Infection Prevention Program in Critical Access Hospitals

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Nothing to disclose

Learning Objectives

• List the essential components of an effective infection prevention program
• Define the purpose of an infection prevention risk assessment
• Explain methods to analyze and interpret surveillance data
• Identify and describe the steps taken in an outbreak investigation
Goals of the Infection Prevention Program

- Decrease risk of infection to patients and personnel
- Monitor for occurrence of infection and implement control measures
- Find and correct issues relating to infection prevention practices
- Minimize unprotected exposure to pathogens
- Minimize risk associated with procedures, medical devices and equipment
- Sustain compliance with regulatory bodies related to infection prevention

Primary Activities

- Surveillance and control measures to prevent infections
- Outbreak investigation
- Policy and procedure review and revisions
- Education; staff and patients
- Performance improvement
- Content expertise and resource, the infection preventionist is a resource for all staff and departments
The Infection Prevention Program Plan

- Risk Assessment
- Assessment of services provided
- Assessment of populations served
- Prioritized strategies for risk reduction
- Surveillance plan including data analysis
- Plan is reviewed annually or as often as needed

Infection Preventionist Competency Model

- Specific core competencies are defined by the Certification Board of Infection Control and Epidemiology (CBIC)
- Extending from these core competencies are 4 domains developmental domains
  - Build on the core competencies
  - Achievement helps move infection preventionist (IP) from novice to expert
4 Domains of APIC’s Competency Model

- Leadership and Program Management
- Performance Improvement and Implementation of Science Domain
- Infection Prevention and Control Domain
- Technical Domain

Infection Control Risk Assessment Purpose

- Evaluation of potential risk for infections, contamination and exposures
  - Based on known risk, historical data and reports in literature
- Evaluation of harm
  - Life threatening, loss of function, loss of community trust, loss of organization good will, financial threat, legal and/or regulatory issues
- Evaluation of organization’s preparedness to eliminate or mitigate the harm or risk of harm
IC Risk Assessment Includes

- Descriptive analysis
  - Geographic area served
  - Environmental factors
  - Populations served
  - Breakdown of major payors
  - System issues
  - Other risks

Example: Descriptive Assessment
Descriptive Assessment: Geographic Area

- Describe size of area
  - How many counties, rural, urban
  - How far away do patients live
- Unique characteristics
  - Low population density
  - Seasonal flooding
- Number of acute care facilities and their distance
- Characteristics that increase or decrease risk

Descriptive Assessment: Population

- Total population
- Breakdown of age groups and ethnicity
- Median household income
- Breakdown of most frequent admitting DX
- Characteristics that increase or decrease risk
Descriptive Assessment: System

• Organization level of preparedness
  – Current plans in place
  – Status of plan implementation
• Education and training
• Back up systems
• Public health and community resources

Descriptive Assessment: Other Risks

• Characteristics that increase risk
  – Influx of seasonal tourists
    • Major population age shift
  – State or county fair
  – Outdoor concert venue
• Increase demand on ED
• Increase potential for food borne illnesses
• DOH underfunded
Descriptive Assessment: Provider Characteristics

- Number of providers on staff
- Breakdown of primary and specialties
- Affiliations with any schools
- Characteristics that increase or decrease risk
  - Availability of infectious disease physician
  - Difficulty recruiting
  - Stable medical staff
  - Engaged support of core measures

Descriptive Assessment: Hospital Characteristics

- List the services provided
- Characteristics that increase or decrease risk
  - Hand hygiene compliance
  - Influenza immunization rates
  - Compliance with precautions
  - Staff turnover
  - Average length of stay
  - Private rooms
  - Wellness center
  - Diabetes education center
Risk Assessment Grid

- Potential problems/issues
  - Include risks identified in the descriptive analysis
- Score probability the risk will occur
- Score the impact of the risk
- Score the current level of preparedness
- Multiply all for a total score

Example of Risk Assessment Grid
**Purpose of Risk Assessment Grid**

- Rank ordering risks by total score helps identify priorities
- Priorities are built into the infection prevention and control program plan
- Stratify infection risks
- Review prevention and control program plan with actual data for success or needed changes to the plan

**Conducting the Risk Assessment**

- **Multidisciplinary team**
  - Employee health, environmental services, lab, pharmacy, nursing, administration etc.
- **Perform at least annually**
  - Remember to update if new services are added
- **Review in infection control committee**
- **Organization determines scoring value below which no action plan is needed**
- **Organization/committee consensus for priorities**
Resources for risk assessment and program plan

- Handouts of infection control risk assessment
  - Descriptive analysis
  - Scoring grid
- Handout of Infection Prevention and Control Program Plan sample

APIC website is a great resource
Infection Prevention and Control Plan

Infection Prevention and Control Program Plan (IPCP)

• Based on your risk assessment
• Your plan for the year
  – Captures your activities and work
• Approved by Infection Control Committee
• Serves as the foundation for progress reports and annual evaluation
## Sample IPCP Plan with Progress Report

**General Community Hospital Infection Control Progress Report**

<table>
<thead>
<tr>
<th>Priority</th>
<th>Priority # from risk assessment</th>
<th>Goal- broad</th>
<th>Objective- narrow</th>
<th>Strategies</th>
<th>Evaluation</th>
<th>Progress/Analysis</th>
</tr>
</thead>
</table>
| 1        | 1. Target: Improve compliance with Infection Control Practices | 1. Whole hospital: 90% of staff wear masks | 1. Increased education programs by January 31 | | Reports on progress | Department manager education completed in February, education of entire staff completed in staff meeting, site audit conducted on monthly basis. Team met February and March, education and data collection completed.
| 2        | 2. Target: Increased education through multiple sources | 2. Increased education through team organization via committee, etc. | 2. Increased education programs by January 31 | | Reports on progress | Department manager education completed in February, education of entire staff completed in staff meeting, site audit conducted on monthly basis. Team met February and March, education and data collection completed. |

**IPCP Plan Headers**

- Priority # from risk assessment
- Priority title
- Goal- broad
  - SMART
  - Specific
  - Measurable
  - Attainable
  - Relevant
  - Time specific
- Objective- narrow
  - Short term
  - Based on fact
  - Supports the goal
- Strategies
  - Action steps
  - How to achieve the objective and ultimately the goal
  - Also called tactics
- Evaluation
- Progress and Analysis
IPCP Plan Example

- Priority # 1
- Priority- CAUTI
- Goal- Achieve zero CAUTI in medical surgical patients by December 2012
- Objective-
  - 1. Provide CAUTI education for 95% of clinical staff by June 2012
  - 2. Implement Nurse protocol for Foley catheter removal by June 2012
- Strategies-
  - 1. Develop educational program
  - 2. Schedule in-services for med surg nursing
  - 3. Develop nurse driven Foley catheter removal criteria

Evaluation
- Progress/Analysis

Monitoring Plan’s Effectiveness

- Analysis and performance improvement will be discussed in more detail under the topic of surveillance
- At least quarterly review your progress
- If you are not on track to achieve goals
  - Check to make sure goal is realistic and attainable
  - Change objectives and strategies
  - Plan is a dynamic document
- Present progress report to Infection Prevention and Control Committee
Infection Prevention and Control Annual Evaluation

• Stand alone document presented and approved by Infection Prevention and Control Committee
• Included in the CAH QAPI report
• Annual evaluation becomes the foundation for next year’s risk assessment

Introduction 485.641 C-0330, C-0335
The purpose of the Quality Assessment and Performance Improvement Plan at Whidbey General Hospital is to provide a framework for all quality assessment and performance improvement activities throughout the organization. The Plan specifically addresses all patient care disciplines including contracted services. An additional objective of the periodic evaluation is to determine whether the utilization of services was appropriate, that established policies were followed, and that any changes that were needed have been made. The performance improvement process uses a coordinated, systematic organization-wide approach which includes: planning, measuring, assessing, prioritizing and improving as essential activities. The Plan is governed by the Whidbey General Hospital Board of Commissioners and is reviewed annually. The results of this review document are used to develop goals and performance improvement plan for 2012. Please see Appendix D: “2012 Quality and Patient Safety Goals.”
Infection Prevention and Control
Statement of Authority

- Standard framework
- Determines decision makers
- Determines decision making authority
  - Everyday functioning
  - Emergent/crisis situations
- Supported by CoPs C-0278
  - Designated Infection Control Officer

Sample Authority Statement

<table>
<thead>
<tr>
<th>Authority Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The authority of the Department of Healthcare Epidemiology will be as follows:</td>
</tr>
<tr>
<td>• The Hospital Epidemiologist or his designee may initiate and conduct any studies or institute any control measures when there is sufficient evidence of a danger to patients or personnel.</td>
</tr>
<tr>
<td>• Environmental, patient or personnel cultures may be carried out as needed by the Hospital Epidemiologist or his designee.</td>
</tr>
<tr>
<td>• All hospital information or data pertaining to unusual or clustered nosocomial infections will be made available upon request to the Department of Healthcare Epidemiology.</td>
</tr>
<tr>
<td>• All hospital information or data pertaining to antimicrobial usage or bacterial resistance trends will be made available, upon request, to the Department of Healthcare Epidemiology.</td>
</tr>
</tbody>
</table>
Surveillance

Surveillance Core Competencies

- Design surveillance system
- Collect and compile surveillance data
- Interpret surveillance data
- Conduct outbreak investigations
Surveillance

- On-going collection and analysis of data translated into information for response/action
- Essential component of an effective IPCP program
- Based on sound epi principles
- Follows current recommended practices and definitions
- System of activities that identifies risk factors for infection and other adverse events, outbreaks, MDROs and bioterrorist events
- Mandatory and public reporting influence surveillance program design, elements and definitions

Sound Epi Principles

- Surveillance data
  - Properly collected and analyzed
  - Information can improve quality and outcomes of healthcare
- Standard definitions
- Common statistical measurements
Elements of Surveillance Program

• Surveillance methodology
  – Total
  – Focused
  – Syndromic
• Population defined
• Indicators to monitor
  – Outcomes and processes
  – High risk, high volume
  – Risk assessment events

-continued

• Time period of observation
• Case definitions
  – NHSN
  – McGreer for Long Term Care
• Data elements to be collected
• Data analysis methods
  – Rates and ratios
Elements of Surveillance Program –continued

- Data collection methodology
  - Concurrent
  - Retrospective
  - Data sources
    - Lab daily reports
    - Anesthesia records
    - Pharmacy reports
    - RT logs

Methodology: Total Surveillance

- Whole house surveillance
- If performing total surveillance
  - An overall infection rate should not be calculated
    - Overall rates are not sensitive enough to identify potential problems
    - Can’t be used to target performance improvement
    - Can’t measure trends over time
- Calculate specific HAI rates in defined population
  - Such as CLABSI in ICU
Methodology: Focused/Targeted Surveillance

- **Focuses on**
  - Specific units such as ICU
  - Medical devices such as Foley catheter
  - Invasive procedures such as surgery
  - Organisms such as MRSA

- **Usually targets**
  - High risk, high volume procedures
  - HAI
  - Adverse outcomes
  - That are preventable

Most CAH include Total and Focused Surveillance:

Monitor targeted events while concurrently monitoring lab reports for house wide locations
Syndromic Surveillance  
MMWR Sept24, 2004/53(Suppl);5-11

- CDC: “... monitor disease indicators in real-time or near real-time to detect outbreaks of disease earlier than... traditional public health methods”
- Does not replace traditional surveillance Focuses on early symptom (prodrome) period before clinical or laboratory confirmation
  - Symptoms- cough, fever
  - Surrogate data- school absenteeism, unexpected avian deaths

Mandatory and Public Reporting

- State enacted legislation affects surveillance
- Example: State of Washington IPs report, CLABSI in ICU, VAP, SSI in CABG, Hip and Knee replacement and hysterectomy. MRSA screening of ICU patients w/in 24 hours of admission
- Resources:
  State QIO  State DOH  APIC chapters
  APIC website- public policy tab
Definitions of Healthcare Associated Infections

Purpose of Definitions

• Definitions provide specific criteria for HAI to
  – Enhance accuracy in determining if HAI exists
  – Promote consistency in identifying HAI
• Adherence to definitions necessary for data comparisons
• NHSN web site:
  – http://www.cdc.gov/nhsn/
Infection Definitions Acute Care

• NHSN
  – Any infection reported to NHSN must meet the definition of an NHSN healthcare-associated infection (HAI)
  – Before reporting to NHSN you must decide that the clinical, laboratory and other diagnostic information collected satisfy the NHSN criteria for a HAI
  – Consistent application of the criteria are necessary so metrics between hospitals can be compared

• Resource:
  www.cdc.gov/nhsn/PDFs/psc/Manual/17pscNosInfDef_current.pdf

NHSN Catheter Associated Urinary Tract Infection (CAUTI)

• In patient locations where denominator can be collected
  – Not in neonatal ICU
  – Not required to monitor after patient is discharged but if you do discover any CAUTI occurring within 48 hours after discharge, it should be counted

• UTI are defined using symptomatic (SUTI) criteria or asymptomatic bacteremic (ABUTI) criteria
CAUTI definition continued

- Count UTIs as catheter associated if patient had a catheter at the time of or within 48 hours before onset of event
- There is no minimum period of time that the catheter must be in place for UTI to be a CAUTI
- If CAUTI develops within 48 hours of transfer from one inpatient unit to another in the same facility or new facility, the infection is attributed to the transferring location
New changes to VAP Surveillance Definition

- Ventilator-associated pneumonia (VAP) is but one type of complication of mechanical ventilation
- No gold standard definition of VAP
- Commonly used definitions include subjective elements and are neither sensitive nor specific for VAP
- Therefore a new approach is needed

From Shelley Magill MD, PhD. CDC. APIC Annual Educational Conference June 2012

Goals for Modifying Current NHSN Definition of VAP

- Achieve face validity/clinical credibility
- Improve reliability
- Reduce burden
Ventilator Associated Event (VAE) Algorithm Summary

1. Patient on mechanical ventilation > 2 days
2. Baseline period of stability or improvement, followed by sustained period of worsening oxygenation
3. Ventilator Associated Condition (VAC)
4. General evidence of infection/inflammation
5. Infection Related Ventilator Associated Complication (IVAC)
6. Positive results of microbiologic testing
7. Possible or Probable VAP
Ventilator Associated Event (VAE) Algorithm Summary

Respiratory Status Component

- Patient on mechanical ventilation > 2 days
- Baseline period of stability or improvement, followed by sustained period of worsening oxygenation

Ventilator Associated Condition (VAC)

Infection Related Ventilator Associated Complication (IVAC)

Ventilator Associated Event (VAE) Algorithm Summary

Infection/Inflammation Component

- Ventilator Associated Condition (VAC)
- General evidence of infection/inflammation

Infection Related Ventilator Associated Complication (IVAC)
Ventilator Associated Event (VAE) Algorithm Summary

Infection Related Ventilator Associated Complication (IVAC)
- Positive results of microbiologic testing
- Possible or Probable VAP

Possible Future Public Reporting Definitions

Infection Related Ventilator Associated Complication (IVAC)
- Positive results of microbiologic testing
- Possible or Probable VAP

Possible or Probable VAP

General evidence of infection/inflammation

Ventilator Associated Condition (VAC)

Baseline period of stability or improvement, followed by sustained period of worsening oxygenation

Patient on mechanical ventilation > 2 days
Be ready for January 2013
Prepare for the new approach

- Assemble your team and engage the stakeholders
  - Respiratory therapy are key stakeholders
- Identify who will collect data and how it will be collected
- Consider what data elements may be electronically collected

One method may be patient worksheets

<table>
<thead>
<tr>
<th></th>
<th>Vent day</th>
<th>PEEP min</th>
<th>FiO2</th>
<th>Temp</th>
<th>WBC</th>
<th>Anti-Micro agent</th>
<th>Micro source</th>
<th>Polys</th>
<th>Epis</th>
<th>Organism</th>
</tr>
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<tr>
<td>1</td>
<td></td>
<td>10</td>
<td>50</td>
<td>37.5</td>
<td>11.6</td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>5</td>
<td>50</td>
<td>37.8</td>
<td>11.8</td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>5</td>
<td>50</td>
<td>37.8</td>
<td>12.0</td>
<td>None</td>
<td>ETA</td>
<td>3+</td>
<td>0</td>
<td>S. Aureus</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>8</td>
<td>70</td>
<td>38.2</td>
<td>15</td>
<td>Piptaz Vanc</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The good news: no more Chest x-rays, data are objective, easily collected and a worksheet like this would allow for immediate interventions and improved outcomes

Definitions of Infection for Surveillance in Long-Term Care: McGreer Criteria

• For statistical reporting McGreer is recommended as a resource for analyzing and quantifying patient’s signs and symptoms
• In combination with cultures and sensitivities, drug resistant organisms and antibiotic usage
• Plus a clinical change in the patient’s condition is reported to the physician, whether or not it meets McGreer’s criteria.
• Resource: Handout “Definitions of Infection for Surveillance in Long-Term Care Facilities” McGreer et al. AJIC 1996
Swing Beds CoP §485.645

- Skilled nursing services instead of acute-care
- CAH swing beds are regulated by both CAH requirements and swing bed requirements 42 CFR Part 485
- Actual swing bed requirements are referenced in Medicare Nursing Homes 43 CFR Part483
- Therefore McGreer Criteria for HAI can be used

Surveillance Resources

- Handout: CDC “Identifying HAI in NHSN”
- Handout: CDC/NHSN “CAUTI Event”
- NHSN link: www.cdc.gov/nhsn/PDFs/psc/Manual/17pscNosInfDef_current.pdf
- Handout “Definitions of Infection for Surveillance in Long-Term Care Facilities” McGreer et al. AJIC 1996
- Handout : Johns Hopkins “Central Line Insertion Care Team Checklist”
- Handout: CDC: “Improving Surveillance for Ventilator Associated Events in Adults”
Statistics and Data Analysis

Using Statistics As A Tool

- Organize and summarize your data
- Translate your findings to others
- Suggest association between cause and effect or make inferences about the data
- Identify problems or outbreaks
- Identify areas for improvement or monitor progress of the improvement
- Describe, such as the occurrence of HAI within the facility or unit
Descriptive Statistics: Frequency Measures, Rates and Ratios

• Use of rates
  – Measures the probability of occurrence (frequency) in a population of some event
  – Provides a way to compare the occurrence of an event in one population to a similar population by adjusting for differences in population sizes
  – Really need to be careful about choosing the appropriate denominator to avoid inaccurate conclusions

Rate

\[ x = \text{The numerator. Number of times event occurred during the time interval} \]

Basic Formula: \( \text{Rate} = \frac{x}{y} \times k \)

\[ y = \text{The denominator. The population at risk from which those experiencing the event were derived during the same time interval} \]

\[ k = \text{The constant. To create a uniform quantity so it can be compared. Whole number such as 100, 1000 or 10000 is used so that the smallest rate calculated has at least one digit left of the decimal point.} \]
Incidence Rate

- Indicates the risk of disease in a population over a period of time
- The number of new cases of a disease for a specified period of time divided by the population at risk for the same time period
  - Multiplied by the constant
- Med surg unit had 680 Foley catheter days in June 2012. They identified 4 catheter associated urinary tract infections. What is their rate?

\[
\frac{4}{680} \times 1000 = 5.88 \text{ UTIs per 1000 catheter days}
\]

Utilization Ratio

- Device utilization ratio (DUR) is the proportion of patient days for which a certain device is used
- DUR is specific to one device
- DUR reflects the amount of devices used and can be a reflection of patient severity or over utilization
- Number of device days/number of patient days x 100 = DUR
**DUR Example**

- Med surg is a 15 bed unit
- In March there were 2 UTIs
- In April there were 2 UTIs
- The March UTI rate was 6.4
- The April UTI rate was 5.7
- Which month is worse?
- In March there were 450 patient days, 310 Foley days and 2 UTIs
- In April there were 450 patient days, 350 Foley days and 2 UTIs
- Would a DUR be helpful?
- March DUR = 0.69 and April DUR = 0.78

**Attack Rate**

- Special form of an incidence rate
- Really a proportion of people at risk who become infected over an entire period of exposure
- Or a measure of the risk of probability of becoming a case
- Number of new cases for a specified time period/ population at risk for same time period x 100
### Attack Rate Example

- Med surg had 224 admissions between December 1 and December 15. 75 of the patients developed Influenza and 80 were diabetics. Of the 224 patients admitted 145 had diabetes.
- Overall attack rate $\frac{75}{224} \times 100 = 33.4\%$
- Diabetic attack rate $\frac{80}{145} \times 100 = 55.2\%$

### Percentile and Percentage

**Percentile**
- Designates the number of frequency position below which a certain number of score will fall
- 50 people ran a race and you beat 40 of them, you would be in the 80th percentile or the top 20% of the group

**Percentage**
- Relative frequency of the occurrence of an event to a total
- Surgical site infection rate is 23%
Percentile and Percentage

- 100 people take a test of 50 items
- Joe got 40 questions right. The percentage he got right is 80%
- What is his percentile ranking?
  - We need to know what everyone else scored
- Of the other 99 people, no one got more than 60% of the questions correct (the test was really hard)
  - So Joe did better than all the other 99 people of the 100. He is in the 99th percentile or the top 1%.

What is an Outbreak?

Outbreak (or Epidemic)
The occurrence of more cases of a disease than expected in a given area or among a specific group of people over a particular period of time
More Definitions

- Endemic: usual number of cases
- Pandemic: widespread epidemic
- Sporadic: infrequent irregular cases
- Cluster: group of cases closely related in time and place
- Pseudo-outbreak: true clustering of false infections or an artificial clustering of real infections
- Incubation period: interval between exposure and onset of signs/symptoms

So... what do you do if you think you have an outbreak?

There is a logical sequence of steps to take when evaluating a possible outbreak.
Many steps are done simultaneously; however, these two must be done first:
  - Verify diagnosis of reported cases
  - Confirm that an outbreak exists
If an outbreak exists...

Institute early control measures based on magnitude and nature of the outbreak

BREAK THE CHAIN OF INFECTION!

- CAUSATIVE AGENT
- RESERVOIR
- PORTAL OF ENTRY
- PORTAL OF EXIT
- MODE OF TRANSMISSION
- SUSCEPTABLE HOST
Outbreak Investigation Steps

- **Verify the diagnosis and identify the agent**
  - Describe the magnitude of the problem and symptoms
  - What diagnosis has been established?
  - What agent has been identified?
  - Develop a case definition which is specific criteria for a case

- **Confirm an outbreak exists**
  - Use your case definition to find all cases
  - Are the number of cases above your endemic rate?
    - If yes consider that an outbreak exists

- **Search for additional cases**
  - Encourage reporting

- **Characterize the cases by person, place and time**
  - Record dates of onset and draw an epidemic curve

- **Form a tentative hypothesis**
  - Reservoir
  - Source
  - Mode of transmission
Outbreak Investigation Steps

- **Institute preliminary control measures**
  - Keep a record of what you have done and date implemented
- **Test hypothesis**
  - Many hospitals don’t reach this stage because the interventions controlled the problem
- **Refine control measures**
  - If you need to add any more control measures
- **Monitor and evaluate control measures and compliance**
- **Prepare and disseminate final report**

Helpful Hints for Outbreak Investigations

- **Conduct a literature search**
  - Helps with development of case definition, control measures, hypothesis formation
- **Notify others including department of health**
- **Assemble the team**
- **Communicate and communicate some more**
- **Save isolates, specimens, sera**
- **Develop data collection form and pilot it**
Create a Line Listing

- Medical record or hospital identification number
- Patient location in hospital
- Date of admission
- Date of infection onset
- Site culture results
- Medical service
- Attending physician
- And other factors thought to be implicated in transmission such as specific personnel having contact with patients, medications, treatments

Line Listing Example

<table>
<thead>
<tr>
<th>Case#</th>
<th>Initials</th>
<th>Date of Report</th>
<th>Date of Onset</th>
<th>Physician Diagnoses</th>
<th>Other</th>
<th>Age</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>JG</td>
<td>10/12</td>
<td>12/6</td>
<td>Hep A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>BC</td>
<td>10/12</td>
<td>10/5</td>
<td>Hep A</td>
<td>A+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>HP</td>
<td>10/13</td>
<td>10/5</td>
<td>Hep A</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MC</td>
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<td>Hep A</td>
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</tr>
<tr>
<td>5</td>
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<td>Hep A</td>
<td></td>
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<td>6</td>
<td>RD</td>
<td>10/15</td>
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<tr>
<td>7</td>
<td>KR</td>
<td>10/16</td>
<td>10/13</td>
<td>Hep A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Signs and Symptoms:
- N=Nausea; V=Vomiting; A=Amaurosis; F=Fever; D+U=Dark urine; J=Jaundice; HAg/HBcAg=Hepatitis A/B antibody test; S-GOT=S-GOT

Photo Credit – CDC Excite Epidemiology in the Classroom
Create an Epidemic Curve

• Plot cases by date of onset

[Graph showing an epidemic curve]

Search for Additional Cases

• Search retrospectively
• Search concurrently
• Asymptomatic cases?
• Encourage reporting
• Collect critical data
  – Use technology/data-mining
• Add cases to line-listing
Example of a Line-Listing

<table>
<thead>
<tr>
<th>MRSA Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

Characterize the Cases

- **Time**
  - determine date onset
  - draw epidemic curve
- **Place**
- **Person**
  - identify cases and population at risk
  - determine risk factors
- **Calculate rates if possible**
Presenting Data: Epidemic Curve (Stacked Bar)

Expand Control Measures

- Hand hygiene
- Barrier precautions
- Isolation precautions
- Cleaning and Disinfecting:
  - Environment
  - Medical equipment
- Cohorting of patients and staff
- Other...
Collect Specimens

- Must coordinate with lab
- Cultures of patients/residents, environment or personnel
  - Always based on data
  - Code the names of persons tested (esp. important for personnel)
- Identify type of specimen, collection parameters, appropriate tests
- Strain typing/Molecular studies

Formulate Tentative Hypothesis

“Best Guess” to explain observations
May have several hypotheses
Should explain majority of cases
May have cases unrelated to outbreak
Measures of Disease Frequency

- Incidence rate
- Attack rate
- Prevalence rate
- Incidence-density rate
- Device-associated infection rate

Incidence Rate

Measures number *new* cases in a population during a given period

Formula:
\[
\frac{\text{# new cases in population in given period}}{\text{# in same population during given period}} \times 10^n
\]

*NOTE: usually
\[10^n = 10^2 = 100\ or\]
\[10^n = 10^3 = 1,000\]
Prevalence Rate

Measures number *new and preexisting* cases in a population at given point (or period) in time

Formula:
\[
\frac{\text{# new and preexisting cases}}{\text{in population in a given period}} \times 10^n
\]

*NOTE: usually
\[
10^n = 10^2 = 100 \text{ or } 10^n = 10^3 = 1,000
\]

Incidence-Density Rate

\[
\frac{\text{# Infections}}{\text{# Patient (or resident)-days}} \times 1000 = \text{rate}
\]

State rate as: “number of infections per 1000 patient (or resident)-days”
Device-Associated Infection Rate (DAR)

\[ \frac{\text{# Device-associated infections}}{\text{# Device-days in total population}} \times 1000 = \text{DAR} \]

State DAR as: “number of device-associated infections per 1000 device-days”

Remember: Device-days are the total number of days of exposure to the device (central line, ventilator, or urinary catheter) by ALL persons in selected population during selected time period.

Continue Surveillance

- Evaluate effectiveness of prevention and control measures
- Continue surveillance for new cases
Communicate Findings
Must be ongoing!

- Oral briefings, summarize findings periodically
- Emails
- Other

Communication during and after outbreak is key to stopping outbreak and preventing recurrence

Prepare Written Final Report

- Introduction
- Method
- Results
- Discussion
- Summary
- Recommendations
- Distribution of report
- Author (s)
Submit an abstract to APIC. Publish your findings!

Summary for Outbreak Investigation

- First 2 steps in outbreak investigation must be “verify the diagnosis” and “confirm the existence of an outbreak”
- There are specific, subsequent steps that should occur
- Goal is to stop outbreak and prevent recurrence
- Communication is key to stopping and preventing outbreaks
Writing The Annual Infection Prevention Program Report

- Written from your program plan and progress reports
- Annual program evaluation is a CMS CoP
- Serves as feedback loop for ICRA

Infection Prevention and Control Cycle

- Annual Report: Becomes the foundation for next year’s ICRA
- IC Program: Developed to address risks and priorities in ICRA
- Performance Improvement and adjustments to IC Program
Performance Improvement

Performance Improvement Methods

• Core Competencies
  – Participates in quality/performance improvement and patient safety activities related to infection prevention and control
  – Demonstrates quality and performance improvement projects through the use of graphic tools
Performance Improvement Methods

- Various methods will be discussed in more detail under *evidence based practices section*
- CUSP and TRIP will be discussed using CAUTI as an example
- **CUSP**
  - Comprehensive Unit based Safety Program
- **TRIP**
  - Translating Research into Practice
- CUSP and TRIP are a two pronged approach to performance improvement
- **STAY TUNED FOR EVIDENCE BASED PRACTICES COMING UP LATER!**

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CMS Conditions of Participation, Interpretive Guidelines and Survey Procedures
Infection Prevention for CAHs

CMS Conditions of Participation (CoPs)

§ 485.641 periodic evaluation and quality assurance
- All patient care services and other services affecting patient health and safety are evaluated
- Nosocomial infections and medication therapy are evaluated
- The critical access hospital (CAH) takes appropriate remedial action to address deficiencies found through the quality assurance program
- The CAH documents outcome of all remedial action

CMS Conditions of Participation (CoPs)

§ 485.635 provision of services
System for identifying, reporting, investigating and controlling infections and communicable diseases of patients and personnel

[Note the federal tag for this section is C-0278]
C-0278 Interpretive Guidelines

C-0278
Interpretive Guidelines §485.635(a)(3)(vi)
The CAH must have an active surveillance program that includes specific measures for prevention, early detection, control, education, and investigation of infections and communicable diseases in the CAH. There must be a mechanism to evaluate the effectiveness of the program and to provide corrective action when necessary. The program must include implementation of nationally recognized systems of infection control guidelines to avoid sources and transmission of infections and communicable diseases as recommended by organizations such as the Centers for Disease Control and Prevention (CDC) Guidelines for Prevention and Control of Nosocomial Infections, the CDC Guidelines for Preventing the Transmission of Tuberculosis in Health Care Facilities, the Occupational Health and Safety Administration (OSHA) regulations, and the Association for Professionals in Infection Control and Epidemiology (APIC) infection control guidelines, etc.).

C-0278 Interpretive Guidelines continued

• A procedure for meeting the reporting requirements of the local health authority;

• Procedures for working with local, State, and Federal health authorities in emergency preparedness situations;

• Policies and procedures developed in coordination with Federal, State, and local emergency preparedness and health authorities to address communicable disease threats and outbreaks; and

• Provision for program evaluation and revision of the program, when indicated.
C-0278 Interpretive Guidelines continued

**Designated Infection Control Officer**

The CAH must designate in writing an individual or group of individuals, qualified through education, training, experience, and certification or licensure, as an infection control officer or officers. An infection control committee may delegate responsibility for infection functions, in accordance with CAH policy. The infection control officer or officers must develop and implement policies governing the control of infections and communicable diseases.

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C-0278 Interpretive Guidelines continued

The infection control officer(s) is responsible for:

- Implementing policies governing asepsis and infection control;
- Developing a system for identifying, investigating, reporting, and preventing the spread of infections and communicable diseases among patients and CAH personnel, including contract staff and volunteers;
- Identifying, investigating and reporting infections and outbreaks of communicable diseases among patients and CAH personnel, including contract staff and volunteers, especially those occurring in clusters;
- Preventing and controlling the spread of infections and communicable diseases among patients and staff;
- Cooperating with CAH-wide orientation and in-service education programs;
- Cooperating with other departments and services in the performance of quality assurance activities; and
- Cooperating with disease control activities of the local health authority.
C-0278 Interpretive Guidelines

The active infection control program should have policies that address the following:

• Definition of nosocomial infections and communicable diseases;

• Measures for identifying, investigating, and reporting nosocomial infections and communicable diseases;

• Measures for assessing and identifying patients and health care workers, including CAH personnel, contract staff (e.g., agency nurses, housekeeping staff), and volunteers, at risk for infections and communicable diseases;

• Methods for obtaining reports of infections and communicable diseases on inpatients and health care workers, including all CAH personnel, contract such as agency nurses, housekeeping staff, and volunteers, in a timely manner;

C-0278 Interpretive Guidelines continued

Measures for the prevention of infections, especially infections caused by organisms that are antibiotic resistant or in other ways epidemiologically important; device-related infections (e.g., those associated with intravascular devices, ventilators, tube feeding, indwelling urinary catheters, etc.); surgical site infections; and those infections associated with tracheostomy care, respiratory therapy, burns, immunosuppressed patients, and other factors which compromise a patient's resistance to infection;

Measures for prevention of communicable disease outbreaks, especially tuberculosis;
C-0278 Interpretive Guidelines

Provision of a safe environment consistent with nationally recognized infection control precautions, such as the current CDC recommendations for the identified infection and/or communicable disease;

• Isolation procedures and requirements for infected or immunosuppressed patients;
• Use and techniques for standard precautions;
• Education of patients, family members and caregivers about infections and communicable diseases;
• Methods for monitoring and evaluating practices of asepsis;
• Techniques for hand washing, respiratory protections, asepsis, sterilization, disinfection, food sanitation, housekeeping, fabric care, liquid and solid waste disposal, needle disposal, separation of clean from dirty, as well as other means for limiting the spread of contagion;

C-0278 Interpretive Guidelines continued

• Authority and indications for obtaining microbiological cultures from patients;
• A requirement that disinfectants, antiseptics, and germicides be used in accordance with the manufacturers’ instructions to avoid harming patients, particularly central nervous system effects on children;
• Orientation of all new CAH personnel to infections, communicable diseases, and to the infection control program;
• Measures for the screening and evaluation of health care workers, including all CAH staff, contract workers such as agency nurses, housekeeping staff, and volunteers, for communicable diseases, and for the evaluation of staff and volunteers exposed to patients with non-treated communicable diseases;
• Employee health policies regarding infectious diseases and when infected or ill employees, including contract workers and volunteers, must not render patient care and/or must not report to work;
The chief executive officer (CEO), the medical staff and the director of nursing (DON) must ensure that the CAH-wide Quality Assurance (QA) program and staff in-service training programs address problems identified through the infection control program.

The CEO, the medical staff, and the DON are responsible for implementing corrective action plans to address problems identified by the infection control officer(s). These plans should be evaluated for effectiveness and revised if needed, and documentation concerning corrective actions and outcomes should be maintained.

§485.641(b)(2) Nosocomial infections and medication therapy are evaluated;
Survey Procedures §485.641(b)(2)

- What methodology does the CAH use to evaluate nosocomial infections and medications therapy?
- Review committee meeting minutes for current issues or projects, etc.
§485.641(b)(5)(ii) The CAH also takes appropriate remedial action to address deficiencies found through the quality assurance program. Survey Procedures §485.641(b)(5)(ii)

• How does the CAH ensure that proper remedial actions are taken to correct deficiencies identified in the quality assurance program?

• Who is responsible for implementing remedial actions to correct deficiencies identified by the quality assurance program?

§485.641(b)(5)(iii) The CAH documents the outcome of all remedial action. Survey Procedures §485.641(b)(5)(iii)

How does the CAH document the outcome of any remedial action?
C-0350 Interpretive Guidelines

§485.645 Special Requirements for CAH Providers of Long-Term Care Services ("Swing-Beds")

A CAH must meet the following requirements in order to be granted an approval from CMS to provide post-CAH SNF care, as specified in §409.30 of this chapter, and to be paid for SNF-level services, in accordance with paragraph (c) of this section.

Interpretive Guidelines §485.645
The swing-bed concept allows a CAH to use their beds interchangeably for either acute-care or post-acute care. A “swing-bed” is a change in reimbursement status. The patient swings from receiving acute-care services and reimbursement to receiving skilled nursing (SNF) services and reimbursement.

Infection Control Log

- §482.42 infection control log no longer required
  - Need a system for identifying, reporting, investigating and controlling infections and communicable diseases of patients and personnel.
  - See Federal Register Vol 76, No. 205
Survey Procedures
\$485.635(a)(3)(vi)

• Verify that there is a system (policies) for identifying, reporting, investigating, and controlling infections and communicable diseases of patients and CAH personnel, including contract workers and volunteers.

• Determine that this system is an active program, that it is both CAH-wide and program-specific, and that it is implemented correctly.

• Throughout the CAH, observe the environment of care, noting the cleanliness of horizontal surfaces, bedside equipment, and air inlets, etc., because infectious organisms may spread from these places.

• Verify that an infection control officer (or officers) is designated and has the responsibility for the infection control program.

• Review the personnel file of the infection control officer(s) to verify that he/she is qualified through education, training, experience, and certification or licensure to oversee the infection control program.

Survey Procedures continued

• Verify that appropriate policies and procedures have been developed and implemented governing the control of infections and communicable diseases.

• Determine that the infection control officer(s) is responsible for the elements specified in the interpretive guidelines.

• Verify that the infection control officer(s) maintains a log of all incidents related to infections and communicable diseases, including those identified through employee health services.

• Determine that the CAH’S QA program and staff in-service training programs address problems identified by the infection control officer(s).

• Determine that problems identified are reported to the medical staff, nursing, and administration, and addressed in the CAH’S quality assurance and in-service training programs.
If your CAH provides outpatient therapy services

- §485.703 defines outpatient rehabilitation
- §485.725 defines infection control for outpatient rehabilitation

If your CAH has Swing Beds

- §485.645 special requirements for CAH providers of long term care services “swing beds”
- §483 subpart B. The CAH is substantially in compliance with… SNF requirements
National Patient Safety Goal 7

- NPSG.07.01.01 Hand hygiene
- NPSG.07.03.01 Preventing MDROs
  - Includes a risk assessment
- NPSG.07.04.01 Implement evidence based practices to prevent central line associated bloodstream infections
- NPSG.07.05.01 Implement evidence based practices for preventing surgical site infections
- NPSG.07.06.01 Implement evidence based practices to prevent indwelling catheter associated urinary tract infections

Implementing CoPs and NPSGs into your infection control risk assessment

- For CoPs:
  - Compare your risk assessment and program plan to make sure all CoPs are addressed
  - Don’t forget you are part of quality assurance and your plan and progress reports need to address “remedial” actions taken to improve your HAI rates, compliance issues like hand hygiene and outcomes
    - Example, if you had an outbreak of Carbapenemase-producing Klebsiella pneumoniae last year that you resolved, it would be expected to see this included in your surveillance this year.
  - Review your policies and procedures to ensure they support the CoPs
Implementing CoPs and NPSGs into your infection control risk assessment

- For NPSGs
  - Again make sure your risk assessment addresses each goal
  - Use your historical data in your risk assessment and program plan
  - For those NPSGs that need improvement include in your program plan
    - Set a measurable goal, strategies and regularly evaluate the effectiveness of your plan
    - Examples: regularly document on your progress report that you have conducted periodic assessment on MDRO acquisition and transmission
    - Implement a team to evaluate the effectiveness of patient and family education on MDRO HAI prevention strategies

Resources for regulatory standards

- National Patient Safety Goals
  - NPSG .7, .13

- CMS CoPs
  - Som107.ap_W_cah.cops.pdf
Questions