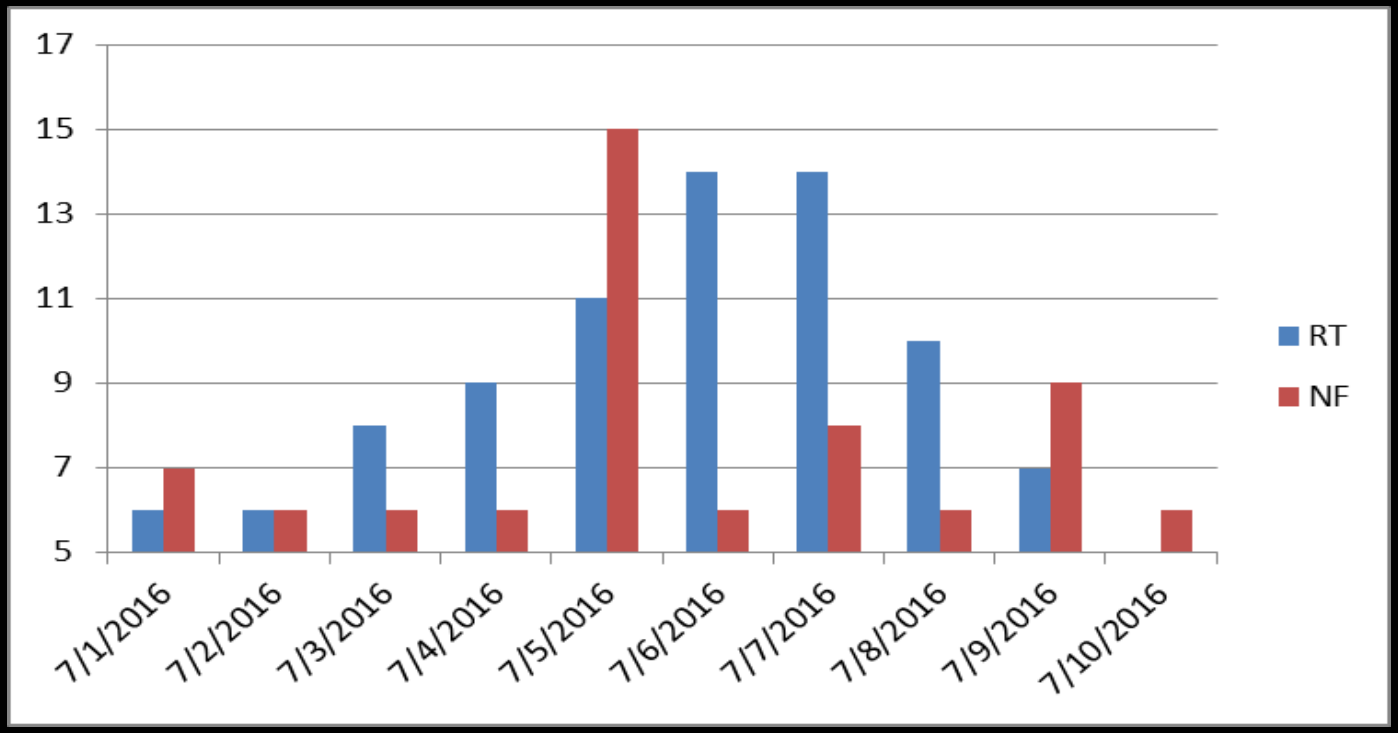
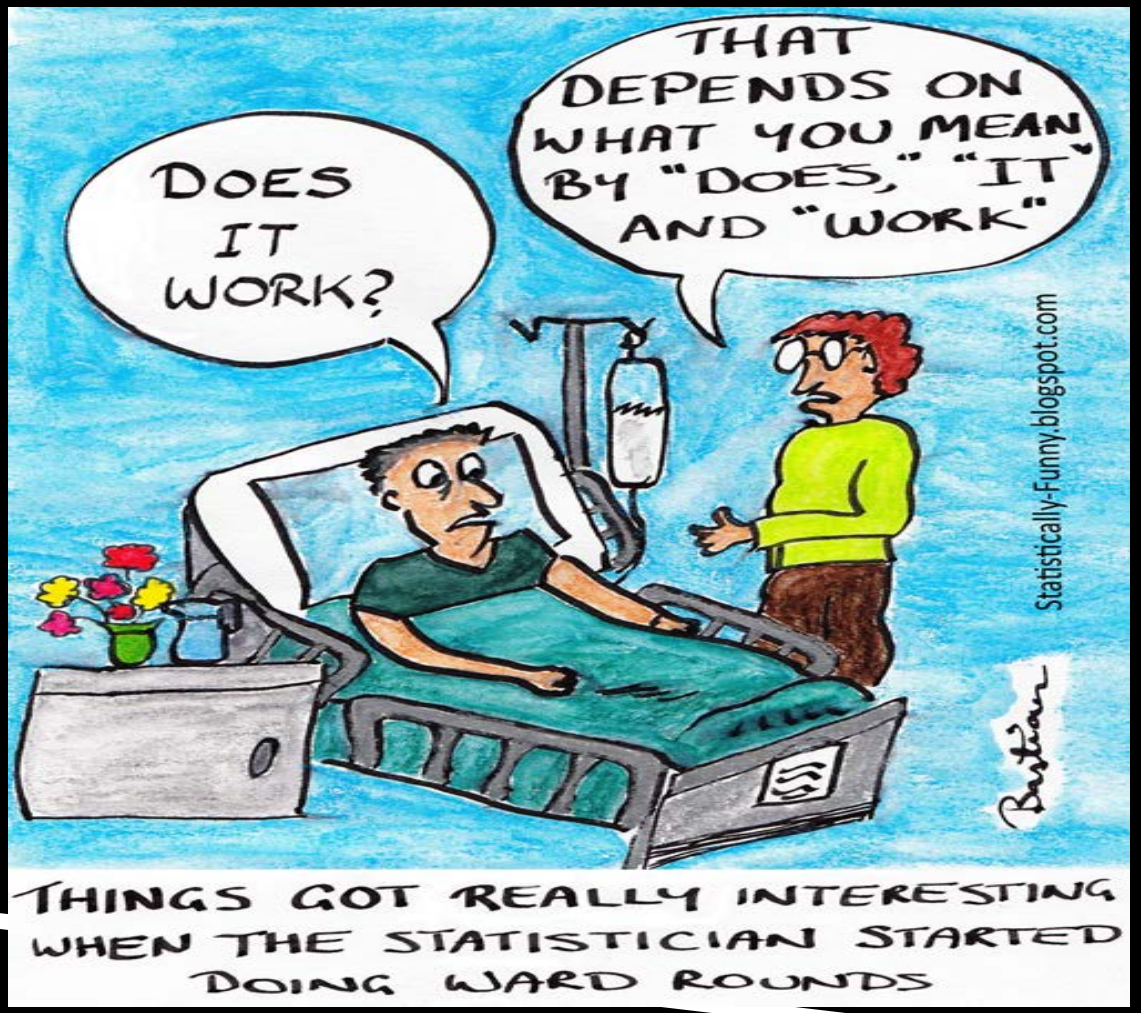
Tables

Number of UTIs by Age Group, LTC X, 2015	
Age Group (Years)	**Number of Cases**
<50	0
51-60	2
61-70	7
71-80	6
81-90	3
>90	1
Total	**19**


17
15
13
11
9
7
5
RT
NF
7/1/2016
7/2/2016
7/3/2016
7/4/2016
7/5/2016
7/6/2016
7/7/2016
7/8/2016
7/9/2016
7/10/2016


DOES IT WORK?
THAT DEPENDS ON WHAT YOU MEAN BY "DOES," "IT" AND "WORK"
Statistically-Funny.blogspot.com
Bastian
THINGS GOT REALLY INTERESTING WHEN THE STATISTICIAN STARTED DOING WARD ROUNDS

Why Analyze your Data?

- Provide feedback to internal stakeholders
- Analyzing HAI data can help facilitate internal validation activities
- Reports can help inform prioritization and success of prevention activities
- At the end of the day, these are YOUR data – you should know your data better than anyone else

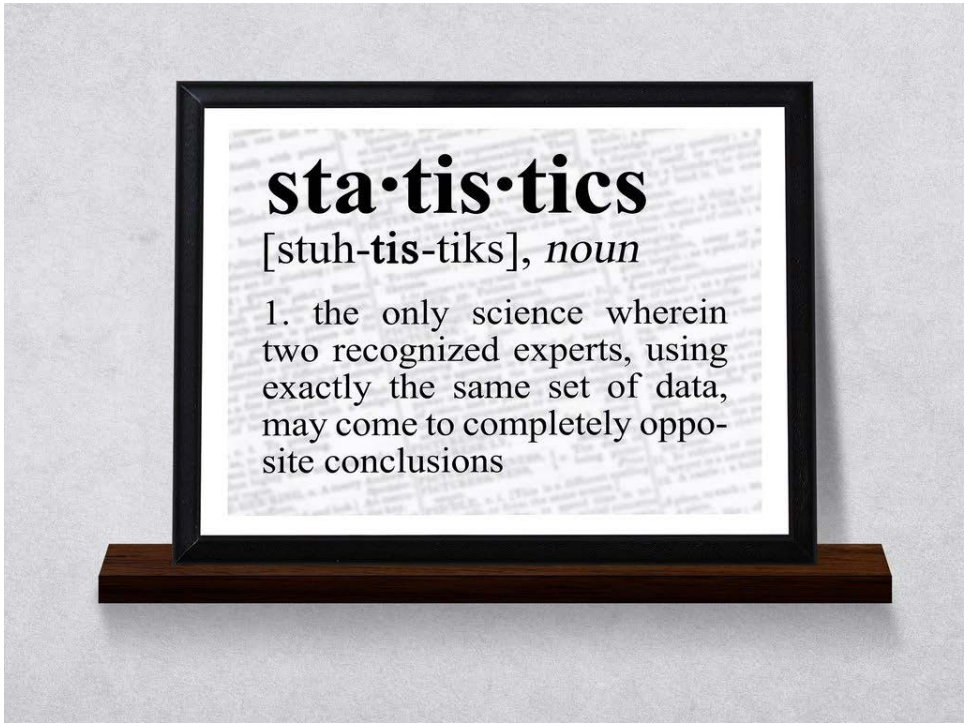
Checklist

- Before you begin analyzing your data, ask yourself these questions:
  - What data are you analyzing?
  - What is the time period of interest?
  - Why are you analyzing these data?
  - Who is the audience?

Data Analysis: Interpreting the Results

- Examine trends over time
- Assess which risk groups are being most affected
- Assess patterns to determine temporality
- Identify acute or unusual events which require immediate follow-up

Determine the Significance of Changes to Surveillance Data



Determine the Significance-How?

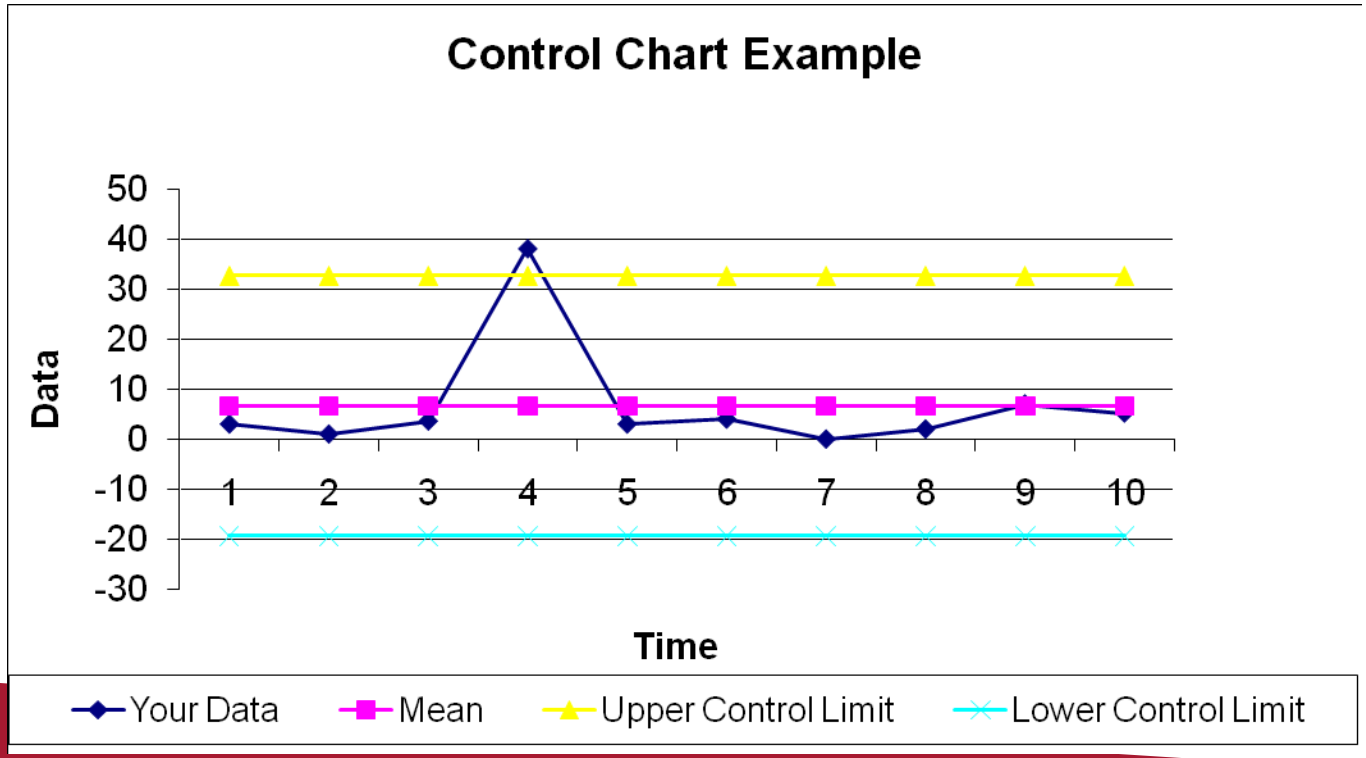
- Practical Significance vs. Statistical Significance
- Make comparisons
  - *For example: over time, to other areas of facility, to other facilities (NHSN data)*
  - Remember to choose appropriate data for comparison (*i.e., same denominator units)*
- Apply a type of statistical test
  - *e.g., control charts (for time trends)*
- Other statistical tests and measures
  - P-values
  - 95% confidence intervals

Internal Benchmarks

- Compare current results to your own prior results
- Best way to chart your own progress over time
  - Select feasible and stretch goals
- Note when interventions took place
- Use when there is no external benchmark

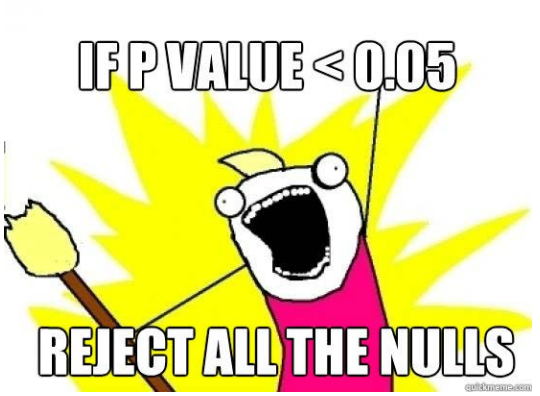
Control Charts

- Tool to determine when infection rates are out of range – user sets control limits. *How high is TOO high?*



Other Statistical Tests: P Value

- Probability that the difference does not reflect a true difference and is only due to chance.
- e.g., P=0.05 means that 95 out of 100 times your estimate was truly significant
- Generally a level of P<0.05 is considered “statistically significant.”



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...and this is where we put the non-significant results.

someecards
user card

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STATISTICIANS ARE MEAN AND SLIGHTLY DEVIANT

IMPLEMENTING AND APPLYING SURVEILLANCE DEFINITIONS

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INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY OCTOBER 2012, VOL. 33, NO. 10

SHEA/CDC POSITION PAPER

Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria

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LTC Surveillance for UTIs

www.cdc.gov/nhsn/ltc/uti/index.html

Apps | Imported From IE | Other bookmarks

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

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SEARCH

CDC A-Z INDEX

National Healthcare Safety Network (NHSN)

- NHSN
- NHSN Login
- About NHSN +
- Enroll Here +
- Materials for Enrolled Facilities −
- Ambulatory Surgery Centers +

CDC > >NHSN > >Materials for Enrolled Facilities > >Long-term Care Facilities

Report Urinary Tract Infections

Resources for NHSN Users Already Enrolled

- Training
- Protocol

New Users - Start Here

www.cdc.gov/nhsn/pdfs/ltc/ltcf-uti-protocol-current.pdf

5:32 PM
9/13/2016

Guiding Principles for LTCF Criteria

- Infection surveillance only
- Applied retrospectively as it relates to clinical diagnosis/treatment
- Focus on transmissible/preventable infections
  - Not for case finding
  - Not for diagnostic purposes
  - Not for clinical decision making

Attribution of infection to LTCF

- No evidence of an incubating infection at the time of admission to the facility
  - Basis of clinical documentation of appropriate signs and symptoms and not solely on screening microbiologic data
- Onset of clinical manifestation occurs > 2 calendar days after admission.

Attribution of infection to LTCF

- All symptoms must be new or acutely worse
- Non-infectious causes of signs and symptoms should always be considered prior to diagnosis
- Identification of an infection should not be based on a single piece of evidence
  - Clinical, microbiologic, radiologic
- Diagnosis by physician insufficient (based on definition)

Constitutional Requirements

Fever:

- A single oral temperature >37.8°C [100°F], OR
- Repeated oral temperatures >37.2°C [99°F]; rectal temperature >37.5° (99.5°F) OR
- >1.1°C [2°F] over baseline from a temperature taken at any site

No time frame provided??

Constitutional Requirements

Leukocytosis

- Neutrophilia > 14000 WBC/mm^3

OR

- Left shift (>6% bands or ≥1500 bands/mm^3)

Constitutional Requirements

Acute Change in Mental Status from Baseline

- Based on Confusion Assessment Method (CAM) criteria available in MDS

Change	Criteria
Acute Onset	Evidence of acute change in mental status from resident baseline
Fluctuating	Behavior fluctuating (e.g., coming and going or changing in severity during assessment)
Inattention	Resident has difficulty focusing attention (e.g., unable to keep track of discussion or easily distracted
Disorganized Thinking	Resident's thinking is incoherent (e.g., rambling conversation, unclear flow of ideas)
Altered level of consciousness	Resident's level of consciousness is described as different from baseline (e.g., hyperalert, sleepy, drowsy, difficult arouse, nonresponsive)

Either /or

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Constitutional Requirements

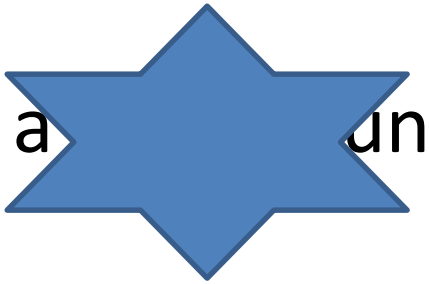
Acute Functional Decline

- New 3 point increase in total ADL score (0-28) from baseline based on 7 ADLs {0 = independent; 4 = total dependence}
  1. Bed mobility
  2. Transfer
  3. Locomotion within LTCF
  4. Dressing
  5. Toilet use
  6. Personal hygiene
  7. Eating

Question

Which statement(s) meet constitutional requirements?

1. The resident must have a temperature >101°F
2. The resident doesn't seem to be herself today
3. The resident hasn't been ambulatory for 3 months
4. The resident has a [redacted]unt 15000 WBC/mm^3



Respiratory Tract Infections

Criteria	Comments
A. *<u>Common cold syndrome/pharyngitis</u>* At least **two** criteria present 1. Runny nose or sneezing 2. Stuffy nose (i.e., congestion) 3. Sore throat or hoarseness or difficulty swallowing 4. Dry cough 5. Swollen or tender glands in neck	Fever may or may not be present. Symptoms must be new, and not attributable to allergies

Respiratory Tract Infections

Criteria	Comments
B. *<u>Influenza-like Illness</u>* **Both** criteria 1 and 2 present 1. Fever 2. At least **three** of the following symptom sub-criteria (a-f) present a. Chills b. New headache or eye pain c. Myalgias or body aches d. Malaise or loss of appetite e. Sore throat f. New or increased dry cough	If criteria for influenza-like illness and another upper or lower respiratory tract infection are met at the same time, only the diagnosis of influenza-like illness should be used Due to increasing uncertainty surrounding the timing of the start of influenza season, the peak of influenza activity and the length of the season, 'seasonality' is no longer part of the criteria to define influenza-like illness

Respiratory Tract Infections

Criteria	Comments
C. <u>Pneumonia</u> **All** criteria 1-3 present 1. Interpretation of chest radiograph as demonstrating pneumonia or the presence of <u>new</u> infiltrate 2. At least **one** of the following respiratory sub-criteria (a-f) present a. New or increased cough b. New or increased sputum production c. O_2 saturation <94% on room air or a reduction in O_2 saturation of more than 3% from baseline d. New or changed lung exam abnormalities e. Pleuritic chest pain f. Respiratory rate of ≥ 25/min 3. At least **one** constitutional criteria	For both pneumonia and lower respiratory tract infections, presence of underlying conditions which could mimic a respiratory tract infection presentation (congestive heart failure, interstitial lung disease), should be excluded by review of clinical records and an assessment of presenting symptoms and signs

Respiratory Tract Infections

Criteria	Comments
D. <u>Lower respiratory tract (Bronchitis or Tracheo-bronchitis</u>	
All criteria 1-3 present 1. Chest radiograph not performed <u>or</u> *negative* for pneumonia or new infiltrate. 2. At least **two** of the following respiratory sub-criteria (a-f) present a. New or increased cough b. New or increased sputum production c. O_2 saturation <94% on room air or a reduction in O_2 saturation of more than 3% from baseline d. New or changed lung exam abnormalities e. Pleuritic chest pain f. Respiratory rate of ≥ 25/min 3. At least **one** constitutional criteria	For both pneumonia and lower respiratory tract infections, presence of underlying conditions which could mimic a respiratory tract infection presentation (congestive heart failure, interstitial lung disease), should be excluded by review of clinical records and an assessment of presenting symptoms and signs

McGeer Urinary Tract Infections

Criteria

A. For Residents without an indwelling catheter

Both criteria 1 and 2 present

1. At least one of the following sign/symptom sub-criteria (a-c) present:
   a) Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate
   b) Fever or leukocytosis

   and

   At least one of the following localizing urinary tract sub-criteria:
      i. Acute costovertebral angle pain or tenderness
      ii. Suprapubic pain
      iii. Gross hematuria
      iv. New or marked increase in incontinence
      v. New or marked increase in urgency
      vi. New or marked increase in frequency
   c) In the absence of fever of leukocytosis, then at least two or more of the following localizing urinary symptoms
      i. Suprapubic pain
      ii. Gross hematuria
      iii. New or marked increase in incontinence
      iv. New or marked increase in urgency
      v. New or marked increase in frequency
2. One of the following microbiologic sub-criteria
   a) $\geq 10^5$ cfu/ml of no more than 2 species of microorganisms in a voided urine
   b) $\geq 10^2$ cfu/ml of any number of organisms in a specimen collected by an in and out catheter

Comments

UTI should be diagnosed when there are localizing s/s and a positive urinary culture

A diagnosis of UTI can be made without localizing symptoms if a blood culture isolate of the same organism isolated from the urine and there is no alternate sight of infection

In the absence of a clear alternate source, fever or rigors with a positive urine culture in a non-catheterized resident will often be treated as a UTI. However evidence suggest most of the these episodes are not from a urinary source

Pyuria does not differentiate symptomatic UTI from asymptomatic bacturia

Absence of pyuria in diagnostic test excludes symptomatic UTI in residents of LTCF

Urine specimens should be processed within 1-2 hours, or refrigerated and processed with in 24 hours.

NHSN Urinary Tract Infections

For Residents without an indwelling catheter

Criteria

Must meet criteria 1a OR 2a

1a

Either of the following:

1. Acute dysuria
2. Acute pain, swelling or tenderness of the testes, epididymis or prostate

2a

Either of the following:

1. Fever
2. Leukocytosis

AND

One or more of the following:

1. Costovertebral angle pain or tenderness
2. New or marked increase in suprapubic tenderness
3. Gross hematuria
4. New or marked increase in incontinence
5. New or marked increase in urgency
6. New or marked increase in frequency

OR 3a

Two or more of the following:

1. Costovertebral angle pain or tenderness
2. New or marked increase in suprapubic tenderness
3. Gross hematuria
4. New or marked increase in incontinence
5. New or marked increase in urgency
6. New or marked increase in frequency

AND

Either of the following:

1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $>10^5$ CFU/ml
2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml

Comments

- Fever can be used to meet SUTI criteria even if the resident has another possible cause for the fever
- Fever definition same as McGeer
- Leukocytosis definition same as McGeer

Notes:

Yeast and other microorganisms which are not bacteria are not acceptable UTI pathogens

McGeer Urinary Tract Infections

Criteria	Comments
B. <u>For the resident with an indwelling catheter</u> **Both** criteria 1 and 2 present 1. At least **one** of the following sign/symptom sub-criteria (a-d) present: a) Fever, rigors, or new onset hypotension, with no alternate site of infection b) Either acute change in mental status <u>or</u> acute functional decline with no alternate diagnosis <u>and</u> Leukocytosis c) New onset suprapubic pain <u>or</u> costovertebral angle pain or tenderness d) Purulent discharge from around the catheter <u>or</u> acute pain, swelling, or tenderness of the testes, epididymis, or prostate 2. Urinary catheter culture with ≥10^5 cfu/ml of any organism(s)	Recent catheter trauma, catheter obstruction or new onset hematuria are useful localizing signs consistent with UTI, but not necessary for diagnosis Urinary catheter specimens for culture should be collected following the replacement of the catheter (if current catheter has been in place for >14 days)

NHSN Urinary Tract Infections

For the resident with an indwelling catheter

Criteria	Comments
CA-SUTI **Both** criteria 1 and 2 present 1. At least **one or more** of the following: a) Fever (same as McGeer) b) Rigors c) New onset hypotension, with no alternate site of infection d) New onset confusion/functional decline **AND** Leukocytosis e) New costovertebral angle pain or tenderness f) New or marked increase in suprapubic tenderness g) Acute pain, swelling, or tenderness of the testes, epididymis, or prostate h) Purulent discharge from around the catheter	**AND** And any of the following: *If urinary catheter removed within last 2 calendar days (day of removal is day 1, so day of removal or following day)* 1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $>10^5$ CFU/ml 2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml *If urinary catheter in place:* 1. Specimen collected from indwelling catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^5$ CFU/ml Notes: *Yeast and other microorganisms which are not bacteria are not acceptable UTI pathogens*

NHSN Notes

- Indwelling urinary catheter should be in place for a minimum of 2 calendar days before infection onset (day 1 = day of insertion)
- Indwelling urinary catheter: a drainage tube that is inserted into the urinary bladder through the urethra, is left in place and is connected to a closed collection system, also called a foley catheter. Indwelling urinary catheters do not include straight in-and-out catheters or suprapubic catheters (these would be captures as SUTIs, not CA-SUTIs)
- *Indwelling catheters which have been in place for > 14 days should be changed prior to specimen collection but failure to change catheter does not exclude a UTI for surveillance purposes*
-

What do the Guidelines Say?

- Specimens collected through the catheter present for more than a few days reflect biofilm microbiology. For residents with chronic indwelling catheters and symptomatic infection, changing the catheter immediately prior to instituting antimicrobial therapy allows collection of a bladder specimen, which is a more accurate reflection of infecting organisms.
- Urinary catheters coated with antimicrobial materials have the potential to decrease UTIs but have not been studied in the LTCF setting.

SHEA/APIC Guideline: Infection prevention and control in the long-term care facility Philip W. Smith, MD, Gail Bennett, RN, MSN, CICb Suzanne Bradley, MD, Paul Drinka, MD, Ebbing Lautenbach, MD, James Marx, RN, MS, CIC, Lona Mody, MD, Lindsay Nicolle, MD and Kurt Stevenson, MD July 2008

Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
A. *Cellulitis/soft tissue/wound infection* At least **one** of the following criteria is present 1. Pus present at a wound, skin, or soft tissue site 2. New or increasing presence of at least **four** of the following sign/symptom sub-criteria a) Heat at affected site b) Redness at affected site c) Swelling at affected site d) Tenderness or pain at affected site e) Serous drainage at affected site **f)** **One** constitutional criteria	More than one resident with streptococcal skin infection from the same serogroup (e.g., A, B, C, G) in a LTCF may suggest an outbreak For wound infections related to surgical procedures: LTCF should use the CDC's NHSN surgical site infection criteria and report these infections back to the institution performing the original surgery Presence of organisms cultured from the surface (e.g., superficial swab culture) of a wound is not sufficient evidence that the wound is infected

Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
B. *Scabies* **Both** criteria 1 and 2 present 1. A maculopapular and/or itching rash 2. At least **one** of the following sub-criteria: a) Physician diagnosis b) Laboratory confirmation (scrapping or biopsy) c) Epidemiologic linkage to a case of scabies with laboratory confirmation	Care must be taken to rule out rashes due to skin irritation, allergic reactions, eczema, and other non-infectious skin conditions An epidemiologic linkage to a case can be considered if there is evidence of geographic proximity in the facility, temporal relationship to the onset of symptoms, or evidence of a common source of exposure (i.e., shared caregiver).

Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
C. <u>Fungal oral/perioral and skin infections</u> <u>Oral candidiasis:</u> **Both** criteria 1 and 2 present: 1. Presence of raised white patches on inflamed mucosa, or plaques on oral mucosa 2. Medical or dental provider diagnosis	Mucocutaneous candida infections are usually due to underlying clinical conditions such as poorly controlled diabetes or severe immunosuppression. Although not transmissible infections in the healthcare setting, they can be a marker for increased antibiotic exposure
<u>Fungal skin Infection:</u> **Both** criteria 1 and 2 present: 1. Characteristic rash or lesion 2. Either a medical provider diagnosis or laboratory confirmed fungal pathogen from scrapping or biopsy	Dermatophytes have been known to cause occasional infections, and rare outbreaks, in the LTC setting.

Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
D. <u>Herpes viral skin infections</u> <u>Herpes simplex infection</u> **Both** criteria 1 and 2 present: 1. A vesicular rash 2. Either physician diagnosis or laboratory confirmation <u>Herpes zoster infection</u> **Both** criteria 1 and 2 present: 1. A vesicular rash 2. Either physician diagnosis or laboratory confirmation	Reactivation of old herpes simplex (“cold sores”) or herpes zoster (“shingles”) is not considered a healthcare-associated infection Primary herpes viral skin infections are very uncommon in LTCF, except in pediatric populations where it should be considered healthcare-associated.

Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
E. *Conjunctivitis* At least **one** of the following criteria present: 1. Pus appearing from one or both eyes, present for at least 24 hours 2. New or increasing conjunctival erythema, with or without itching. 3. New or increased conjunctival pain, present for at least 24 hours.	Conjunctivitis symptoms (“pink eye”) should not be due to allergic reaction or trauma.

Gastrointestinal Tract Infections

Criteria	Comments
A. <u>*Gastroenteritis*</u> At least **one** of the following criteria present 1. Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24 hour period 2. Vomiting, two or more episodes in a 24 hour period **3.** **Both** of the following sign/symptom sub-criteria present: a) A stool specimen positive for a pathogen (such as *Salmonella, Shigella, E. coli* 0157:H7, *Campylobacter* species, rotavirus) b) At least **one** of the following GI sub-criteria present i. Nausea ii. Vomiting iii. Abdominal pain iv. Diarrhea	Care must be taken to exclude non-infectious causes of symptoms. For instance, new medication may cause diarrhea, nausea/vomiting; initiation of new enteral feeding may be associated with diarrhea; nausea or vomiting may be associated with gallbladder disease. Presence of new GI symptoms in a single resident may prompt enhanced surveillance for additional cases. In the presence of an outbreak, stool from specimens should be sent to confirm the presence of norovirus, or other pathogens (such as rotavirus and *E. coli* 0157:H7).

Gastrointestinal Tract Infections

Criteria	Comments
B. *Norovirus gastroenteritis* **Both** criteria 1 and 2 present 1. At least **one** of the following GI sub-criteria a) Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24 hour period b) Vomiting, two or more episodes in a 24 hour period 2. A stool specimen positive for detection of norovirus either by electron microscopy, enzyme immune assay, or by a molecular diagnostic test such as polymerase chain reaction (PCR).	In the absence of laboratory confirmation, an outbreak (2 or more cases occurring in a LTCF) of acute gastroenteritis due to norovirus infection in a LTCF may be assumed to be present if **all** of the following criteria are present ("Kaplan criteria") a) Vomiting in more than half of affected persons b) A mean (or median) incubation period of 24-48 hours c) A mean (or median) duration of illness of 12-60 hours d) No bacterial pathogen is identified in stool culture.

Gastrointestinal Tract Infections

Criteria	Comments
C. <u>*Clostridium difficile gastroenteritis*</u> **Both** criteria 1 and 2 present **1.** **One** of the following GI sub-criteria a) Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24 hour period b) The presence of toxic megacolon (abnormal dilation of the large bowel documented on radiology) **2.** **One** of the following diagnostic sub-criteria a) The stool sample yields a positive laboratory test result for *C. difficile* toxin A or B, or a toxin-producing *C. difficile* organism is identified in a stool culture or by a molecular diagnositic test such as PCR b) Pseudomembranous colitis is identified during endoscopic examination or surgery, or in histopathologic examination of a biopsy specimen.	A "primary episode" of *C. difficile* infection (CDI) is defined as one that has occurred without any previous history of CDI., or that has occurred more than 8 weeks after the onset of a previous episode of CDI. A "recurrent episode" of CDI is defined as an episode of CDI that occurs 8 weeks or less after the onset of previous episode, provided the symptoms from the earlier (previous) episode resolved Individuals previously infected with *C. difficile* may continue to remain colonized even after symptoms resolve In the setting of a GI outbreak, individuals could test positive for *C. difficile* toxin due to ongoing colonization and also be co-infected with another pathogen. It is important that other surveillance criteria are used to differentiate infections in this situation.

CASE STUDIES

PRACTICE APPLYING THE DEFINITIONS

McGeer Urinary Tract Infections

Criteria	Comments
B. For the resident with an indwelling catheter	
Both criteria 1 and 2 present	Recent catheter trauma, catheter obstruction or new onset hematuria are useful localizing signs consistent with UTI, but not necessary for diagnosis
1. At least **one** of the following sign/symptom sub-criteria (a-d) present: a) Fever, rigors, or new onset hypotension, with no alternate site of infection b) Either acute change in mental status or acute functional decline with no alternate diagnosis and Leukocytosis c) New onset suprapubic pain or costovertebral angle pain or tenderness d) Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate	
2. Urinary catheter culture with $\geq 10^5$ cfu/ml of any organism(s)	Urinary catheter specimens for culture should be collected following the replacement of the catheter (if current catheter has been in place for >14 days)

NHSN Urinary Tract Infections

For the resident with an indwelling catheter

Criteria	Comments
CA-SUTI **Both** criteria 1 and 2 present 1. At least **one or more** of the following: a) Fever (same as McGeer) b) Rigors c) New onset hypotension, with no alternate site of infection d) New onset confusion/functional decline **AND** Leukocytosis e) New costovertebral angle pain or tenderness f) New or marked increase in suprapubic tenderness g) Acute pain, swelling, or tenderness of the testes, epididymis, or prostate h) Purulent discharge from around the catheter	**AND** And any of the following: *If urinary catheter removed within last 2 calendar days (day of removal is day 1, so day of removal or following day)* 1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $>10^5$ CFU/ml 2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml *If urinary catheter in place:* 1. Specimen collected from indwelling catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^5$ CFU/ml Notes: *Yeast and other microorganisms which are not bacteria are not acceptable UTI pathogens*

Respiratory Tract Infections

Criteria	Comments
D. <u>Lower respiratory tract (Bronchitis or Tracheo-bronchitis</u>	
All criteria 1-3 present 1. Chest radiograph not performed <u>or</u> *negative* for pneumonia or new infiltrate. 2. At least **two** of the following respiratory sub-criteria (a-f) present a. New or increased cough b. New or increased sputum production c. O_2 saturation <94% on room air or a reduction in O_2 saturation of more than 3% from baseline d. New or changed lung exam abnormalities e. Pleuritic chest pain f. Respiratory rate of ≥ 25/min 3. At least **one** constitutional criteria	For both pneumonia and lower respiratory tract infections, presence of underlying conditions which could mimic a respiratory tract infection presentation (congestive heart failure, interstitial lung disease), should be excluded by review of clinical records and an assessment of presenting symptoms and signs

Gastrointestinal Tract Infections

Criteria	Comments
B. *Norovirus gastroenteritis* **Both** criteria 1 and 2 present 1. At least **one** of the following GI sub-criteria a) Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24 hour period b) Vomiting, two or more episodes in a 24 hour period 2. A stool specimen positive for detection of norovirus either by electron microscopy, enzyme immune assay, or by a molecular diagnostic test such as polymerase chain reaction (PCR).	In the absence of laboratory confirmation, an outbreak (2 or more cases occurring in a LTCF) of acute gastroenteritis due to norovirus infection in a LTCF may be assumed to be present if **all** of the following criteria are present ("Kaplan criteria") a) Vomiting in more than half of affected persons b) A mean (or median) incubation period of 24-48 hours c) A mean (or median) duration of illness of 12-60 hours d) No bacterial pathogen is identified in stool culture.

Gastrointestinal Tract Infections

Criteria	Comments
A. *Gastroenteritis* At least **one** of the following criteria present 1. Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24 hour period 2. Vomiting, two or more episodes in a 24 hour period **3.** **Both** of the following sign/symptom sub-criteria present: a) A stool specimen positive for a pathogen (such as *Salmonella, Shigella, E. coli* 0157:H7, *Campylobacter* species, rotavirus) b) At least **one** of the following GI sub-criteria present i. Nausea ii. Vomiting iii. Abdominal pain iv. Diarrhea	Care must be taken to exclude non-infectious causes of symptoms. For instance, new medication may cause diarrhea, nausea/vomiting; initiation of new enteral feeding may be associated with diarrhea; nausea or vomiting may be associated with gallbladder disease. Presence of new GI symptoms in a single resident may prompt enhanced surveillance for additional cases. In the presence of an outbreak, stool from specimens should be sent to confirm the presence of norovirus, or other pathogens (such as rotavirus and *E. coli* 0157:H7).

Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
A. *Cellulitis/soft tissue/wound infection* At least **one** of the following criteria is present 1. Pus present at a wound, skin, or soft tissue site 2. New or increasing presence of at least **four** of the following sign/symptom sub-criteria a) Heat at affected site b) Redness at affected site c) Swelling at affected site d) Tenderness or pain at affected site e) Serous drainage at affected site **f)** **One** constitutional criteria	More than one resident with streptococcal skin infection from the same serogroup (e.g., A, B, C, G) in a LTCF may suggest an outbreak For wound infections related to surgical procedures: LTCF should use the CDC's NHSN surgical site infection criteria and report these infections back to the institution performing the original surgery Presence of organisms cultured from the surface (e.g., superficial swab culture) of a wound is not sufficient evidence that the wound is infected

Questions?