Respiratory Infections in Nursing Homes

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INFECTION MANAGEMENT ANTIBIOTIC STEWARDSHIP

CS-LTC Collaborative Studies of Long-Term Care University of North Carolina at Chapel Hill

Outline

1. **General Principles** of Medical Care for Nursing Home Residents, with a Focus on the Respiratory System
2. **Common Respiratory Infections**
   - Presentation and Treatment
   - Common Questions and Controversies

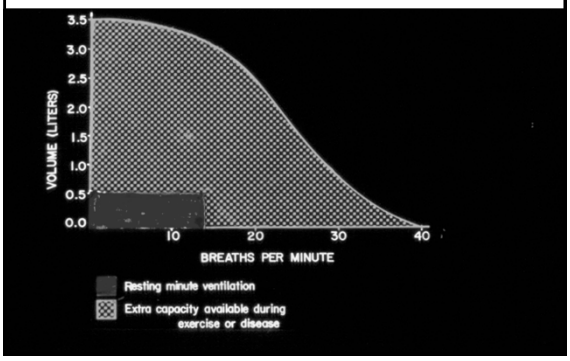
Basic Principles about Nursing Home Residents and Respiratory Disease

The Rule of Thirds

Of the 'decline in normal function" seen as people age…..

- **1/3 is due to** → **Disease**
- **1/3 is due to** → **Dis-use (or misuse)**
- **1/3 is due to** → **Physiological aging**

We Have Lots of Respiratory Reserve



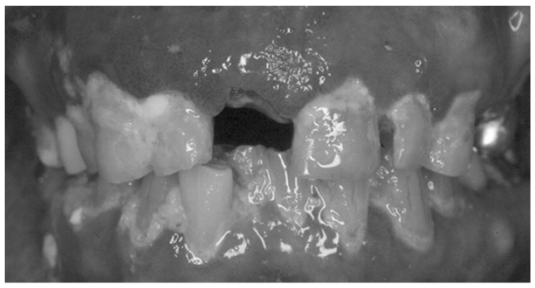
Bad Teeth and Lung Disease

- Poor oral health → bacterial pathogens
- Bacteria get inhaled → aspiration pneumonia

Two-thirds of nursing home residents have bacterial pathogens in their dental plaque

Over half of nursing home pneumonias are due to aspiration

Plaque and Gingivitis



Mouth Care to Prevent Pneumonia

Research Results

Pilot studies of enhanced oral hygiene care have demonstrated 42% - 56% reduction in pneumonia

Reduction is NOT due to use of a new product such as chlorhexidine but rather a comprehensive program of brushing, interdental care, specialized products, and staff training / reassignment

Mouth Care Without a Battle ©

Individualized Mouth Care
for Persons with Cognitive and Physical Impairment

* Module 1: Basic Techniques
* Module 2: Managing Behavioral Challenges
* Module 3: Nurse Supervisor Training
Module 4: Short Overview for Administrators / Advocates
* Continuing education credit available

More information: *mouthcarewithoutabattle.org*

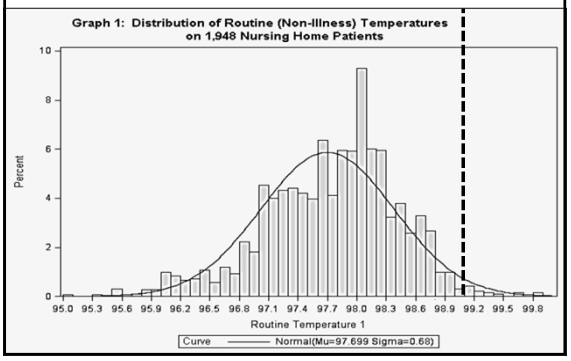
A Nursing Home is a Community

- High population density (like a cruise ship)
- Lots of contact with others and certain parts of the environment
- Many persons are immunocompromised or at high risk for other reasons

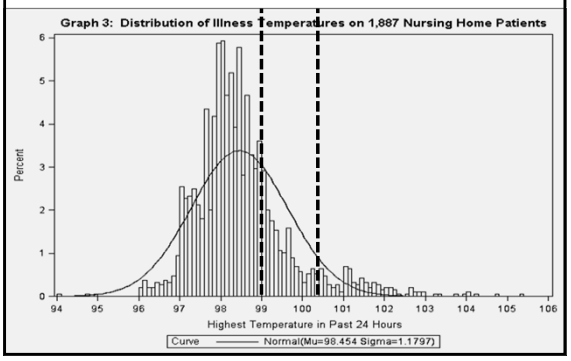
Implications

- Infection control measures very important (and most common reason for survey citations)
- Resistant organisms will spread

Fever in Older Persons



Fever and Antibiotic Use



Concern About Overtreatment

Between 25-75% of antibiotic prescriptions in long term care do not meet evidence-based clinical guidelines

Prescribing antibiotics **"just in case"** was accepted in the past, but now antibiotics should be given after **careful, evidence-based consideration** of risks and necessity.

Chest X-Ray Report Ambiguity Can Foster Antibiotic Overtreatment

Not all Infiltrates Are Equal

- "…mild right lower lobe infiltrate"
- "…patchy left retrocardiac infiltrate not demonstrated on the lateral."
- "…extensive bilateral pulmonary infiltrates"

Report Includes Diagnostic Uncertainty

- "…increased opacity with consideration for pneumonia and subsegmental atelectasis"
- "Recommend clinical correlation."
- "crowding of lung markings/chronic lung markings vs a mild paratracheal infiltrate"

Visualization Suboptimal

- …modest left lower lobe consolidation/ effusion is suggested on the AP exam, but not confirmed on the lateral projection.
- …report limited by patient's inability to cooperate. Bilateral areas of more laterally positioned density over lung fields, indeterminate in nature, with benign etiology not established.

McGeer Criteria for Pneumonia

1. Chest x-ray interpretation demonstrates "pneumonia or the presence of a new infiltrate"
2. At least 1 of the following: new or increased cough; new or increased sputum; O2 sat <94% or down by >3% on room air; new or changed lung exam abnormalities; pleuritic pain; respiratory rate ≥25
3. New fever, leukocytosis; delirium, or functional decline

Reference: Stone N, et al. Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria. Infect Control Hosp Epidemiol. 33(10): 965-977.

Cough Scares Providers, Leading to Overtreatment

Research Result: Cough Alone Increases 3x the likelihood of a LTC Patient Getting Antibiotics

Common Respiratory Infections

Infection Type	Common Cause	Common Symptoms	Distinguishing Features
Common Cold	**Virus**	Nasal congestion/sneezing Sore throat **Dry cough** +/- fever	Nasal symptoms Normal vitals (+/- fever) Unchanged lung exam
Acute bronchitis	**Virus**	**Cough** (+/- **sputum**) +/- Fever	Normal chest X-ray Normal vitals (+/- fever)
Pneumonia	**Bacteria or Virus**	**Cough** (+ **sputum**) Pleuritic chest pain Fever	Abnormal vital signs Abnormal lung exam Infiltrate on chest X-ray Mental status changes
Influenza-like illness	**Virus**	Sore throat Dry **cough** Fever	Chills Body aches Malaise
COPD exacerbation	**Virus or bacterial**	**Cough** (+/- **sputum**) +/- Fever	Normal chest X-ray Normal vitals (+/- fever)

Common Respiratory Infections

Case 1: Mr. Jackson

- 82 year old, never smoked
- 4 days of illness
- Prominent symptoms are runny nose and sneezing.
- Had sore throat on first two days, now gone.
- Mild, dry cough
- No dyspnea
- Energy level normal

More about Mr. Jackson

Temperature:	**98.4°F**
Blood Pressure:	**145/85**
Respiratory rate:	**18**
Pulse:	**75**
Pulse ox:	**97%**
Mental status:	**Baseline**
Lung exam:	**Clear**

1. What is the most likely diagnosis?
2. What treatment(s) are indicated?

What can be done for viral respiratory infection?

TO DO:

- ☑ Reassure patient and/or family
- ☑ Monitor vital signs and worsening signs or symptoms
- ☑ Encourage fluids and rest
- ☑ Acetaminophen or NSAIDS for fever/pain
- ☑ Nasal saline spray/humidified air for congestion
- ☑ Consider cough medicine

"Sinus" and "Sinusitis"

- When people say they have "sinus" they don't usually mean acute sinusitis.
- Acute sinusitis requires: purulent nasal drainage plus nasal obstruction and/or facial pain, pressure, or fullness, and (usually) fever.
  - Most is viral, a minority are bacterial
  - Proven effective: nasal steroids
  - Unproven effectiveness: antibiotics [but still they are overused]

Case 2: Mr. Leonard

- 76 year old non-smoker
- 5 days of illness
- Began with nasal congestion, sore throat
- Soon cough became main symptom, worse at night
- Small amount of sputum
- Decreased appetite, more tired but up and about

More about Mr. Leonard

Temperature:	**99.4°F**
Blood Pressure:	**130/75**
Respiratory rate:	**18**
Pulse:	**75**
Pulse ox:	**97%**
Mental status:	**Baseline**
Lung exam:	**Scattered wheezes**

1. What is the most likely diagnosis?
2. What treatment(s) are indicated?

What is Mr. Leonard's Diagnosis?

Upper Respiratory Infection
☑ **Nasal congestion**
☑ **Sore throat**
☑ **Sneezing**
Acute Bronchitis
☑ **Cough**
☑ **Low grade fever**
☑ **Normal other vital signs/non-focal lung exam (often with expiratory wheezes)**

What can be done for acute bronchitis?

TO DO:

- ☑ Reassure patient and/or family
- ☑ Monitor vital signs and worsening signs or symptoms
- ☑ Encourage fluids and rest
- ☑ Acetaminophen or NSAIDS for fever/pain
- ☑ Nasal saline spray/humidified air for congestion
- ☑ Cough medicine or inhaled bronchodilator

What About Antibiotics?

Most cases of bronchitis are VIRAL and won't improve with antibiotic treatment.

65% of acute bronchitis cases in nursing homes did not follow evidence-based antibiotic treatment guidelines

2d most common reason for inappropriate antibiotic use in NHs

J Am Geriatr Soc. 2011 Jun;59(6):1093-8

Common Reasons for Antibiotic Treatment of Viral Respiratory Infections

1. Belief that antibiotics can help
2. "Just in case" pneumonia develops
3. Meeting patient/family expectations

Do Antibiotics Improve Cold and Bronchitis Symptoms?

Antibiotics:
- DO NOT shorten recovery time or improve symptoms
- DO increase adverse effects

Antibiotics for respiratory symptoms in moderate to severe COPD may be the exception, depending on the clinical situation.

Cochrane Database Syst Rev. 2014 Mar 1, 245.
Lancet Infect Dis. 2013 Feb;13(2):123-9
Am Jour of Respir and Crit Care Med. 186, 8 (2012); 716-723

Do Antibiotics for Viral Infections Prevent Pneumonia?

- Antibiotics do reduce pneumonia risk slightly – 40 courses are needed to prevent 1 case of pneumonia.
- If pneumonia develops, antibiotic resistance more likely

Nursing home residents with viral respiratory illness must be carefully monitored for signs or symptoms of pneumonia.

BMJ. 2007 Nov 10;335(7627):982

"…But the Family Expects an Antibiotic"

Studies show:
- Patient/family expectations for antibiotics are overestimated
- Satisfaction is *not* severely impacted when antibiotics not given
- Communication and education are key

Nursing staff have the opportunity to educate and reassure

BMJ. 1998 Sep 5;317(7159):637-42.
Cochrane Database Syst Rev. 2013 Apr 30:4.
J Gen Intern Med. 2014 Nov 6

How To Talk To Patients And Families About Viral Respiratory Illness

- **Inform** that **resident is ill and staff is helping them –** by providing symptom relief and monitoring
- **Advise** on illness course
  - Colds: up to 1.5 weeks
  - Bronchitis: up to 3 weeks
- **Respond** to concerns
- **Reassure** that antibiotics not needed
  - explain risks
  - explain that you will monitor

BMJ. 2008;337:a437

What Could You Tell Mr. Leonard's Concerned Family?

Advise on illness course:

"His cough might last several more days to several weeks, and it may take him a while to feel better."

Respond to concerns about symptoms:

"We're going to help him feel more comfortable so his body can fight this virus. He'll need plenty of fluids and rest. Also, we'll give medicine for his fever and cough, and keep an eye on him."

If the Family Asks Specifically About Antibiotics

"Mr. Leonard's chest cold is caused by a virus, and antibiotics won't help viruses. Giving him antibiotics when they aren't needed can cause side effects and make it so that antibiotics won't work when he really needs them. We will monitor him closely for any change in condition that might indicate a need for antibiotics."

Case 3: Mrs. Gallagher

- 78 year old, smoker, COPD, on oxygen (2 L/min)
- 5 days of productive cough
- Increased dyspnea
- Pulse ox 93% (normal 93-95%)
- Temperature 100.0 °F
- Exam: rhinorrhea, nasal congestion, anterior wheezes.
- X-ray: no acute changes

1. What is the most likely diagnosis?
2. What treatment(s) are indicated?

Are Antibiotics Indicated for COPD Exacerbations?

- Cochrane systematic review (2012):
  - large beneficial effects patients admitted to an ICU
  - For outpatients and inpatients, results inconsistent
- Guidelines for COPD exacerbation:
  - Mild disease: start with inhaled bronchodilator, consider oral steroids. If inadequate relief, consider antibiotic
  - Moderate / severe disease → inhaled bronchodilator, oral steroids, and antibiotics
  - Monitor for signs of pneumonia

Cochrane Database Syst Rev. 2012 Dec 12;12:CD010257.
Ann Intern Med 2001;134:521-529..

Influenza in the Nursing Home

- Vaccinate all residents and staff
- Test residents with suspicious symptoms
- Infection control
  - Standard precautions
  - Droplet precautions
- Antiviral treatment
- Antiviral chemoprophylaxis
- Monitor for signs suggesting pneumonia

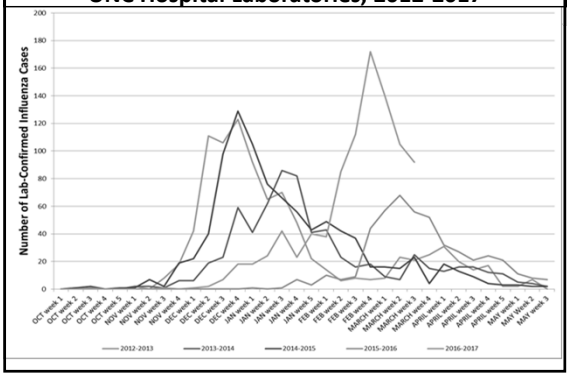
http://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm

Flu Days

by Peter Macuck

"Shivering, you drag yourself,
as if gun-shot, to the living room,
to the old movie channel…
your mind fogged over…
edging toward feverish sleep."

Laboratory-Confirmed Influenza Cases, UNC Hospital Laboratories, 2012-2017



When and Whom to Test for Flu

"Influenza testing should occur when any resident has signs and symptoms of influenza-like illness."

CDC defines influenza-like condition as an unexplained illness characterized by:

- Fever > 100°F, 37.8°C
  PLUS
- cough and/or sore throat

for details on lab testing, check CDC website
http://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm

Dealing with a Flu Outbreak

- Definition: at least one laboratory confirmed case plus one other case that looks like the flu
- If outbreak occurs, implement:
  - ✓ Daily active surveillance of residents, health care personnel and visitors.
  - ✓ Droplet precautions for all residents with suspected or confirmed influenza
  - ✓ Antiretroviral treatment for all cases
  - ✓ Antiviral chemoprophylaxis for all non-ill residents, continuing at least 2 wks (until 7 days after last case)
  - ✓ Review material on CDC website:
    http://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm

Pneumonia

What Clinical Signs Suggest Pneumonia?

- Abnormal vital signs
  - Fever
  - Respiratory rate > 25 (90% sensitive, 90% specific)
  - Tachycardia
- Pulse ox drop of >3% (about 75% sensitive and 75% specific)
- New localized rales on physical exam
- Acute delirium

Clin Endocrinol 1984; 20:451–6.
Am J Med Sci 2002; 324:237–42.

Three Main Types of Pneumonia

- Aspiration pneumonia
  - Most common type of pneumonia in NH patients
  - Affects 300,000 – 600,000 Americans annually
  - Oral bacteria predominate

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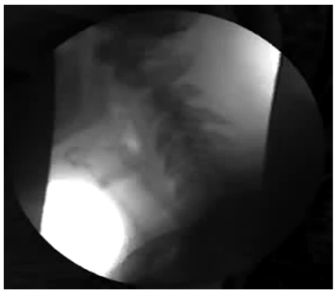
  - Oral bacteria predominate
- Other bacterial pneumonia
  - Often spontaneous, can follow viral infection
  - Variety of organisms
- Viral pneumonia
  - Least common
  - Example -- influenza

Aspiration Pneumonitis vs Pneumonia

- Controversial area
  - When to diagnose?
  - When to treat?
  - How to prevent?
  - How best to treat?
- Pneumonitis – inflammation without infection
- Pneumonia – infection by a microorganism

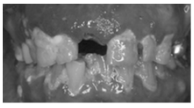
Aspiration Happens Frequently



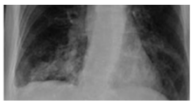
- Dysphagia affects up to 68% of elderly nursing home residents
- Small volume aspiration is frequent
- Sign: cough after swallowing
- Usually is cleared without development of pneumonia

When Is Aspiration Most Hazardous?

- Infection and heavy colonization in mouth



- Solid aspirate
- High volume



- Very ill and/or dying patient

Can Aspiration Pneumonia be Prevented?

- Thickened liquids do not reduce aspiration or pneumonia
- Posture adjustment (e.g. chin tuck) – limited benefit
- Diet modification leads to poor intake and greater use of supplements

Bottom line: Individualize, but do not torture patient with measures that may not work

Reducing Aspiration Pneumonia Risk

"Regardless of prescribed diet consistencies, all residents continuously produce saliva, which is routinely swallowed between meals and at night. Consequently, many programs designed to prevent aspiration pneumonia concentrate on improved oral hygiene, which is definitely a modifiable risk factor, rather than dysphagia as such. They also modify medication regimens, because antipsychotics and sedatives significantly increase the risk of aspiration pneumonia."

Nichols J. *Caring for the Ages. AMDA:* February, 2015, pp 3, 5.

Monitoring For Signs And Symptoms of Pneumonia

- ☑ Fever (especially if >100.4 ºF)
- ☑ Respiratory rate ≥25 breaths/minute
- ☑ Elevated pulse (>100 beats per minute)
- ☑ Oxygen saturation <94% on room air or >3% reduction baseline
- ☑ New or worsening shortness of breath
- ☑ Lung exam with focal changes

If pneumonia is suspected, contact the provider.

Should We Prescribe Antibiotics for Pneumonia at the End of Life?

- Sir William Osler – pneumonia as the "old man's friend"
- Terminal bronchopneumonia occurs in most dying patients
- Relieving dyspnea is crucial to quality of dying
  - Most effective treatments for relieving dyspnea include positioning, oxygen/humidification, sedatives / opioids
  - Antibiotics are NOT effective treatment for dyspnea; consider risk of nausea and diarrhea
  - Use depends on care goals; consider alternatives to antibiotics when comfort is main goal of care

Summary: The Five Major Types of Respiratory Tract Infections

Infection Type	Cause	Common Symptoms	Distinguishing Features
Common Cold	Virus	Nasal congestion/sneezing Sore throat Dry cough +/- fever	Nasal symptoms Normal vitals (+/- fever) Unchanged lung exam
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COPD exacerbation	Virus or bacterial	Cough (+/- sputum) +/- Fever	Normal chest X-ray Normal vitals (+/- fever)

A Final Reminder

We can no longer use antibiotics
"Just in case."

We should use them
"Just when needed."

Thank You

We take for granted that we can breathe effortlessly. Some of our patient's can't!