Antimicrobial Stewardship for Hospitalists

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No disclosures, conflicts of interest, or off-label uses

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- **SHM Research Abstract Competition Co-Chair**

Valerie Vaughn has no relevant financial or advisory relationships with corporate organizations related to this activity.

Please take a moment to answer the poll questions.

AGENDA

Why stewardship matters

Why stewardship is hard

High yield stewardship opportunities

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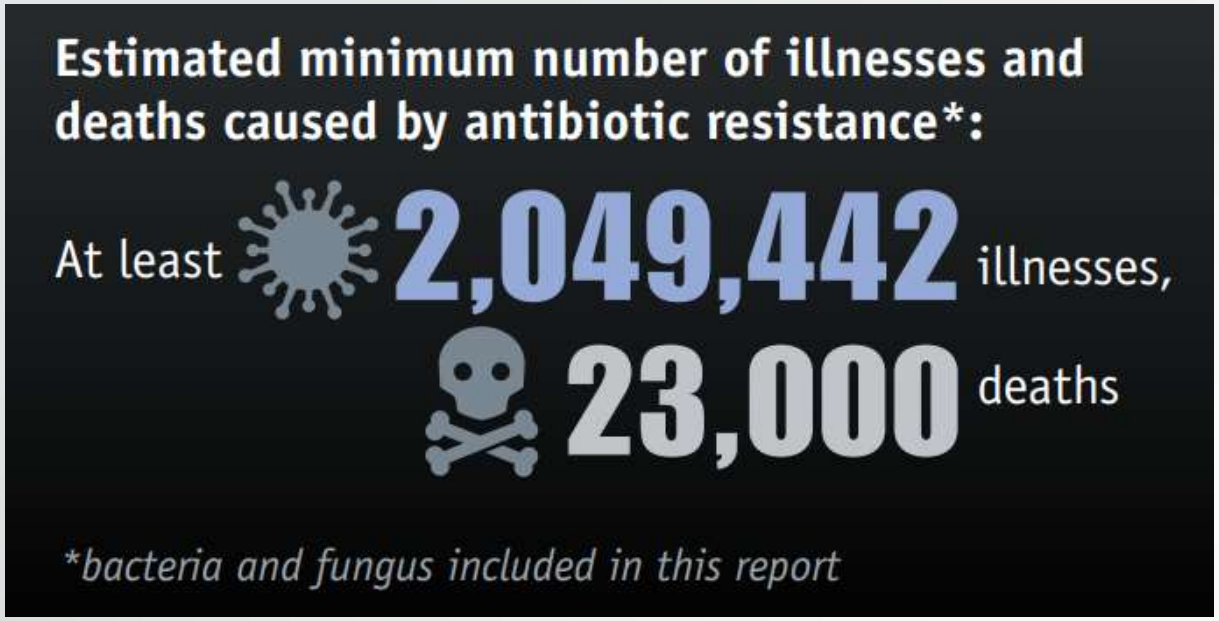
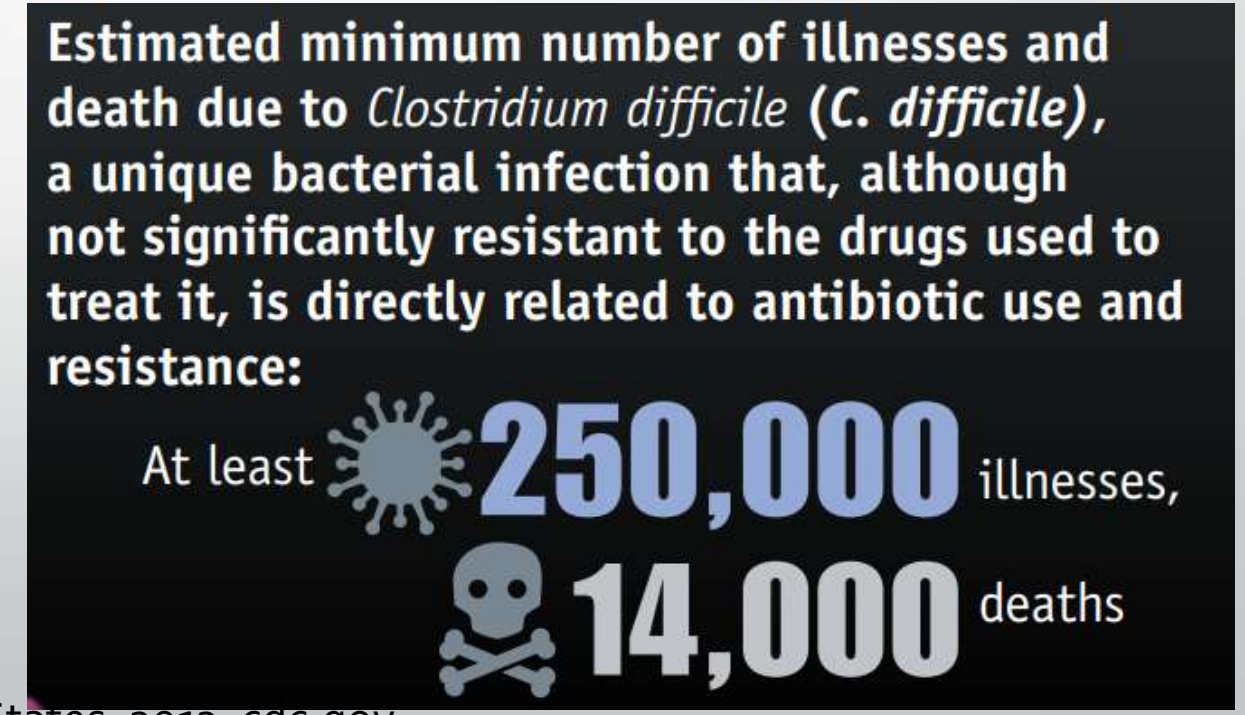
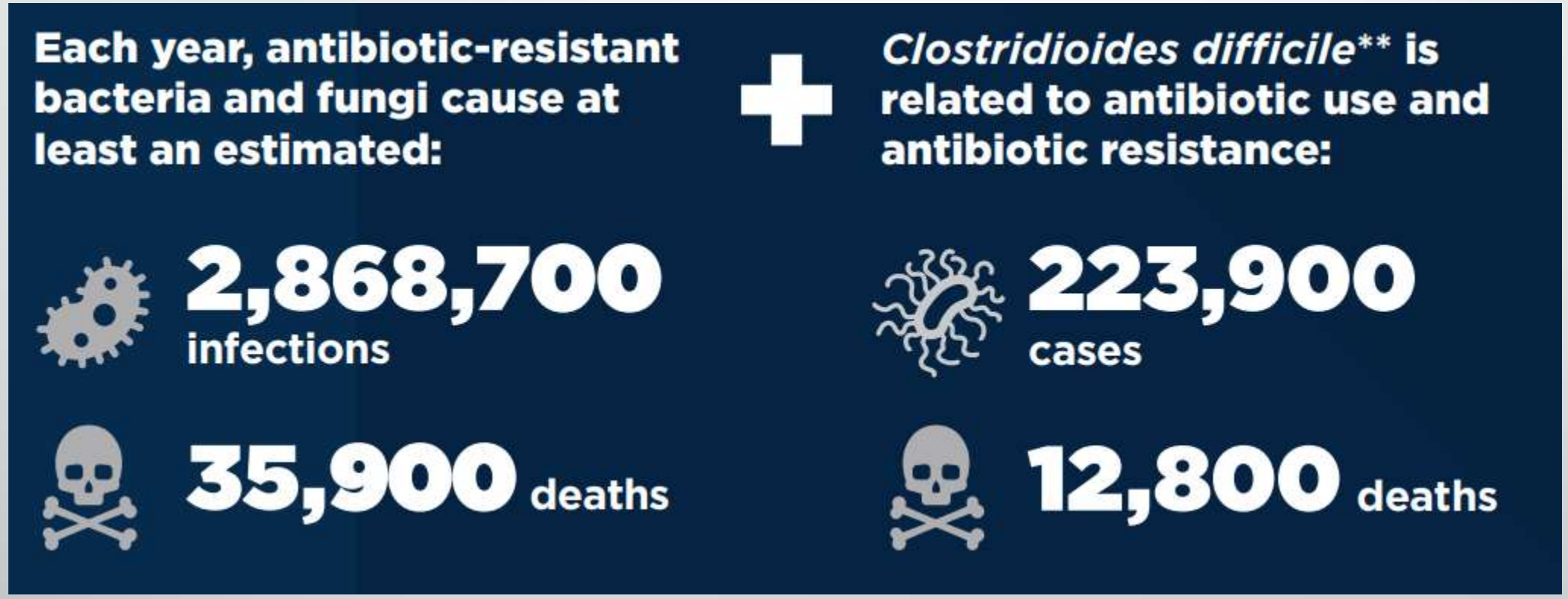
"The use of antibiotics is the single most important factor leading to antibiotic resistance around the world…up to 50% of all the antibiotics prescribed for people are not needed or are not optimally effective as prescribed."

Antibiotic Resistance Threats in the United States, 2013. cdc.gov





Antibiotic Resistance Threats in the United States, 2013. cdc.gov



Antibiotic Resistance Threats in the United States, 2019. cdc.gov

4,950,000

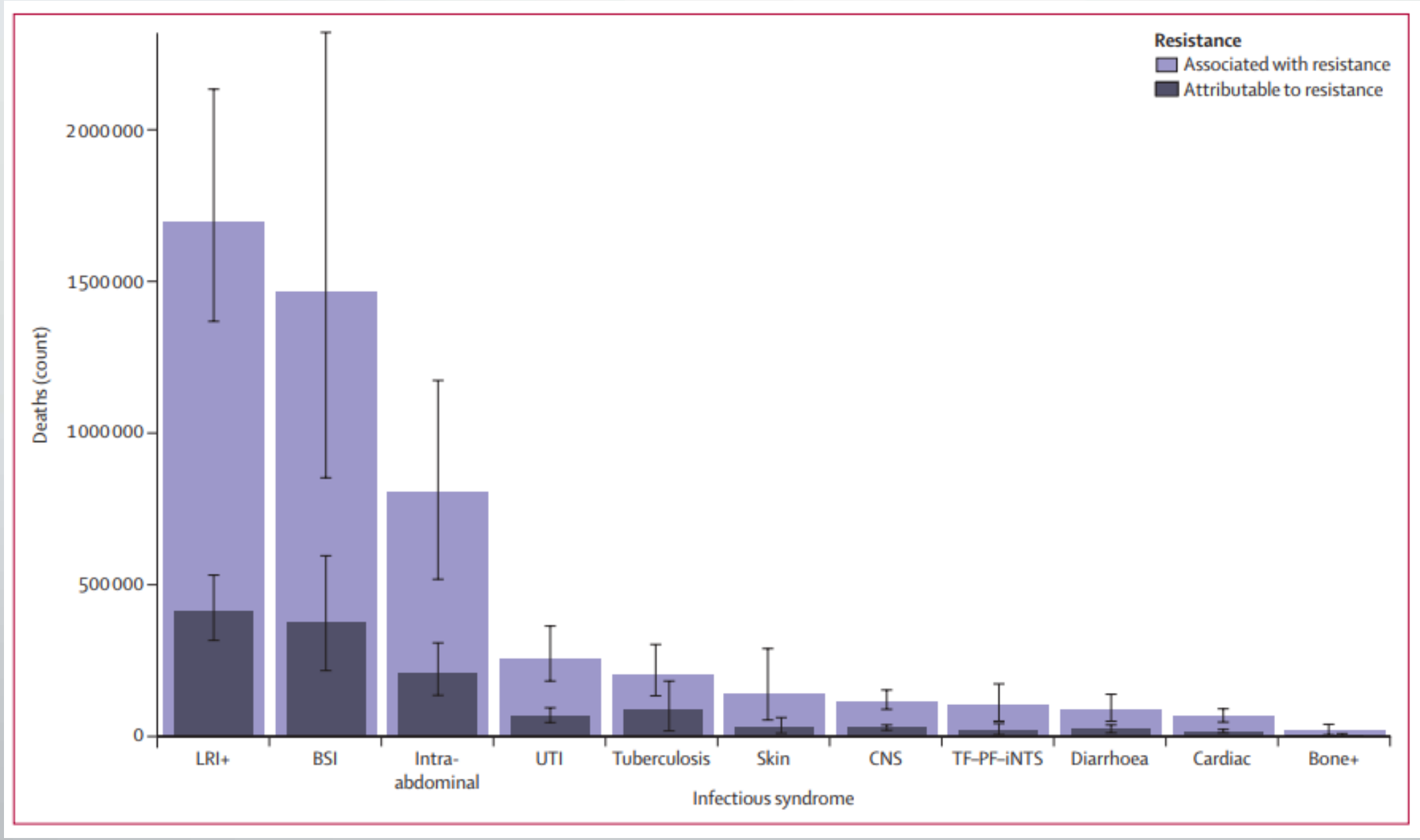
Global deaths associated with bacterial AMR, 2019

1,270,000

Global deaths attributable to bacterial AMR, 2019

LA

Antimicrobial Resistance Collaborators. Lancet. 2022



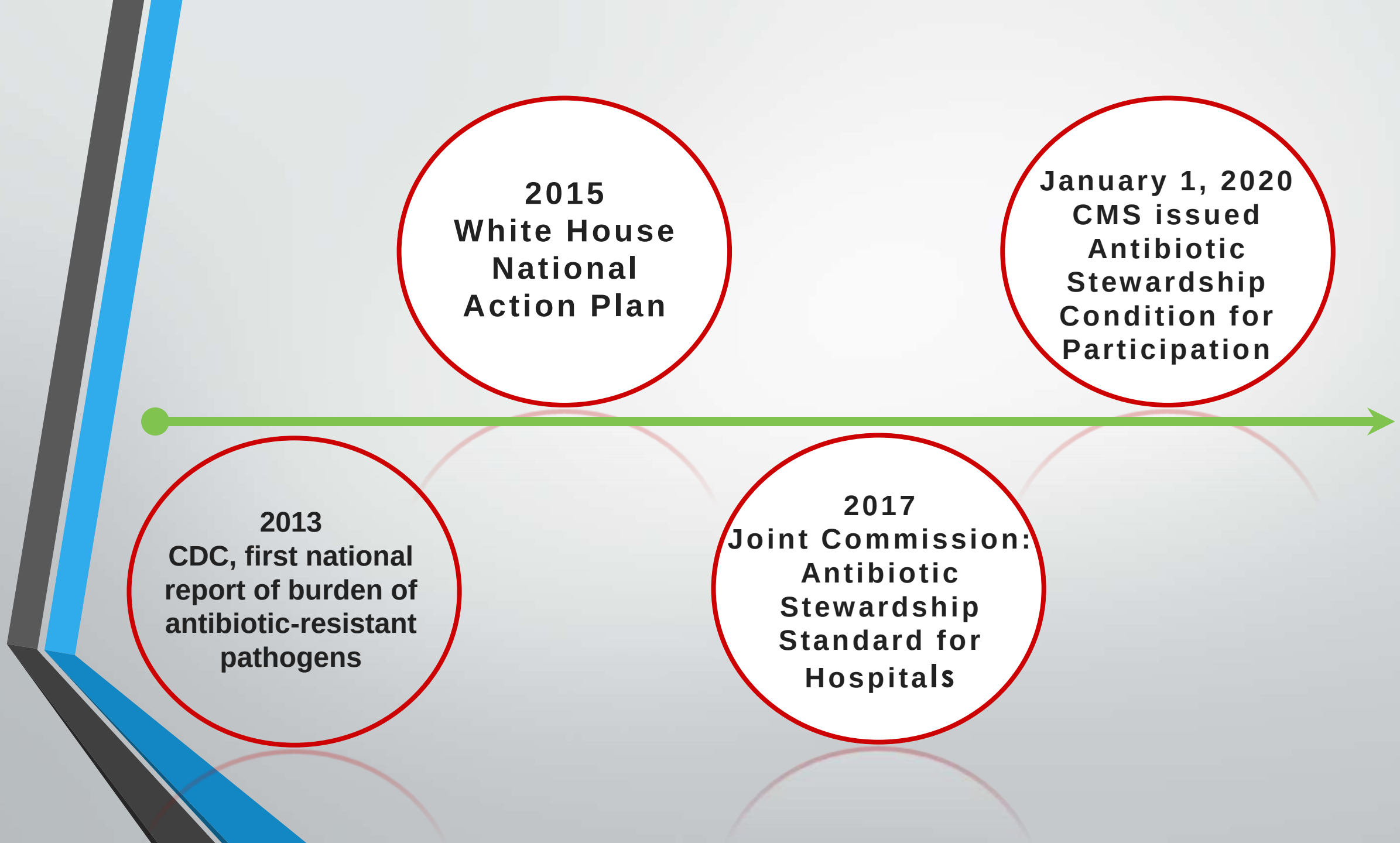
Antimicrobial Resistance Collaborators. Lancet. 2022

“20% of hospitalized patients who receive an antibiotic have an adverse drug event (from that antibiotic) within 30 days”

Tamma et al. *JAMA Internal Medicine*. 2017

"*Antibiotic resistance added $1,383 to the cost of treating a patient with a bacterial infection…in 2014, (antibiotic resistance) amounts to a national cost of $2.2 billion annually*."

Thorpe KE. *Health Affairs.* 2018


2015
White House
National
Action Plan
January 1, 2020
CMS issued
Antibiotic
Stewardship
Condition for
Participation
2013
CDC, first national
report of burden of
antibiotic-resistant
pathogens
2017
Joint Commission:
Antibiotic
Stewardship
Standard for
Hospitals

2023
Joint Commission: New antibiotic stewardship requirements for hospital/critical access programs

AGENDA

Why stewardship matters

Why stewardship is hard

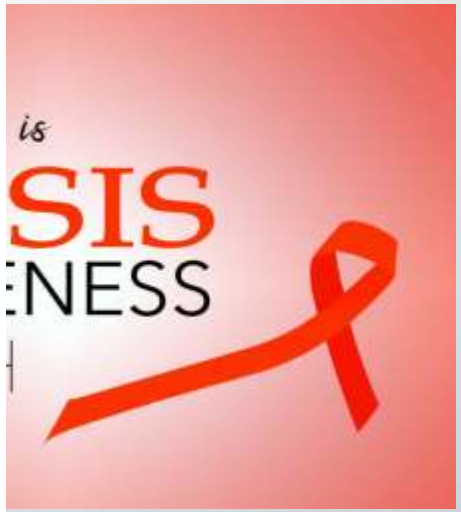
High yield stewardship opportunities

Distractions or interruptions

Competing or conflicting priorities

Time/effort

Competing or conflicting priorities



SEP-1 BUNDLE

3 Hour Bundle (to be completed within 3 hours of time zero)

- Send initial Lactic Acid Level
- Obtain Blood Cultures Before Abx
- Administer Antibiotics
- 30 ml/kg IV fluid bolus *in presence of hypotension* or Lactic Acid >4.0*

6 Hour Bundle (to be completed within 6 hours of time zero)

- Repeat Lactic Acid if initial Lactic Acid >2
- Vasopressors if hypotensive after fluids
- Repeat Physical Exam

WHAT'S "WORSE"?

- Antibiotics withheld/initial suspicion for infection low → "subtle" transition → septic/bacteremic
- Pt gets antibiotics for non-infectious cause → gets readmitted for MDR infection

Distractions or interruptions

- BPAs
- Multimodal communication: phone, secure chats, pagers
- Patient care handoffs

Time and effort

- Hospitalist burnout on the rise post-covid
- Perception of stewardship efforts being time consuming and cumbersome

Is stewardship actually difficult though?

AGENDA

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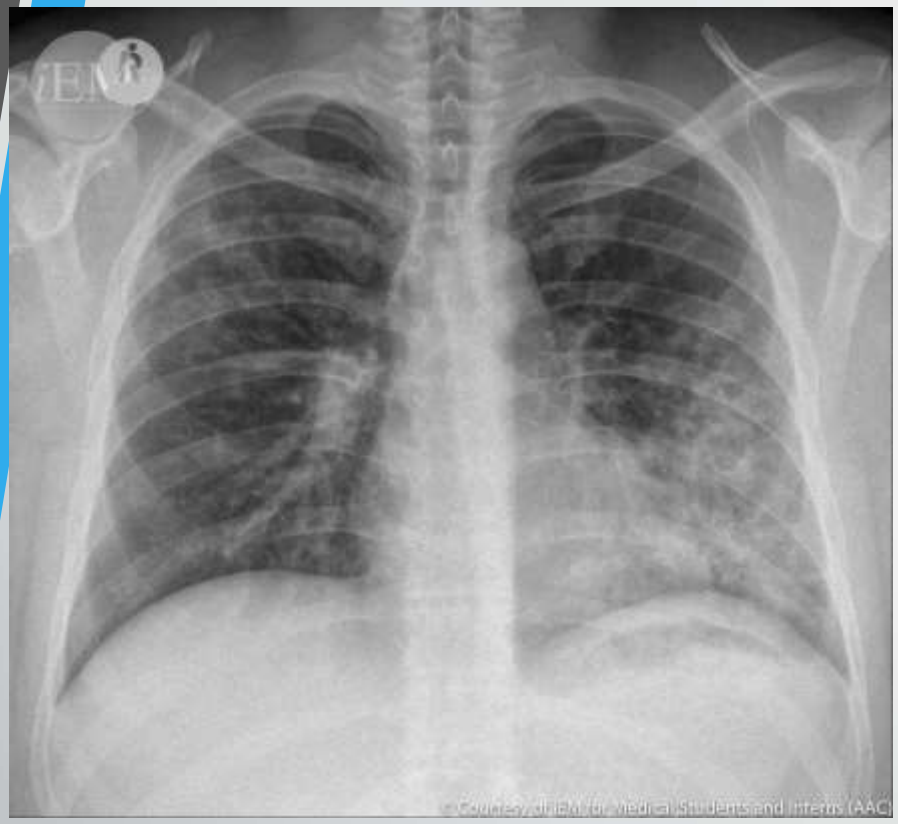
80 year-old woman with dementia presents for altered mental status.
She comes in alone from her nursing home and is unable to provide any history.

Physical exam
Stable vital signs, oriented x 1
Exam difficult due to poor patient cooperation

Laboratory findings
WBC 10,000 (80% PMNs)

+ LE, + WBC, occ bacteria, numerous squamous cells

(culture pending)



Left lower lobe pneumonia

Poor positioning and effort. Cannot rule out underlying infection

What’s your next step?

A) Supportive care + Chest CT to evaluate for pneumonia

B) Supportive care + empiric Vanc/Zosyn

C) Supportive care + empiric ceftriaxone

D) Supportive care + ask the night team to check response in 1-2 hours

E) Give up, medicine was never supposed to be this hard…

High-Yield

Antibiotic Stewardship Moment #1

Don’t treat asymptomatic bacteriuria

(Bacteria in the urine in the absence of signs/symptoms of UTI)

Signs of Symptoms of a UTI

- Dysuria
- Urinary frequency or urgency
- Suprapubic pain
- Costovertebral pain/tenderness
- *Without alternative cause:*
  - Fever
  - Hematuria
  - Spasticity (if spinal cord injury)
- Altered mental status + systemic signs of Infection (SIRS, leukocytosis)

Adapted from 2019 SHEA/IDSA Guidelines for Management of ASB.

Asymptomatic Bacteriuria

- Common in hospitalized patients
  - Elderly, women, h/o catheter, coming from nursing home
- Marker of debility/poorer prognosis
- Treatment does not improve outcomes
  - Increased risk of UTI in following year
  - Increased risk of developing antibiotic resistance
  - Elderly at highest risk of antibiotic associated adverse-events (*C. difficile*)

Nicolle. *Clinical Infectious Diseases*. 2019.

What is ASB?

- Bacteria in the urine in the absence of signs/symptoms of UTI
  - Even if UA is “positive”
  - Even if UA has pyuria, leukocyte esterase, nitrites, bacteria, multiple bacteria, resistant bacteria

Lab Finding	Odds Ratio for Inappropriate ASB Treatment
E. Coli	1.4 (1.1-1.8)
≥100,000 CFU	2.3 (1.8-2.9)
Positive urinalysis	2.8 (2.1-3.9)

Petty, L et.al. *JAMA Internal Medicine*. 2019

What about patients with Altered Mental Status?

- Depends
  - Physical exam findings (suprapubic tenderness)
  - Vital sign abnormalities (sepsis?) or leukocytosis?
- If none of the above
  - Supportive care for 48 hours
  - e.g., IVF, constipation, medication evaluation

Nicolle. *Clinical Infectious Diseases*. 2019.

What about patients with Altered Mental Status?

- Of 11,793 patients hospitalized in 59 hospitals with a + urine culture and no symptoms or only non-specific signs & symptoms of a UTI
  - Only 166 (1.4%) developed bacteremic UTI
  - Predictors? Hypotension, tachycardia, leukocytosis
  - Not predictors? Altered mental status
  - Negative predictors? Dementia
- You'd have to treat nearly 100 patients with antibiotics to prevent one bacteremic UTI

Submitted Abstract to SHEA. Sonali Advani.

Clinical Infectious Diseases

IDSA FEATURES

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America[a]

Lindsay E. Nicolle,[1] Kalpana Gupta,[2] Suzanne F. Bradley,[3] Richard Colgan,[4] Gregory P. DeMuri,[5] Dimitri Drekonja,[6] Linda O. Eckert,[7] Suzanne E. Geerlings,[8] Béla Köves,[9] Thomas M. Hooton,[10] Manisha Juthani-Mehta,[11] Shandra L. Knight,[12] Sanjay Saint,[13] Anthony J. Schaeffer,[14] Barbara Trautner,[15] Bjorn Wullt,[16] and Reed Siemieniuk[17]

"In older patients **with functional and/or cognitive impairment** with bacteriuria and delirium (acute mental status change, confusion) and **without local genitourinary symptoms or other systemic signs of infection** (e.g., fever or hemodynamic instability), we recommend assessment for other causes and **careful observation** rather than antimicrobial treatment."

JAMA Internal Medicine | Original Investigation | LESS IS MORE

Risk Factors and Outcomes Associated With Treatment of Asymptomatic Bacteriuria in Hospitalized Patients

83% of patients with asymptomatic bacteriuria received (inappropriate) antibiotic treatment

Altered mental status in 18%
(OR 1.93 for treatment)

Petty, L et.al. *JAMA Internal Medicine*. 2019

JAMA Internal Medicine | Original Investigation | LESS IS MORE

Risk Factors and Outcomes Associated With Treatment of Asymptomatic Bacteriuria in Hospitalized Patients

Antibiotics associated with a 37% longer LOS

No improvement in other outcomes

Petty, L et.al. JAMA Internal Medicine. 2019

80 year-old woman with dementia presents for altered mental status.
She comes in alone from her nursing home and is unable to provide any history.

<u>Physical exam</u>
Blood pressure 72/40, heart rate 110, RR 16, oriented x 1
Exam difficult due to poor patient cooperation

<u>Laboratory findings</u>
WBC 10,000 (80% PMNs)

Give antibiotics!!!

Clinical Infectious Diseases

IDSA FEATURES

Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America[a]

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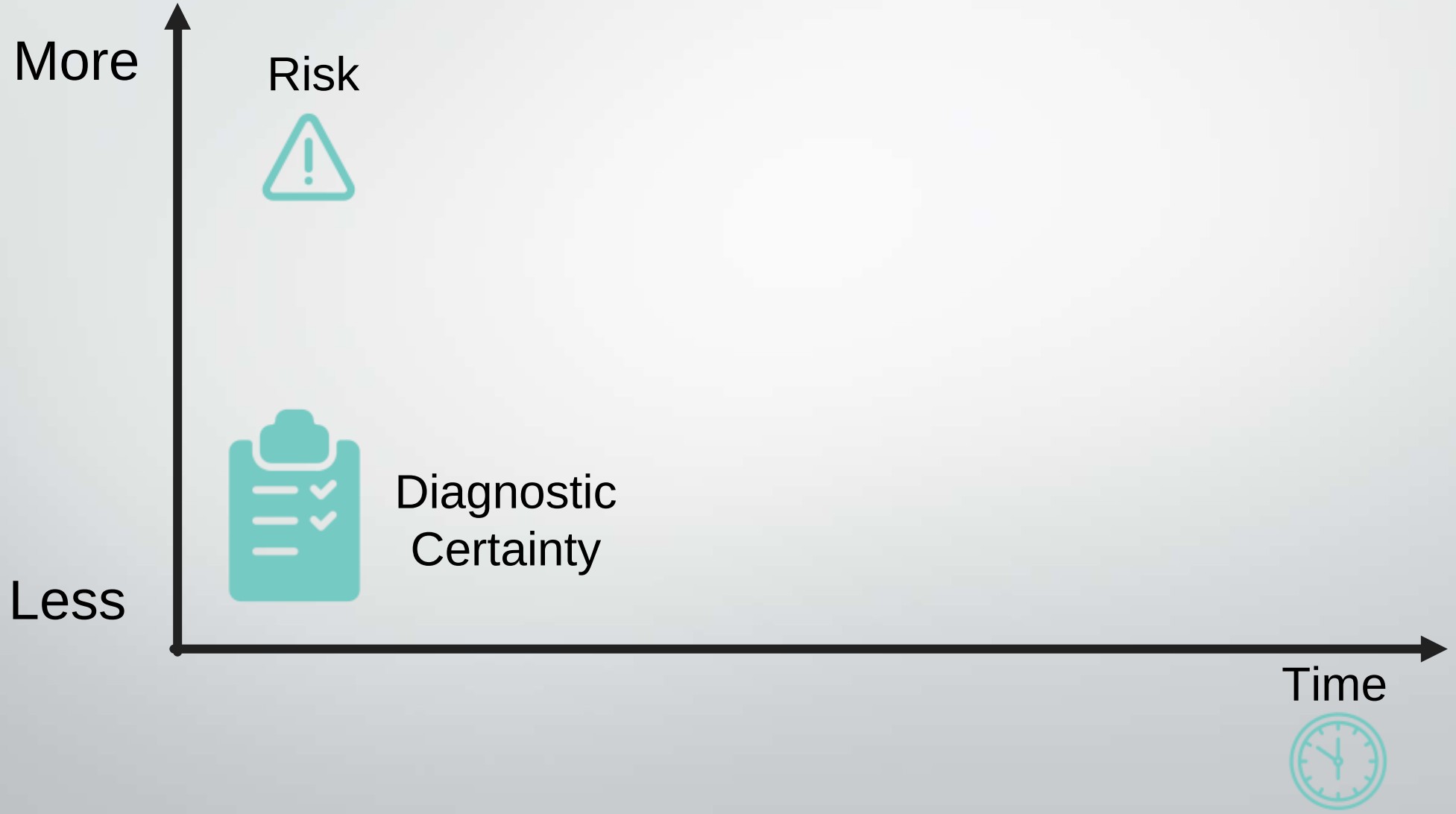
"For the bacteriuric patient with fever and other systemic signs potentially consistent with a **severe infection (sepsis)** and without a localizing source, **broad-spectrum antimicrobial therapy** directed against urinary and nonurinary sources should be initiated."


More
Risk
Diagnostic
Certainty
Less
Time

Summary

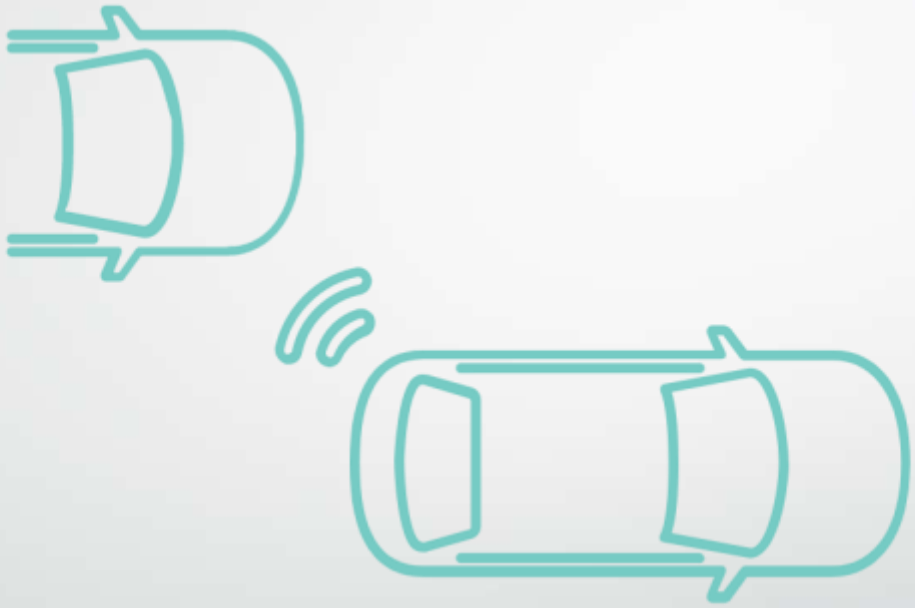
- Asymptomatic bacteriuria = positive urine culture in absence of signs/symptoms of a UTI
- A positive urinalysis does not mean a UTI
- In hemodynamically stable patients with altered mental status, check for alternative etiologies before treating for UTI (risk is <1%!)

AGENDA

Why stewardship matters

Why stewardship is hard

High yield stewardship opportunity #2



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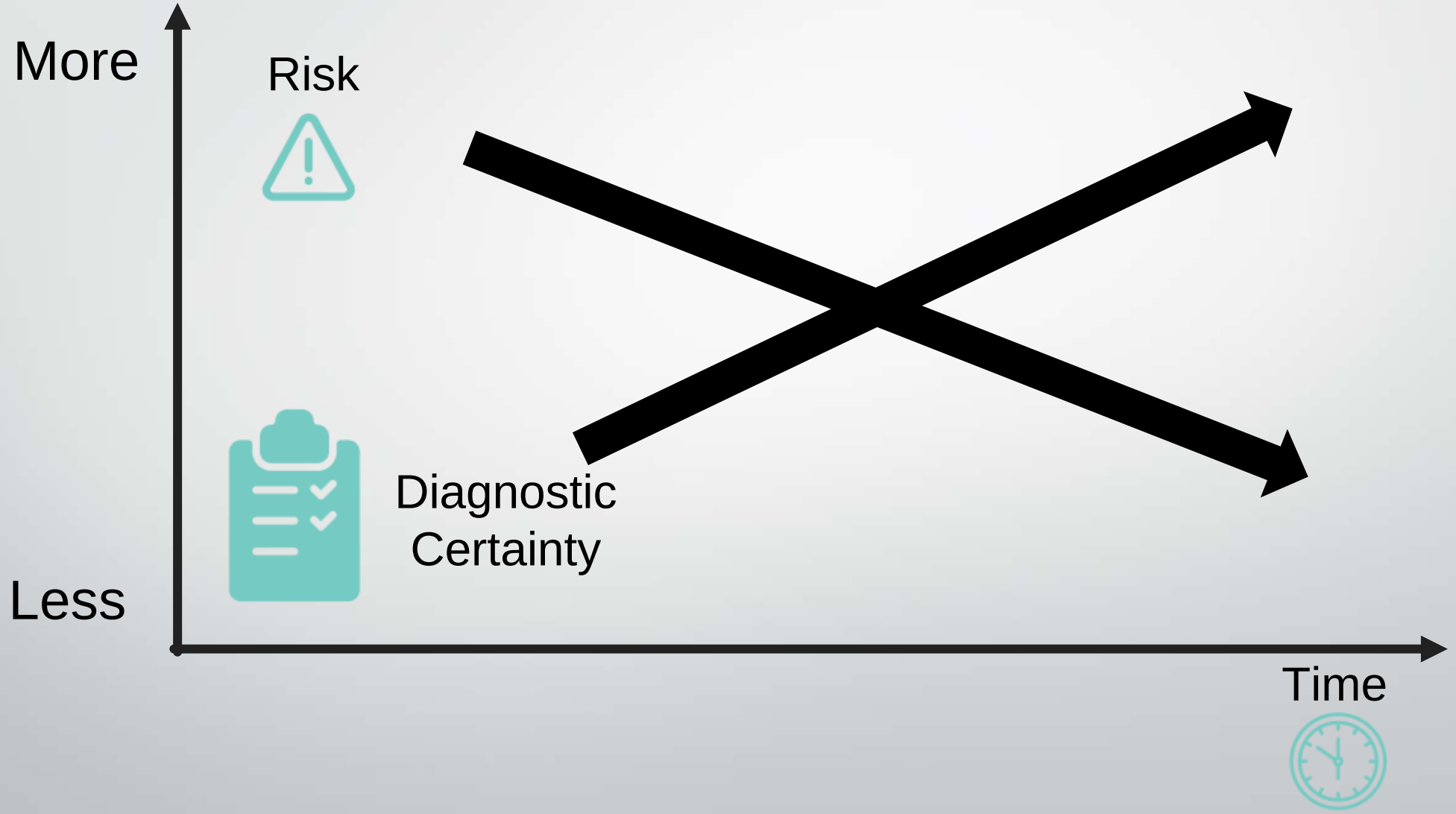
Give antibiotics!!!

80 year-old woman with dementia presents for altered mental status.
She comes in alone from her nursing home and is unable to provide any history.

- Vital signs stabilize with fluids and broad-spectrum antibiotics
- Procalcitonin is negative
- Mental status clears, patient denies urinary/pulmonary symptoms
- You found out she was started on zolpidem just prior to admission
- In fact, she says…


“Dr., I never want that Ambien medicine again! It made me feel awful the second I took it!”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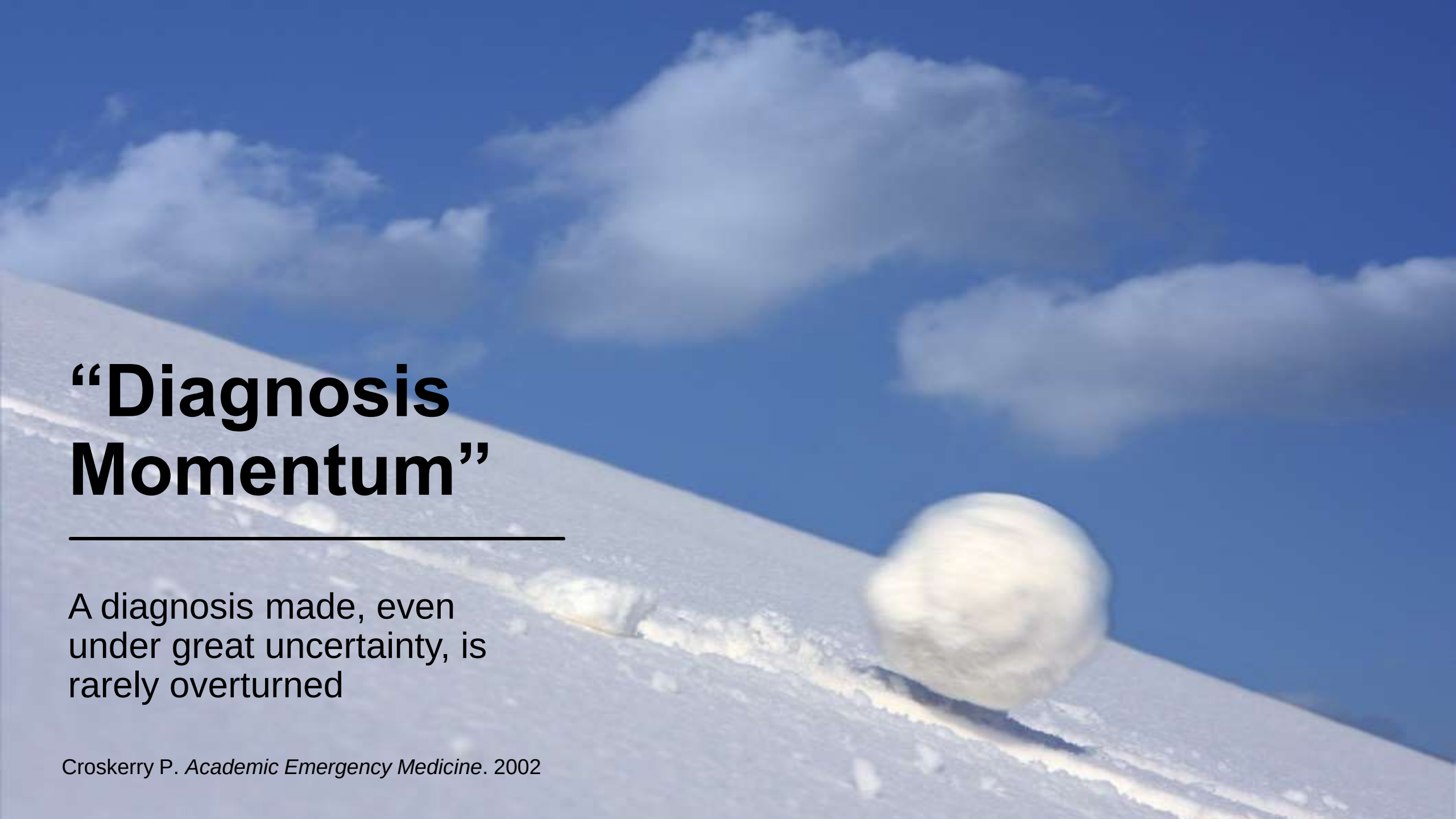


“Diagnosis Momentum”

A diagnosis made, even under great uncertainty, is rarely overturned

Croskerry P. *Academic Emergency Medicine*. 2002

How much antibiotic overuse at discharge is there?

Work funded by AHRQ K08 and Blue Cross and Blue Shield of Michigan (Value Partnerships Program)

MEASURING ANTIBIOTIC OVERUSE AT DISCHARGE

21,825 hospitalized patients (at 46 hospitals)

- 12,445 treated for pneumonia
- 9,380 treated for urinary tract infection

7/1/2017 through 7/30/2019

Vaughn VM, *Clinical Infectious Diseases*. 2020

MEASURING ANTIBIOTIC OVERUSE AT DISCHARGE

Unnecessary Antibiotics

Given for a non-infectious or non-bacterial syndrome

Excessive Antibiotics

Antibiotic needed, but prescribed for longer than necessary

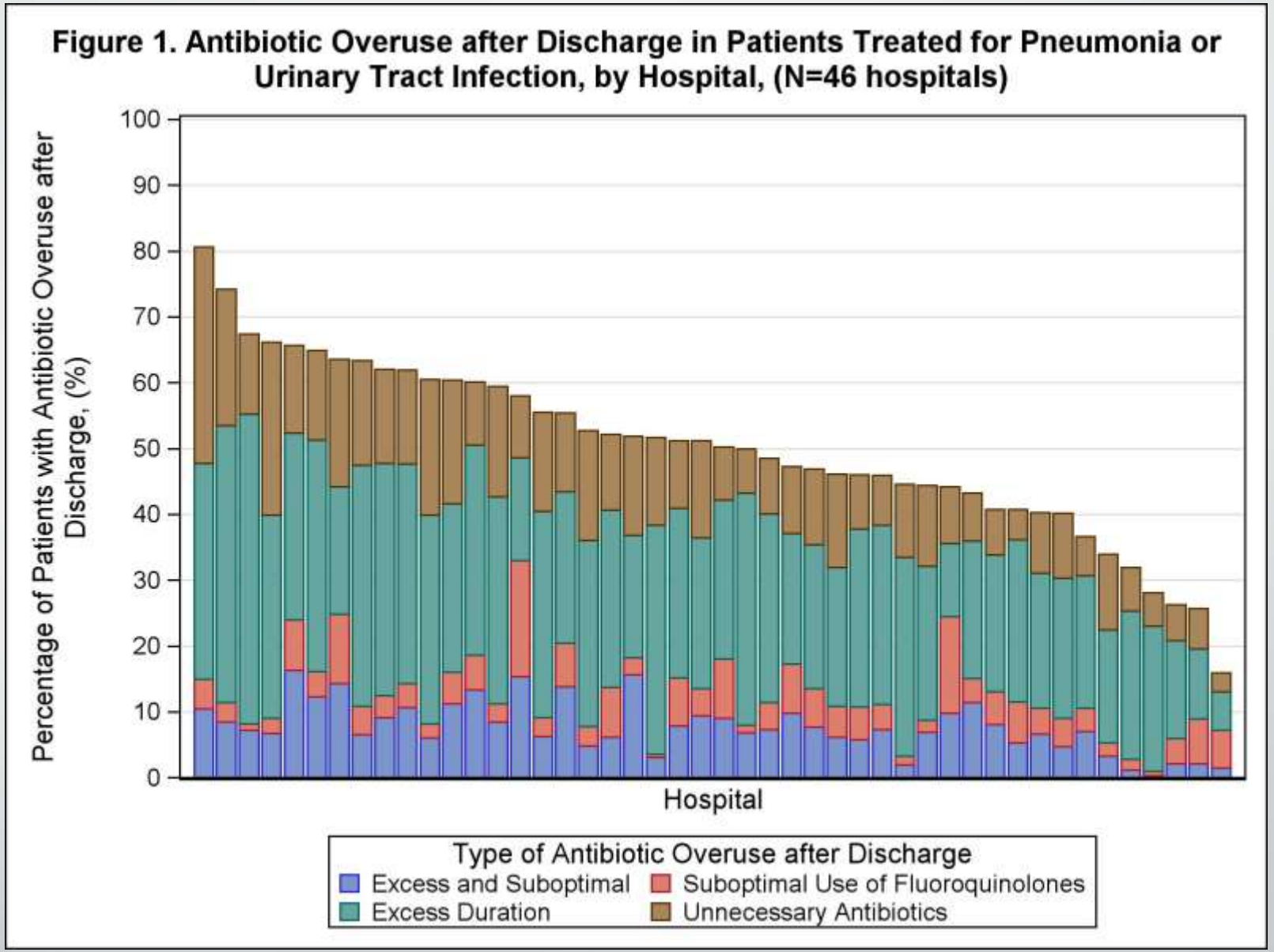
Avoidable Fluoroquinolones

Antibiotic needed, but safer alternative exists

57% had antibiotic overuse at discharge

39% had antibiotic overuse at discharge

5-FOLD VARIATION ACROSS HOSPITALS



Vaughn VM, *Clinical Infectious Diseases*. 2020

STRONGLY CORRELATED ACROSS CONDITIONS

Figure 2. Antibiotic Overuse after Discharge in Patients Treated for UTI vs. Patients Treated for Pneumonia, by Hospital, (N=44 hospitals)

Vaughn VM, *Clinical Infectious Diseases*. 2020

High-Yield

Antibiotic Stewardship Moment #2

Hospital Discharge

THINK ABOUT 4 THINGS AT HOSPITAL DISCHARGE

1) Can antibiotics be stopped?
   - Infection no longer most likely diagnosis
   - Course has already been finished inpatient

THINK ABOUT 4 THINGS AT HOSPITAL DISCHARGE

1) Can antibiotics be stopped? If no,
2) Is the preferred agent being used?
    1) Narrow spectrum when able
    2) Avoid fluoroquinolones when able

THINK ABOUT 4 THINGS AT HOSPITAL DISCHARGE

1) Can antibiotics be stopped? If no,
2) Is the preferred agent being used?
3) What's the shortest effective duration?

   E.g., 3-5 days for most patients with CAP; 3-5 days for uncomplicated UTI

THINK ABOUT 4 THINGS AT HOSPITAL DISCHARGE

1) Can antibiotics be stopped? If no:
2) Is the preferred agent being used?
3) What's the shortest effective duration?
4) Is the dose, indication, total planned duration (with start/stop dates) in discharge summary?

Summary

1. Antibiotics can often be stopped at hospital discharge
2. If prescribing antibiotics, make sure to assess:
   - necessity, duration, antibiotic selection
3. Documentation key to aiding communication

CONCLUSIONS

As hospitalists we have a key role in antibiotic stewardship

- Help fight antibiotic resistance AND improve patient outcomes

Even with sepsis metrics, we have high-yield opportunities for improvement

- Not treating asymptomatic bacteriuria
  - Including stable delirium (i.e., those without sepsis)
- Pausing to think about antibiotics at discharge
  - Stop unnecessary (e.g., now know it's ASB)
  - Shortest effective duration (e.g., 3-5 days for CAP)
  - Safest, narrowest spectrum (avoid fluoroquinolones when able)

Please take a moment to answer the poll questions.

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UNIVERSITY OF MICHIGAN

Questions?

Keep In Touch!

●●●

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