

# Preventing Respiratory Infections in Skilled Nursing Facilities

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Infection Preventionist Training for Skilled Nursing Facilities  
Healthcare-Associated Infections Program  
Center for Health Care Quality  
California Department of Public Health



# 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

[A Unit Guide To Infection Prevention for Long-Term Care Staff, AHRQ](#)

([www.ahrq.gov/hai/quality/tools/cauti-ltc/modules/resources/guides/infection-prevent.html](http://www.ahrq.gov/hai/quality/tools/cauti-ltc/modules/resources/guides/infection-prevent.html))

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

# Most Common Pneumonia Pathogens in SNF

<i>Pathogen</i>	<b>Risk factors</b>
<i>Streptococcus pneumoniae</i> <i>Haemophilus influenzae</i> <i>Klebsiella pneumoniae</i>	Most common pathogens
<i>K. Pneumoniae</i> <i>P. aeruginosa</i>	Repeat hospitalizations, invasive lines, intubation and mechanical ventilation
<i>Staphylococcus aureus</i> MRSA	Chronically ill, frequently hospitalized
Anaerobic: <i>Peptostreptococcus</i> <i>Bacteroides</i> <i>Prevotella</i> species	Common in the oral-pharynx
Fungal organisms (e.g. <i>Candida</i> species)	Immunosuppressed

Stamm, D., Katta, S., Stankowicz, A., Nursing home acquired pneumonia, STATPearls, NCBI, (August 24, 2020)

# 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

# Preventing Pneumonia Through Vaccination

- Promote pneumococcal vaccine
  - Required by CMS
  - 13-valent pneumococcal conjugate vaccine (PCV13), 1 dose\* OR
  - 23-Valent pneumococcal polysaccharide vaccine (PPSV23), 1-3 doses depending on indication\*
- Promote annual resident influenza vaccination
  - Required by CMS
  - Have an annual event to educate and promote vaccine
  - Get consents signed early or upon admission to facilitate
- Promote influenza HCP vaccination
  - Myths dispelled such as “I get the flu from the flu shot”

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[\\*CDC Adult Immunization Schedule](http://www.cdc.gov/vaccines/schedules/easy-to-read/adult.html#schedule)  
([www.cdc.gov/vaccines/schedules/easy-to-read/adult.html#schedule](http://www.cdc.gov/vaccines/schedules/easy-to-read/adult.html#schedule))

# 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

# Recommended Adult Immunization Schedule for ages 19 years or older

UNITED STATES  
**2020**

## How to use the adult immunization schedule

- 1** Determine recommended vaccinations by age ([Table 1](#))
- 2** Assess need for additional recommended vaccinations by medical condition and other indications ([Table 2](#))
- 3** Review vaccine types, frequencies, and intervals and considerations for special situations ([Notes](#))

### Vaccines in the Adult Immunization Schedule\*

Vaccines	Abbreviations	Trade names
Haemophilus influenzae type b vaccine	Hib	ActHIB® Hiberix® PedvaxHIB®
Hepatitis A vaccine	HepA	Havrix® Vaqta®
Hepatitis A and hepatitis B vaccine	HepA-HepB	Twincix®
Hepatitis B vaccine	HepB	Engerix-B® Recombivax HB® Hepitsav-B®
Human papillomavirus vaccine	HPV vaccine	Gardasil 9®
Influenza vaccine (inactivated)	IV	Many brands
Influenza vaccine (live, attenuated)	LAIV	FluMist® Quadrivalent
Influenza vaccine (recombinant)	RIV	Flublok® Quadrivalent
Measles, mumps, and rubella vaccine	MMR	M-M-R® II
Meningococcal serogroups A, C, W, Y vaccine	MenACWY	Menactra® Menveo®
Meningococcal serogroup B vaccine	MenB-4C MenB-FHbp	Bexsero® Trumenb®
Pneumococcal 13-valent conjugate vaccine	PCV13	Pneumar 13®
Pneumococcal 23-valent polysaccharide vaccine	PPSV23	Pneumovax® 23
Tetanus and diphtheria toxoids	Td	Tenivac® Tdvax™
Tetanus and diphtheria toxoids and acellular pertussis vaccine	Tdap	Adacel® Boostrix®
Varicella vaccine	VAR	Varivax®
Zoster vaccine, recombinant	RZV	Shingrix
Zoster vaccine live	ZVL	Zostavax®

\*Administer recommended vaccines if vaccination history is incomplete or unknown. Do not restart or add doses to vaccine series if there are extended intervals between doses. The use of trade names is for identification purposes only and does not imply endorsement by the ACIP or CDC.

Recommended by the Advisory Committee on Immunization Practices ([www.cdc.gov/vaccines/acip](http://www.cdc.gov/vaccines/acip)) and approved by the Centers for Disease Control and Prevention ([www.cdc.gov](http://www.cdc.gov)), American College of Physicians ([www.acponline.org](http://www.acponline.org)), American Academy of Family Physicians ([www.aafp.org](http://www.aafp.org)), American College of Obstetricians and Gynecologists ([www.acog.org](http://www.acog.org)), and American College of Nurse-Midwives ([www.midwife.org](http://www.midwife.org)).

### Report

- Suspected cases of reportable vaccine-preventable diseases or outbreaks to the local or state health department
- Clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System at [www.vaers.hhs.gov](http://www.vaers.hhs.gov) or 800-822-7967

### Injury claims

All vaccines included in the adult immunization schedule except pneumococcal 23-valent polysaccharide (PPSV23) and zoster (RZV, ZVL) vaccines are covered by the Vaccine Injury Compensation Program. Information on how to file a vaccine injury claim is available at [www.hrsa.gov/vaccinecompensation](http://www.hrsa.gov/vaccinecompensation).

### Questions or comments

Contact [www.cdc.gov/cdc-info](http://www.cdc.gov/cdc-info) or 800-CDC-INFO (800-232-4636), in English or Spanish, 8 a.m.–8 p.m. ET, Monday through Friday, excluding holidays.



Download the CDC Vaccine Schedules App for providers at [www.cdc.gov/vaccines/schedules/hcp/schedule-app.html](http://www.cdc.gov/vaccines/schedules/hcp/schedule-app.html)

### Helpful information

- Complete ACIP recommendations: [www.cdc.gov/vaccines/hcp/acip-recs/index.html](http://www.cdc.gov/vaccines/hcp/acip-recs/index.html)
- General Best Practice Guidelines for Immunization (including contraindications and precautions): [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html](http://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html)
- Vaccine information statements: [www.cdc.gov/vaccines/hcp/vis/index.html](http://www.cdc.gov/vaccines/hcp/vis/index.html)
- Manual for the Surveillance of Vaccine-Preventable Diseases (including case identification and outbreak response): [www.cdc.gov/vaccines/pubs/surv-manual](http://www.cdc.gov/vaccines/pubs/surv-manual)
- Travel vaccine recommendations: [www.cdc.gov/travel](http://www.cdc.gov/travel)
- Recommended Child and Adolescent Immunization Schedule, United States, 2020: [www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html](http://www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html)



U.S. Department of  
Health and Human Services  
Centers for Disease  
Control and Prevention

CE210821-A



**Table 1** Recommended Adult Immunization Schedule by Age Group, United States, 2020

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
Influenza inactivated (IIV) or influenza recombinant (RIV) <b>or</b> Influenza live, attenuated (LAIV)	1 dose annually			
Tetanus, diphtheria, pertussis (Tdap or Td)	1 dose Tdap, then Td or Tdap booster every 10 years			
Measles, mumps, rubella (MMR)	1 or 2 doses depending on indication (if born in 1957 or later)			
Varicella (VAR)	2 doses (if born in 1980 or later)		2 doses	
Zoster recombinant (RZV) (preferred) <b>or</b> Zoster live (ZVL)			2 doses <b>or</b> 1 dose	
Human papillomavirus (HPV)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Pneumococcal conjugate (PCV13)	1 dose			65 years and older
Pneumococcal polysaccharide (PPSV23)	1 or 2 doses depending on indication			1 dose
Hepatitis A (HepA)	2 or 3 doses depending on vaccine			
Hepatitis B (HepB)	2 or 3 doses depending on vaccine			
Meningococcal A, C, W, Y (MenACWY)	1 or 2 doses depending on indication, see notes for booster recommendations			
Meningococcal B (MenB)	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations			
	19 through 23 years			
Haemophilus influenzae type b (Hib)	1 or 3 doses depending on indication			

[CDC 2020 Recommended Adult Immunization Schedule \(PDF\)](#)

([www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf](http://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf))

## Preventing Pneumonia in SNF

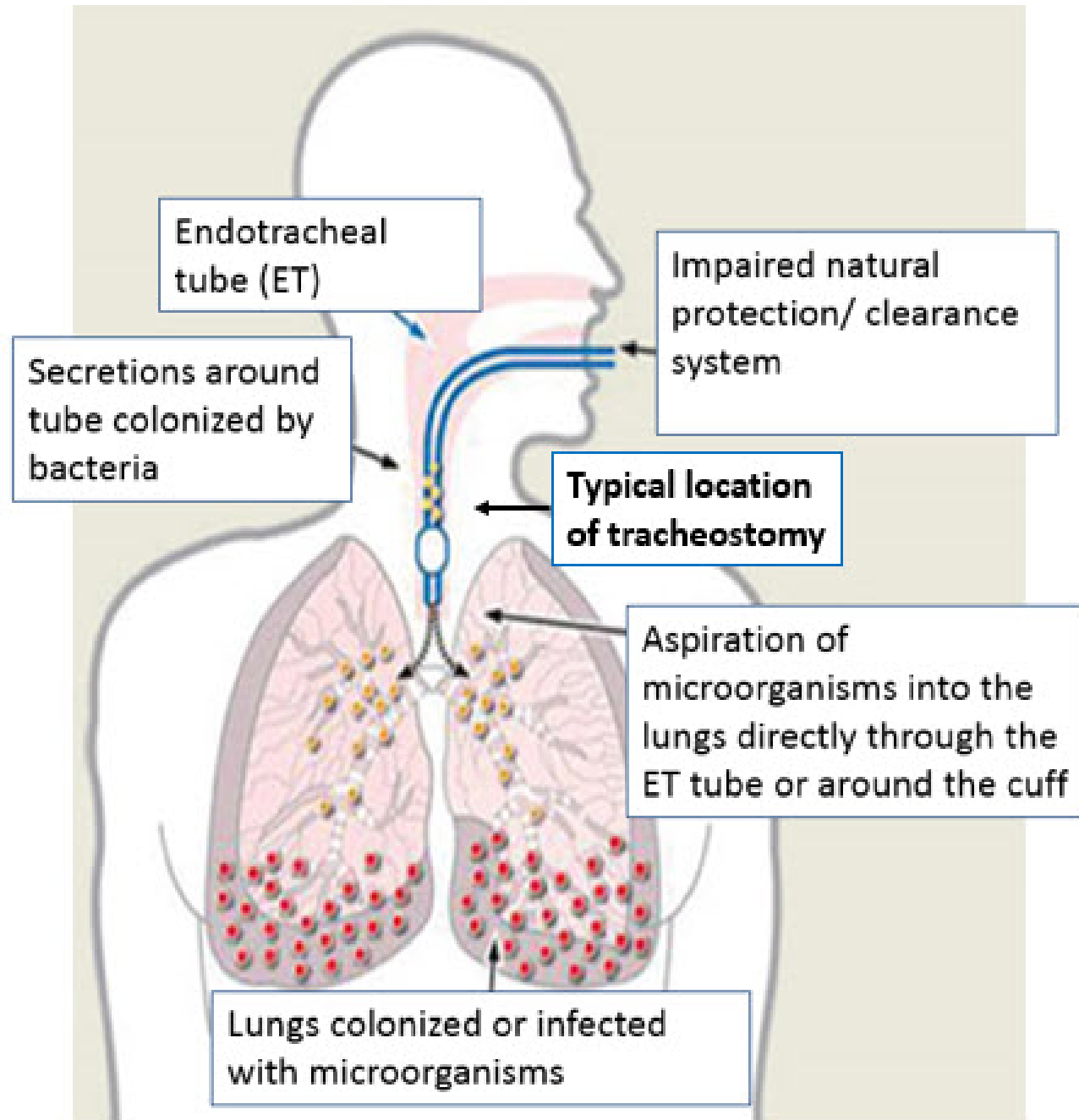
- Ensure adequate nutrition and hydration
  - Record food and fluid intake to ensure adequacy
  - For those able to eat, offer small snacks and fluid several times a day
- Provide daily oral care
  - Prevent bacteria from accumulating
  - Decreases risk of pneumonia if aspirated
- Elevate the head of the bed 30 to 45 degrees during tube feeding and for at least 1 hour after to reduce potential 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 total SNF 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% residents with VAP die
  - Highest mortality occurs in patients with severe illness and infection with non-fermentative gram-negative bacilli (examples, *Acinetobacter* and *Burkholderia* species)

# VAP

## Pathogenesis



# Risks for Ventilator-Associated Pneumonia (VAP)

Non-Modifiable Risks	Modifiable Risks
Head trauma	Prevent aspiration of secretions
Coma	Reduce duration of ventilation
Nutritional deficiencies	Reduce colonization of GI and respiratory tract
Immune deficiency	Prevent exposure to contaminated equipment
Multisystem organ failure	
Acidosis	
Co-morbidities such as diabetes, COPD, lung disease	
History of smoking	

# Prevent Aspiration of Secretions

- Maintain elevation of head of bed (HOB) 30-45 degrees
- Avoid unplanned extubation and re-intubation
  - Accidental dislodgement during care
  - Resident pulls at trach and tubing
- Use cuffed tracheostomy tube with in-line suctioning
- Encourage early mobilization of residents with physical/occupational therapy
- Manage oral secretions

# Reduce Duration of Ventilation

- Evaluate sedation if in place, to improve mobility and weaning off ventilation
  - Sedation vacation means reducing or stopping medications that sedate, such as opiates or diazepam
- Assess readiness to wean from vent daily depending on the underlying diagnosis
- Conduct spontaneous breathing trials with provider input

**May not be feasible for SNF residents on long term ventilator support**

# Reduce Colonization of Airway and Digestive Tract - 1

- Use cuffed tracheostomy tube with inline suctioning
  - Minimizes secretions above cuff; reduces contamination of lower airway
  - Avoid overfilling the cuff, will cause permanent damage to the trachea
- Avoid acid suppressive therapy for patients not at high risk for stress ulcer or stress gastritis
  - Increases colonization of the digestive tract-the acidity of the stomach kills bacteria



## 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 tracheostomy from patient's mouth, HCP hands
  - Avoid 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
  - Avoid storing in places where the equipment can be contaminated

# Legionnaire's Disease

- Severe form of pneumonia
- Caused by inhaling or aspirating the bacteria *Legionella pneumophila* from legionella
  - 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

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[CDC What Clinicians Need to Know about Legionnaires' Disease \(PDF\)](#)

([www.cdc.gov/legionella/downloads/fs-legionella-clinicians.pdf](http://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%)**

## U.S. Legionella outbreaks (2000–2014)

- ~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 pneumonophila*

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# Laboratory Test for Legionella

- Urinary antigen test
  - Detects most common cause- *L. pneumophila* 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 local public health and CDPH L&C District Office

# Water Management Plan

- Perform Risk Assessment for facility to reduce risk of exposure to *Legionella* – **Required!**
- Observe for areas that may be breeding grounds for *Legionella*: standing water sources, water fountains, hot tubs
- Culture cooling towers and water storage units regularly, and maintain HVAC systems to prevent air conditioning condensate to pool
  - Report to IP and Infection Control Committee
  - Include what actions were taken if culture is positive
  - May need to flush plumbing of resident rooms that are not used
  - Include these elements in facilities Policy and Procedure Manual

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[CDC Legionella Environmental Assessment Form](#) (PDF)

([www.cdc.gov/legionella/downloads/legionella-environmental-assessment.pdf](http://www.cdc.gov/legionella/downloads/legionella-environmental-assessment.pdf))



# 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

# Influenza Epidemiology

- Incubation period 1-4 days
- Highly contagious during first 3 days of illness
- Symptoms
  - Fever  $\geq 100^{\circ}\text{F}$
  - Muscle aches
  - Headache
  - Non productive cough
  - Sore throat
  - Runny nose
- SNF residents may have subtle changes in mental status and a temperature below normal
- **Symptoms are like that of COVID-19 – suspect BOTH**
  - COVID-19 will be discussed in a separate module

# Influenza Etiology

- Spread by viral particles' 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 (droplets)
  - Person-object-person (direct or indirect contact)

[CDPH Preventing HAI in California Skilled Nursing Facilities](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI_in_LTC_Facilities.aspx)

[www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI\\_in\\_LTC\\_Facilities.aspx](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI_in_LTC_Facilities.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
- Transmission based precautions for suspect cases immediately

***COVID-19 transmission-based precautions  
will be discussed in a separate module***

[Post-acute and LTC Facility Toolkit: Influenza Vaccination among HCP](#)

([www.cdc.gov/flu/toolkit/long-term-care/index.htm](http://www.cdc.gov/flu/toolkit/long-term-care/index.htm))

[CDPH Preventing HAI in California Skilled Nursing Facilities](#)

([www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI\\_in\\_LTC\\_Facilities.aspx](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI_in_LTC_Facilities.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 24 hours after resolution of fever and respiratory symptoms, whichever is longer
  - Place ill residents in private room or cohort with other influenza residents
  - Keep symptomatic residents in the room, restrict group activities, and serve meals in their rooms
  - If other residents become symptomatic, cancel all group activities

***COVID-19 must be ruled out and implement appropriate transmission-based precautions – discussed in COVID-19 module***

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[CDPH Preventing HAI in California Skilled Nursing Facilities](#)

([www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI\\_in\\_LTC\\_Facilities.aspx](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI_in_LTC_Facilities.aspx))

# Admissions or Readmitting Residents Treated for Influenza

- Avoid placing 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

***COVID-19 residents: follow guidance for transmission-based precautions, observation status***

## Admissions or Returning Residents Treated for Influenza, Continued

- Returning influenza residents from a hospital, who are clinically appropriate for discharge from the hospital and have passed the acute phase, may still need droplet precautions
  - Hospital patients with influenza should be discharged when clinically appropriate, not based on the period of potential virus shedding or recommended duration of droplet precautions

# Influenza Outbreak

- Definition of ‘outbreak’ in your facility
- 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

[CDPH Preventing HAI in California Skilled Nursing Facilities](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI_in_LTC_Facilities.aspx)

([www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI\\_in\\_LTC\\_Facilities.aspx](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/PreventingHAI_in_LTC_Facilities.aspx))



# Facility Role in Respiratory Infection Prevention

- Ensure policies reflect current recommended 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
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# Are Pneumonia Prevention Care Practices Used in YOUR Facility?

## All Residents

- Promote resident and HCP influenza vaccination
- Promote pneumonia vaccine
- Ensure adequate nutrition and hydration
- Perform regular oral care
- Perform hand hygiene
- Ensure effective water management program
- Encourage early mobilization

## Additional Practices for Residents on Mechanical Ventilation

- Maintain HOB 30-45 degrees
- Avoid gastric distention
- Assess readiness to wean
- Used cuffed ETT with inline suctioning
- Avoid acid suppressive therapy if possible
- Prevent exposure to contained equipment

**You won't know if you don't monitor!**

# Sample Adherence Monitoring Tool - VAP Prevention

Ventilator Pneumonia Prevention Observations	Pt 1		Pt 2		Adherence by Task	
	#Yes	#Obs	#Yes	#Obs	#Yes	#Obs
Head of bed 30-45 degrees	1	2	1	2	1	2
Sedation vacation documented	0	2	0	2	0	2
Readiness to wean documented	2	2	2	2	2	2
Oral care with an antiseptic agent is performed regularly (per policy)	0	2	0	2	0	2
Hand hygiene performed before providing care	0	2	0	2	0	2
Sterile water used to rinse reusable respiratory equipment	2	2	2	2	2	2
Condensate in ventilatory circuit is removed	1	2	1	2	1	2
Ventilatory circuit is changed only when malfunctioning or soiled	2	2	2	2	2	2
# Yes <u>8</u> # Observed <u>16</u>	#Yes/#Observed = % Adherence				<u>50</u>	<u>%</u>

[CDPH Monitoring Adherence to Health Care Practices that Prevent Infection](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/MonitoringAdherenceToHCPracticesThatPreventInfection.aspx)

(www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/MonitoringAdherenceToHCPracticesThatPreventInfection.aspx)



# Summary

- Evidence-based prevention care practices prevent healthcare associated pneumonia
- SNF pneumonia prevention includes programs to vaccinate residents and health care providers
- Complications of ventilated patients are common, but many are preventable
- 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

# Infection Preventionist's Guide to Long-Term Care

Available at [APIC Website  
Store](https://www.apic.org/resources/topic-specific-infection-prevention/long-term-care/)

([apic.org/resources/topic-specific-  
infection-prevention/long-term-care/](https://www.apic.org/resources/topic-specific-infection-prevention/long-term-care/))



## Infection Preventionist's Guide to Long-Term Care



# References and Resources

- Coffin, S, et al. Strategies to Prevent Ventilator-Associated Pneumonia in Acute Care Hospitals. *Infect Control Hosp Epidemiol* ,29:S31-S40, 2008
- Greene LR, Sposato K, Farber MR, Fulton TM, Garcia RA. Guide to the Elimination of Ventilator – Associated Pneumonia. Washington, D.C.: APIC, 2009
- [How-to Guide: Prevent Ventilator-Associated Pneumonia, Institute for Healthcare Improvement \(IHI\)](http://www.ihl.org/resources/Pages/Tools/HowtoGuidePreventVAP.aspx)  
([www.ihl.org/resources/Pages/Tools/HowtoGuidePreventVAP.aspx](http://www.ihl.org/resources/Pages/Tools/HowtoGuidePreventVAP.aspx) )
- [NHSN Patient Safety Module: Chapter 6 \(PNEU/VAP\)](http://www.cdc.gov/nhsn/PDFs/pscManual/6pscVAPcurrent.pdf) (PDF)  
([www.cdc.gov/nhsn/PDFs/pscManual/6pscVAPcurrent.pdf](http://www.cdc.gov/nhsn/PDFs/pscManual/6pscVAPcurrent.pdf))

## References and Resources, continued

- Smith, P.W., Bennett, G., Bradley, S., Drinka, P., Lautenbach, E., Marx, J., Mody, L., Nicolle, L., Stevenson, K. SHEA/APIC Guideline: Infection prevention and control in the long-term care facility. *ICHE*, 29(9), 785-814, July 2008
- Stamm, D., Katta, S., Stankowicz, A., Nursing home acquired pneumonia, *STATPearls, NCBI*, (August 24, 2020) [www.ncbi.nlm.nih.gov/books/NBK537355/](http://www.ncbi.nlm.nih.gov/books/NBK537355/)
- Stone, N.D., Muhammad S.A., Calder, J., et al, Surveillance definitions of infections in long-term care facilities: revisiting the McGeer criteria. *Infect Control Hosp Epidemiol* 33(10):965-977, 2012  
[www.cambridge.org/core/services/aop-cambridge-core/content/view/96F1AC4F148B6FB8C80F3A7B094CA240/S0195941700031684a.pdf/surveillance\\_definitions\\_of\\_infections\\_in\\_longterm\\_care\\_facilities\\_revisiting\\_the\\_mcgeer\\_criteria.pdf](http://www.cambridge.org/core/services/aop-cambridge-core/content/view/96F1AC4F148B6FB8C80F3A7B094CA240/S0195941700031684a.pdf/surveillance_definitions_of_infections_in_longterm_care_facilities_revisiting_the_mcgeer_criteria.pdf)
- [CMS Requirement to Reduce Legionella Risk in Healthcare Facility Water Systems to Prevent Cases and Outbreaks of Legionnaires' Disease \(LD\) \(PDF\)](#)  
([www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/Survey-and-Cert-Letter-17-30.pdf](http://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/Survey-and-Cert-Letter-17-30.pdf))

## Questions?

For more information,  
please contact

[HAIProgram@cdph.ca.gov](mailto:HAIProgram@cdph.ca.gov)

Include “SNF IP Training Class”  
in the subject line

## Post Test

Now that you have completed  
this module,

Click on the “Post Test” link  
when it pops up

To Return to

Learning Stream

and take the post test

*If the Post Test link does not pop up,  
you will be sent a link via e-mail*