

“Test Smart, Treat Smart”: Optimizing Bacteriuria Management in Veterans with Spinal Cord Injury and Disorder

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Objectives



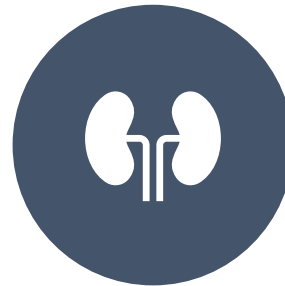
To describe the implications of national and VHA policies surrounding bacteriuria management on clinical practice



To visualize the unique challenges and opportunities of bacteriuria management of Veterans with spinal cord injury and disorder (SCI/D)



To explore previous work done on outcomes of bacteriuria management for Veterans with SCI/D



To discuss our current work to aimed to provide diagnostic and antibiotic stewardship for bacteriuria management to this population

Disclosure of Conflict of Interest

- Felicia Skelton-Dudley has no financial conflicts of interest relevant to this activity.
- Grant/research support
 - VA Health Services R&D Career Development Award 1 IK2 HX002484-03 (Optimizing Bacteriuria Management in Veterans with Spinal Cord Injury)
 - VA RR&D Merit Award 1 I01 RX002595-01A2 (Bacteriophage to treat Multi-Drug Resistant UTI after Spinal Cord Injury)
- Advisory Board:
 - American Paraplegia Society Board of Directors

Poll Question #1

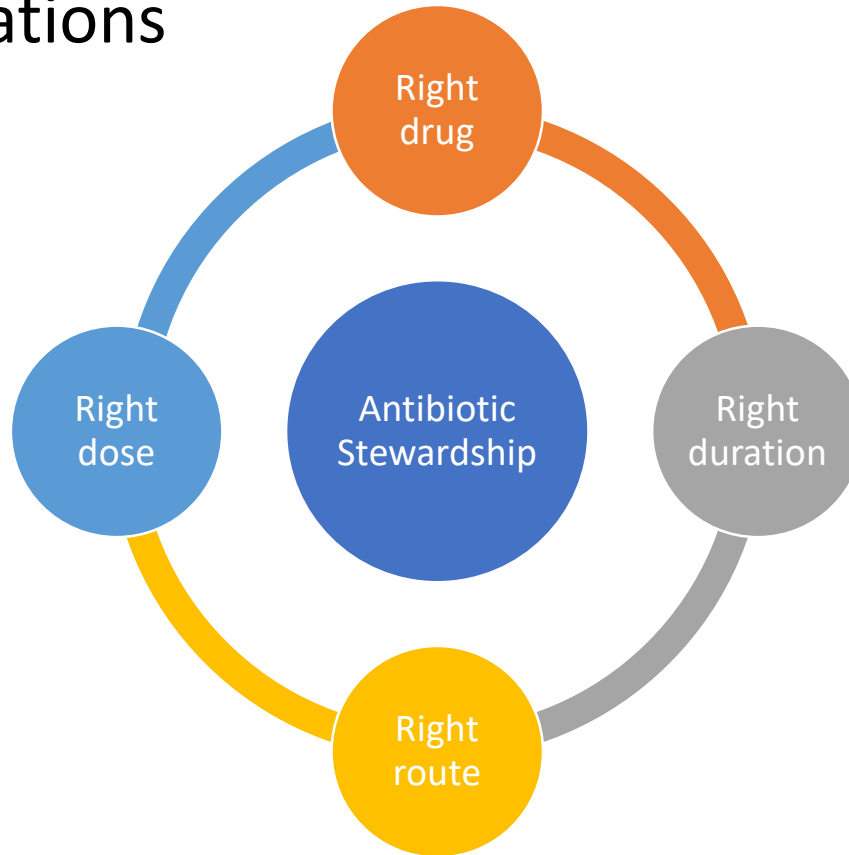
- What is your primary role in VA?
 - Student, trainee, or fellow
 - Clinician
 - Researcher
 - Administrator, manager or policy-maker
 - Other

Poll Question #2

- How familiar are you with the VHA System of Care for Spinal Cord Injury and Disorder (SCI/D)?
 - 1 (not at all familiar)
 - 2
 - 3
 - 4
 - 5 (very familiar)

Antibiotic Stewardship to Combat Antibiotic Resistance: a National and Global Priority

- Initiatives from the White House, Centers for Disease Control, and the United Nations



Catheter-
Associated UTI
(CAUTI) and
Asymptomatic
Bacteriuria (ASB):
Where Policy and
Clinical Practice
Collide

“Getting to Zero”

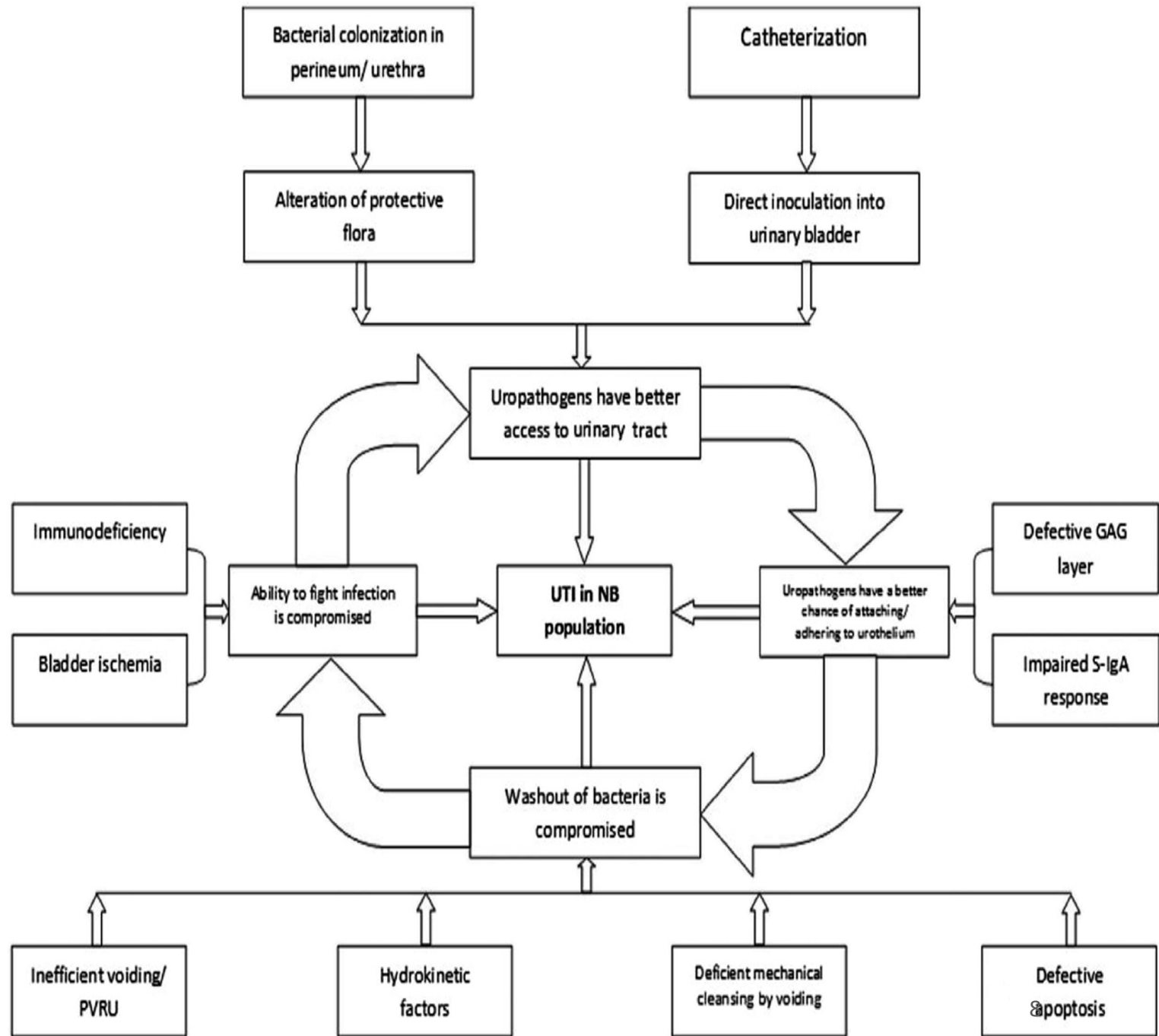
Clinical Practice
Guidelines

Cabana: Why physicians
don't follow guidelines

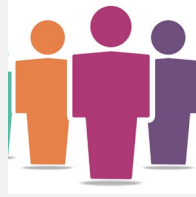
Clinical Bacteriuria
Management

Bacteriuria Management in SCI/D Presents Unique Challenges

McKibben, et al, *Urol Clin N Am*,
2015.



CAUTI in
people with
SCI/D is



Common



Costly



Confusing

Diseases of the genitourinary tract amongst the most common reasons persons with SCI/D access health care

Skelton, et al, *Arch Phys Med Rehabil.* 2019 Sep;100(9):1614-1621.

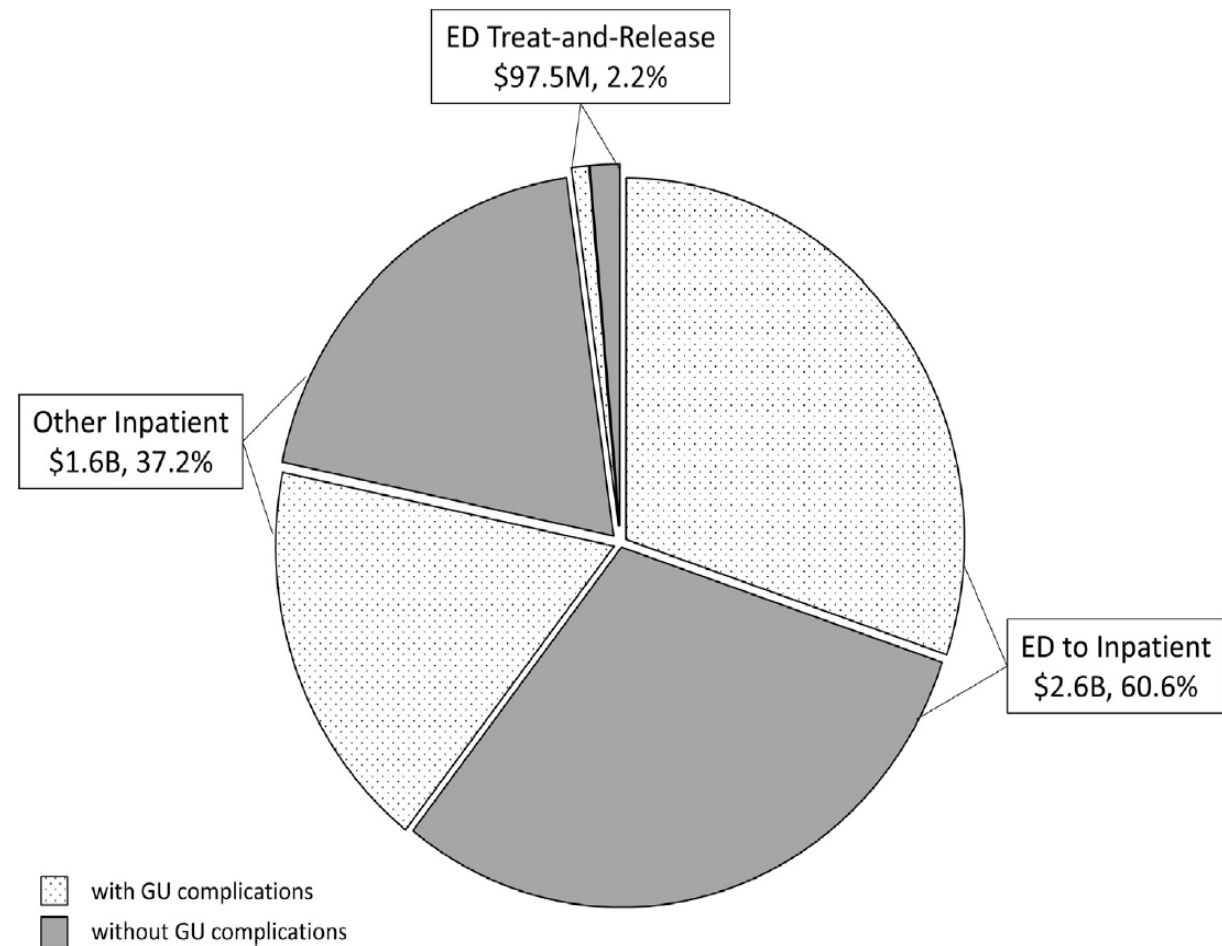
Retrospective cross-sectional and cost analysis of the 2006-2015 National Inpatient Sample and National Emergency Department Sample from the Healthcare Cost and Utilization Project

SCI/D-related encounters identified using International Classification of Disease, Ninth Edition, Clinical Modification (ICD-9-CM) diagnosis codes

- Inpatient sample included 1,796,624 hospitalizations. Top three reasons for admission:
 - septicemia (13.4%)
 - rehabilitation care (6.8%)
 - urinary tract infections (6.7%)
- Emergency department sample included 618,118 treat-and-release visits. Top three reasons for presentation:
 - urinary tract infections (16.7%)
 - genitourinary symptoms and ill-defined conditions (4.7%)
 - complication of a medical device, implant or graft (4.7%)

Total costs for encounters associated with genitourinary conditions exceed \$2 billion per year

- Skelton, F, et al. Arch Phys Med Rehabil. 2019.



Inpatient and Emergency Department visits for persons with SCI/D
Costs expressed as millions (M) or billions (B) of 2015 US dollars

Diagnosing CAUTI after SCI/D is challenging!

- High rates of CAUTI, but also high rates of ASB that does not require treatment
- Presenting signs and symptoms of infection are challenging to interpret
- High rates of multi-drug resistant organisms isolated from the urine and antibiotic complications, such as *C. difficile* infection
- Nicolle LE, et al. Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019, *Clin Infect Dis*, 2019.
- Fitzpatrick MA, et al, *J Spinal Cord Med*, 2017.
- Ramanathan S, et al, *Am J Infect Control*, 2014.

Bacteriuria Management in SCI/D Presents Unique Opportunities



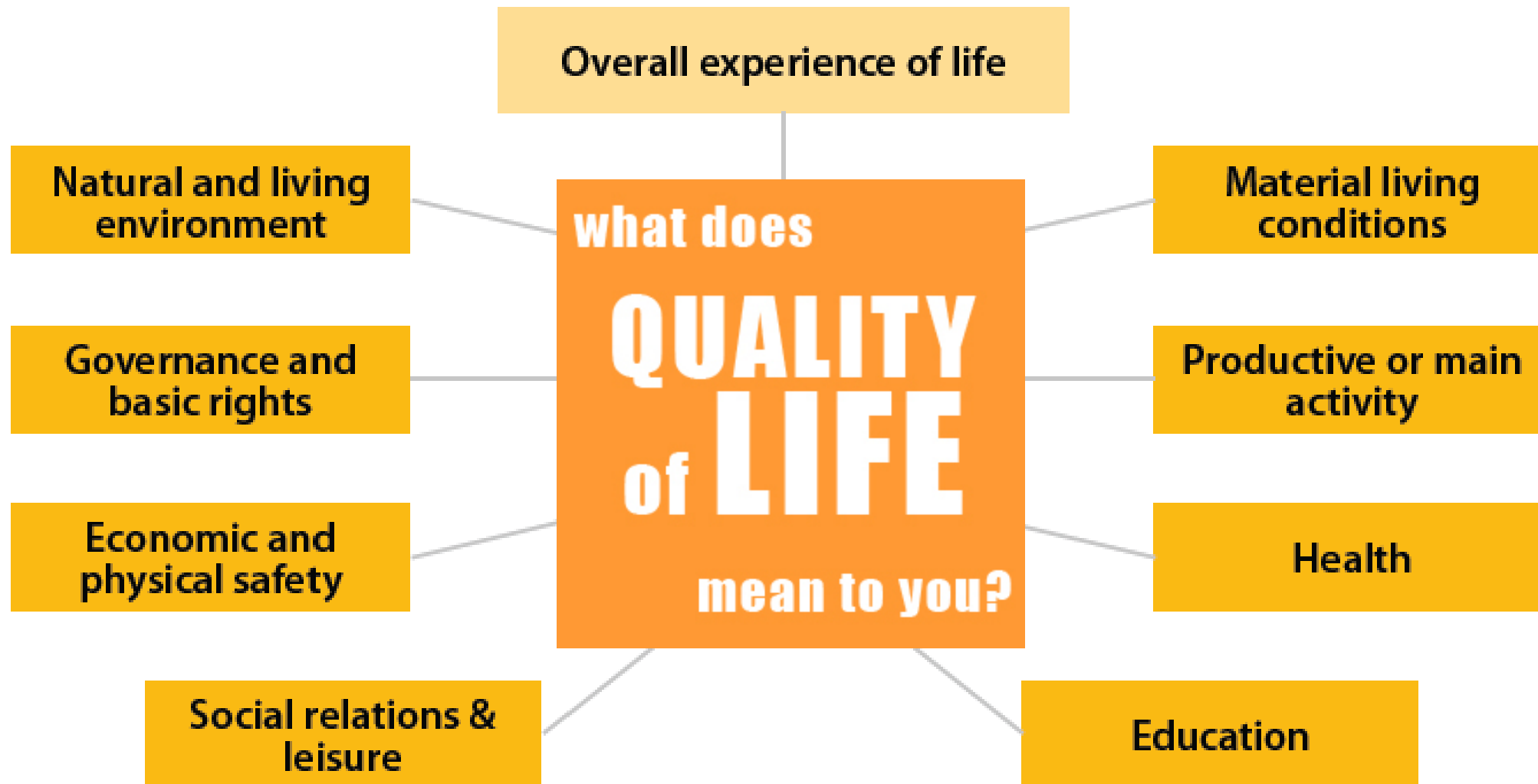
Patient Engagement



Unique Model of Care
-VHA SCI/D guidelines



SCI/D-specific Interventions and
Implementation



The Importance of Patient Engagement in Bacteriuria Management with SCI/D

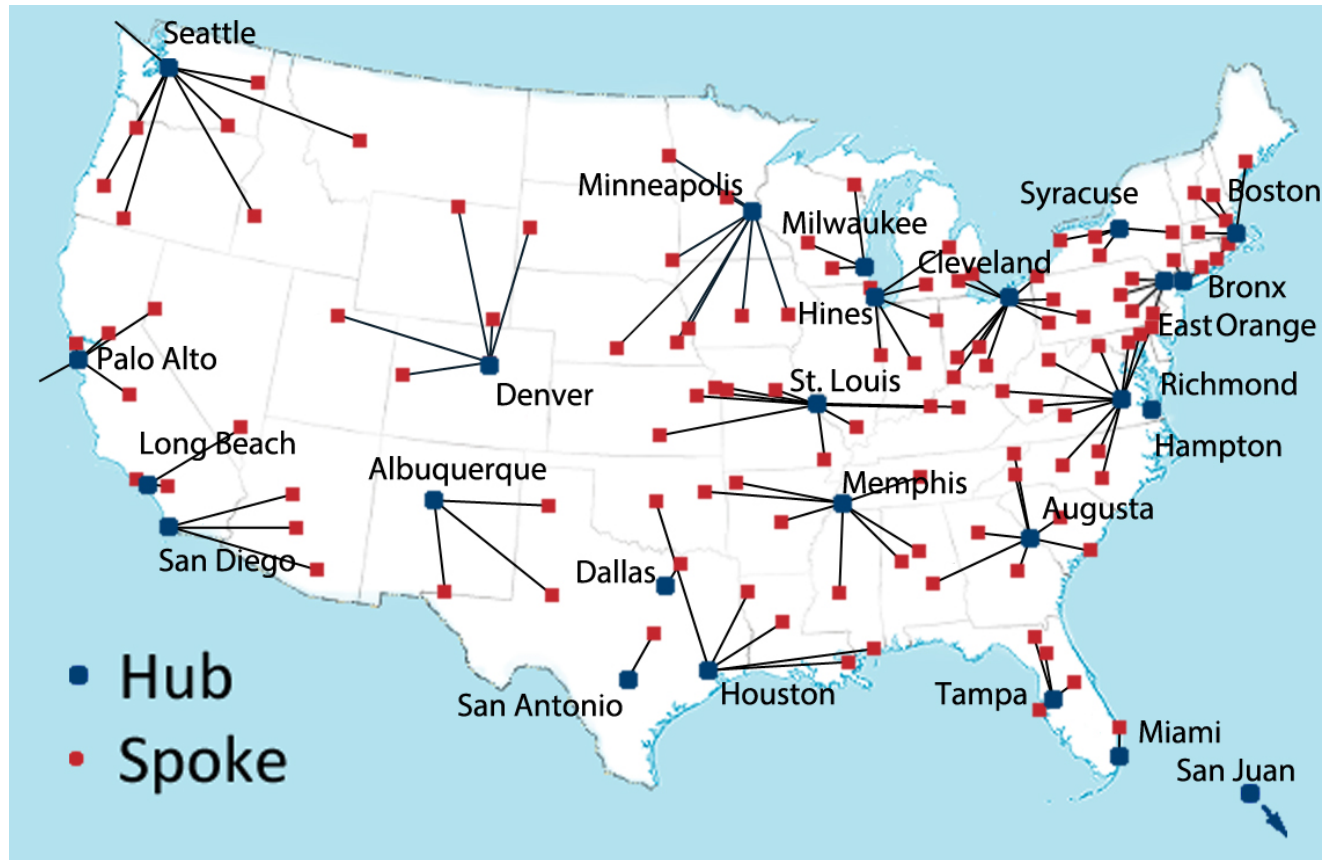


Medication adherence



How patients like to receive
information

VHA SCI/D System of Care



- 25 centers nationally
- Physiatrists as primary care physicians
- VHA 1176

<https://www.sci.va.gov/index.asp>



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SCI/D-Specific Interventions and Implementation

- Skelton-Dudley, F, et al. *Topics in Spinal Cord Injury Rehabilitation*, in press.

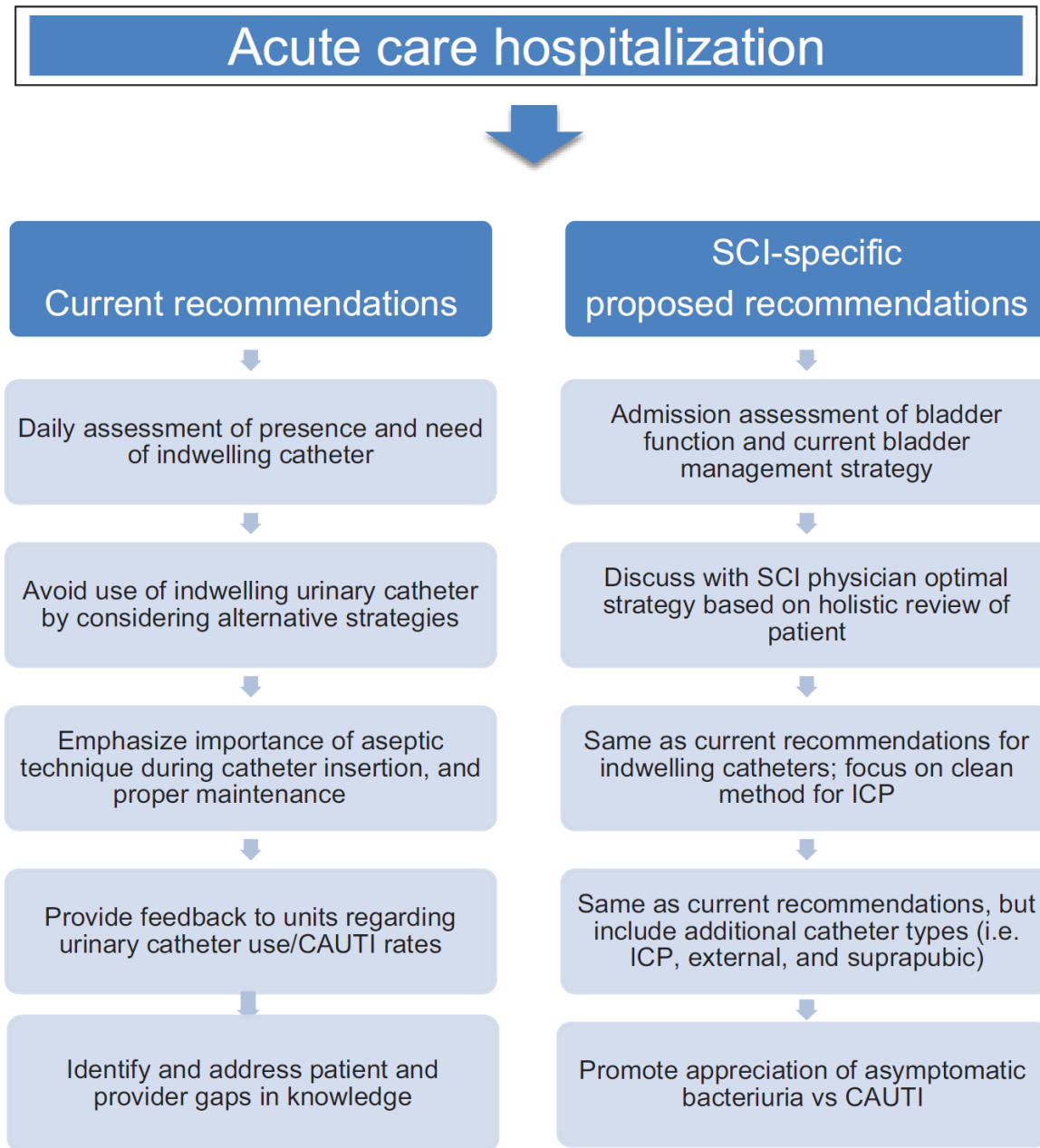
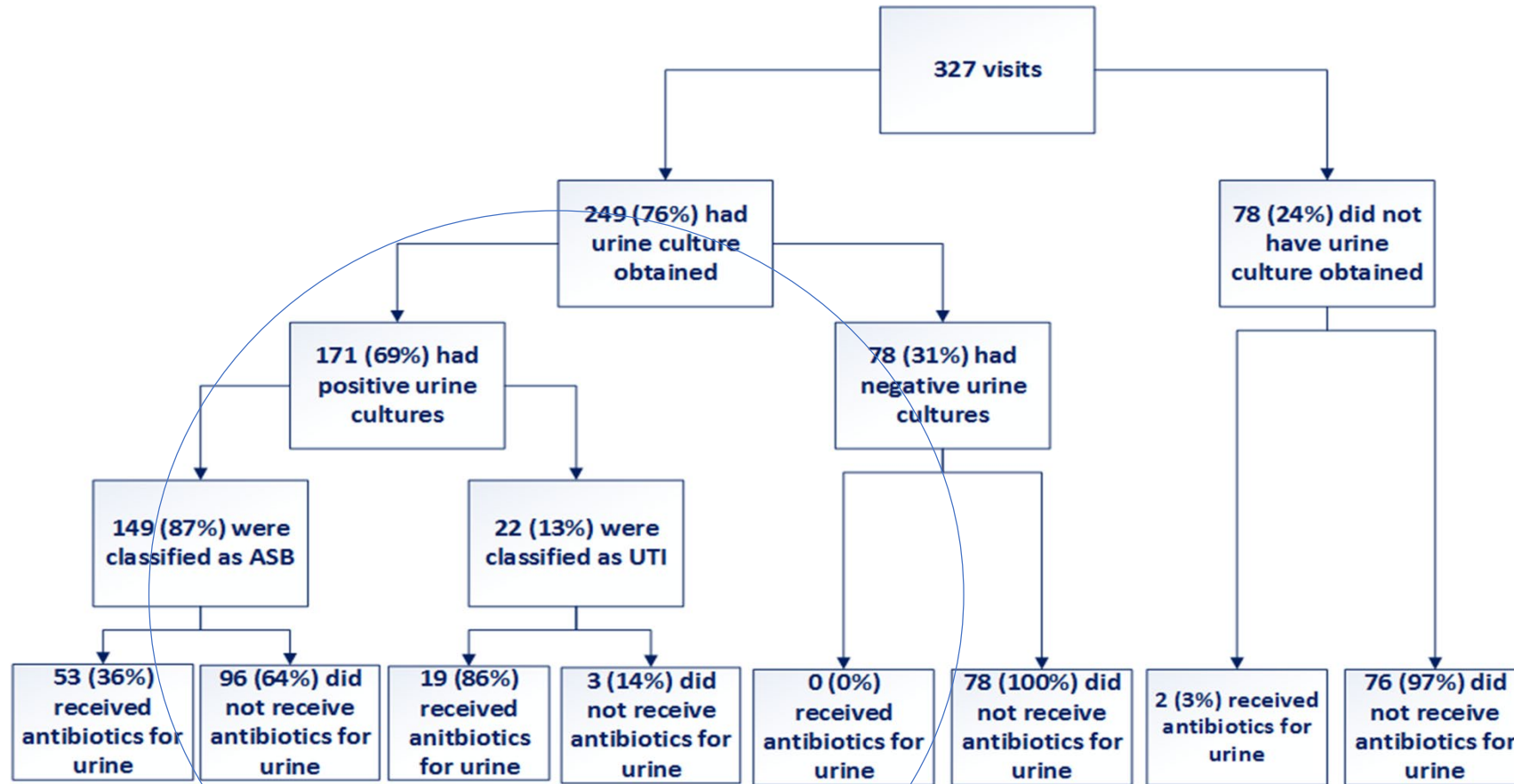


Figure 1. Catheter-associated urinary tract infection (CAUTI) bundle tailored to spinal cord injury (SCI) population. ICP = intermittent catheterization program.



Preliminary Studies

Positive Urine Cultures Drive Antibiotic Use



Skelton, F, et, al. *Arch Phys Med Rehabil*, 2018.

Bacteriuria Management and Outcomes at a Single VHA SCI/D Clinic

Predictors of Antibiotic Use for ASB				
	Univariate		Multivariate	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Age	1.06 (1.02-1.09)	<0.01*	1.05 (1.01-1.09)	<0.01**
LE +	8.71 (1.11-68.22)	0.04*	4.88 (0.57-41.83)	0.15
Nitrite +	2.44 (1.22-4.88)	0.01*	2.78 (1.31-5.90)	<0.01**
UPO on culture	3.42 (1.69-6.89)	<0.01*	2.92 (1.38-6.18)	<0.01**
OR=odds ratio; CI=confidence interval, LE=leukocyte esterase, UPO=urease-positive organism				

Skelton, F, et, al. *Arch Phys Med Rehabil*, 2018.

Healthcare
Utilization 60
Days after the
Annual
Evaluation
Encounter

	Received antibiotics for ASB	Did not receive antibiotics for ASB	p-value
ER visit, n (%)	2 (3.8%)	6 (6.3%)	0.512
Hospitalization, n (%)	6 (11.3%)	5 (5.3%)	0.178
Had another urine culture collected, n (%)	9 (17%)	13 (14%)	0.589
Diagnosed with UTI, n (%)	4 (7.5%)	5 (5.2%)	0.648
Diagnosed with urologic complication, n (%)	2 (3.8%)	5 (5.3%)	0.682

SCI/D-Specific Results
of a National
Veterans Health
Administration
Survey on Antibiotic
Stewardship



- 2012 web-based surveys administered to 130 facilities with inpatient and outpatient facilities
 - 23 facilities with SCI/D centers
 - 107 facilities without SCI/D centers

Skelton, F, et, al. *J Spinal Cord Med.* 2018.

Domain	Facility factor	Centers with SCI units N=23 (%)	Centers without SCI units N=107) (%)	P value
Antibiotic stewardship team	ID physician was part of AS team	15 (65%)	32 (30%)	<0.01*
	Clinical pharmacist/clinical pharmacy specialist was part of AS team	15 (65%)	36 (34%)	<0.04*
	Clinical pharmacist/clinical pharmacy specialists had ID training	13 (57%)	21 (20%)	<0.01*
Training programs	Pharmacy residency program	23 (100%)	79 (74%)	<0.01*
	ID pharmacy residency program	6 (26%)	6 (6%)	<0.01*
	ID fellowship program	22 (96%)	46 (43%)	<0.01*
	Internal medicine residency program	23 (100%)	72 (67%)	<0.01*
	Surgical residency program	22 (96%)	62 (58%)	<0.01*
	Emergency medicine residency program	7(30%)	10 (9%)	<0.01*
Antibiotic restrictions and policies	Policy to promote substitution of oral for parenteral antibiotics	23 (100%)	13 (12%)	<0.01*
	Policy for de-escalation of antibiotics	21 (91%)	17 (16%)	<0.01*
Antibiotics guidelines	Written clinical pathways/guidelines for specific conditions	21 (91%)	75 (70%)	0.01*
SCI=spinal cord injury; AS=antibiotic stewardship; ID=Infectious Diseases				

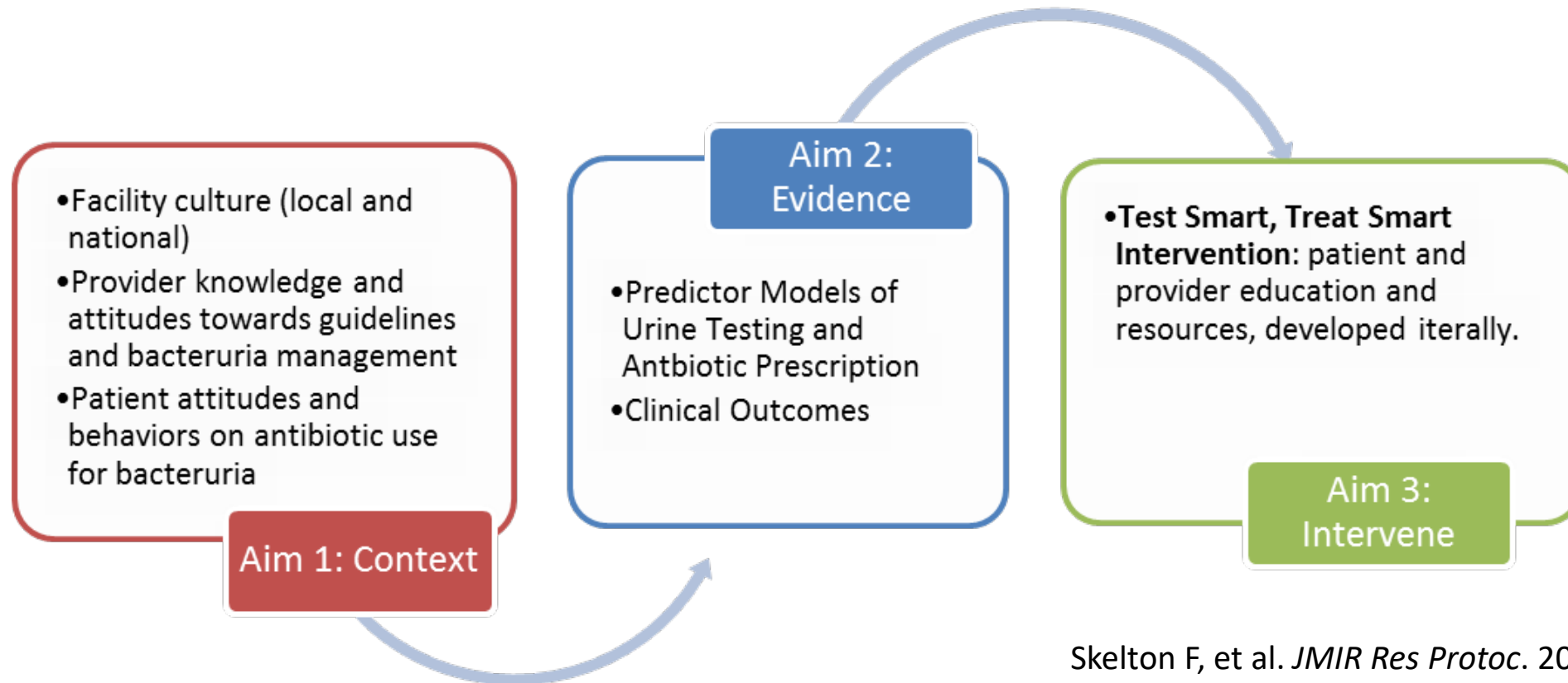
Gaps In Current Knowledge

We need to understand what SCI/D patients believe, want, and expect in regards to having their urine tested annually, and being prescribed and adhering to antibiotics.

We need to understand SCI/D providers' concerns and rationale behind urine testing in the absence of symptoms.

We need to understand the outcome of these testing and treatment decisions on a national scale to disprove or prove our hypotheses.

Optimizing Bacteriuria Management in Veterans with SCI/D

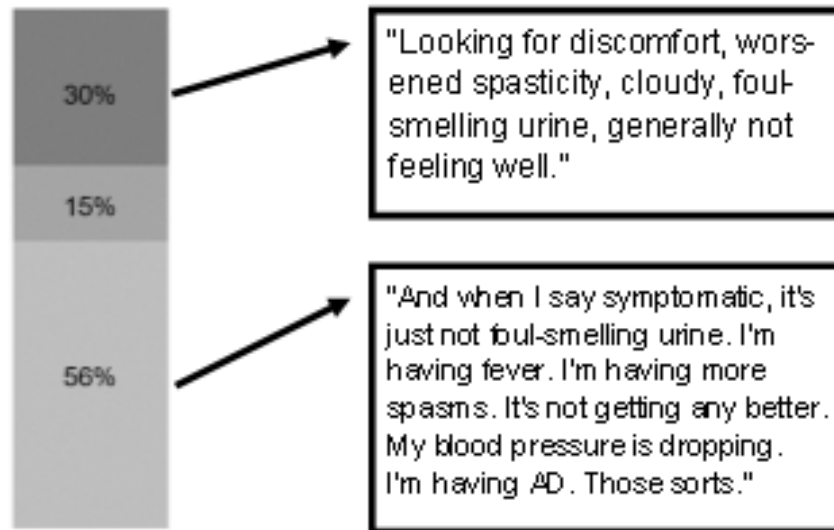


Skelton F, et al. *JMIR Res Protoc*. 2019.

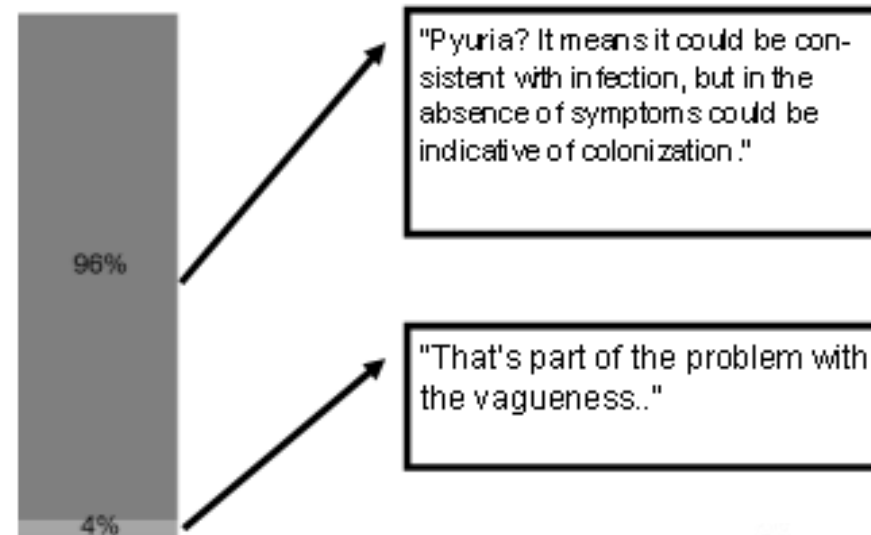
SCI/D Provider Knowledge and Attitudes Towards Antibiotic Stewardship for Bacteriuria

A. Testing

I usually order a urine culture on catheterized patients when there is a change in urine color, cloudiness or odor.



I feel confident that I know when to order a urine culture on a catheterized patient.

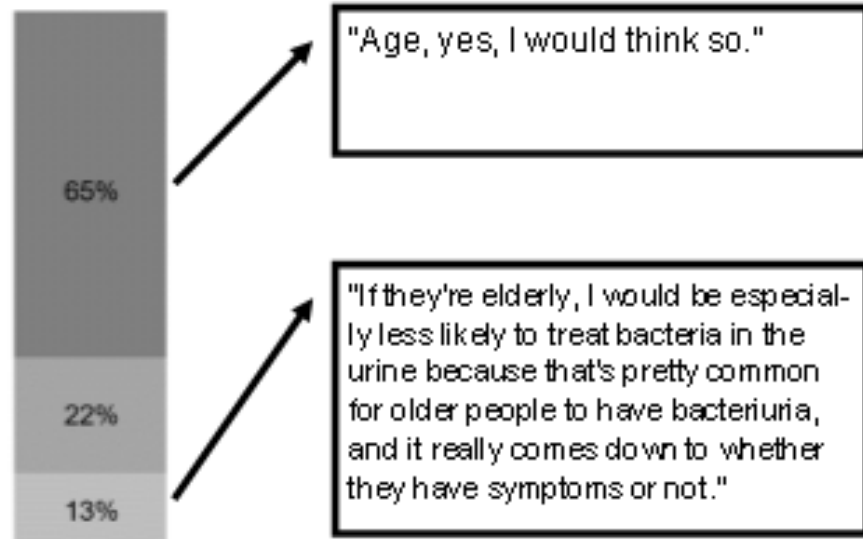


■ Disagree ■ Neutral ■ Agree

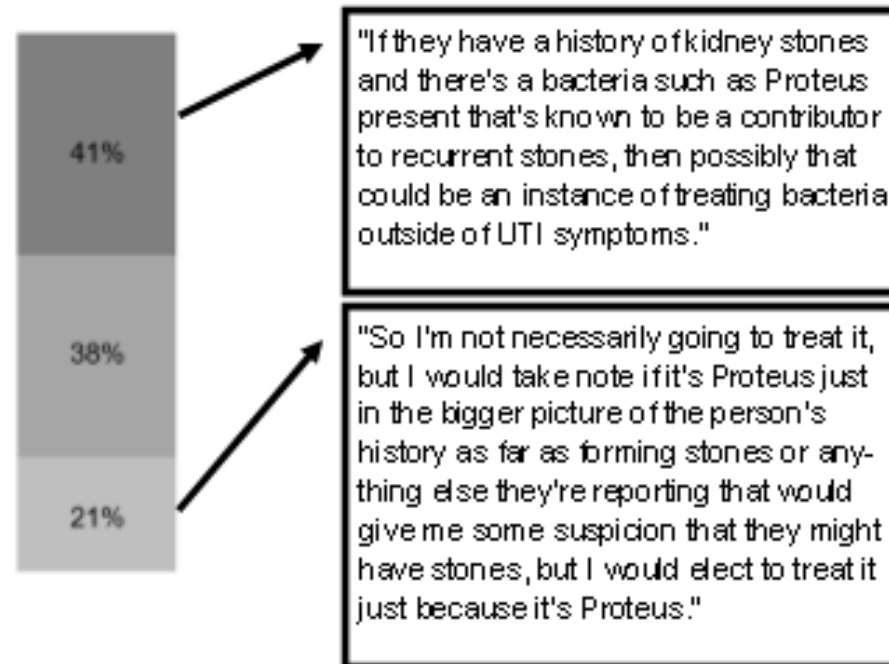
SCI/D Provider Knowledge and Attitudes Towards Antibiotic Stewardship for Bacteriuria

B. Treatment

ASB requires treatment more often in geriatric patients than younger patients.



Gram negative organisms are more harmful if left untreated.

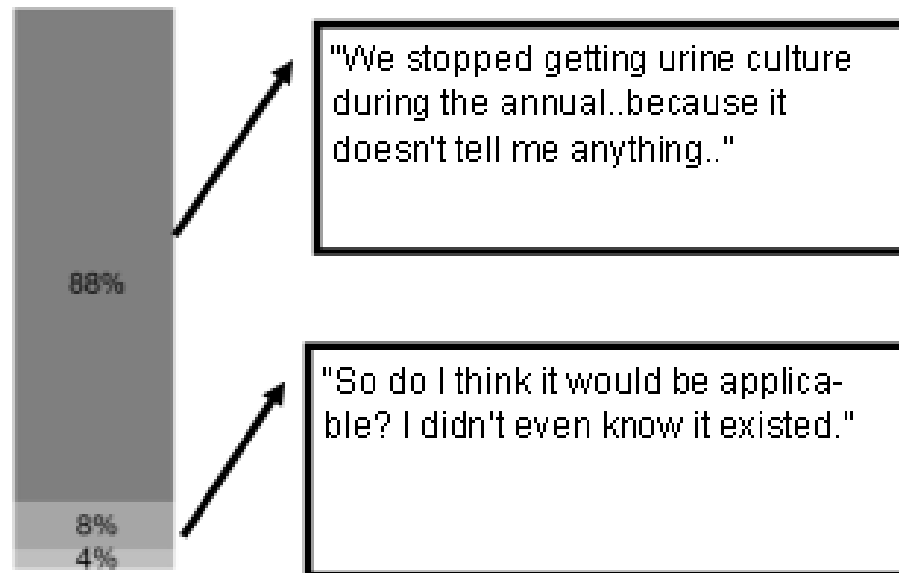


■ Disagree ■ Neutral ■ Agree

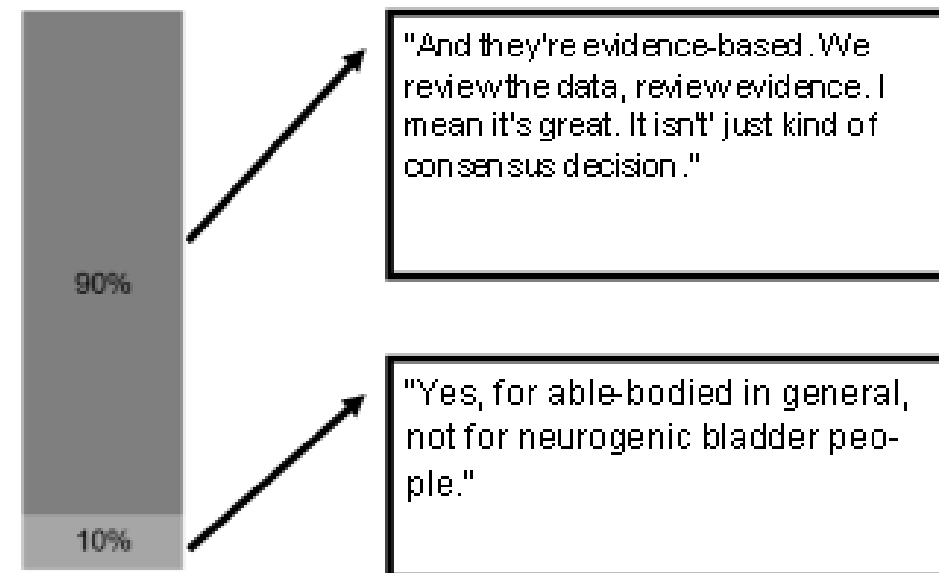
SCI/D Provider Knowledge and Attitudes Towards Antibiotic Stewardship for Bacteriuria

C. Guidelines

I feel confident that I can apply ASB guidelines to my patients.



Acceptance of Guidelines



Patient Attitudes and Behaviors towards UTI and Antibiotic Use after SCI/D

Qualitative Interviews

Quantitative data: Morisky
Medication Adherence Scale-8

Recruitment ending, initial
analysis ongoing

Leveraging Big
Data to Explore
the Consequences
of Urine Testing
and Antibiotic Use
During the SCI/D
Annual Evaluation

Corporate Data Warehouse and the SCI/D
Registry Report from VHA Support Service
Center Capital Assets (VSSC)

Over 7,000 unique SCI/D annual
evaluation encounters in FY 18 and 19

Exposure: antibiotic use within 7 days of
the annual evaluation encounter

Outcomes: subsequent urine testing, ER
visits, hospitalizations, *C. difficile* infection

Next Steps

Develop

- “Test Smart, Treat Smart”
intervention
- Patient and provider components



Conduct

Feasibility trial of intervention use
during the SCI/D annual evaluation in
Houston

Research Directions

- Diagnostic tools or biomarkers to distinguish CAUTI from ASB in people with SCI/D
- SCI/D-specific CAUTI evidence, with the goals of
 - Minimizing catheter-related harm
 - Reducing emergence of antibiotic resistance
 - Improve quality of life for SCI/D patients

Acknowledgements

- **Career Development Award Mentors and Advisors**

- Barbara Trautner, MD, PhD
- Ivy Chui Poon, PharmD
- Sally Ann Holmes, MD
- Lindsey Ann Martin, PhD
- Charlesnika Evans, PhD MPH
- Anne Robinson, Texas Paralyzed Veterans of America President

- **Other Mentors and Collaborators**

- Laura Petersen, MD, MPH
- Mark Kunik, MD, MPH
- Barry Goldstein, MD, PhD
- Stephen Burns, MD
- Larissa Grigoryan, MD, PhD
- Katie Suda, PharmD, MS
- Aanand Naik, MD
- LeChauncey Woodard, MD, PhD
- Jennifer Kramer, PhD, MPH
- Ashok Balasubramanyam, MD
- Jesus Vallejo, MD, PhD
- Fred Pereira, PhD
- Kelly Levitt



Questions?

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