Preventing Respiratory Infections in Skilled Nursing Facilities
Objectives

• Discuss the epidemiology of pneumonia and ventilator-associated pneumonia (VAP)
• Discuss evidence based pneumonia and VAP prevention care practices
• Review importance of a water management program in *Legionella* prevention
• Review influenza prevention strategies
• Describe adherence monitoring of prevention practices
Pneumonia in Skilled Nursing Facilities

- Second most common cause of infection in SNF
- Seasonal increase in pneumonia due to influenza
- 6-23% of SNF residents with pneumonia die

SHEA/APIC Guideline:
Infection Prevention and Control in the Long-Term Care Facility (2008)
Bacterial Pneumonia Pathogens in SNF

Most common pneumonia pathogens in SNF

- *Streptococcus pneumoniae* 13%
- Aerobic gram-negative bacteria 13%
- *Hemophilus influenzae* 6.5%
- *Staphylococcus aureus* 6.5%
- *Moraxella catarrhalis* 4.5%

SHEA/APIC Guideline: Infection Prevention and Control in the Long-Term Care Facility (2008)
Pneumonia Etiology

• Bacteria enter the respiratory tract by
  • Aspiration or oral content
  • Inhalation of aerosols containing bacteria
  • From other parts of the body
    • Oral pharyngeal microorganisms
    • Stomach
Elderly SNF Residents at Risk for Pneumonia

Residents with:

- Decreased clearance of bacteria from the airways
- Altered throat flora
- Poor functional status, immobility
- Presence of feeding tubes
- Swallowing difficulties and aspiration
- Inadequate oral care
Preventing Pneumonia Through Vaccination

• Promote pneumococcal vaccine
  • Required by CMS to offer pneumococcal vaccine
  • 13-valent pneumococcal conjugate vaccine (PCV13), 1 dose*
  • 23–Valent pneumococcal polysaccharide vaccine (PPSV23), 1-3 doses depending on indication*

• Promote annual resident influenza vaccination
  • Required by CMS to offer Influenza vaccine
  • Have an annual event to kick off flu season
  • Get consents signed early or upon admission to facilitate

• Promote influenza HCP vaccination
  • Required by 35 (60%) California local health departments

*CDC Adult Immunization Schedule
Preventing Pneumonia in SNF

- Ensure adequate nutrition and hydration
  - Record food and fluid intake to ensure adequacy
  - Offer small snacks and fluid several times a day
- Provide daily oral care
  - Prevent bacteria from accumulating, decreases risk of pneumonia if aspirated
- Elevate the head of the bed 30 to 45 degrees during tube feeding and for at least 1 hour after to decrease aspiration
- Perform hand hygiene after contact with respiratory secretions
- Use gloves for suctioning, and cleaning respiratory equipment
Ventilator-Associated Pneumonia (VAP)

- Approximately 1200 SNF in California
  - 131 (10%) care for residents on mechanical ventilation – (3855 ventilator beds)
- Residents may be on ventilator long term or for life
- Residents with an endotracheal tube directly into the respiratory tract at risk for VAP
- Up to 50% patients with VAP die
  - Highest mortality occurs in patients with severe illness and infection with non-fermentative gram-negative bacilli (e.g., Acinetobacter or Burkholderia species)

Institute for Healthcare Improvement (IHI)
http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventVAP.aspx
VAP Pathogenesis

Endotracheal tube (ET)

Impaired natural protection/clearance system

Secretions around tube colonized by bacteria

Aspiration of microorganisms into the lungs directly through the ET tube or around the cuff

Lungs colonized or infected with microorganisms
VAP Prevention Challenges

Pre-existing conditions (non-modifiable risk factors):

- Head trauma
- Coma
- Nutritional deficiencies
- Immunocompromised
- Multi organ system failure
- Acidosis
- Co-morbidities such as diabetes or lung disease
- History of smoking
VAP Prevention: Modifiable Risk Factors

1. Prevent aspiration of secretions
2. Reduce duration of ventilation
3. Reduce colonization of airway and digestive tract
4. Prevent exposure to contaminated equip
Prevent Aspiration of Secretions

- Maintain elevation of head of bed (HOB) 30-45 degrees
- Avoid gastric over-distention
- Avoid unplanned extubation and re-intubation
- Use cuffed endotracheal tube with in-line or subglottic suctioning
- Encourage early mobilization of patients with physical/occupational therapy
Reduce Duration of Ventilation

- Conduct “sedation vacations”
- Assess readiness to wean from vent daily
- Conduct spontaneous breathing trials

May not be feasible for SNF residents on long term ventilator support
Reduce Colonization of Airway and Digestive Tract

- Use cuffed Endotracheal Tube (ETT) with inline or subglottic suctioning
  - Minimizes secretions above cuff; prevents contamination of lower airway
- Avoid acid suppressive therapy for patients not at high risk for stress ulcer or stress gastritis
  - Increases colonization of the digestive tract
Reduce Colonization of Airway and Digestive Tract - 2

- Perform regular oral care with an antiseptic agent
- Reduce the opportunities to introduce pathogens into the airway
  - Perform good hand hygiene
  - Use gloves for contact with respiratory secretions or contaminated objects; follow with hand hygiene
  - Educate staff to avoid contaminating the ETT from patient’s mouth, HCP hands, introducing pathogens from patient’s other body sites or the environment
Prevent Exposure to Contaminated Equipment

- Use sterile water to rinse reusable respiratory equipment
- Remove condensate from ventilatory circuits
- Change ventilatory circuit only when malfunctioning or visibly soiled
- Store and disinfect respiratory equipment effectively
Legionnaire's Disease

• Severe form of pneumonia
• Caused by inhaling or aspirating the bacteria, Legionella pneumophila
  • Not transmitted person-to-person
• Often requires hospitalization
• Incubation period 2-10 days prior to onset of symptoms
• Fatal in 10% of cases overall and 25% of healthcare-associated cases

[Links]
cdc.gov/legionella
https://www.cdc.gov/legionella/downloads/fs-legionella-clinicians.pdf
Legionella in California and the United States

California cases reported between 2015 – 2017
• Total Legionella cases – 1554
• Healthcare-associated – 125 (8%)
  • Hospital associated – 45(35%)
  • SNF associated – 57(46%)

• ~5,000 cases
• 19% in LTC facilities
• Rate increased 286% from 2000–2014
Legionella

- Found naturally in freshwater
- Grows best in man-made water environments with temperatures 77°-107.6° F, stagnation, scale and sediment, and presence of certain aquatic amoebae
- Identified in health care facilities
  - Water used for showering (potable water)
  - Cooling towers (parts of large air conditioning systems)
  - Decorative fountains
  - Hot tubs
Risk Factors for *Legionella*

- Immunosuppressed hosts
- Solid organ transplant recipients
- Advanced age
- Male gender
- Cigarette smoking
- Alcohol abuse
- Chronic pulmonary disease
- Corticosteroid usage
- Renal failure

APIC Text 2018: Healthcare Associated Pathogens and Diseases: *Legionella pneumophila*
Laboratory Test for Legionella

• Urinary antigen test
  • Detects most common cause- L. pneumophilia serogroup 1
• Lower respiratory secretion, tissue, or pleural fluid culture
  • Detects other Legionella species
  • Ordered if urinary antigen test is negative, and Legionella is suspected
• Report all positive Legionella cases to CDPH L&C District Office and local public health department
Legionella Prevention

• Since 2017, SNF are required by CMS to have a comprehensive water management program to reduce the risk of *Legionella* growth and spread

“Facilities must develop and adhere to policies and procedures that inhibit microbial growth in building water systems that reduce the risk of growth and spread of legionella and other opportunistic pathogens in water”

CMS Memo June 02, 2017
Influenza

- Caused by Influenza virus (Influenza A and B most common)
- “Flu season” is late fall to early spring (October – March)
  - Varies from season to season depending on flu strain
  - Recommendation for vaccination before end of October
- Elderly are at highest risk for serious influenza complications
- Severe illness may lead to life-threatening pneumonia
  - 400-5,000 influenza deaths annually in California

https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LTCF_PreventingHAI.aspx
Influenza Epidemiology

- Incubation period 1-4 days
- Highly contagious first 3 days of illness
- Symptoms
  - Fever >100°F
  - Muscle aches
  - Headache
  - Non productive cough
  - Sore throat
  - Runny nose
- SNF residents may have subtle changes in mental status and a temperature below normal

https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LTCF_PreventingHAI.aspx
Influenza Etiology

- Spread by viral particles coming in contact with the respiratory tract
  - Infected person coughs or sneezes (droplets)
  - Uninfected person inhales the viral particles
- Can survive on surfaces for 24-48 hours (contact)
- Transmission can occur
  - Person to person
  - Person to object to person

https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LTCF_PreventingHAI.aspx
Influenza Prevention

• Vaccinate residents and healthcare workers
• Post “Cover Your Cough” signage and visitation restrictions
• Screen visitors during flu season
• Implement work restrictions for ill employees
• Encourage residents and visitors to practice respiratory hygiene and cough etiquette
• Ensure adherence to hand hygiene

https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LTCF_PreventingHAI.aspx
Transmission-based Precautions for Influenza

- Droplet precautions and Enhanced Standard precautions
- Implement precautions for suspected or confirmed influenza for 7 days after illness onset or until 24 hours after resolution of fever and respiratory symptoms, whichever is longer
  - Place ill residents in private room or cohort with other influenza residents
  - Confine symptomatic residents to their rooms, restrict group activities, and serve meals in their rooms
  - If other residents become symptomatic, cancel all group activities – serve meals in resident rooms

https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LTCF_PreventingHAI.aspx
Admissions or Returning Residents Treated for Influenza

• Avoid new admissions or transfers of asymptomatic residents to units with symptomatic residents
  • Ensure new or returning residents with acute respiratory illness be medically evaluated before admission or transfer to determine appropriate placement

https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LTCF_PreventingHAI.aspx
Admissions or Returning Residents Treated for Influenza - 2

Remember:

- Returning influenza residents from a hospital, who are clinically appropriate for discharge from the hospital and past the acute phase - may still need droplet precautions

- Hospital patients with influenza should be discharged when clinically ready, not based on the period of potential virus shedding or recommended duration of droplet precautions

https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LTCF_PreventingHAI.aspx
Influenza Outbreak

• Consult with **local health department** to
  • Determine strategies for limiting admissions
  • Determine limitations on a case by case basis
  • Consider chemoprophylaxis of non-ill residents
  • Reduce any prolonged closures to all admissions if transmission appears to be controlled with unaffected units able to accept new admissions.

https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LTCF_PreventingHAI.aspx
Facility Role in Pneumonia Prevention

• Ensure policies reflect current evidence based practices
  • CDC guidelines
• Ensure staff competency upon hire and at least annually
  • New hire orientation
  • Annual skills fair
  • Return demonstration to ensure competency
• Establish an adherence monitoring program for measuring prevention care practices
  • Use tools to measure adherence
• Provide feedback to frontline staff and leaders
  • Present adherence results to each unit
HEALTHCARE-ASSOCIATED INFECTIONS PROGRAM

Are Pneumonia Prevention Care Practices Used in YOUR Facility?

<table>
<thead>
<tr>
<th>All Residents</th>
<th>Additional Practices for Residents on Mechanical Ventilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promote resident and HCP influenza vaccination</td>
<td>Maintain HOB 30-45 degrees</td>
</tr>
<tr>
<td>Promote pneumonia vaccination</td>
<td>Avoid gastric distention</td>
</tr>
<tr>
<td>Ensure adequate nutrition and hydration</td>
<td>Assess readiness to wean</td>
</tr>
<tr>
<td>Perform regular oral care</td>
<td>Use cuffed ETT with inline suctioning</td>
</tr>
<tr>
<td>Perform hand hygiene</td>
<td>Avoid acid suppressive therapy if possible</td>
</tr>
<tr>
<td>Ensure effective water management program</td>
<td>Prevent exposure to contaminated equipment</td>
</tr>
<tr>
<td>Encourage early mobilization</td>
<td></td>
</tr>
</tbody>
</table>

You won’t know if you don’t monitor!
# Sample Adherence Monitoring Tool - VAP Prevention

<table>
<thead>
<tr>
<th>Ventilator Pneumonia Prevention Observations</th>
<th>Pt 1</th>
<th>Pt 2</th>
<th>Adherence by Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head of bed 30-45 degrees</td>
<td>Yes</td>
<td>No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Sedation vacation documented</td>
<td>Yes</td>
<td>No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Readiness to wean documented</td>
<td>Yes</td>
<td>No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Oral care with an antiseptic agent is performed regularly (per policy)</td>
<td>Yes</td>
<td>No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Hand hygiene performed before providing care</td>
<td>Yes</td>
<td>No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Sterile water used to rinse reusable respiratory equipment</td>
<td>Yes</td>
<td>No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Condensate in ventilatory circuit is removed</td>
<td>Yes</td>
<td>No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Ventilatory circuit is changed only when malfunctioning or soiled</td>
<td>Yes</td>
<td>No</td>
<td>Yes No</td>
</tr>
</tbody>
</table>

# Yes   # Observed = % Adherence  _____

CDPH Adherence Monitoring Tools: [www.cdph.ca.gov/hai](http://www.cdph.ca.gov/hai)
Summary

• Evidence-based prevention care practices prevent healthcare associated pneumonia
• SNF pneumonia prevention includes programs to vaccinate residents and health care providers
• Morbid complications of ventilated patients are common but many are preventable by following care practices
• A comprehensive water management program, required by CMS, reduces residents’ risk for Legionnaire’s disease
• SNF should have a robust annual influenza plan
• Adherence monitoring of prevention care practices and providing feedback to frontline staff improves outcomes
References and Resources


• Institute for Healthcare Improvement (IHI) 
  [http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventVAP.aspx](http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventVAP.aspx)

• NHSN Patient Safety Module: Chapter 6 (PNEU/VAP), 
Infection Preventionist’s Guide to Long-Term Care

Available at:
APIC Website Store
apic.org/APICStore/Products/Product?id=SLS6008
References and Resources


Questions?

For more information, please contact any HAI Program Liaison IP Team member.

Or email
HAIProgram@cdph.ca.gov