UWTASP
tele-antimicrobial stewardship program

January 12, 2020

Agenda

- Didactic: [Re]*CAP*
  Encore from Joanne Huang
- COVID-19 vaccines & other questions

CAP Guidelines (2019)

Guidelines last updated: 2007

<u>Will not cover:</u>

- Immunocompromised patients
  - Refer to 2019 Pneumonia in Solid Organ Transplantation: Guidelines from ATS Infectious Diseases
- Patients with history of foreign travel

<u>Refer to:</u>

- HAP/VAP guidelines 2016

Am J Respir Crit Care Med Vol 200, Iss 7 pe45-e67, Oct 1 2019.

CAP treatments - Inpatient

Inpatient CAP

Non-Severe

Beta-lactam with a macrolide

Fluoroquinolone

Severe

Beta-lactam with a macrolide

Beta-lactam with a fluoroquinolone

Severe PNA

Minor criteria: 3+

- RR≥30
- PaO2/FiO2≤250
- Multilobar infiltrates
- Confusion
- BUN≥20
- WBC<4000
- PLT<100,000
- T<36C
- Hypotension requiring fluids

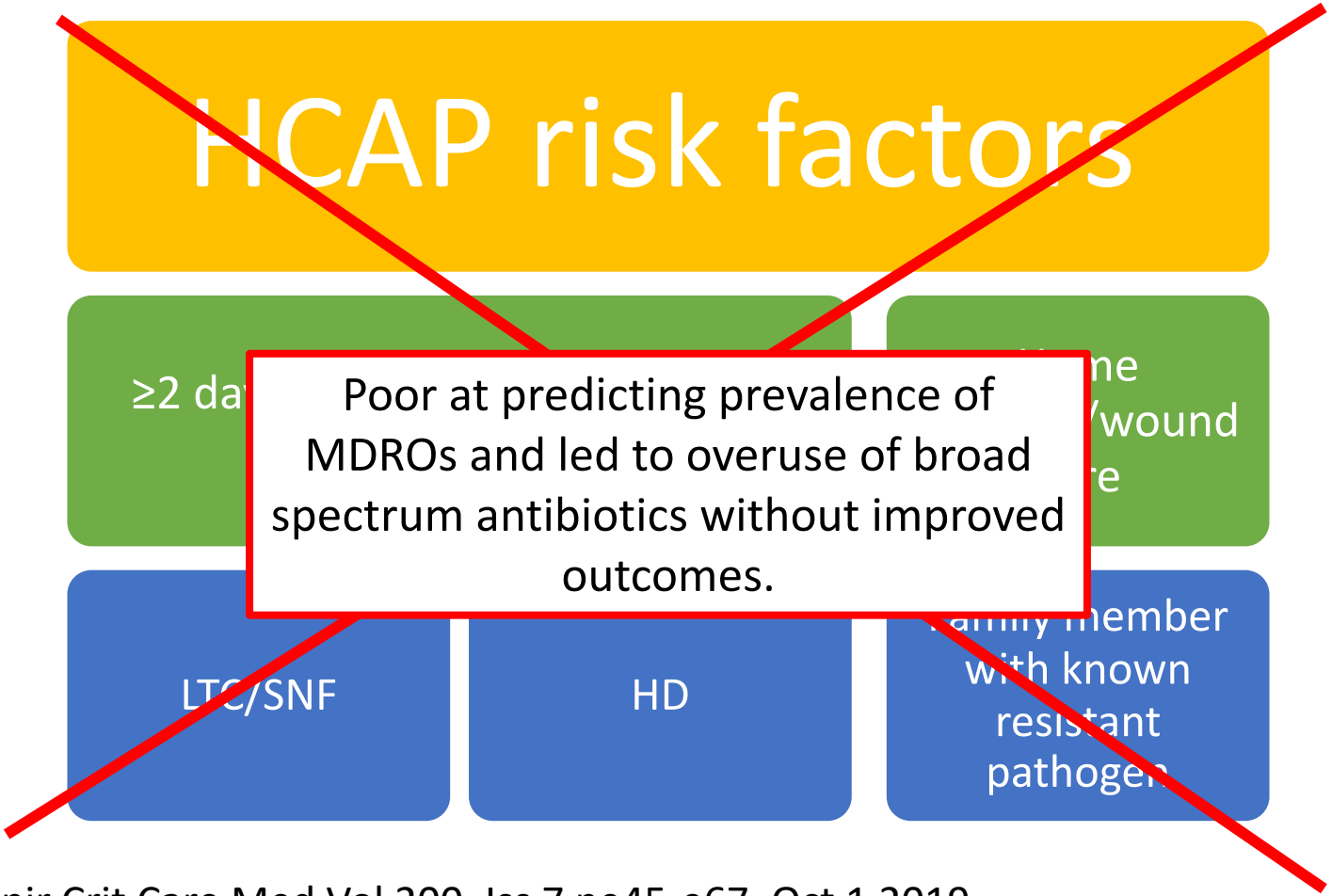
OR

Major criteria: 1+

- Vasopressors
- Mechanical ventilation

May broaden to add coverage in patients w/ prior respiratory isolation or recent hospitalization AND IV abx in last 90 days

So long, HCAP



Am J Respir Crit Care Med Vol 200, Iss 7 pe45-e67, Oct 1 2019.

What's the status of HCAP at your Institution?

- HCAP has been cancelled – order set AND practice
- Still on order sets and/or in practice
- Removed from order sets and/or local guidelines
- Not sure

Innovating

CAP treatments - Inpatient

Inpatient CAP

Non-Severe

Beta-lactam with a macrolide

IV dose x1 then PO

500mg x1
T ½ = 70 hours

Severe

Beta-lactam with a macrolide

Beta-lactam with a fluoroquinolone

Does anyone do this??

*Empirically cover MRSA or *P. aeruginosa*

Am J Respir Crit Care Med Vol 200, Iss 7 pe45-e67, Oct 1 2019.

CAP pathogens: do we really know?

Streptococcus pneumoniae
Haemophilus influenzae
Moraxella catarrhalis
Staphylococcus aureus

Streptococcus pneumoniae
Viruses

ORIGINAL ARTICLE

Community-Acquired Pneumonia Requiring Hospitalization among U.S. Adults

Seema Jain, M.D., Wesley H. Self, M.D., M.P.H., Richard G. Wunderink, M.D., Sherene Fakhran, M.D., M.P.H., Robert Balk, M.D., Anna M. Bramley, M.P.H., Carrie Reed, Ph.D., Carlos G. Grijalva, M.D., M.P.H., Evan J. Anderson, M.D., D. Mark Courtney, M.D., James D. Chappell, M.D., Ph.D., Chao Qi, Ph.D., et al., for the CDC EPIC Study Team*

60% with no pathogen detected in sputum

Jain S, et al. N Engl J Med. 2015;373(5):415-427.

In Outpatient and Inpatient Adults with CAP who are Improving, What is the Appropriate Duration of Treatment?

- 5 days
- 7 days
- 10 days
- 14 days

In Outpatient and Inpatient Adults with CAP who are Improving, What is the Appropriate Duration of Treatment?

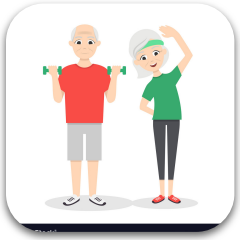
Recommendation: We recommend that the duration of antibiotic therapy should be guided by a validated measure of clinical stability (resolution of vital sign abnormalities [heart rate, respiratory rate, blood pressure, oxygen saturation, and temperature], ability to eat, and normal mentation), and antibiotic therapy should be continued until patient achieves stability and for no less than a total of 5 days (**strong recommendation, moderate quality of evidence**)

Am J Respir Crit Care Med Vol 200, Iss 7 pe45-e67, Oct 1 2019.

CAP treatments – Outpatient

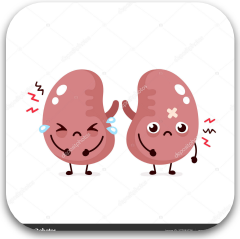
Outpatient CAP

Healthy



- Amoxicillin (high dose)
- Doxycycline
- Macrolide if resistance<25%

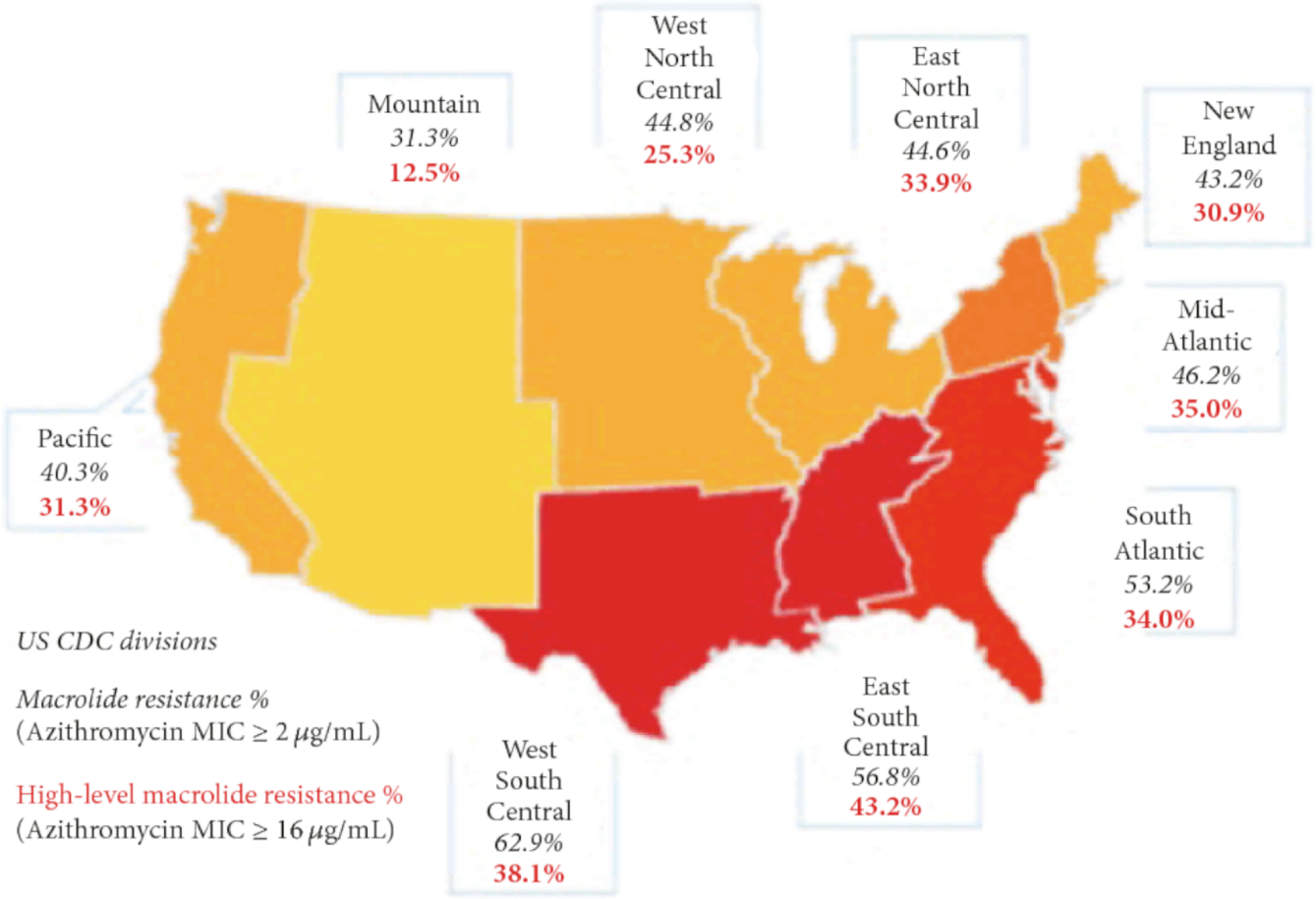
Comorbidities



- Amoxicillin/clavulanate
- Cephalosporin with a macrolide or doxycycline
- Fluoroquinolone

Comorbidities: chronic heart, lung, liver, or renal disease; diabetes, alcoholism, malignancy, asplenia

Macrolide resistance for *S. pneumoniae* 2014

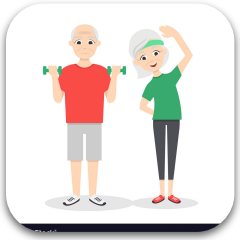


Blondeau JM, et al. J Infect Dis Ther. 2017;5:313.

CAP treatments – Outpatient

Outpatient CAP

Healthy



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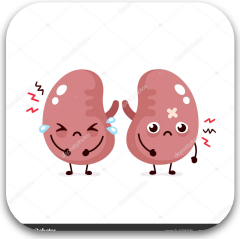
Comorbidities

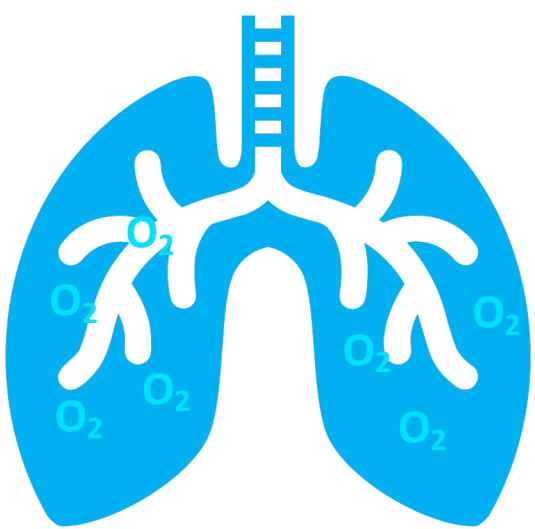


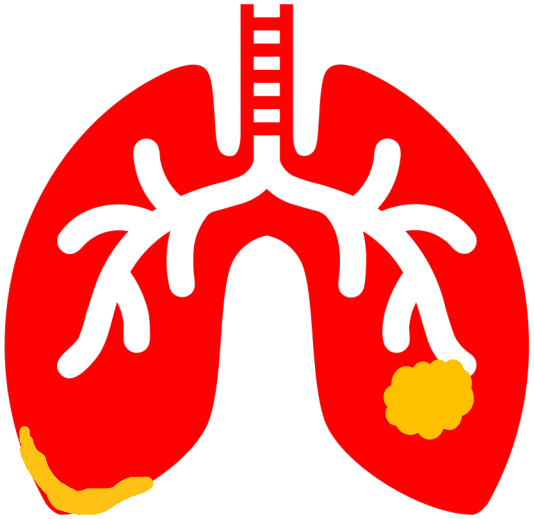
- Amoxicillin/clavulanate
- Cephalosporin with a macrolide or doxycycline
- Fluoroquinolone – if allergy to penicillins and cephalosporins

Comorbidities: chronic heart, lung, liver, or renal disease; diabetes, alcoholism, malignancy, asplenia

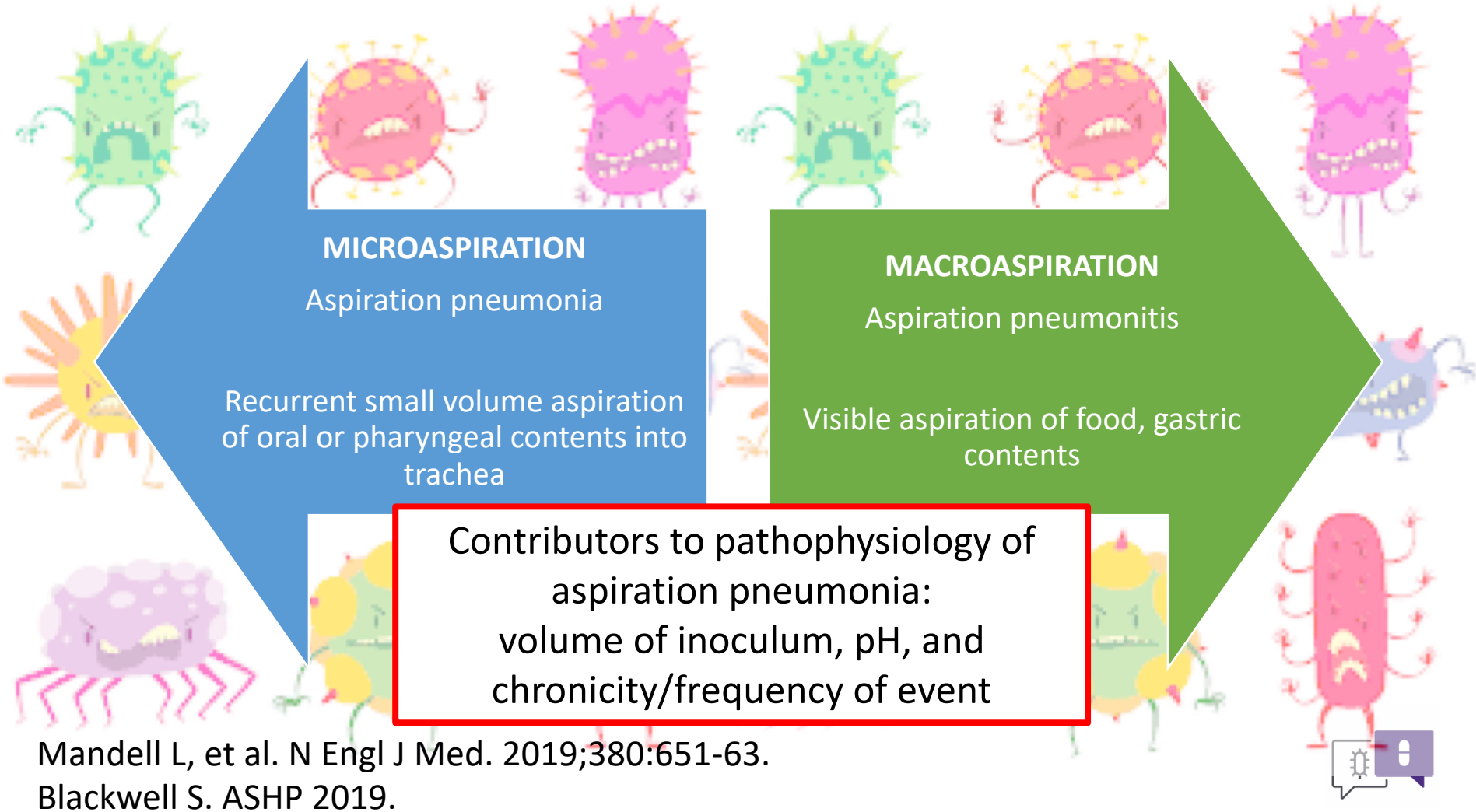
Aspiration pneumonia

Adding anaerobic coverage is NOT recommended unless lung abscess or empyema is suspected





Micro vs Macroaspiration



Contributors to pathophysiology of aspiration pneumonia:
volume of inoculum, pH, and chronicity/frequency of event

Mandell L, et al. N Engl J Med. 2019;380:651-63.
Blackwell S. ASHP 2019.

Pneumonitis does not improve with antibiotics

Clinical Infectious Diseases

MAJOR ARTICLE

Prophylactic Antimicrobial Therapy for Acute Aspiration Pneumonitis

Vlad Dragan,[1] Yanliang Wei,[1] Marion Elligsen,[2] Alex Kiss,[3] Sandra A. N. Walker,[2,4] and Jerome A. Leis[1,3,5,6]

[1]Department of Medicine, University of Toronto, [2]Department of Pharmacy, Sunnybrook Health Sciences Centre, [3]Sunnybrook Research Institute and Institute of Health Policy, Management and Evaluation, [4]Leslie Dan Faculty of Pharmacy, University of Toronto, [5]Division of Infectious Diseases and General Internal Medicine, Sunnybrook Health Sciences Centre, and [6]Centre for Quality Improvement and Patient Safety, University of Toronto, Ontario, Canada

Prophylactic antibiotics DO NOT:

- ✓ Decrease 30-day mortality
- ✓ Decrease ICU transfers

Prophylactic antibiotics MAY:

- ✓ Generate selective antibiotic pressure
- ✓ Lead to abx escalation

Dragan V, et al. CID. 2018;67(4):513-8.

Pneumonitis ≠ Pneumonia

- Aspiration of gastric contents – aspiration pneumonitis
  - Supportive care only
  - Symptom resolution 24-48h
- Can suspect secondary pneumonia if symptoms persist >48h after macro-aspiration
- Do not need additional anaerobic coverage – most pulmonary infections do not involve anaerobes
- (Most CAP antibiotics cover PO anaerobes already)

De-escalation

De-escalation of antibiotic therapy at 48 hours is appropriate if microbiological results do not yield MRSA or *P. aeruginosa*

- MRSA nasal swabs
  - High specificity and sensitivity
  - High negative predictive value
  - Lower sensitivity and positive predictive value, especially for more severe pneumonia

PNA	Sensitivity	Specificity	PPV	NPV
CAP	85%	92%	57%	98%
VAP	40%	94%	36%	95%

Parente D, et al. CID. 2018;67(1):1-7.

Setting expectations

- 1 week: resolution of fever
- 4 weeks: reduced chest pain and sputum production
- 8 weeks: reduced cough and breathlessness
- 3 months: fatigue may still be present, however most other symptoms should be resolved
- 6 months: should feel back to normal

NICE 2019 CAP Guidelines

CAP Takeaways

- Treatment
    - Antimicrobial stewardship opportunities, PO, Single dose macrolide
- Sputum cultures are generally unhelpful unless resistant pathogens including MRSA suspected
- No more HCAP
- No more broad anaerobic coverage
- 5 days is adequate for *most* CAP
- Clearance of infection may precede improvement in symptoms
- No more HCAP