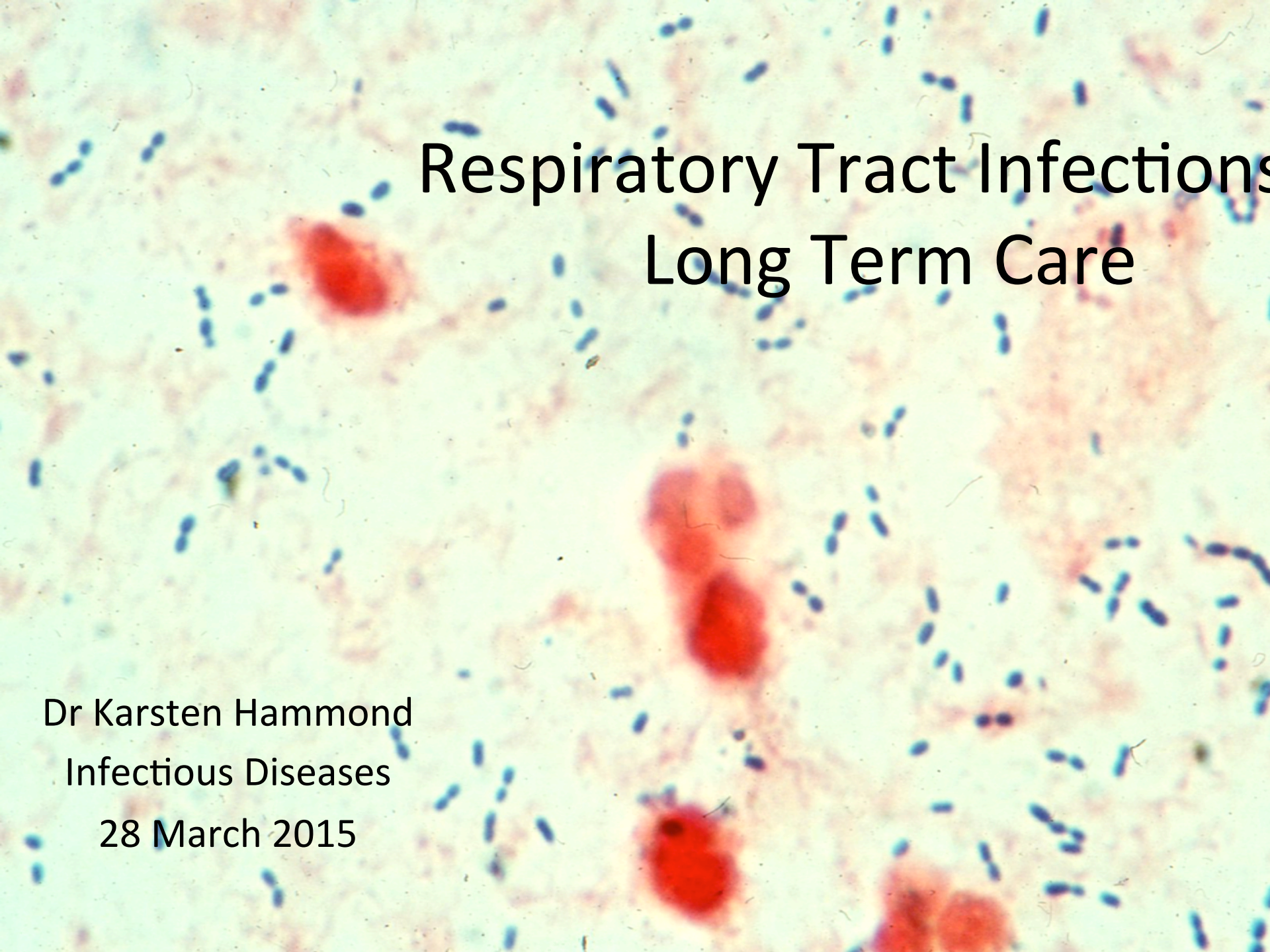

Respiratory Tract Infections
Long Term Care

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Infectious Diseases
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Disclosures

- I have no financial relationships to disclose

82 yo Female

- In LTC for two years, total care from
  - Moderate dementia
  - Immobility and dysphagia following CVAs
    - Thickened fluids, not tube fed
- Over several days noted to be more confused, respiratory rate elevated (25)
  - Area of crepitations on exam
  - No productive cough
  - O2 sats 96

?

- Send to hospital?
- Send for x-ray?
- Most likely pathogen?
- Start antibiotics?
  - Azithromycin?
  - Amoxicillin-clavulanate?
  - Moxifloxacin?
  - Amoxicillin?
- Duration?

Objectives

- For pneumonia in long-term care, review the:
  - Epidemiology and microbiology
  - Presentation and diagnosis
  - Treatment and prevention

Epidemiology of Pneumonia in LTC

- 2004 US survey of LTC facilities
  - 2.2% of patients had diagnosis of pneumonia
    - Second only to UTI at 5.2%
- 8-21% of patients in LTC per year diagnosed with pneumonia
- In a Veterans Affairs study mortality high
  - 23% at 14 days
  - 75% at one year (vs 40% in controls)

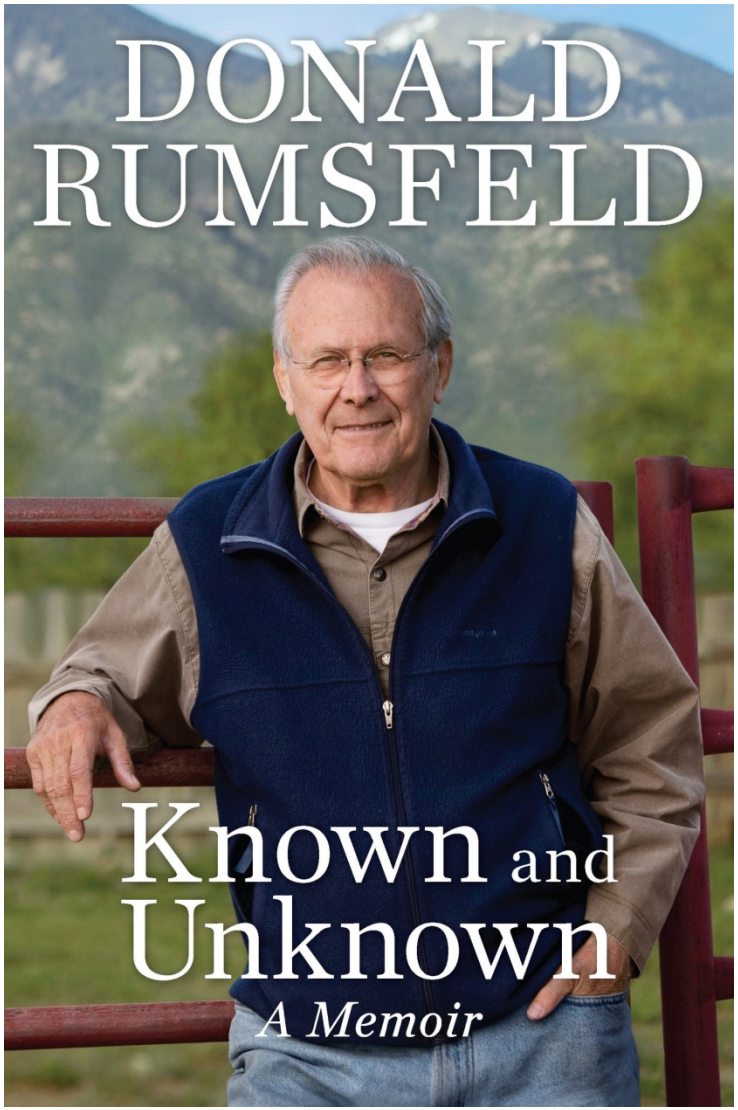
All Pneumonia is From Aspiration

- Viruses and some atypical pathogens are inhaled
- Bacterial pneumonia pathogens initially colonize oropharynx
- Microaspiration delivers these organisms into the lung

Risk Factors for Pneumonia in LTC

- Debilitation
- Swallowing difficulties
- NG feeds
- Confusion and sedation
- Chronic lung disease

What Causes Pneumonia in LTC?



Viruses

- Influenza common, severe
- Other respiratory viruses also common
  - 382 patients had serum drawn twice a year apart
    - For a vitamin E study
  - Serologic response to respiratory viruses
    - 41% had at least one viral infection
    - Most common was metapneumovirus
- Viruses other than influenza also cause outbreaks (RSV, metapneumovirus)

Clues to a Diagnosis of a Viral Infection

- Rhinitis/rhinorrhea
- Conjunctivitis
- Wheeze
- Lack of sputum production
  - Although often absent in bacterial pneumonia
- Note that with some viruses (influenza, parainfluenza) significant consolidation can occur

Atypicals

- *Chlamydophila pneumoniae*
  - Can occur, severity is low
- *Legionella pneumophila*
  - Outbreaks can occur in LTC
    - Spread by HVAC systems
  - Illness typically very severe
  - Very little legionella in BC
- *Mycoplasma pneumoniae*
  - Not a significant concern in LTC settings

TUBERCULOSIS

THE FOE OF YOUTH

TB in LTC

- Many patients in LTC at higher risk for TB
  - Reactivation increased due to age, coomorbidities
  - More likely to have latent TB as many grew up in pre-treatment era
- LTC patients should be screened before entering LTC
  - Not sure what BC guidelines are
  - Screening can still miss cases

Bacteria

- Elderly patients in the community
  - *S. pneumoniae* the significant pathogen
- In LTC, poorly studied
  - Hard to get sputum cultures from weak patients
  - Diagnostics not as available as in acute care
  - Little focus on this population

Spanish Series on Pneumonia in LTC

- Looked at 150 consecutive patients admitted from LTC to hospital for pneumonia
  - Only identified a cause in 57 cases (38%)
- *S. pneumoniae* most common
  - 22% of all cases, 57% of cases with micro diagnosis
- Gram negatives and *Staphylococcus aureus*
  - 7% of all cases, 18% of cases with micro diagnosis

Aspiration Pathogens

- Aspiration pneumonia after macro-aspiration
- Normal oral flora (majority)
  - *Streptococcus virdans* group
  - Anaerobes
- Coliforms (possible)
  - Major pathogen if gastric contents aspirated
  - Colonize the oropharynx of unwell patients
    - Same process as in hospital acquired pneumonia

Causes of Pneumonia in LTC: Summary

- Viral pneumonia is common
- Bacterial causes unclear but
  - *S. pneumoniae* most common
  - Gram negatives and *S. aureus* more common than in community but still uncommon
  - Atypicals not a significant problem (in BC)
- Aspiration pneumonia involves oral streptococci, anaerobes and possibly coliforms

Aspiration Pneumonia

Aspiration – 3 Clinical Conditions

- Aspiration pneumonitis
  - Chemical pneumonitis secondary to gastric acid
  - Rapid onset (hours), does not need antibiotics
- Aspiration with obstruction
  - Secondary to mechanical obstruction with food
- Aspiration pneumonia
  - Oropharyngeal flora or gastrointestinal flora

Aspiration Pneumonia Presentation

- Often indolent
- Foul smelling sputum
- Usually no significant aspiration event
  - Microaspiration
- Forms lung abscesses if not caught early

Presentation of Pneumonia in LTC

- Compared to non-LTC patients, less likely to:
  - Have fever
  - Have productive cough
  - Have pleuritic pain
- More likely to:
  - Have confusion
  - Have dehydration
  - Have a decrease in function

Diagnosis

- Difficult given resources in LTC
- Clinical signs
  - Tachypnea
  - Fever, low O2 sats, dehydration and confusion
- Exam
  - Area of consolidation
- Investigations
  - Leukocytosis and abnormal CXR
  - Sputum culture if possible
  - Blood culture not helpful

Treatment – When to Transfer

- Subjective
- If care directive allows transfer:
  - O2 sats <90
  - Unable to take po medications
  - RR elevated and fatiguing
  - Severe dehydration

Treatment

- Won't cover IV treatments
- Choosing oral antibiotics depends on
  - Likely pathogens
  - Co-morbidities and other medications
  - Allergies
- Treatment guidelines are not evidence based for pneumonia in LTC


IGNORANCE DOESN'T SOLVE ANYTHING
2011 Protest
INFECTIOUS DEATH SENTENCE ASSOCIATION

IDSA HAP/HCAP/VAP Guidelines

- HAP - hospital acquired pneumonia
- VAP - ventilator acquired pneumonia
- HCAP – Health-Care Associated Pneumonia
  - In hospital in prior 90 days
  - In nursing home
  - On dialysis
  - Recent IV antibiotics or chemotherapy

IDSA Guidelines

- Guidelines lump HAP, VAP and HCAP together
- Suggest broad spectrum IV antibiotics
- No specific suggestions for LTC
- No suggestions for initial oral therapy

VIHA Guidelines

- VIHA has guidelines for community acquired pneumonia
  - Includes specific suggestions for LTC
- First line in community – amoxicillin alone
- First line in LTC
  - Amoxicillin-clavulanate 500 tid or 875 bid
- If there is a penicillin allergy
  - Cefuroxime 500 bid or moxifloxacin 400 daily

Principles

- Atypical therapy (usually) not needed
- Adding second drug may help in *S. pneumo*
  - Not clear, so not suggested at this time
- Use amoxicillin-clavulanate for increased gram negative and MSSA coverage
  - Also excellent anaerobic coverage for aspiration

Allergies to Penicillin

- If mild reaction
  - ie, not anaphylaxis, angioedema (maybe hives)
  - Cefuroxime 500 bid
    - Poor anaerobic coverage, add metronidazole if needed
- If severe reaction
  - Moxifloxacin 400 daily
    - Good anaerobic coverage

Adverse Effects

- Amoxicillin-clavulanate
  - Nausea, diarrhea quite common
- Moxifloxacin
  - Diarrhea common, can induce *C. difficile* colitis
  - QT prolongation, watch with other drugs
- Cefuroxime
  - Diarrhea (less common)

What About Macrolides?

- Resistance
  - In VIHA, ~25% of *S. pneumoniae*
- Coverage
  - Does not cover anaerobes in aspiration
- Drug interactions
  - Common and can be severe


Azi market share is yours for the taking!
ONCE-DAILY
BIAXIN XL
CLARITHROMYCIN EXTENDED-RELEASE TABLETS

Antibiotic Selection Summary - 1

- First line for all pneumonia in LTC
  - Amoxicillin-clavulanate
- If mild penicillin allergy
  - Cefuroxime
  - Add metronidazole for aspiration
- If severe penicillin allergy
  - Moxifloxacin

Antibiotic Selection Summary - 2

- Don’t need to cover atypicals
- Moxifloxacin is not first line
- Don’t use macrolides

Duration

- Trend in treatment of *S. pneumoniae* CAP is towards shorter courses
  - Maximum 7 days if uncomplicated
  - Need to lengthen if complicated, *S. aureus*
- Not studied in LTC patients, but a 7 day course is reasonable for most
- Aspiration pneumonia often forms lung abscesses
  - If present, need weeks of therapy

Prevention of Pneumonia in LTC

- Conservative measures to reduce aspiration
  - Because all pneumonia is from aspiration
  - Thickened fluids
  - Eating while upright
- Oral care
  - Poor dentition risk for aspiration, even if tube fed
  - Wearing dentures overnight doubles risk
    - In the community elderly

Prevention – Pneumococcal Vaccine

- Two vaccines
  - 13 valent conjugate vaccine
    - Conjugate makes it more immunogenic
      - Reduces pharyngeal colonization
  - 23 valent polysaccharide vaccine
    - Does not decrease colonization
- US guidelines say to use conjugate then polysaccharide in >65
- Canada does not suggest conjugate for elderly
- Give one dose to >65, repeat once at 5 years

Efficacy of Pneumococcal Vaccine

- Efficacy
  - Reduction in incidence in a study population
- Effectiveness
  - Reduction in incidence on a population level
- 2013 Cochrane review efficacy:
  - Invasive pneumococcal disease – 74%
  - All cause pneumonia – 28%

Efficacy in LTC

- 2010 Japanese RCT of 1000 LTC patients
  - Mean age 85
- 23 valent vaccine used
- Significant protection over two years
  - 64% reduction in pneumococcal pneumonia
  - 45% reduction in all cause pneumonia
  - 35% reduction in death from pneumococcal pneumonia

Summary

- Pneumonia in LTC is common and has a high mortality
- Caused by both viruses and bacteria
  - *S. pneumoniae* the most common
  - Atypicals rare
  - Consider TB
- Diagnosis in LTC mainly clinical
  - Tachypnea key symptom

Summary

- First line antibiotic is amoxicillin-clavulanate
- In mild penicillin allergy, use cefuroxime
- In severe allergy, use moxifloxacin
- 7 days long enough for most cases
  - Much longer if abscesses present
- Pneumococcal vaccine effective in LTC
- Conservative measures reduce aspiration