Antibiotic Stewardship 2019

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Objectives

- What the Joint Commission and CMS have been up to
- Remind you of a few things
- Address some new data and a recurrent question from last year
- Stewardship doesn’t always = cheap
- A little influenza stewardship

“We know all we need to know about antibiotics except for how much to give and how long to give them”

Lou Rice, M.D. - ICAAC 2007

Joint Commission

Requirement

Official Publication of Joint Commission Requirements

New Antimicrobial Stewardship Standard

Applicable to Hospitals and Critical Access Hospitals

Effective January 1, 2017

- "Assessment of Appropriateness of Antibiotics for…"
  - CAP
  - Skin & soft tissue infections
  - Urinary tract infections
  - Care of patients with *C. difficile*
  - "Guidelines for Antimicrobial Use in Adults & Pediatrics"

https://www.jointcommission.org/assets/1/6/New_Antimicrobial_Stewardship_Standard.pdf

June 20, 2019 05:01 PM

Joint Commission unveils antibiotic stewardship programs for outpatient settings

MARIA CASTELLUCCI

https://www.jointcommission.org/assets/1/18/R3_23_Antimicrobial_Stewardship_AMB_6_14_19_FINAL.pdf

The Five Requirements in the Outpatient Mandate

- Picking an individual responsible for developing and monitoring appropriate prescribing practices.
- Creating at least one goal each year related to antimicrobial stewardship.
- Using evidence-based guidelines to complete the goal.
- Educating staff and licensed independent practitioners on the organization's goal and appropriate prescribing practices.
- Collecting and analyzing data related to antimicrobial stewardship.

https://www.jointcommission.org/assets/1/18/R3_23_Antimicrobial_Stewardship_AMB_6_14_19_FINAL.pdf

Appropriateness of outpatient antibiotic prescribing among privately insured US patients: ICD-10-CM based cross sectional study

Kao-Ping Chua,[1] Michael A Fischer,[2] Jeffrey A Linder[3]

- 19,203,264 privately insured U.S. kids & adults
- 15,455,834 outpatient antibiotic Rxs
- Among all antibiotic prescriptions filled:
  - 23.2% were inappropriate
  - 35.5% were potentially appropriate
  - 28.5% not associated with a recent diagnosis code

BMJ 2019;364:k5092

Telemedicine study raises stewardship concerns

Filed Under: **Antimicrobial Stewardship**

Chris Dall | News Reporter | CIDRAP News | Aug 02, 2019

A study of more than 12,000 telemedicine encounters involving children with respiratory ailments has found that antibiotics were prescribed in more than half of the visits, and that patient satisfaction was strongly linked to receiving an antibiotic.

Providers who prescribed antibiotics were more than three times a likely to receive a 5-star rating from patients, researchers from the Cleveland Clinic reported yesterday in *Pediatrics*.

Zinkevych / iStock

Infections for Which Short-Course Therapy Has Been Shown to Be Equivalent in Efficacy to Longer Therapy

Disease	Treatment, Days	
	Short	Long
Community-acquired pneumonia	3-5	7-10
Nosocomial pneumonia	≤8	10-15
Pyelonephritis	5-7	10-14
Intraabdominal infection	4	10
AECB & COPD	≤5	>7
Acute bacterial sinusitis	5	10
Cellulitis	5-6	10
Chronic osteomyelitis	42	84

Spellberg B, *JAMA Intern Med* 2016;176:1254-5

Infectious Diseases Society of America/American Thoracic Society Consensus Guidelines on the Management of Community-Acquired Pneumonia in Adults

Lionel A. Mandell,[1,a] Richard G. Wunderink,[2,a] Antonio Anzueto,[3,4] John G. Bartlett,[7] G. Douglas Campbell,[8] Nathan C. Dean,[9,10] Scott F. Dowell,[11] Thomas M. File, Jr.[12,13] Daniel M. Musher,[5,6] Michael S. Niederman,[14,15] Antonio Torres,[16] and Cynthia G. Whitney[11]

Duration of antibiotic therapy.

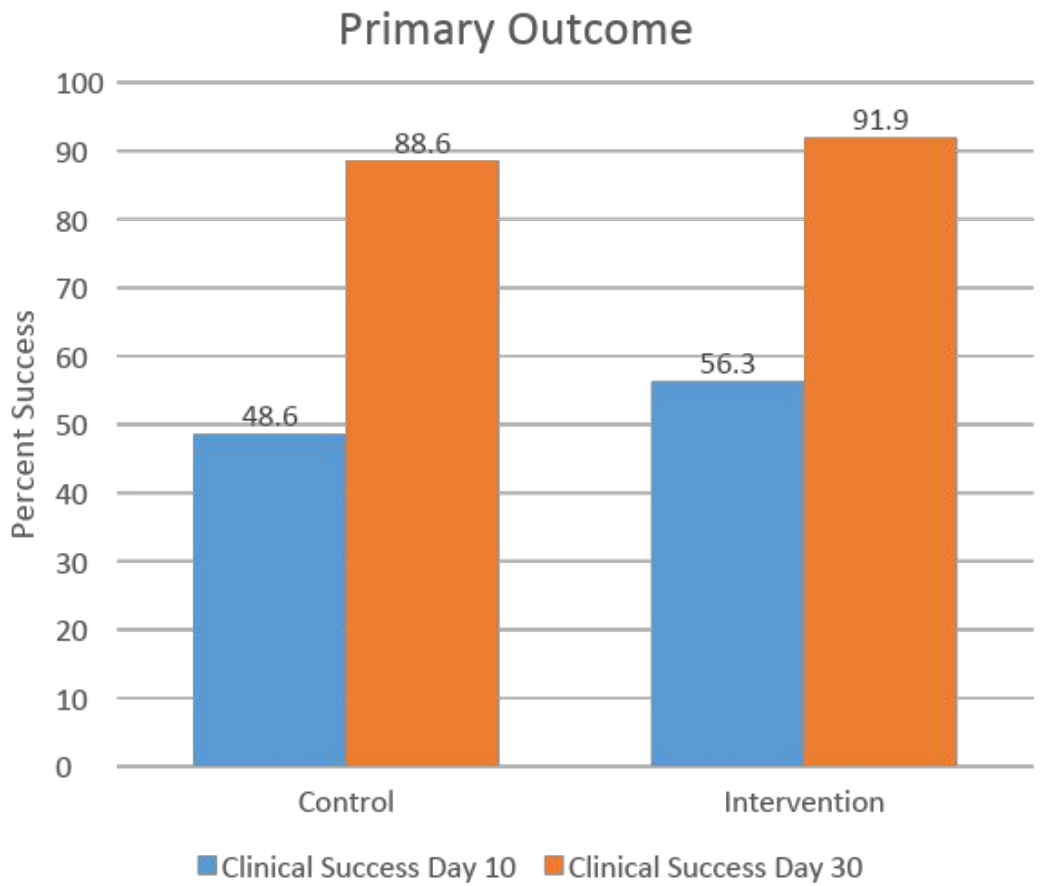
32. Patients with CAP should be treated for a minimum of 5 days (level I evidence), should be afebrile for 48–72 h, and should have no more than 1 CAP-associated sign of clinical instability (table 10) before discontinuation of therapy (level II evidence). (Moderate recommendation.)

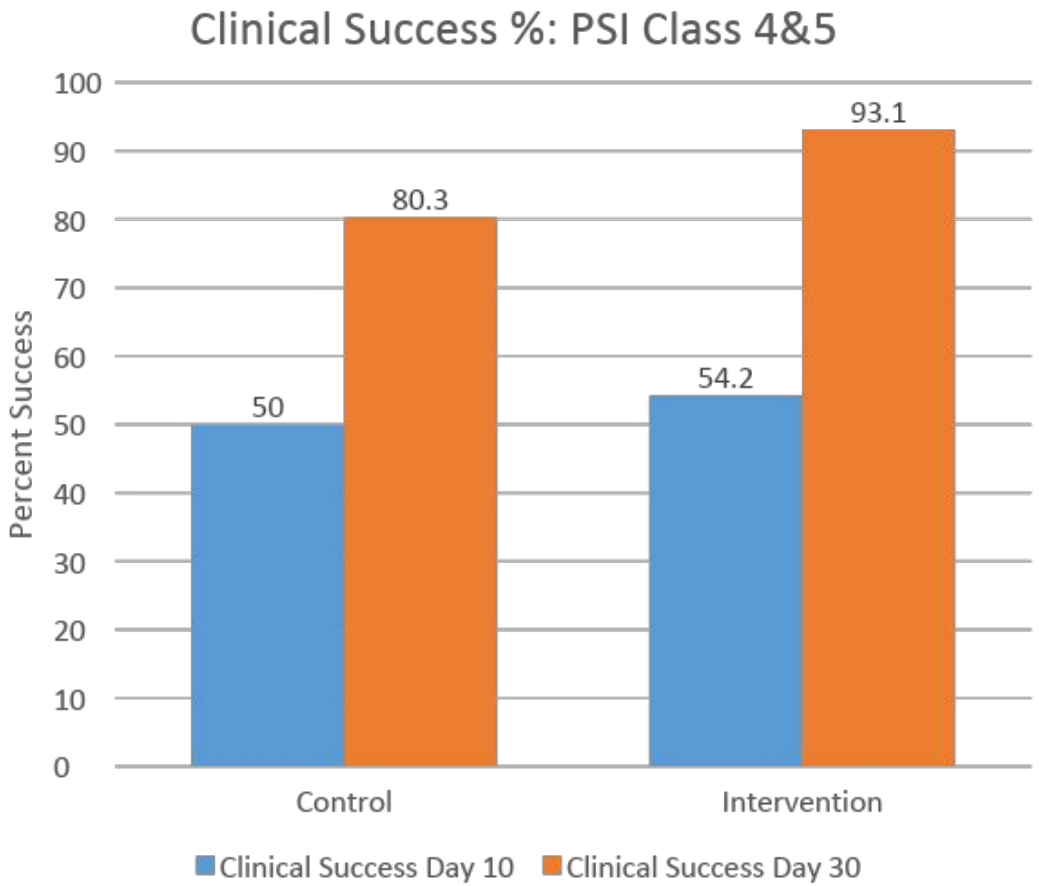
33. A longer duration of therapy may be needed if initial therapy was not active against the identified pathogen or if it was complicated by extrapulmonary infection, such as meningitis or endocarditis. (Weak recommendation; level III evidence.)

Clin Infect Dis 2007;44:s27-72

JAMA Internal Medicine | Original Investigation | LESS IS MORE

Duration of Antibiotic Treatment in Community-Acquired Pneumonia
A Multicenter Randomized Clinical Trial





JAMA Internal Medicine 2016;176:1257-65

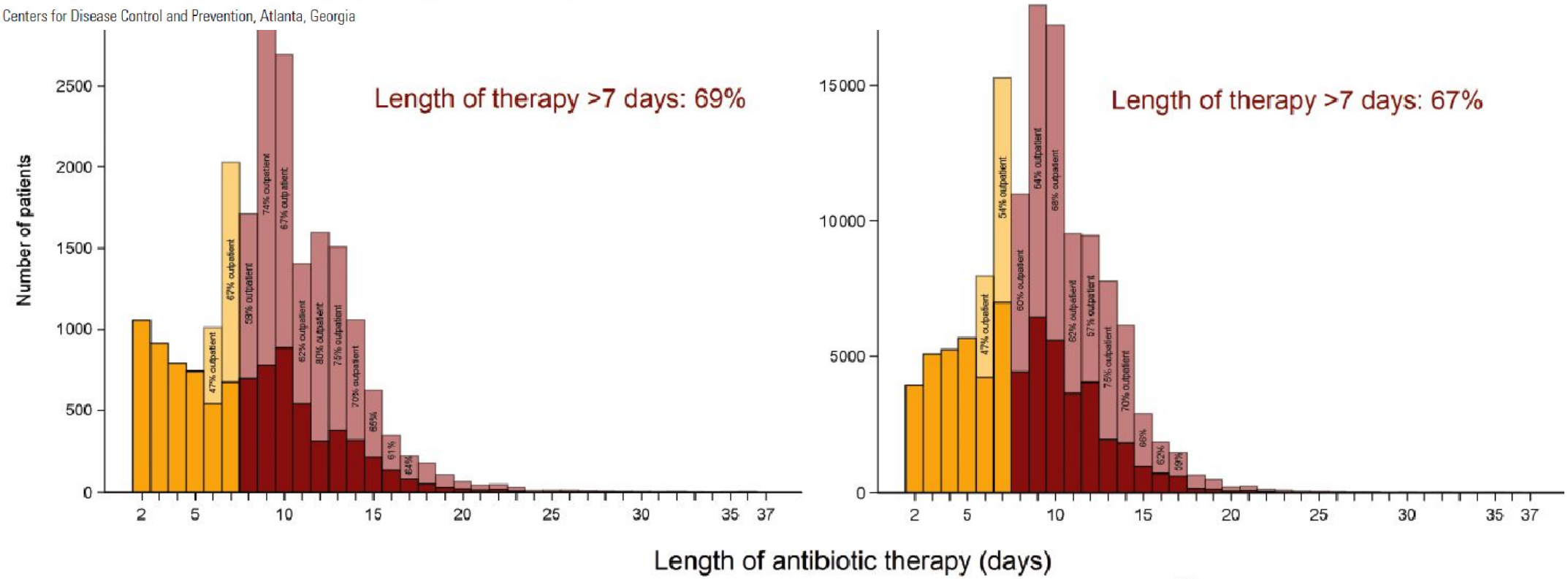
Clinical Infectious Diseases

MAJOR ARTICLE

Duration of Antibiotic Use Among Adults With Uncomplicated Community-Acquired Pneumonia Requiring Hospitalization in the United States

Sarah H. Yi, Kelly M. Hatfield, James Baggs, Lauri A. Hicks, Arjun Srinivasan, Sujan Reddy, and John A. Jernigan

Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia



CID 2018;66:1333

Annals of Internal Medicine ORIGINAL RESEARCH

Excess Antibiotic Treatment Duration and Adverse Events in Patients Hospitalized With Pneumonia

A Multihospital Cohort Study

Valerie M. Vaughn, MD, MSc; Scott A. Flanders, MD; Ashley Snyder, MS; Anna Conlon, PhD; Mary A.M. Rogers, PhD, MS; Anurag N. Malani, MD; Elizabeth McLaughlin, MS, RN; Sarah Bloemers, MPH; Arjun Srinivasan, MD; Jerod Nagel, PharmD, BCPS; Scott Kaatz, DO; Danielle Osterholzer, MD; Rama Thyagarajan, MD; Lama Hsaiky, PharmD, BCPS; Vineet Chopra, MD, MSc; and Tejal N. Gandhi, MD

- 67.8% (4391/6481) received excess ABX
- Antibiotics prescribed at discharge = 93.2% of excess duration
- Excess therapy not associated with ANY BENEFIT
- Each excess day = 5% risk in ABX ADRs reported by patient
- Don’t reset the clock!

Ann Intern Med. doi:10.7326/M18-3640- Epub AOP 7/9/2019

Annals of Internal Medicine

EDITORIAL

Duration of Antibiotic Therapy: Shorter Is Better

- More than 45 recent RCTs Short vs Long Therapy
- Short always as good
- First day is the most important
- For CAP 3-5 days for most patients
- Anything above that does nothing but increase adverse events

Spellberg B, Rice LB. *Ann Intern Med.* doi:10.7326/M19-1509

Clinical Infectious Diseases

IDSA GUIDELINE

Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia: 2016 Clinical Practice Guidelines by the Infectious Diseases Society of America and the American Thoracic Society

XXI. Should Patients With VAP Receive 7 Days or 8–15 Days of Antibiotic Therapy?

Recommendation

1. For patients with VAP we recommend a 7-day course of antimicrobial therapy rather than a longer duration *(strong recommendation, moderate-quality evidence)*.

Remarks: There exist situations in which a shorter or longer duration of antibiotics may be indicated, depending upon the rate of improvement of clinical, radiologic, and laboratory parameters.

XXII. What Is the Optimal Duration of Antibiotic Therapy for HAP (Non-VAP)?

Recommendation

1. For patients with HAP we recommend a 7-day course of antimicrobial therapy *(strong recommendation, very low-quality evidence)*.

Remarks: There exist situations in which a shorter or longer duration of antibiotics may be indicated, depending upon the rate of improvement of clinical, radiologic, and laboratory parameters.

Kalil AC, et al. *Clin Infect Dis* 2016;63:e61-e111

7 vs 14 Days of Ciprofloxacin (Cip) for Pyelonephritis

	Cip 7 days	Cip 14 days	Difference (90% CI)	Non-Inferiority test P value
Cure	93%	93%	-0.3% (-7.4 to 7.2)	0.015
Clinical failure or recurrent UTI symptoms	7%	7%	-	-

- The take home – quit treating pyelo for 14 days with quinolones!
- Even bacteremic pyelo!
- Questions when using non-quinolone agents

Sandberg T, et al. *Lancet* 2012;380:484-90.

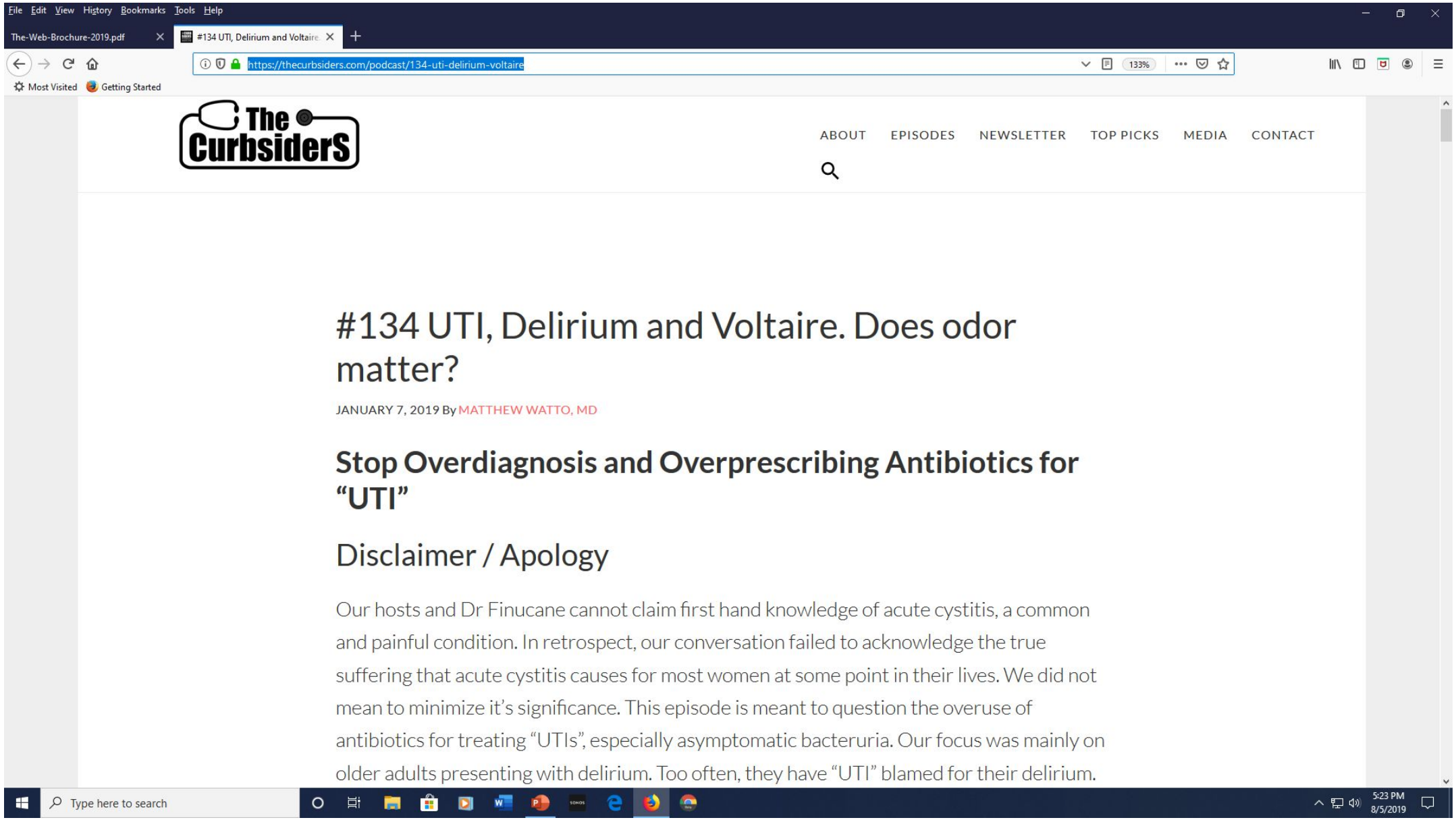
MAJOR ARTICLE

Asymptomatic Bacteriuria Treatment Is Associated With a Higher Prevalence of Antibiotic Resistant Strains in Women With Urinary Tract Infections

Tommaso Cai,[1] Gabriella Nesi,[5] Sandra Mazzoli,[7] Francesca Meacci,[7] Paolo Lanzafame,[2] Patrizio Caciagli,[3] Liliana Mereu,[4] Saverio Tateo,[4] Gianni Malossini,[1] Cesare Selli,[8] and Riccardo Bartoletti[6]

- 550 patients
- 257 not treated, 293 treated
- Antibiotic treatment associated with higher occurrence of antibiotic-resistant bacteria

Clin Infect Dis 2015;61:1655



- https://thecurbsiders.com/podcast/134-uti-delirium-voltaire

Thoughts About Diabetic Foot Infections (DFI) – Since You Asked Last Year

- Diabetes costs the U.S. $176 billion in 2012
- Desire to reduce risk of poor outcome = overprescribing
- Unnecessarily broad regimens (often combinations)
- Parenteral rather than oral therapy often used
- Commonly continuing therapy longer than necessary
- All this is ineffective and = risks of ADR, increased cost, & resistance
- Failure to recognize importance of offloading & limb revascularization

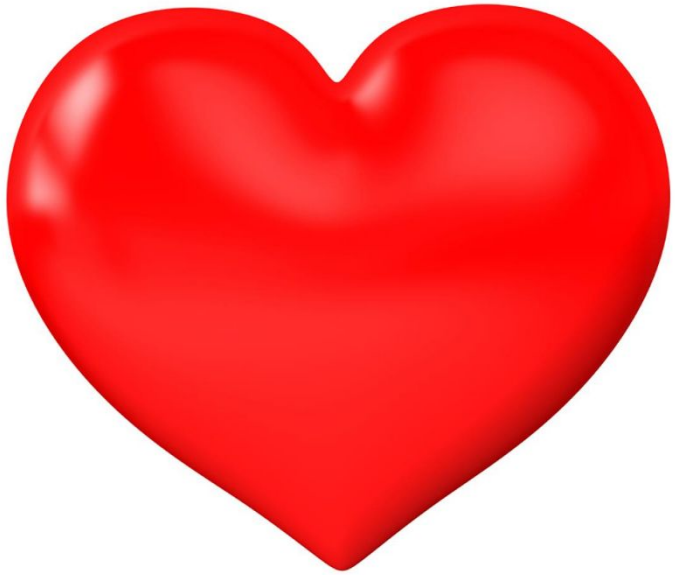
Uckay I, et al. *Curr Opin Infect Dis* 2019;32:95.

The Most Effective Measures Relating to Antibiotic Stewardship in DFI

- Making a correct DFI diagnosis
- Prescribing an antibiotic regimen with the narrowest effective spectrum
- Surgically draining and resecting infected & necrotic material
- Expert guidance suggests 1-2 weeks is sufficient for most
- 4-6 weeks is adequate for osteomyelitis

Uckay I, et al. *Curr Opin Infect Dis* 2019;32:95.

Do you “heart” clindamycin?

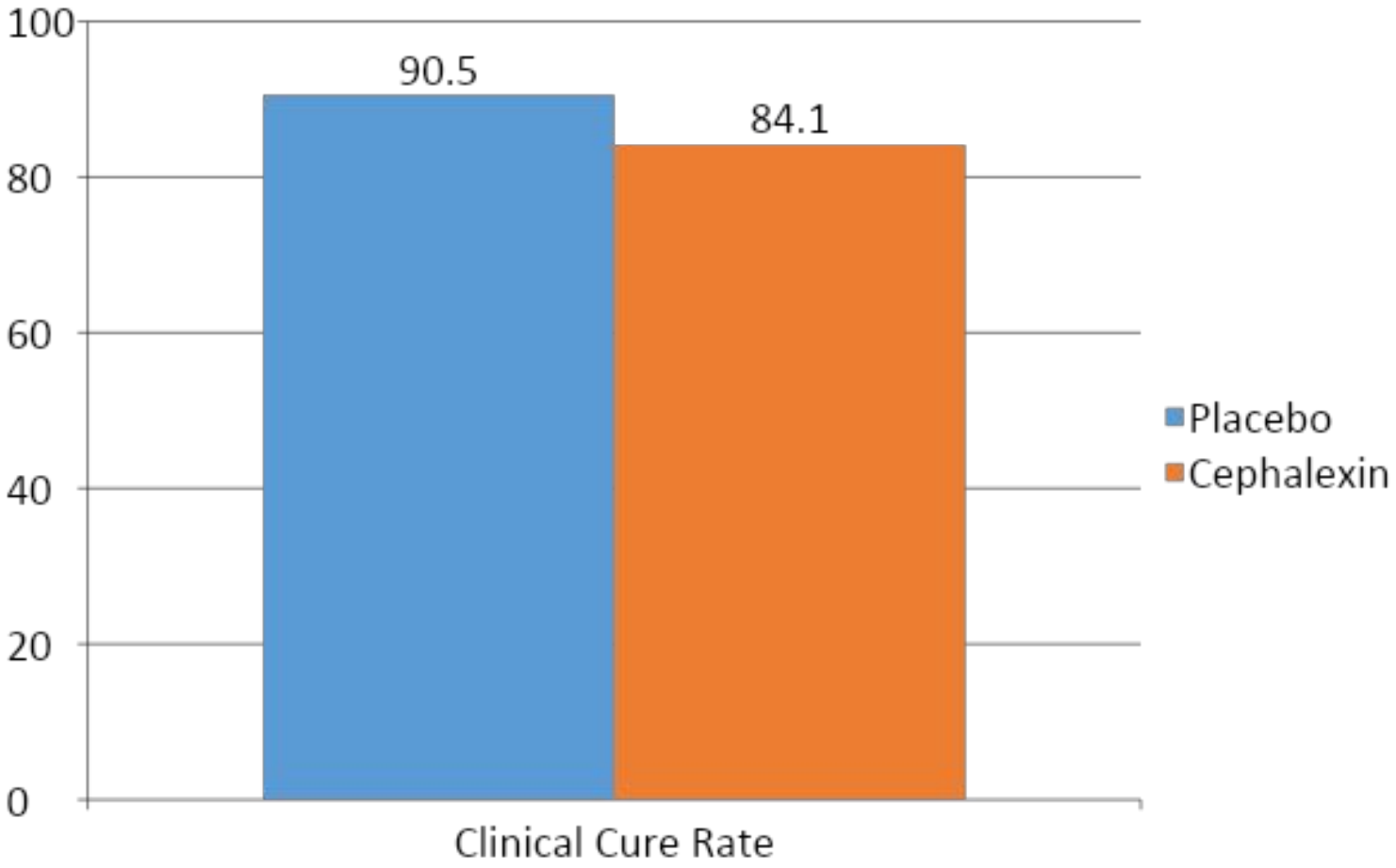


Antibiotic Choice for Outpatient Management of SSSI

	Gram Negative Aerobes						Gram Positive Aerobes						
	Pseudomonas aeruginosa (168)	Enterobacter cloacae (50)	E.coli (1018)	Proteus mirabilis (72)	Klebsiella pneumoniae (148)	Klebsiella oxytoca (49)	Enterococcus faecalis (133)	MRSA (methicillin-resistant S.aureus) (161)	MSSA (methicillin-susceptible S.aureus) (560)	Staphylococcus coagulase-negative (59)	Staphylococcus lugdunesis (48)	Streptococcus pneumoniae (non-meningitis) (35)	Streptococcus pneumoniae (meningitis) (35)
Ampicillin	-	-	62	86	-	-	99	-	-	-	-	-	-
Amoxicillin/clavulanate	-	-	87	96	92	84	-	-	-	-	-	-	-
Cefazolin	-	-	93	96	95	28	-	-	100	64	92	-	-
Cefepime	93	92	99	99	97	100	-	-	-	-	-	-	-
Ceftriaxone	-	84	97	99	95	96	-	-	-	-	-	100	96
Ciprofloxacin	88	98	89	96	94	94	84*	-	-	-	-	-	-
Clindamycin	-	-	-	-	-	-	-	65	80	71	85	-	-
Erythromycin	-	-	-	-	-	-	-	-	-	-	-	76	-
Gentamicin	90	100	95	94	95	94	-	-	-	-	-	-	-
Levofloxacin	82	98	89	99	96	94	91*	-	-	-	98	100	-
Meropenem	90	100	100	100	100	100	-	-	-	-	-	-	-
Nitrofurantoin	-	66	97	-	37	96	100	-	-	93	100	-	-
Oxacillin (Nafcillin)	-	-	-	-	-	-	-	-	100	64	92	-	-
Penicillin (intravenous)	-	-	-	-	-	-	-	-	-	-	-	98	84
Piperacillin/tazobactam	90	86	97	100	95	88	-	-	-	-	-	-	-
Tetracycline	-	92	82	-	79	90	24	98	95	85	94	-	-
Tobramycin	96	100	94	96	93	92	-	-	-	-	-	-	-
Trimethoprim/ sulfamethoxazole	-	82	82	90	92	92	-	92	97	58	98	80	-
Vancomycin	-	-	-	-	-	-	100	100	100	100	100	100	-

* Use for urine pathogens only

Do We Need Antibiotics for Purulent SSSI?



Antimicrob Agents Chemother. 2007 Nov;51(11):4044-8.

Clinical Infectious Diseases

MAJOR ARTICLE

Colistin Versus Ceftazidime-Avibactam in the Treatment of Infections Due to Carbapenem-Resistant Enterobacteriaceae

David van Duin,[1] Judith J. Lok,[2] Michelle Earley,[2] Eric Cober,[3] Sandra S. Richter,[4] Federico Perez,[5,6] Robert A. Salata,[6] Robert C. Kalayjian,[7] Richard R. Watkins,[8,9] Yohei Doi,[10] Keith S. Kaye,[11] Vance G. Fowler Jr,[12,13] David L. Paterson,[14] Robert A. Bonomo,[5,6,15,16] and Scott Evans[2]; for the Antibacterial Resistance Leadership Group

- 38 patients ceftaz-avi vs 99 colistin
- Often used in combination
- 30 day after start of treatment mortality
  - Ceftaz-avi: 9%
  - Colistin 32%
  - 95% CI = 9-35%, P=.001

Clin Infect Dis 2018;66:163-71.

Evidence to improve the treatment of infections caused by carbapenem-resistant Gram-negative bacteria

- "The high patient mortality rate (44% at 28 days)… is sobering – considering that infection with bacteria susceptible to colistin was a criterion for inclusion and that colistin dosing was carefully controlled – but is not surprising."
- "…low Charlson and SOFA scores…"
- "…colistin, either as monotherapy or combined with a carbapenem, is not that effective."

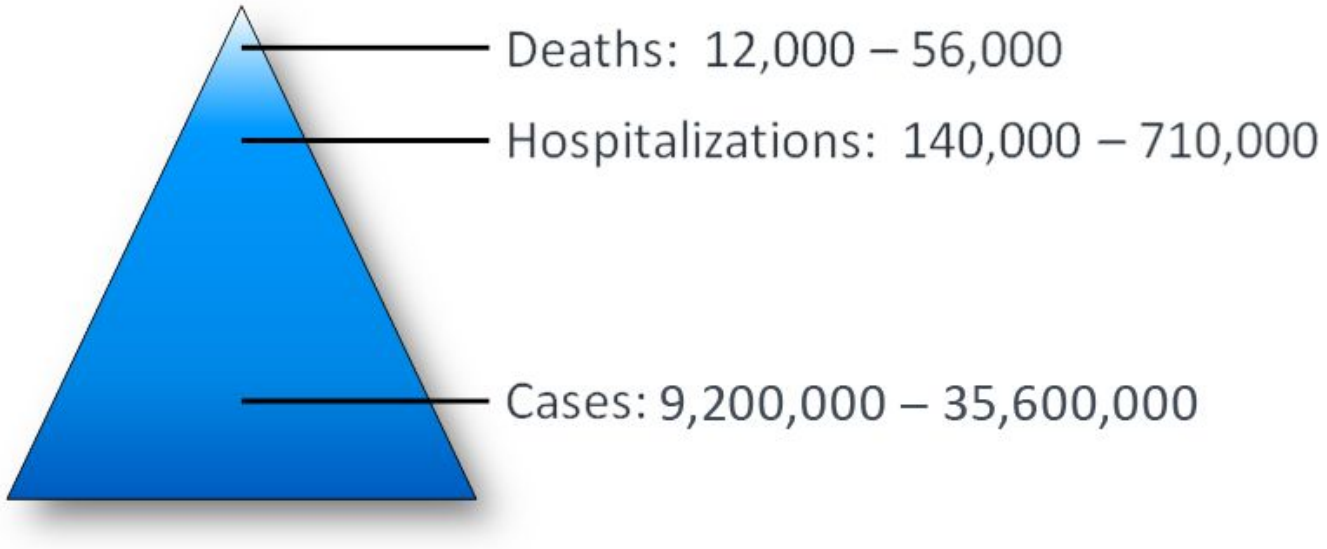
Perez F & Bonomo R. *Lancet Infect Dis* 2018; epub 2/15/18

But Unfortunately…

- February 2018-January 2019.
  - estimate that of carbapenem resistant Enterobacteriaceae (CRE) infections:
  - ~28% (range: 19% to 50%) treated with a parenteral polymyxin
  - ~23% (16% to 42%) new anti-CRE antibiotic
    - ceftazidime-avibactam
    - meropenem-vaborbactam
    - plazomicin)

Clancy et al. Open Forum Infect Dis 2019; epub AOP 7/28/19

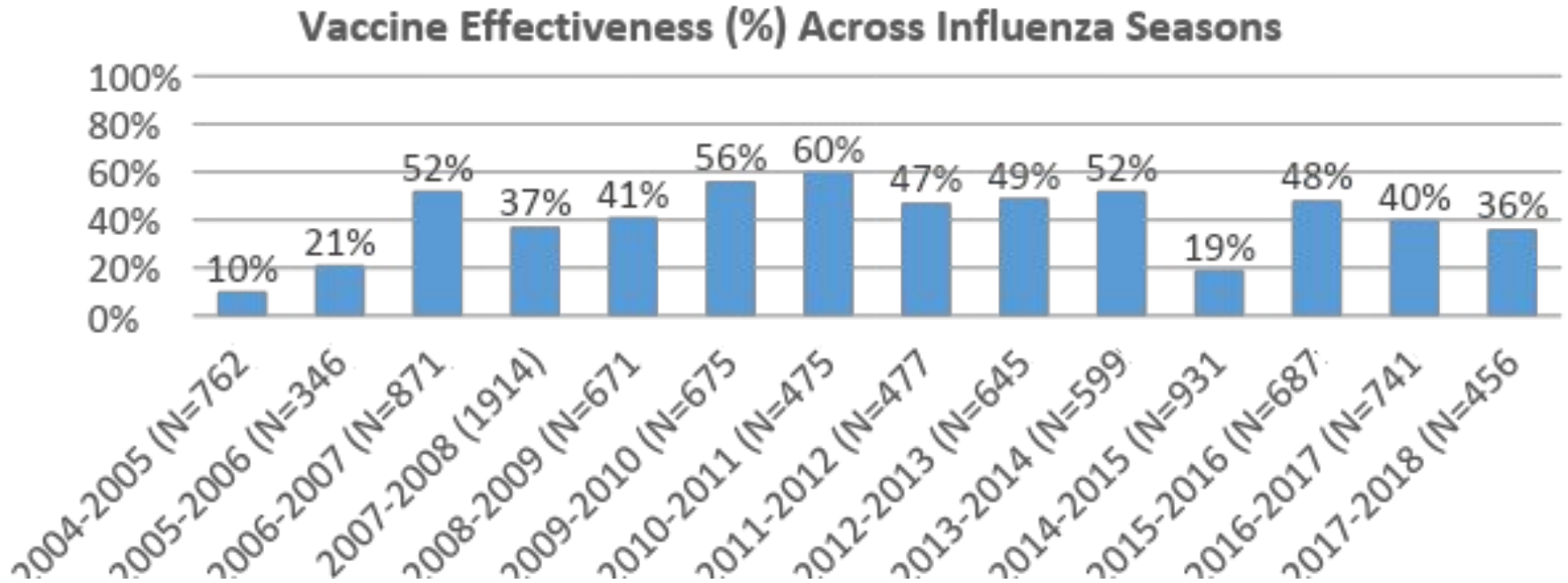
Influenza Morbidity and Mortality: Annual US Rates, 2010–2016 Influenza Seasons



*Data on respiratory and circulatory deaths are available with a 3-y lag; therefore, estimates on averted respiratory and circulatory deaths are available for the 2010-2011 through 2013-2014 influenza seasons but not for the 2014-2015 or 2015-2016 seasons.

Rolfes MA et al. 12/9/16. www.cdc.gov/flu/about/disease/2015-16.htm. Accessed 9/13/18.

Fact: Influenza Vaccination Is Effective, But Not Foolproof



[a]Interim 2016-2017 vaccine effectiveness estimates (4/20/2016-4/9/2017) were presented to the Advisory Committee on Immunization Practices in June 2017

[b]Interim early estimates may differ from final end-of-season estimates

CDC. 8/30/18. www.cdc.gov/flu/about/season/flu-season-2018-2019.htm. Accessed 9/13/18.

All Patients With Influenza-like Illness at High Risk of Complications Should Receive Antiviral Therapy[1]

- Hospitalized
- Younger age (6–59 mo)
- Older age (≥50 y)
- Chronic diseases
  - Pulmonary (eg, asthma)
  - Cardiovascular*
  - Renal
  - Hepatic
  - Neurologic
  - Hematologic
  - Metabolic disorders (eg, diabetes)
- Immunocompromised
- Pregnant or postpartum
- <19 y of age receiving long-term aspirin therapy
- LTC facility residents
- American Indians/Alaska Natives
- Obese patients (BMI ≥40 kg/m^2)

*Excluding isolated hypertension
BMI, body mass index; LTC, long-term care

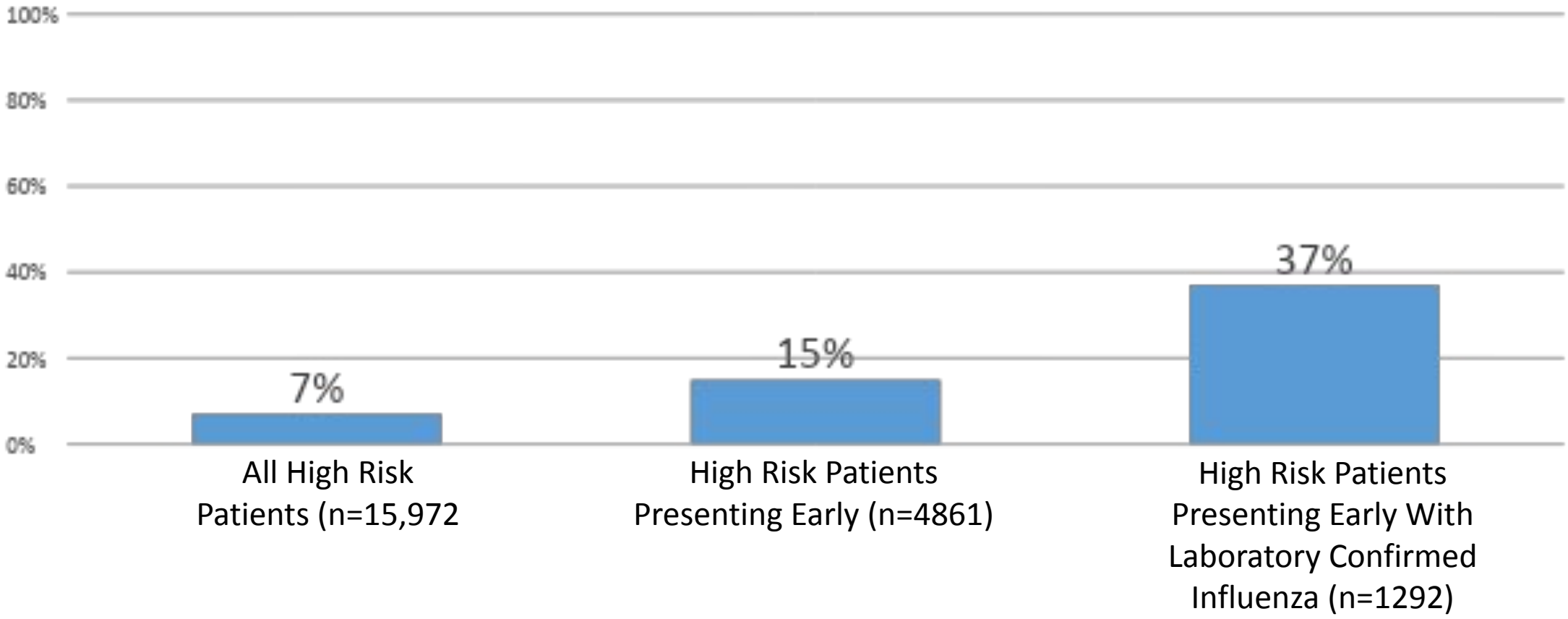
Grohskopf LA et al. *MMWR Recomm Rep*. 2018;67(No.RR-3):1-20.

Key Educational Points for Patients and Clinicians

- Encourage all patients to be vaccinated!
- Consider a diagnosis of influenza in patients with signs and symptoms, even when laboratory test results are negative and the patient has been vaccinated
- RT-PCR has greater diagnostic accuracy than RIDT and is thus preferred
- Antiviral therapy should be initiated as soon as possible in patients with influenza who are at high risk for complications—*without waiting for laboratory results*
- People who are not at high risk may also be treated with antiviral drugs, especially if treatment can begin within 48 h

Antivirals For High-Risk Outpatients With Influenza

Data Collected Across 5 Influenza Seasons,
US Influenza Vaccine Effectiveness Network (2011-2016)



Stewart RJ, etl al. *Clin Infect Dis* 2018;66:1035

Conclusions

- The Joint Commission, CMS, and seemingly everyone else…
- We’re still struggling with appropriate antibiotic use
- Less is more… still… seemingly always
- Colistin and Polymyxin B should go away
- Influenza is an antibiotic stewardship problem