Multimodal Antimicrobial Stewardship Quality Improvement Initiative in Critical Access Hospitals: Asymptomatic Bacteriuria

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Asymptomatic Bacteriuria (ASB)

- Presence of 1 or more species of bacteria growing in the urine in the absence of signs or symptoms of infection

- 15% of people aged 65-80 years and 50% of people older than 80 years have bacteria in their urine without symptoms

- Upwards of 65% of patients are given antibiotics for ASB

- ASB treatment is recommended only in pregnant women and patients undergoing endourological procedures

Givler, et al. StatPearls Publishing; 2021 July 25.
Lindsay, et al. Clininfect Dis. 2019.

Stewardship in Critical Access Hospitals (CAHs)

- In 2015, 26% of CAHs met all seven antimicrobial stewardship core elements

- Centers for Medicare and Medicaid Services (CMS) Final Rule
    - Required to provide antimicrobial stewardship programs in hospitals

- Prevalence and treatment of asymptomatic bacteriuria in CAHs, n=84 patients
    - ASB prevalence: 41/84 (48.8%)
    - Treatment of ASB: 37/41 (90.2%)

Centers for Diseases Control and Prevention. 2021.
Liu F, et al. Infection Control & Hospital Epidemiology. 2022.

Study Objectives

Implementation and Feasibility

Primary endpoint:

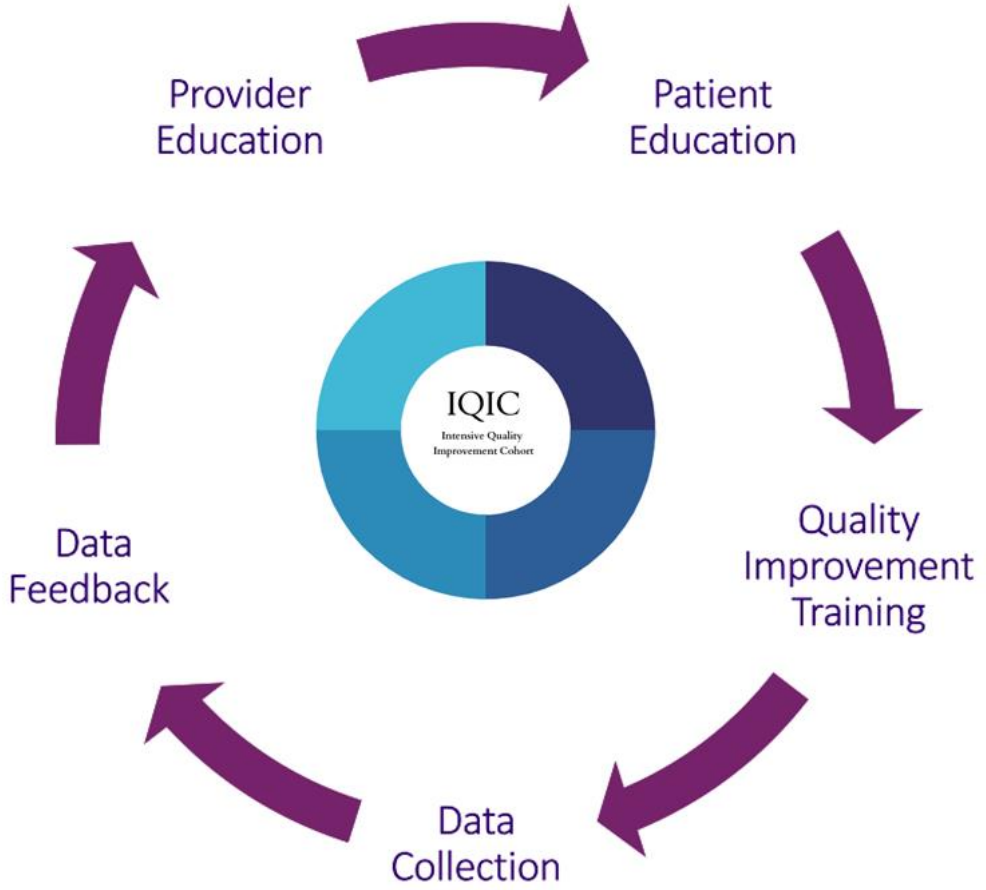
- Assess the feasibility of implementing a quality improvement program on antibiotic prescribing for ASB

Assessment of ASB

Secondary endpoints:

- Assess the prevalence of ASB
- Assess prescribing rate of unnecessary antibiotics for ASB

Evaluate the Impact of an Intensive Quality Improvement Collaborative (IQIC)



N = 19 rural and critical access hospitals

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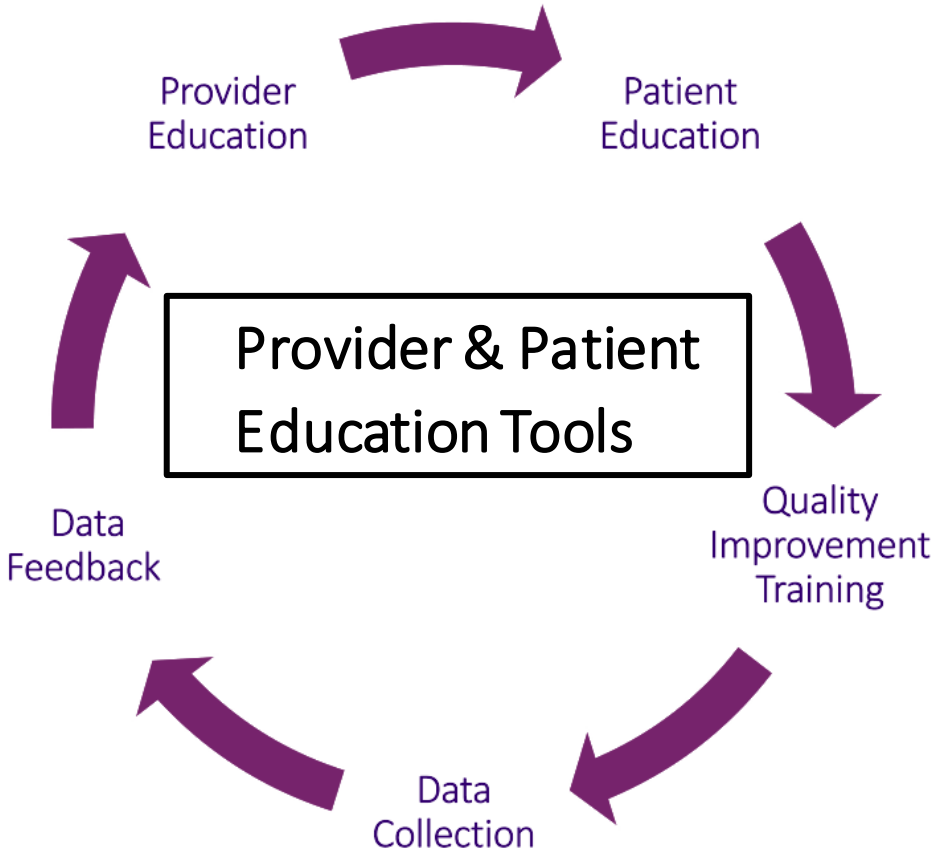
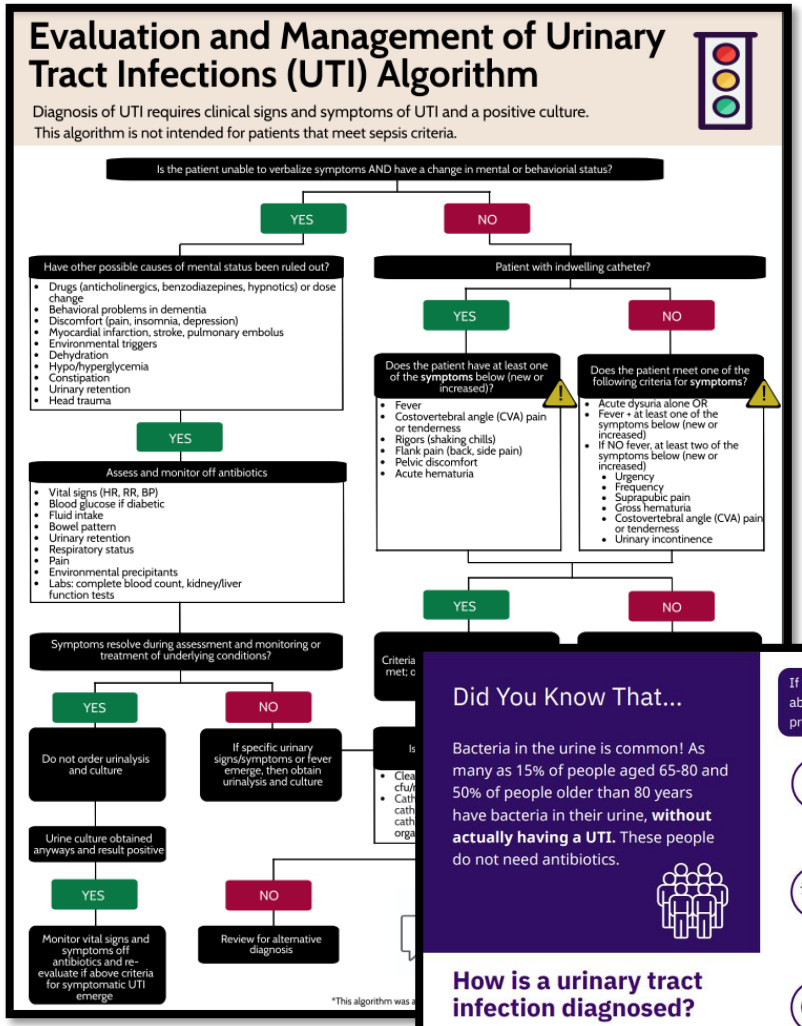
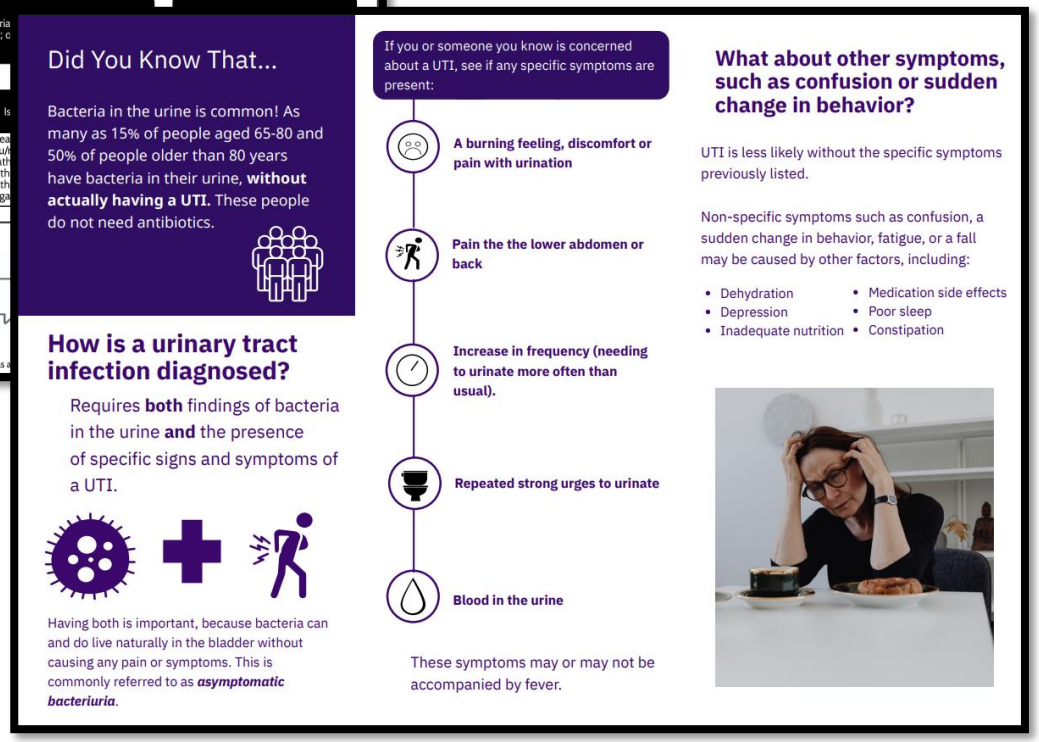
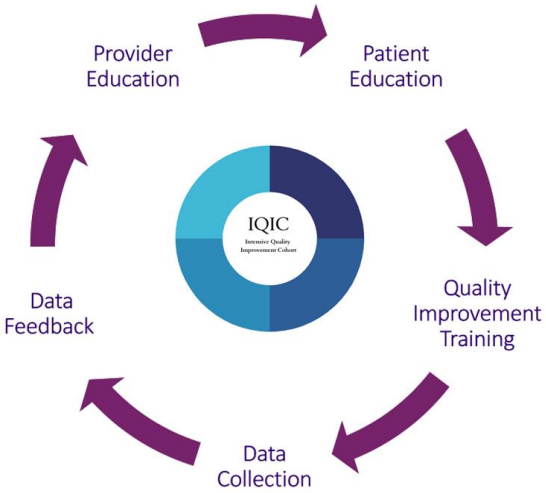
IQIC Structure

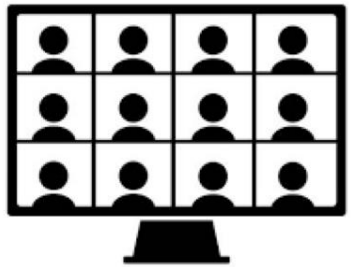






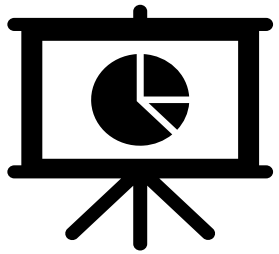
IQIC Structure





Meetings

- Monthly meeting (1 hr)
- Coaching sessions (30 min)
  - Monthly-Bimonthly



Day-to-Day Work

- Distributing education
  - Nursing huddles
  - Provider meetings
  - To patients
- Tracking impact
- Quality improvement goals
- Antibiotic prescribing rates

Assessment of ASB

How We Assessed ASB

Study outcomes

- Prevalence of ASB
    - Positive urine culture showing ≥100,000 CFU/mL of one or more bacteria in the absence of signs or symptoms attributable to urinary tract infection
- Rate of unnecessary antibiotics for ASB
    - Documentation of antibiotic treatment for bacteriuria

Sites Utilized a Data Collection Tool

REDCap survey utilized by participating hospitals to capture antibiotic prescribing for ASB

- Patient demographics
- Symptoms of urinary tract infection
- Location at time of culture collection
- Laboratory results
  - Quantity of bacteria
  - Organisms present
- Antibiotic selection
  - PO versus IV agents
  - Total therapy duration

REDCap
Research Electronic Data Capture

Variations in Defining Signs and Symptoms of UTI

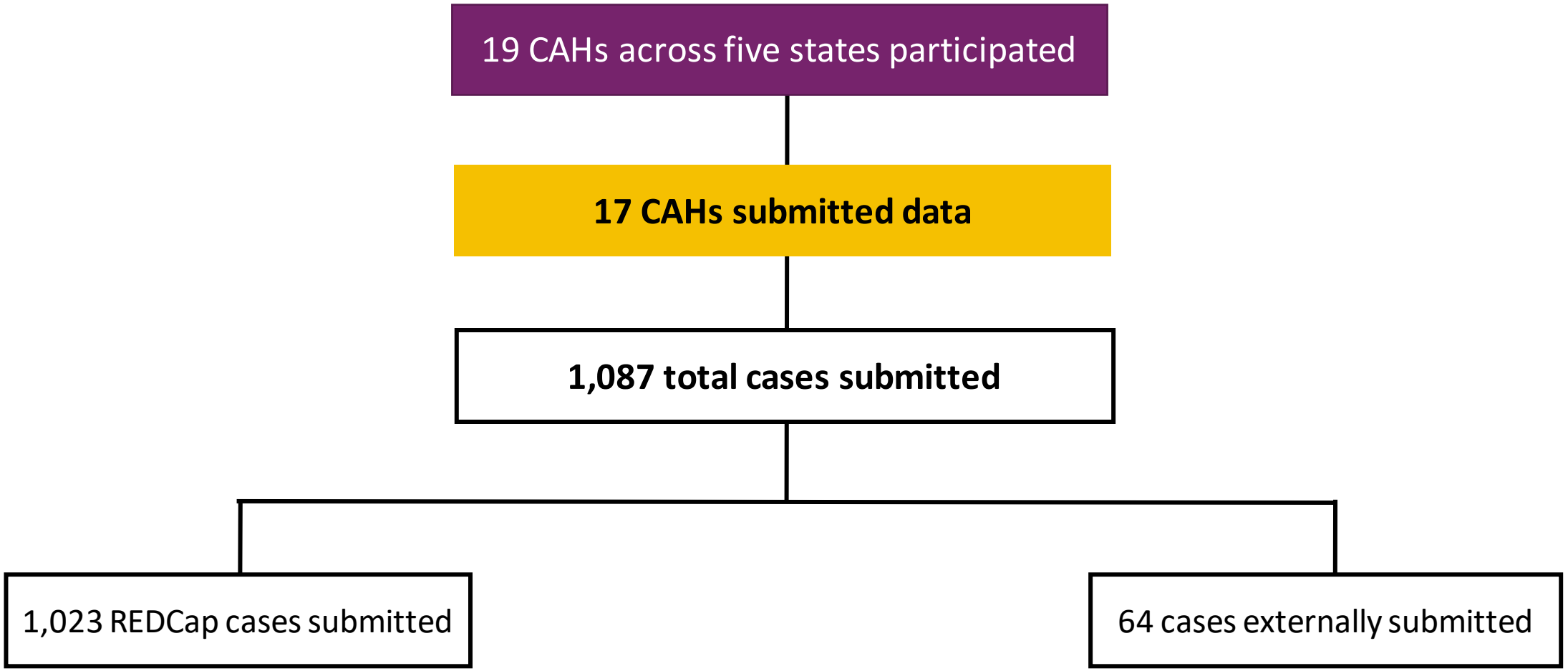
NHSN Definition of UTI

- At least **one** sign or symptom:
  - Fever (>38°C)
  - Suprapubic tenderness
  - Costovertebral angle pain or tenderness
  - Urinary urgency
  - Urinary frequency
  - Dysuria

Study Definition of UTI

- At least **one** sign or symptom related to UTI:
  - Fever (>38°C)
  - Suprapubic tenderness
  - Costovertebral angle pain or tenderness
  - Urinary urgency
  - Urinary frequency
  - Dysuria
  - **Documentation of pyelonephritis**
  - **Flank pain**
  - **Acute hematuria**
  - **Rigors**
  - **New onset mental status changes**
  - **Nausea and/or vomiting**

Inclusion in the Assessment of ASB



Baseline Characteristics

	Study Population			Prevalence of ASB, n=132 (24.3%)	
	Overall, n=997	Negative Urine Cultures, n=453 (%)	Positive Urine Cultures, n=544 (%)	Treated, n=99 (%)	Not treated, n=33 (%)
Median age, years	69	65.5	72	77.5	74
Female	743 (76)	323 (71)	420 (77)	69 (70)	30 (91)
Urological comorbidities present	167 (17)	78 (17)	89 (16)	19 (19)	31 (94)
Location of urine culture collection					
ED, then admitted	243 (24)	113 (25)	130 (24)	34 (34)	10 (30)
ED, then discharge	483 (48)	229 (51)	254 (47)	43 (43)	13 (39)
Outpatient	254 (25)	100 (22)	154 (28)	19 (19)	10 (30)
Inpatient	17 (2)	11 (2)	6 (1)	3 (3)	0 (0)

*Outpatient: ambulatory care clinic, rehab or long-term care, urgent or quick care facility, home health

Infection Characteristics

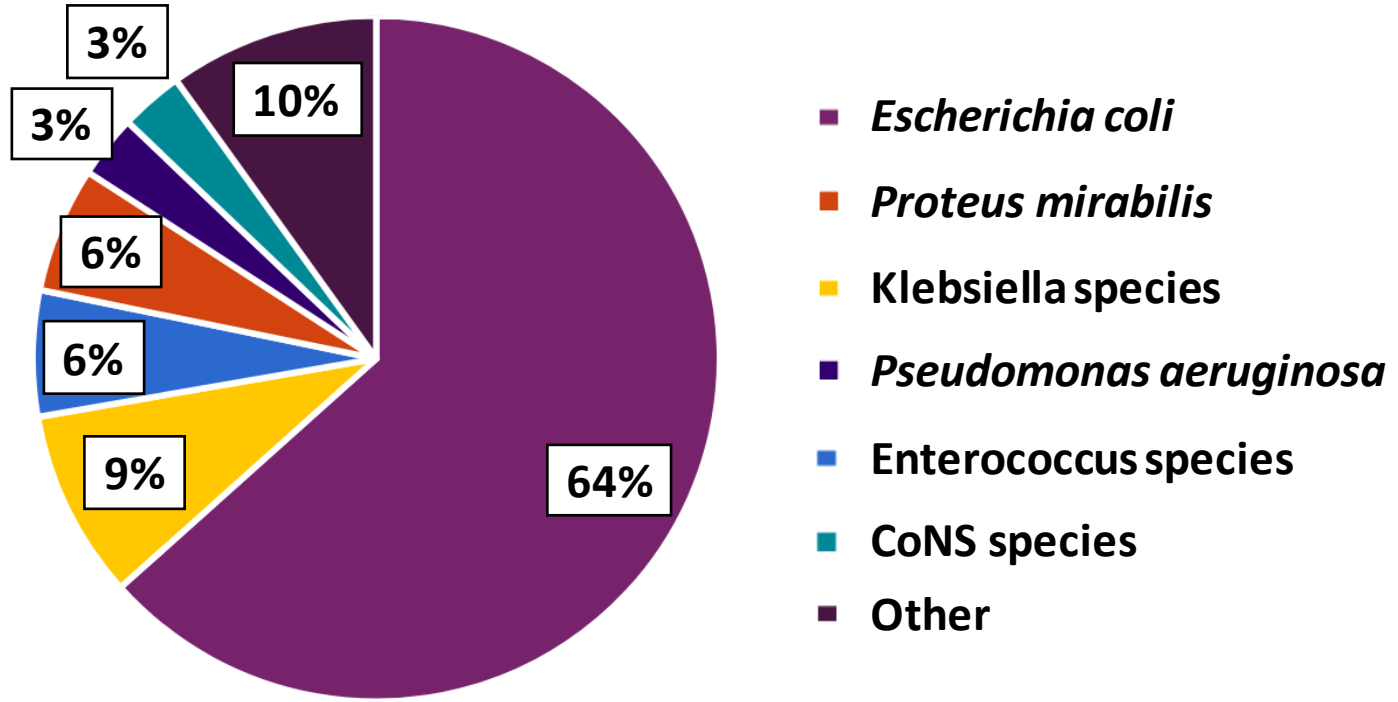
	Study Population			Prevalence of ASB, n=132 (24.3%)	
	Overall, n=997	Negative Urine Cultures, n=453 (%)	Positive Urine Cultures, n=544 (%)	Treated, n=99 (%)	Not treated, n=33 (%)
Documented signs and symptoms of urinary tract infection	713 (72)	321 (71)	412 (76)	0	0
Suspected or confirmed concomitant bacterial infection and receiving antibacterials for treatment	106 (11)	48 (11)	58 (11)	10 (10)	2 (6)
SIRS criteria and/or organ dysfunction *	467 (47)	210 (46)	287 (53)	53 (54)	8 (24)

* Temp >38°C or <36°C, HR >90, RR >20, WBC >10; New organ dysfunction: Scr >2, bilirubin >2, platelet < 100,000, INR >1.5, lactate >2, SBP < 90

Laboratory Findings

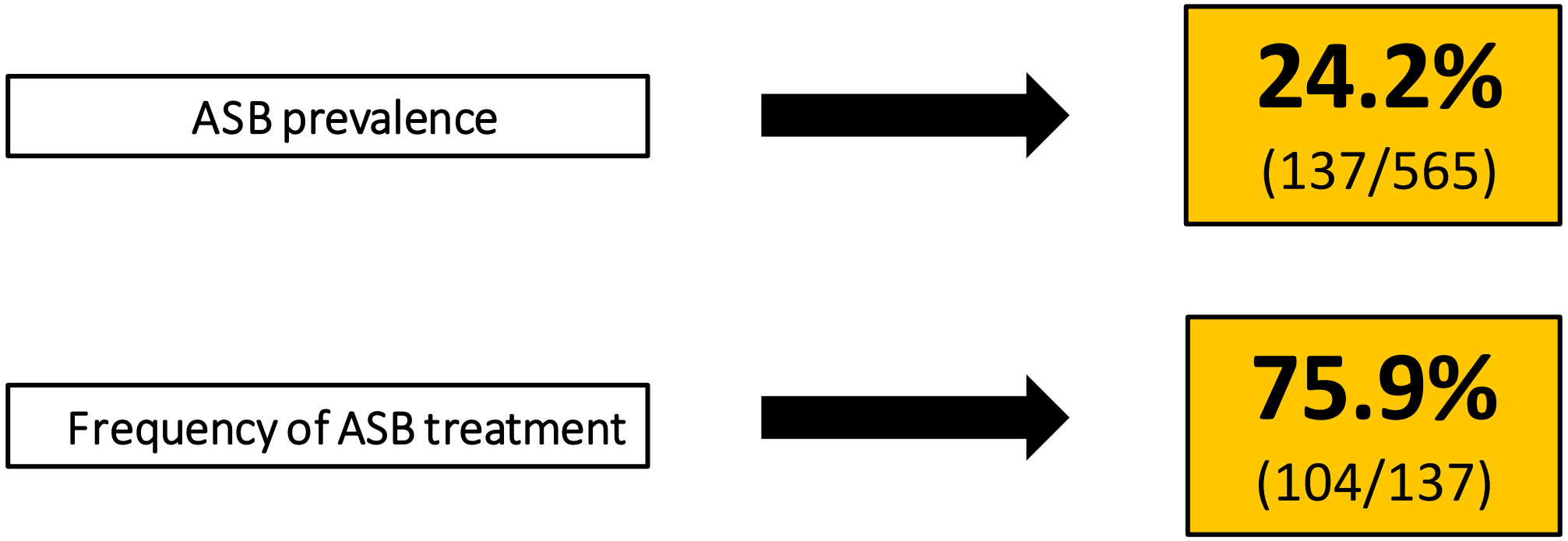
	Study Population		
	Overall, n=997	Negative Urine Cultures, n=453 (%)	Positive Urine Cultures, n=544 (%)
Urinalysis reflexed to culture	754 (76)	268 (59)	486 (89)

Positive Urine Culture Bacteria Types

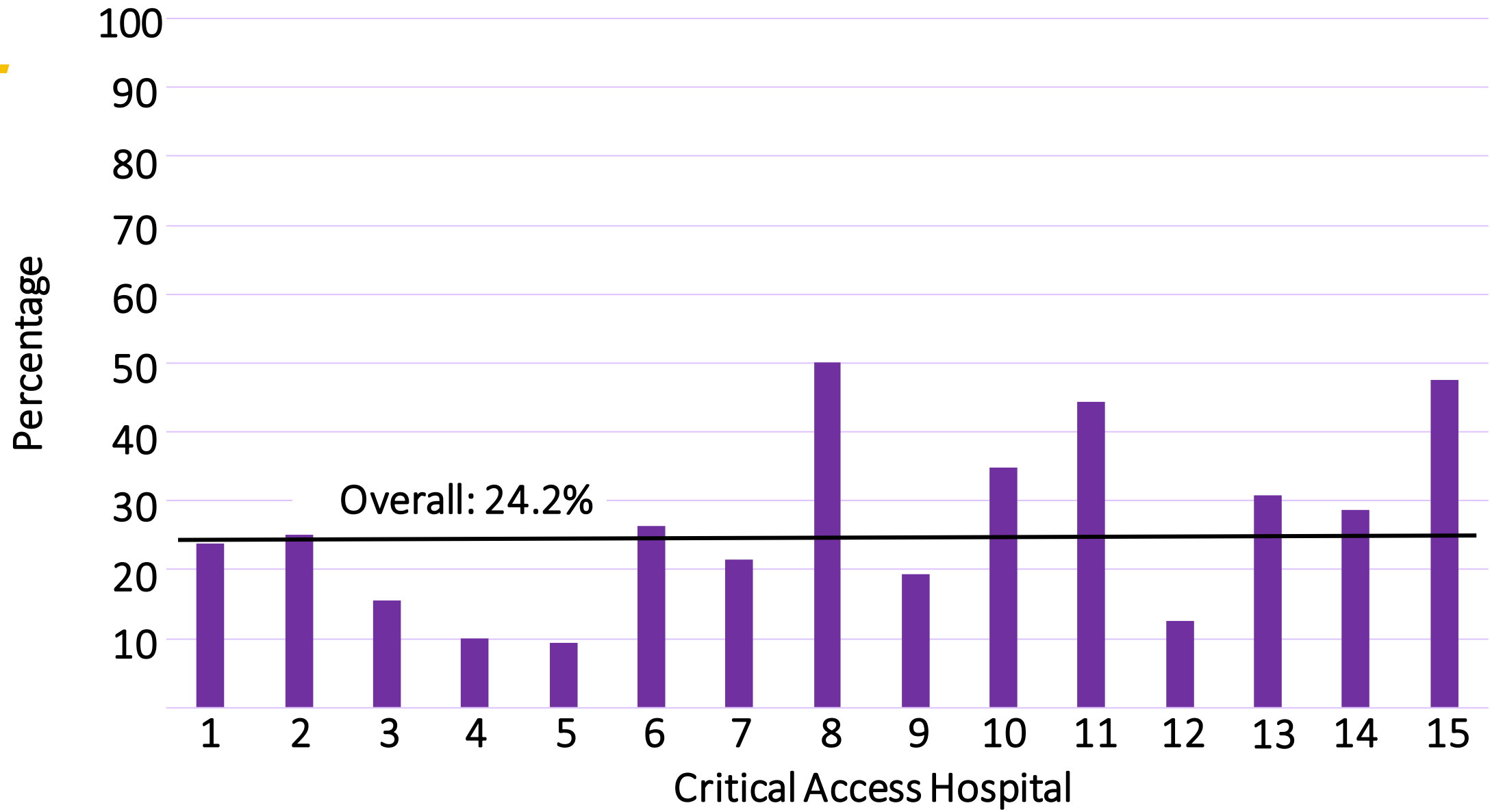


Prevalence and Treatment Rates of ASB

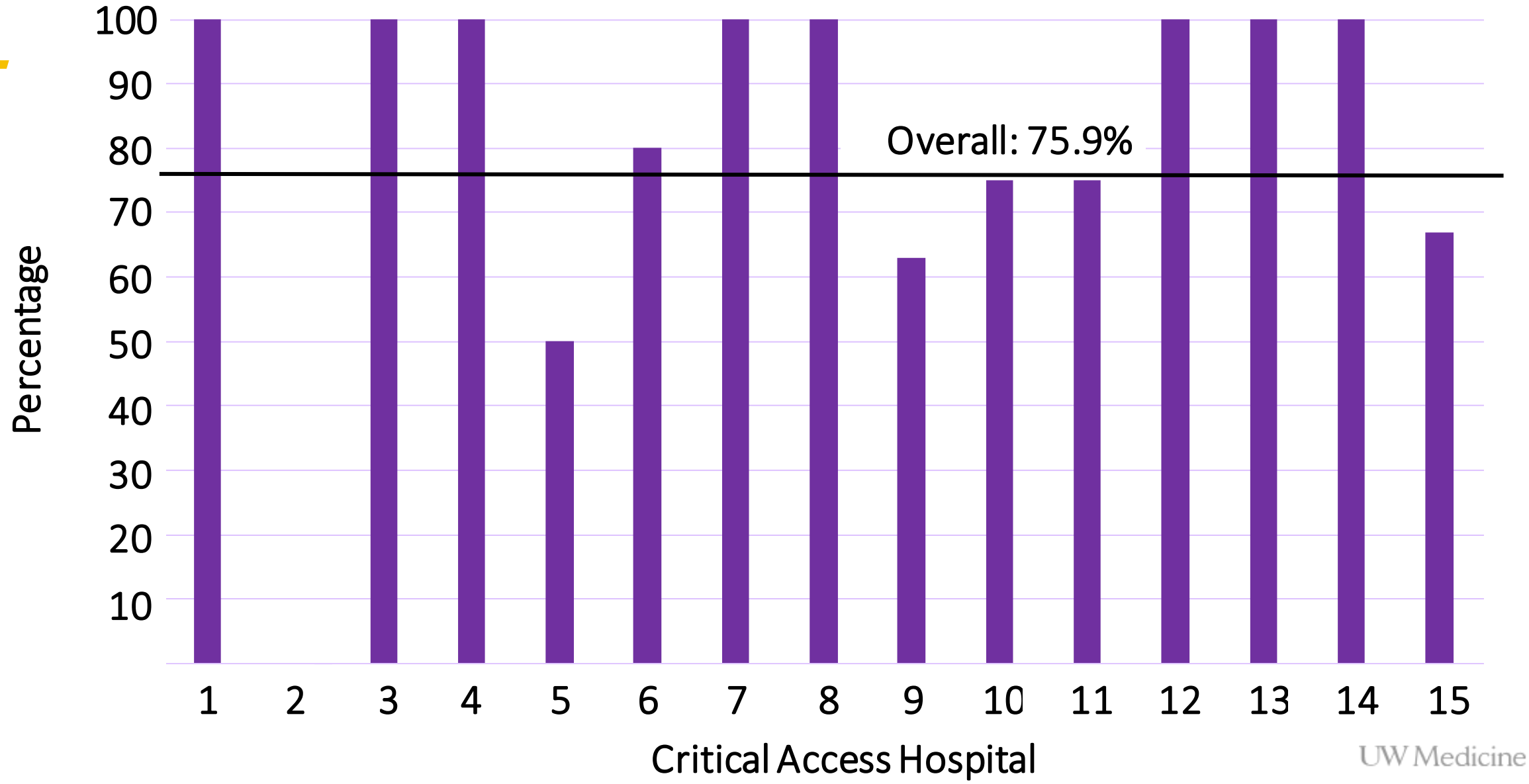
Study population, n = 1,087



Prevalence of ASB at your Sites



Treatment Rate of ASB at your Sites



Antibiotic Selection

	Overall Study Population, n=997 (%)	ASB Treated Population, n=99 (%)
IV antimicrobial therapy during hospitalization	329 (33)	47 (47)
IV antimicrobial therapy at discharge	12 (1)	2 (2)
Any PO antimicrobial therapy	724 (73)	79 (80)
Median total antimicrobial duration of therapy	7 days	6 days

Discussion

- Low prevalence of ASB, high treatment rate
- Potential bias in patient selection
- Target opportunities for stewardship interventions
  - Shortening treatment duration
  - Appropriate antibiotic initiation for presumed UTI
- Future directions
    - Round two of pilot study
    - F-ASB 2.0

Conclusion

- Training the stewards to manage and identify ASB versus UTI as well as to use quality improvement tools was successful in launching stewardship initiatives among CAHs
- Data in CAHs is underrepresented and our pilot showed that we have the ability to collect data from these individual sites
- Low prevalence of ASB in CAHs indicates appropriate diagnostic stewardship
- The high treatment rate of ASB in CAHs reinforces the need for a continued stewardship focus in the future

Thank you!!

Questions?

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