Healthcare Epidemiology in the LTC Setting
Bringing it all Together

Dr. Nace has no conflicts of interest related to this presentation.

Learning Objectives

By the end of the session, participants will be able to:
• Discuss challenges faced by LTC facilities when implementing an infection control program
• Describe what a reasonable Infection Prevention & Control Program (IPCP) for nursing facilities might look like
• Discuss the role of interdisciplinary team members in supporting LTC infection control programs
Evolution of Nursing Homes & the Regulatory Environment

Nursing Homes – Key Component of the Modern U.S. Healthcare System

- Nursing Homes are the predominant institutional site for PA/LTC
- PA/LTC represents fastest growing spending category in US healthcare system*

Nursing homes are active participants in the transmission of MDROs across care sites**

* Chandra A, Dalton M, Homes J. Health Affairs, May 2013

Nursing Facilities Roles

- Residential
- Medical Care
- Rehabilitation
- Socialization
- Spiritual Care
What is the Purpose of the IPCP in NFs?

- Prevent Healthcare Associated Infections
- Prevent Antimicrobial Resistance
- Prevent Adverse Drug Events

Harm from infections among SNF residents

- Infections were among the most common causes of harm; accounting for 26% of adverse events

<table>
<thead>
<tr>
<th>Type of Harm</th>
<th>Events related to infection</th>
<th>Infection events deemed preventable</th>
<th>Transfers to hospital from infection event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse events</td>
<td>39 (25.8%)</td>
<td>22 (55%)</td>
<td>34 (87.2%)</td>
</tr>
<tr>
<td>Temporary</td>
<td>20 (16.8%)</td>
<td>9 (45%)</td>
<td>NA</td>
</tr>
</tbody>
</table>

- Hospitalizations from infections were estimated to cost ~$83 million dollars (the most expensive cause of harm)

OIG report: Adverse Events in Skilled Nursing Facilities: National Incidence Among Medicare Beneficiaries (OEI-06-11-00370), February 2014


Variability of Antibiotic Use in 607 Ontario NF

Days of Antibiotic Use per 1000 Resident-days

Variation in antibiotic use across Ontario NFs.
Increased ADE Risk in Hi Abx Use Homes

- 24% increased risk of ADE in high use NFs
- Abx related ADE included:
  - C diff, diarrhea, gastroenteritis, MDROs, allergic reactions, general medical ADE
  - Focused on hospital or ED related ADE
- ADE risk occurred among residents with and without abx exposure

<table>
<thead>
<tr>
<th>Number Needed to Harm</th>
<th>All Residents</th>
<th>Residents Who Received Abx</th>
<th>Residents Who Didn’t Receive Abx</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>53</td>
<td>71</td>
<td>83</td>
</tr>
</tbody>
</table>


Infection Control Regulations

- **1990-2009**
  - 5 survey tags – 6 pages
  - F441 – “Infection Control”
  - F442 – “Preventing Spread of Infection”
  - F443 – “Employees with Communicable Disease”
  - F444 – “Handwashing”
  - F445 – “Linens”
  - Antimicrobial stewardship unknown
  - No clear guidance on how to interpret the regs

Infection Control Regulations

- **2005**
  - F334 – “Immunizations” tag added
  - New regulation addressing influenza and pneumococcal vaccination of residents
  - Doesn’t address staff
Infection Control Regulations

• **2009**
  - Surveyor Guidance updated
  - Collapsed tags to F441 – “Infection Control” – 34 pages
  - Required infection control program
    - Included tracking of antimicrobial stewardship
    - Person who oversees, but short of requiring “IP”
    - Oversight not a full FTE
    - Hand hygiene
    - Transmission based precautions

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**STATE OF WISCONSIN / DEPARTMENT OF HEALTH SERVICES**
Division of Quality Assurance / Bureau of Nursing Home Resident Care

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**Deficiencies for FY15 and FY14**

<table>
<thead>
<tr>
<th>Tag #</th>
<th>Tag Title</th>
<th>Rank FY15</th>
<th>Rank FY14</th>
</tr>
</thead>
<tbody>
<tr>
<td>F215</td>
<td>Investigate/report allegations/individuals</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>F200</td>
<td>Provide care/services for highest well-being</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>F498</td>
<td>Nurse Aide Competency/Care Needs</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>F465</td>
<td>Safe, functional, sanitary, comfortable environment</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>F123</td>
<td>Free of Accidents/Hazards/Infections</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>F170</td>
<td>Develop/Implement Care Plans</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>F136</td>
<td>Develop/Implement AID Policies</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>F295</td>
<td>Pharmaceutical Services</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>F371</td>
<td>Food Service: Store/Prep/Server</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>F441</td>
<td>Infection Control</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

### Infection Control Regulations

**2016**
- Regulations changed – *Guidance Pending - How Many Pages??*
- Facilities must have an Infection Control & Prevention Program (IPCP)
  - Facilities must have an Antimicrobial Stewardship Program (ASP)
    - Antibiotic use protocols
    - System to monitor antibiotic use

[https://www.federalregister.gov/documents/2016/10/04/2016‐23503/medicare‐and‐medicaid‐programs‐reform‐of‐requirements‐for‐long‐term‐care‐facilities](https://www.federalregister.gov/documents/2016/10/04/2016‐23503/medicare‐and‐medicaid‐programs‐reform‐of‐requirements‐for‐long‐term‐care‐facilities)

### Infection Control Regulations

**2016**
- Facilities must delegate at least one infection preventionist (IP)
  - May designate more than one person
  - Primary professional training in nursing, medical technology, microbiology, epidemiology, or other related field and can be qualified by education, training, experience or certification
- 3 Phase Implementation
  - Phase 1 – Nov 28, 2016 - IPCP
  - Phase 2 – Nov 28, 2017 - ASP
  - Phase 3 – Nov 28, 2019 - IP

### Challenges for Facilities

- **Training**
  - Infection control
  - What is included in an IPCP?
  - What types of surveillance are there?
  - What is an ASP?
- **Annual Facility Risk Assessments**
  - What should be considered when performing an annual risk assessment?
- **Access to Expertise**
Impact of the New Regulations?

• Facility Activities
  • Past implementation experience suggests that facilities will change structure and processes
  • Prior IC regulations
  • PA Act 95 of 2002 – Reporting LTC Staff Immunizations

• Deficiency Citations
  • Will there be a shift in citations?

Outcomes

• Uncertain if quality and outcomes will change
  • No alignment of facilities and practitioners
  • Lack of relevant QMs related to infections

Silos and Missed Marks

▷ Outside of resident immunizations & UTI
  • No facility-based QMs addressing infection control or ASP
  • No Impact for Impact Act

▷ MIPS measures (physician quality payment system requirement) currently irrelevant to nursing facility settings
  AND

▷ MIPS QMs do not align with facility QM / incentives

Opportunities

• NHSN
  • May prove to be an important data source

• AMDA
  • Promoting ASP as a CMS recognized “Improvement Activity” under MIPS
  • Working with stakeholders to develop relevant QMs

• NQF
  • Calls for measure development - Require substantial funding
The Infection Prevention and Control Program (IPCP)

Creating a Reasonable IPCP for NF

• The visible tip represents the outcomes of the IPCP
  • Limited activity should be spent here
  • The non-visible portion represents the activities (processes) undertaken by the IPCP to improve outcomes
  • This is meat of the activity
IPCP Key Activities

- Risk Assessment
  - Identifying key processes that are high volume, high risk, problem prone

- Surveillance (Measurement)
  - System to track, trend, monitor, & assess outcomes
    - Outcome measures – rates of disease, AMR, ADE
    - Process measures – rates of key components of processes

Surveillance Patterns

- **Common Cause**
  - Endemic disease
  - Seasonality / Cyclic

- **Special Cause**
  - Clusters
  - Outbreaks
  - Epidemics
  - Seasonality / Cyclic

Surveillance Patterns - Common Cause
Endemic disease

![Graph showing endemic cases](image)

Endemic cases are expected regularly throughout time.
Cluster is an aggregation of cases in a given area, over a period of time.

Outbreak is occurrence of more cases than expected of a particular disease.

Surveillance Patterns - Special Cause
Clusters & Outbreaks

Surveillance Patterns - Common or Special Cause
Seasonality / Cyclic

Cases noted to vary predictably at a given time period each year.

Typical Surveillance Patterns

<table>
<thead>
<tr>
<th>Facility Acquired Infection</th>
<th>Type of Variation</th>
<th>Pattern</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTI</td>
<td>Common Cause</td>
<td>Endemic</td>
<td>Cluster or seasonality suggests over-diagnosis</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Common Cause</td>
<td>Endemic</td>
<td>Cluster or seasonality suggests respiratory viral cases</td>
</tr>
<tr>
<td>C. diff</td>
<td>Common Cause</td>
<td>Endemic</td>
<td>Spike suggests inappropriate antibiotic use; unlikely to be outbreak</td>
</tr>
<tr>
<td>Influenza</td>
<td>Special Cause</td>
<td>Cluster</td>
<td>Never endemic; prompts immediate interventions;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outbreak; Seasonal</td>
<td></td>
</tr>
<tr>
<td>Norovirus</td>
<td>Special Cause</td>
<td>Cluster</td>
<td>Never endemic; prompts immediate interventions;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outbreak; Seasonal</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Special Cause</td>
<td>Cluster</td>
<td>Never endemic; prompt immediate search for cause;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outbreak</td>
<td></td>
</tr>
<tr>
<td>Legionella</td>
<td>Either</td>
<td>Any</td>
<td>Often endemic; Clusters prompt search for cause</td>
</tr>
<tr>
<td>MDROs</td>
<td>Either</td>
<td>Arh</td>
<td>May be endemic; Clusters prompt search for cause</td>
</tr>
</tbody>
</table>
Defining Infections – “Criteria”

- Definitions used will vary with your goals for surveillance
- Optimal definitions will have no false negatives and no false positives
- To conduct surveillance – you must use infection definitions

Reality Check – Criteria Aren’t Winds That Blow In From the East

Various “Infection Criteria”

- There are several criteria used to define infections
  - McGeer, Stone, Loeb, PA-PSA, IDSA, etc.
- These criteria serve different purposes
- May differ from what you are calling an infection in your facility

- Stone (2012 Revised McGeer)
  - Not very sensitive (miss some true infections)
  - Benchmark comparisons against other facilities (upper portion of iceberg)
- Loeb
  - More sensitive
  - Reasonable set of minimum criteria for when to start antibiotics (appropriate – lower portion of iceberg)
- PA Patient Safety Authority
  - Similar to Stone
Infection Definition Tradeoffs

A Word on “Infection Criteria”

- May need to use more than one set of criteria
  - In PA – infections treated as well as PA-PSA reported infections
  - Infections you treat vs those meeting Loeb criteria (appropriateness measure)
- No set of criteria should always supplant clinical judgment
- Clinical judgment should not always supplant criteria

What is important is the process

AHRQ Tools
https://www.ahrq.gov/nhguide/index.html
**Tool 4. Quarterly or Monthly Prescribing Profile**

<table>
<thead>
<tr>
<th>Resident Name</th>
<th>Infection Type/Diagnosis</th>
<th>Last Treated</th>
<th>Organism Identified</th>
<th>Rx Date</th>
<th>Rx Duration</th>
<th>Antibiotic Name</th>
<th>Dose</th>
<th>Must Minimum Criteria</th>
</tr>
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</table>

https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/3_TK2_T4-Quarterly_or_Monthly_Prescribing_Profile_Final.pdf

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**Example of McGeer Criteria Class Worksheet Checklist**

- Complete worksheet for each resident with suspected infection
- Documents signs and symptoms
- Facilitates analysis of appropriateness

Reporting at QAPI / Infection Control Meeting


The QAPI process and IPCP will both be more data driven.

• Regular QAPI reporting
  • Outcome measures – disease rates, MDRO rates

• Periodic / As needed reporting
  • Process measures – audits of PPE compliance;

Examples of Risk Assessment and Process Surveillance Activities for the 7 Components of an IPCP
Occupational Health

- Risk Assessment
  - Completing a Community TB Risk Assessment
  - Hepatitis B Program and Policies
  - HCP Influenza Immunization Program

- Process Measures
  - Number or rate of PPD conversions among staff
  - Number of staff who accept hepatitis B vaccination
  - Rate of influenza vaccination among staff


Parenteral and Device Care

- Risk Assessment
  - POC Device Policies
  - Line care policies
    - Standards for care
    - Training expectations
  - Injection safety training
  - Urinary catheter care
  - Phlebotomy services

- Process Measures
  - Line care observations
  - Injection safety observations
  - POC device use audits
  - Rates of CAUTI
  - Line infection rates
  - Percent of false positive blood cultures

Toolkit for Implementing Single Patient Use Glucose Meters in Long-Term Care Facilities

Wisconsin

Example of a Checklist for Assessing Competency for Urinary Catheter Insertion

http://m.bardmedical.com/media/143117/edu_bestpractices/checklist/advance_skillschecklistinsertionremoval.pdf

Example of a Checklist for Assessing Competency for Urinary Catheter Insertion

CDC Website

https://www.cdc.gov/hai/prevent/tap/resources.html

http://www.mnreducinghais.org/prevention/injection.html
Central Line Checklist


Aseptic Technique for Dressing Changes

https://www.jointcommission.org/topics/clabsi_toolkit__chapter_3.aspx

Antimicrobial Stewardship

• Risk Assessment
  • Guideline adherence (caution - this won’t be black or white)
  • Broad spectrum antibiotic use
  • Antimicrobial resistance
  • C. diff burden

• Process Measures
  • Antibiotic use measures – antibiotic starts, antibiotic days
  • Rate of compliance with Loeb (or other treatment) criteria
  • Rate of treatments over 7 days
  • MDRO rates
  • Rate of usage of specific antibiotics such as floxacins
UTI Test Tracking Sheet

- Tracks testing for suspected UTI
- Symptoms checked on drop down list
- Interdisciplinary approach – engages Medical Director
- Can be used to determine rate of compliance with Loeb or other criteria

MDRO Tracking
Mandated CRE Reporting WI

- CRE tracking in WI
  - Voluntary as of Sep 1, 2016
  - Mandatory as of Jun 1, 2017
- NHSN reporting module
- All facilities must enter information monthly, even if no cases occurred in the facility
  - Must report the denominator monthly

Immunizations

- Risk Assessment
  - Vaccine education
  - Resident immunization – influenza and pneumococcal disease
- Process Measures
  - Immunization rates
  - Documentation audits
    - Was education provided?
    - Were vaccine information statements (VIS) given?
Transmission Based Precautions

- Risk Assessment
  - MDRO transfer
  - Outbreak spread

- Process Measures
  - PPE compliance audits
  - Rate of education compliance

Hand Hygiene

- Risk Assessment
  - 5 Moments
  - Accessibility of Alcohol Based Sanitizers
  - Resident hand hygiene

- Process Measures
  - Compliance observations and audits
  - ABHG dispenser audits
    - Percentage empty (or broken) by unit
    - Rate of use of resident hand wipes

WHO Sample Hand Hygiene Observation Form

http://www.who.int/gpsc/5may/tools/evaluation_feedback/en/
Environment

- Risk Assessment
  - Legionella (in areas prone to legionella)
  - MDRO / C diff risk
  - Water pitcher contamination

- Process Measures
  - Water cultures or faucet cultures
  - Terminal cleaning audits
  - Linen handling audits
  - Water pitcher audits

How Does this Impact Me?

- Administration and Governing Board
  - Know the final guidance
  - Ensure IPCP and QAPI programs are active
  - Ensuring right leaders are in place
  - Set expectations for the program
  - Monitoring and responding to results
  - Ensuring resources
    - Appropriate FTE for IP
    - Assess need for consultant expertise
    - Do we have the data sources needed
      - Reach out to lab to obtain antibiograms
    - Do we have the diagnostic testing necessary
      - Frequency of lab draws in facility
      - Timeliness of results
      - Do we have the most appropriate types of testing
How Does This Impact Me?

• All Nursing Staff
  • Active participants in surveillance
    • Know signs and symptoms of infections – avoid early closure of differential diagnosis
    • Thoroughly documenting signs/symptoms of infections
    • Accurately and timely communicating potential and confirmed infections
  • Recognizing increases in infection rates on the unit
  • Must be responsible partner in antimicrobial stewardship activities
  • Adequate evaluation in response to CNA, resident, or family concerns
  • Monitoring response
    • Not just vitals Q shift
    • How is the resident doing?
  • Understand role doesn’t end when culture ordered or sensitivities checked
  • Make recommendations

How Does This Impact Me?

• Medical Director
  • Need to read the final guidance
  • Active participant in IPCP and QAPI programs
  • Communication and outreach to practitioners
  • Actively intervening with practitioners
  • Assisting in community and facility assessments

• Attending Physicians and NP / PA / CNS
  • Must respond to pharmacy and facility recommendations
  • Align MIPS or APM (ACO) requirements
  • Meeting quality metrics to remain on staff and/or in network
  • Meeting resident & family expectations
  • Practice specialization likely (training or certification in PA/LTC Medicine by ABPLM)

How Does This Impact Me?

• ID Physician and Hospital Based IP?
  • Drivers
    • Greater role expected with ACO’s and narrowed networks
    • Uncertainty in the ID physician’s traditional acute care based role
  • Potential roles
    • Unlikely to take on the MD or primary care role
    • Insaluble partner in addressing the need for more formalized IPCPs in nursing facilities
    • Collaborating with acute to LTC antibiotic therapy programs
  • Caveats
    • Need to make sure there is an understanding of the NF environment and culture
    • Focus on stewardship
References

• Final Requirements of Participation (NF Regs)

• CDC Principles of Epidemiology in Public Health
  • https://www.cdc.gov/ophss/csels/dsepd/ss1978/index.html

• Practical Healthcare Epidemiology
  • Lautenbach E, Woltert KF, Malani PN. University of Chicago Press, Chicago, IL; 3rd Ed: 2010

• WI Healthcare-Associated Infections in LTC Coalition Events
  • https://www.dhs.wisconsin.gov/regulations/nh/hai-events-index.htm

References

• AHRQ Nursing Home Antimicrobial Stewardship Toolkits
  • https://www.ahrq.gov/nhguide/index.html

• Collaborative Healthcare-Associated Infection Network
  • http://www.noresducinghais.org/

• Injection Practices – HAI Prevention Strategies
  • http://www.noresducinghais.org/prevention/injection.html

• PA Patient Safety Authority
  • http://patientsafetyauthority.org

Questions?

Thank You!

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