

Leveraging the Urinalysis to Understand True Antibiotic Overuse

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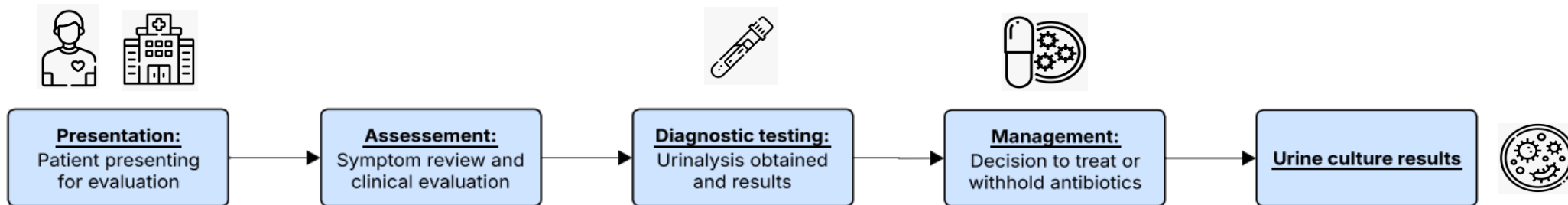
Urinary Tract Infections (UTIs) and Why This Matters

- UTIs drive **substantial healthcare impact** annually
 - 7.7 million ED visits for GU issues
 - 2.8 million hospitalizations for UTI diagnosis
- **Inappropriate** prescribing for UTIs is **significant**
- AMS programs have identified **ASB** as a critical target for **decreasing inappropriate antimicrobial use**

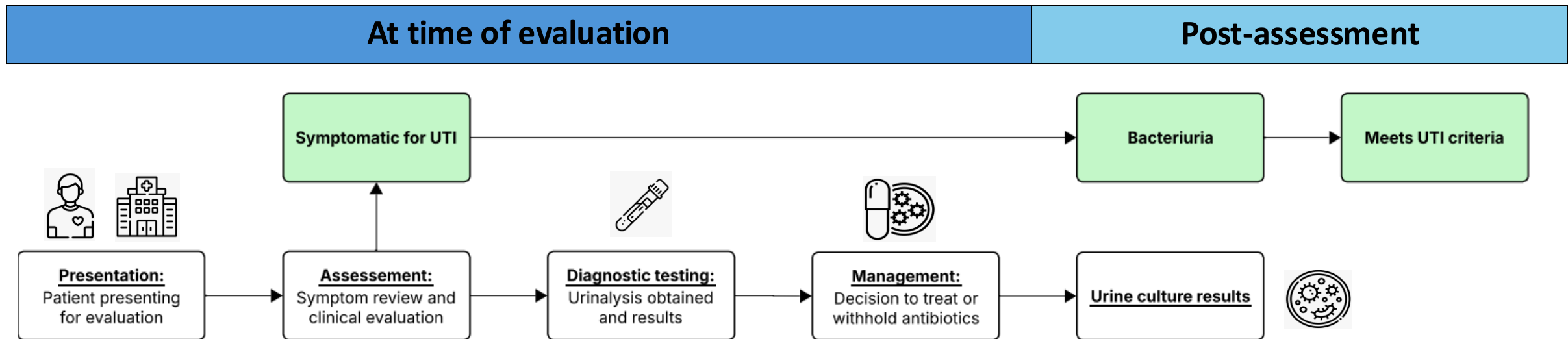
Asymptomatic bacteriuria (ASB) =

bacterial growth $\geq 10^5$ colony forming units/mL without genitourinary symptoms

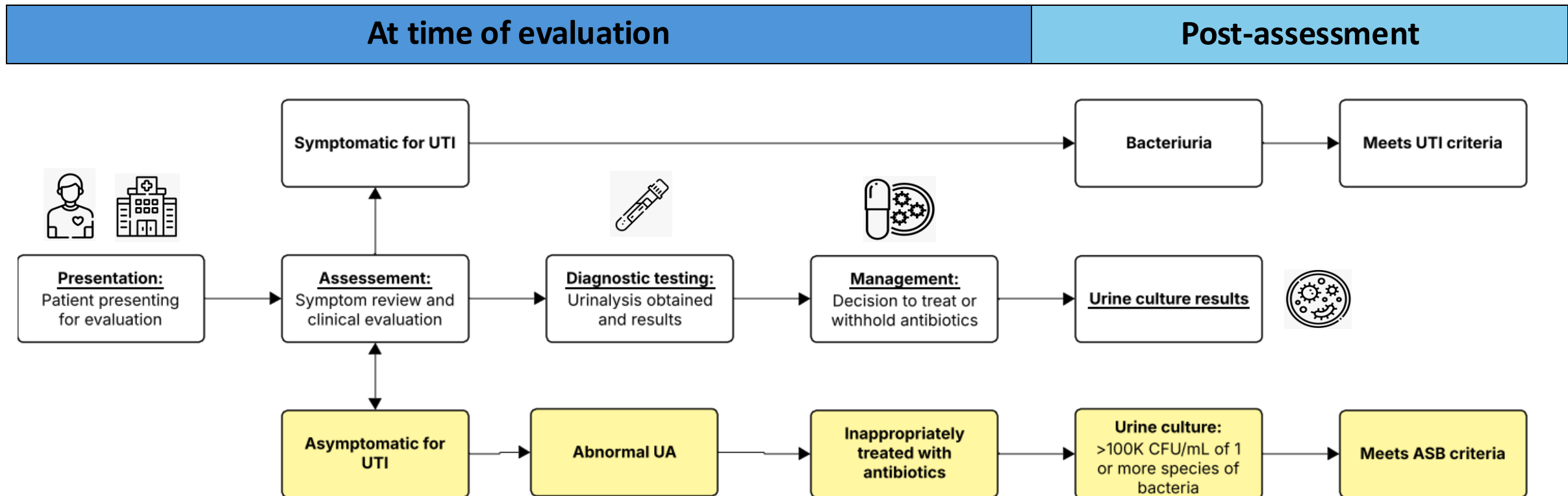
Current Workflow & Limitations of ASB-only Approach



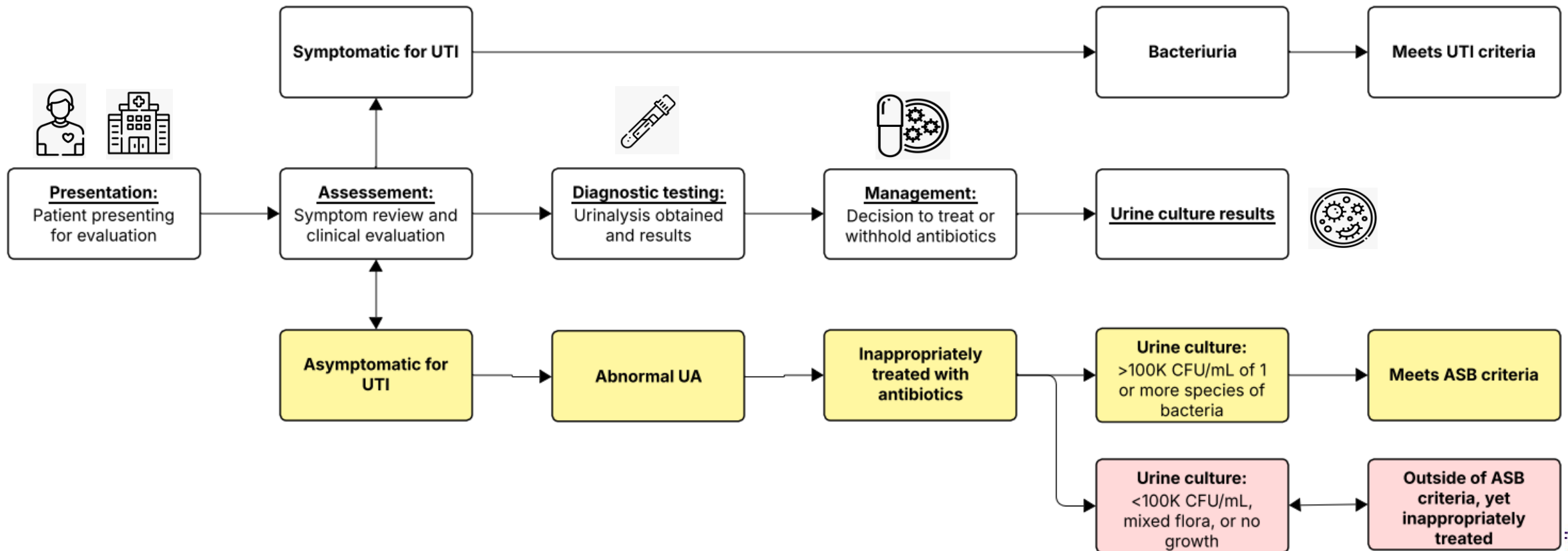
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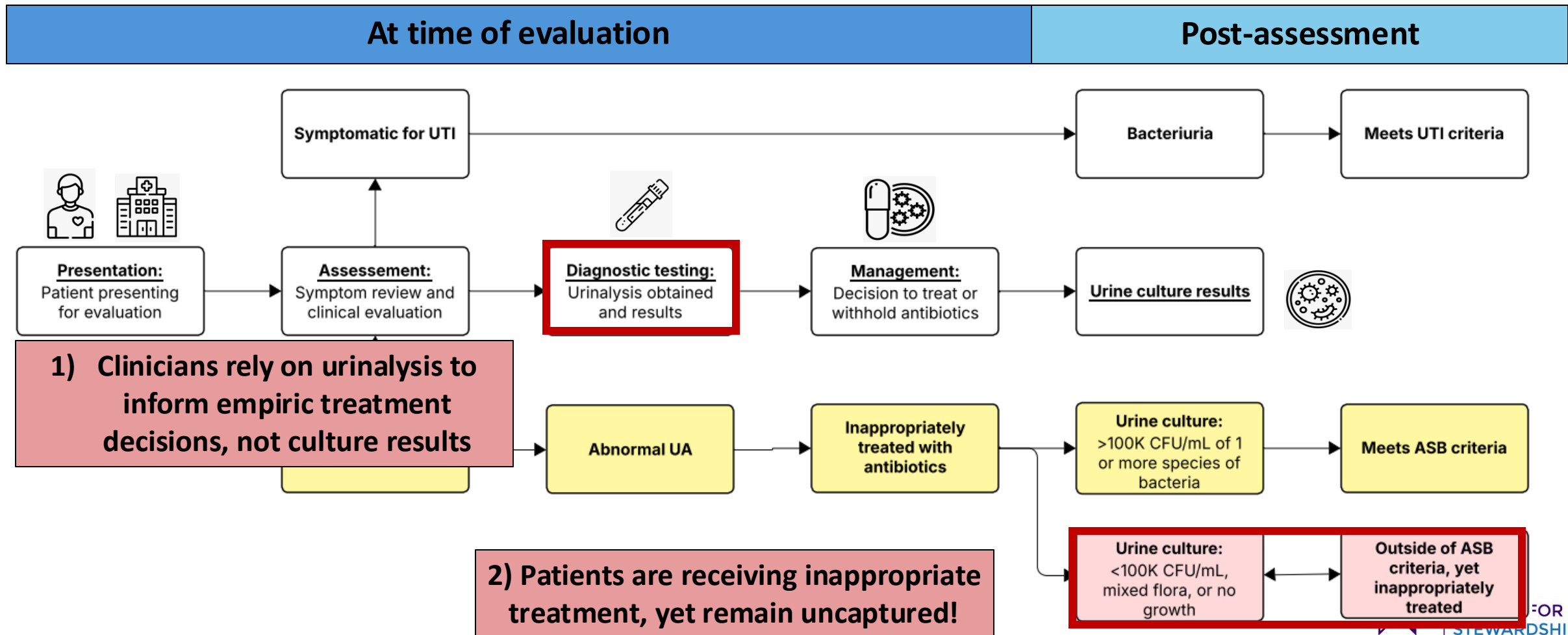
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Study Objectives

- **Key point:** using ASB criteria alone likely underrepresents unnecessary antibiotic use for UTIs and limits tracking of overuse
- **Our study questions:**
 - What are the overlaps and differences in inappropriate antibiotic use among asymptomatic patients with bacteriuria (ASB) versus those with asymptomatic pyuria and/or nitrituria (term we coined "ASPN")?
 - Does ASPN provide a more comprehensive measurement of antibiotic overuse?

Definitions

- **Presence of UTI:**

- Urinary urgency or frequency, dysuria, costovertebral angle pain or tenderness, suprapubic pain, temperature $>38^{\circ}\text{C}$, or altered mental status plus a systemic sign of possible infection

- **ASB:**

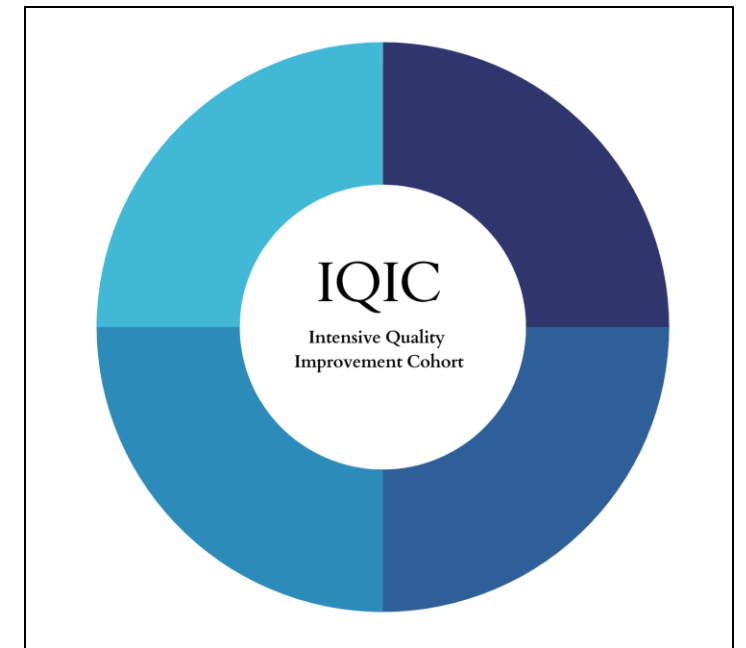
- Urine culture with $>100,000$ CFU/mL of 1 or more species of bacteria without signs or symptoms of UTI

- **ASPn:**

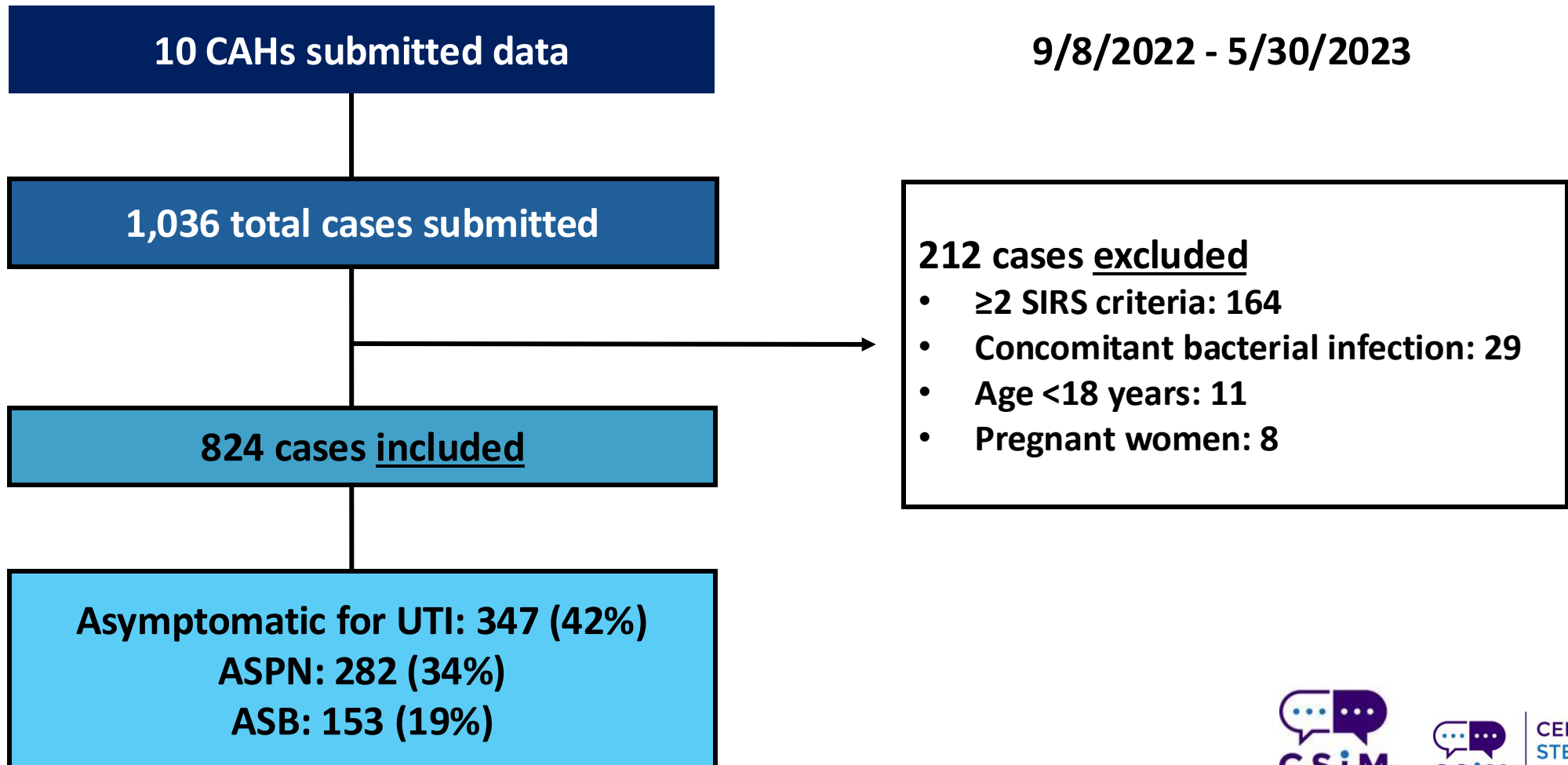
- Positive leukocyte esterase or WBC >10 or positive nitrites on urinalysis without signs or symptoms of UTI

Methods & Curriculum

- Ten CSiM sites underwent an intensive quality improvement cohort (IQIC) focused on UTIs
- IQIC curriculum
 - Monthly didactic sessions (n=12)
 - Quarterly coaching sessions (n=3)
 - Set SMART goal
 - Record progress in Plan-Do-Study-Act (PDSA) cycle
 - **Collect data (1-2 cases/week or 6 cases/month)**



Methods



Results

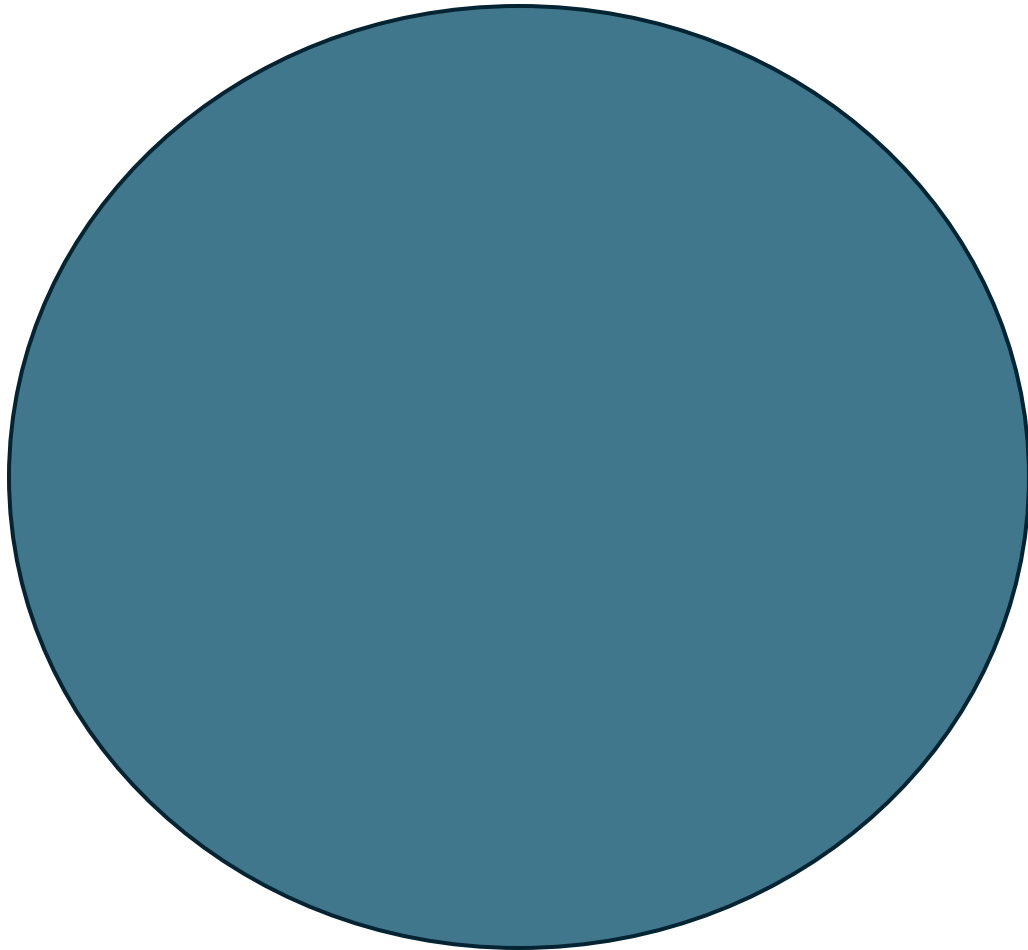
Table 1. Baseline and clinical characteristics

Variables	Asymptomatic for UTI, N = 347		Pyuria/Nitrituria (ASPN), N = 282		ASB with >100,000 CFU/ml, N = 153	
	Treated n = 249 (%)	Not Treated n = 98 (%)	Treated, n = 222 (%)	Not Treated, n = 60 (%)	Treated, n = 133 (%)	Not Treated, n = 20 (%)
Age, median y [IQR]	76 [66–84]	71 [53–80]	76 [66–84]	72 [51–82]	76 [66–82]	77 [70–87]
Sex, female	174 (70)	64 (65)	154 (69)	45 (75)	91 (68)	17 (85)
Chronic catheter use	27 (11)	4 (4)	25 (11)	2 (3)	17 (13)	2 (10)
Location of urine study collection						
ED	193 (78)	76 (78)	177 (80)	45 (75)	101 (76)	15 (75)
Ambulatory care	43 (17)	14 (14)	34 (15)	11 (18)	24 (18)	2 (10)
Inpatient	13 (5)	8 (8)	11 (5)	4 (7)	8 (6)	3 (15)
Altered mental status alone	36 (14)	10 (10)	34 (15)	7 (12)	22 (17)	3 (15)
Positive urinalysis result						
Leukocyte esterase	202 (81)	53 (54)	202 (91)	53 (88)	110 (83)	12 (60)
WBC >10	148 (59)	24 (24)	148 (67)	24 (40)	100 (75)	12 (60)
Nitrites	93 (37)	10 (10)	93 (42)	10 (17)	91 (68)	6 (30)
Urine culture with no growth	39 (16)	44 (45)	32 (14)	23 (38)	–	–
Urine culture with any quantity of growth	210 (84)	54 (55)	190 (86)	37 (62)	–	–
>100,000 CFU/ml	147 (59)	22 (22)	137 (72)	16 (43)	133 (100)	22 (100)
51,000–100,000 CFU/ml	35 (14)	8 (8)	29 (21)	5 (14)	–	–
11,000–50,000 CFU/ml	19 (8)	18 (18)	15 (8)	13 (35)	–	–
≤10,000 CFU/ml	9 (4)	6 (6)	9 (5)	3 (8)	–	–

Abbreviations: UTI, Urinary tract infection; ASPN, asymptomatic pyuria and/or nitrituria; ASB, asymptomatic bacteriuria; IQR, Interquartile range; ED, Emergency Department; WBC, white blood cell count; CFU, Colony forming unit.

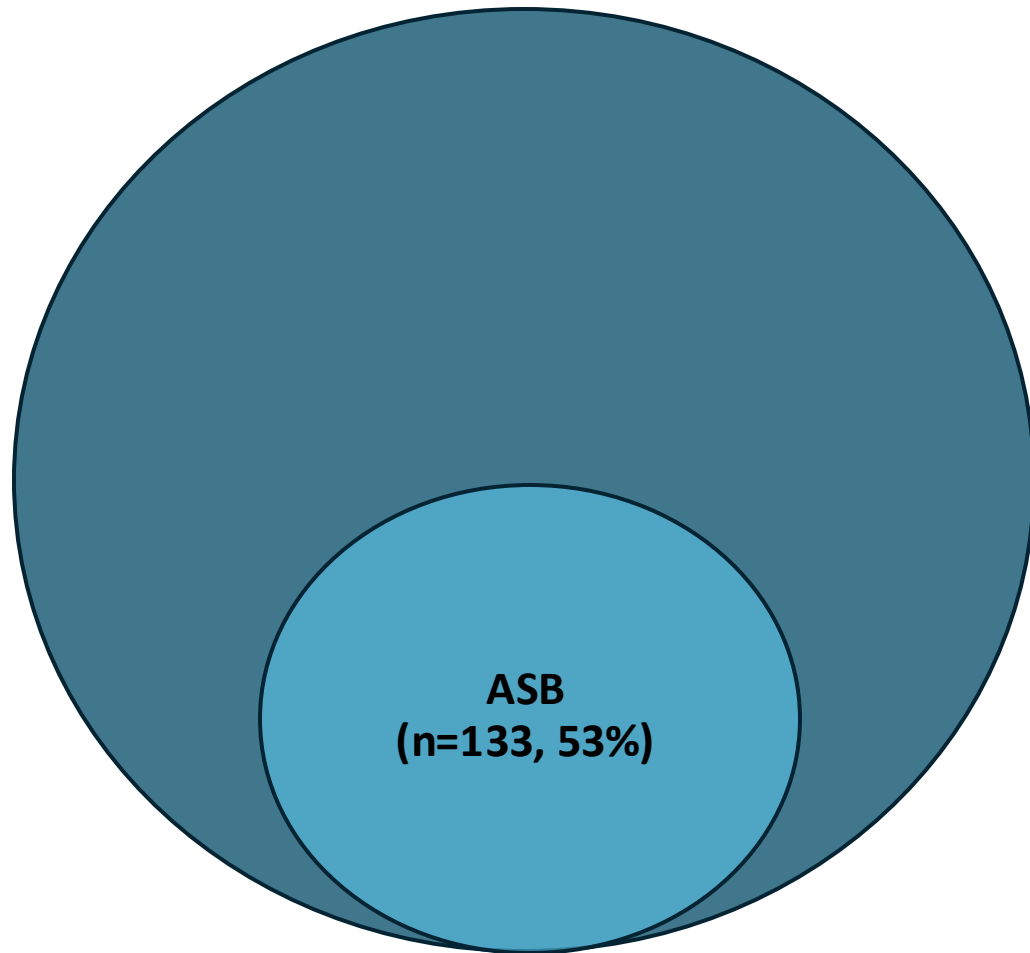
Results – Overlap Between ASB and ASPN

Asymptomatic, treated patients (n=249)



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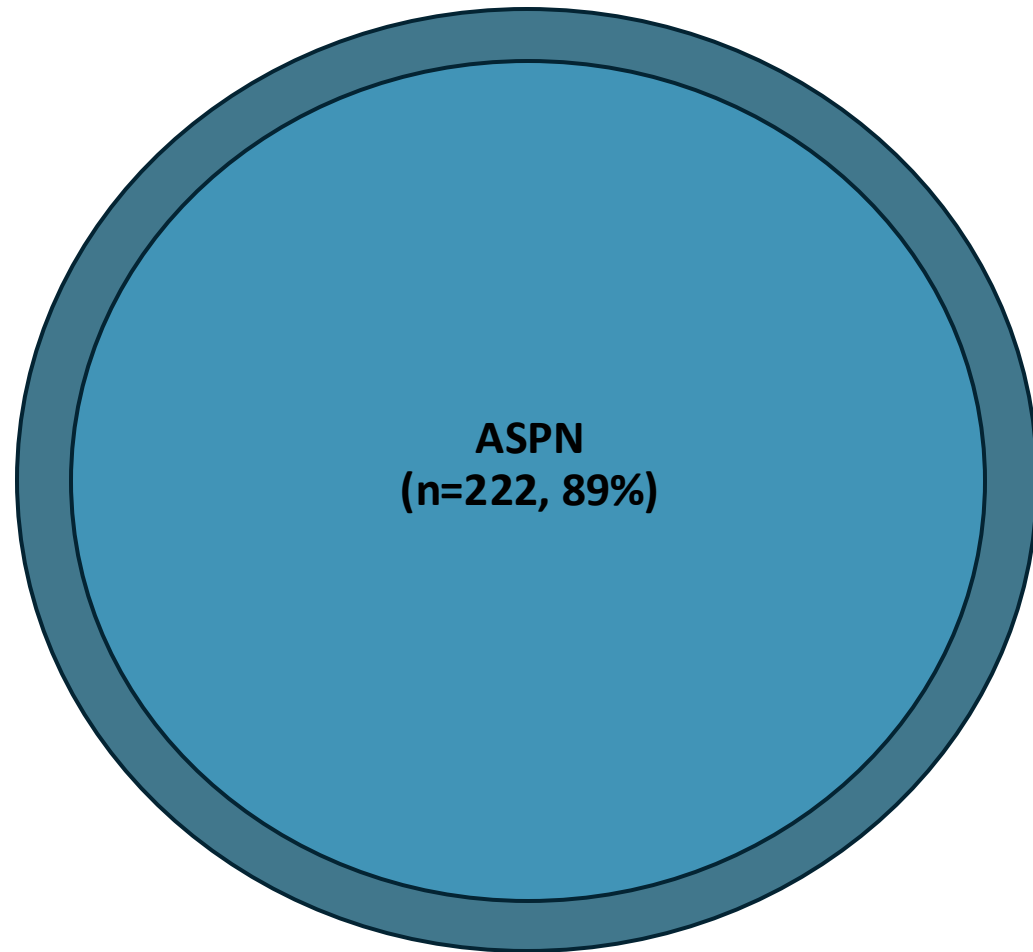
Asymptomatic, treated patients (n=249)



Among the patients inappropriately treated (n=249), how many would be captured using **ASB** metric?

Results – Overlap Between ASB and ASPN

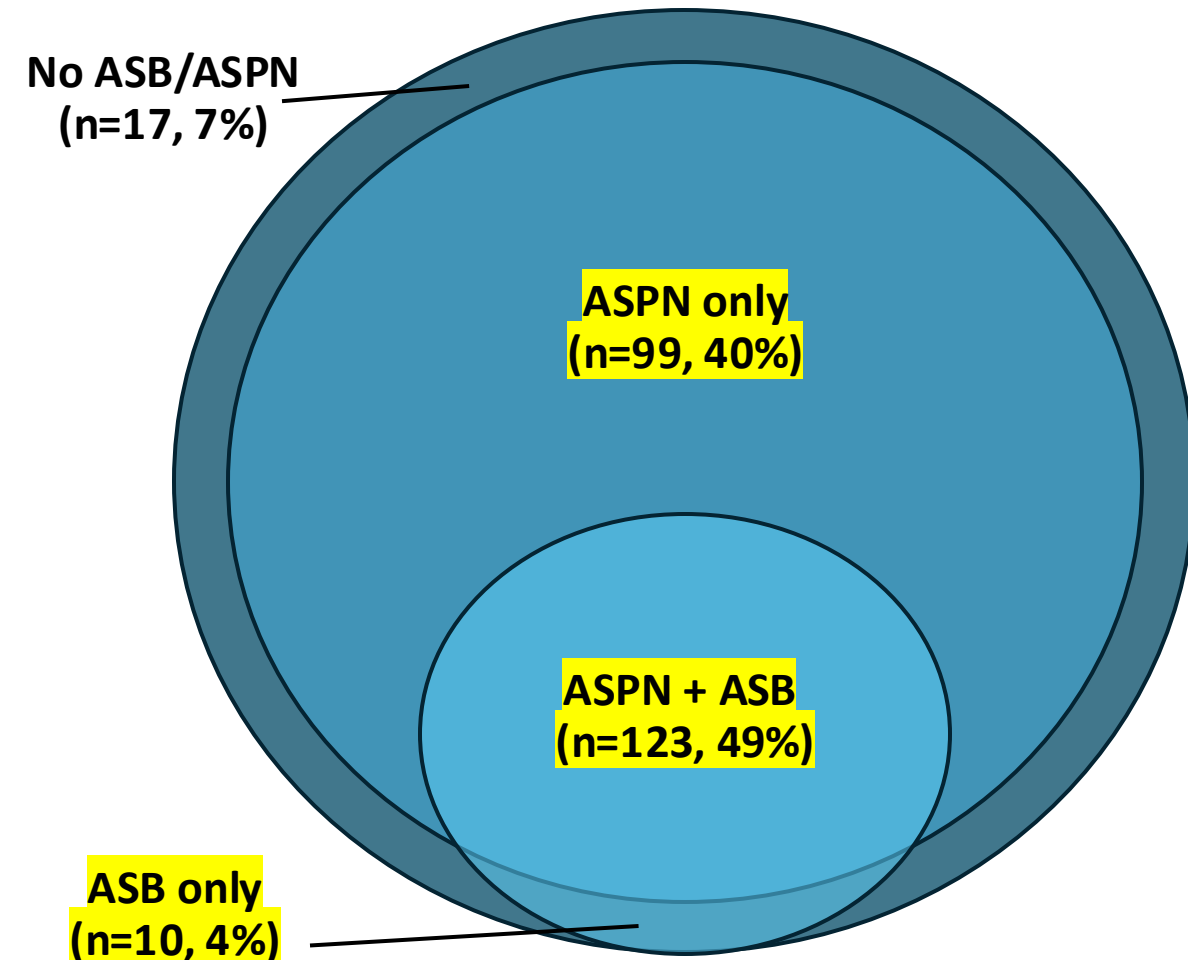
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Among the patients inappropriately treated (n=249), how many would be captured using ASPN metric?

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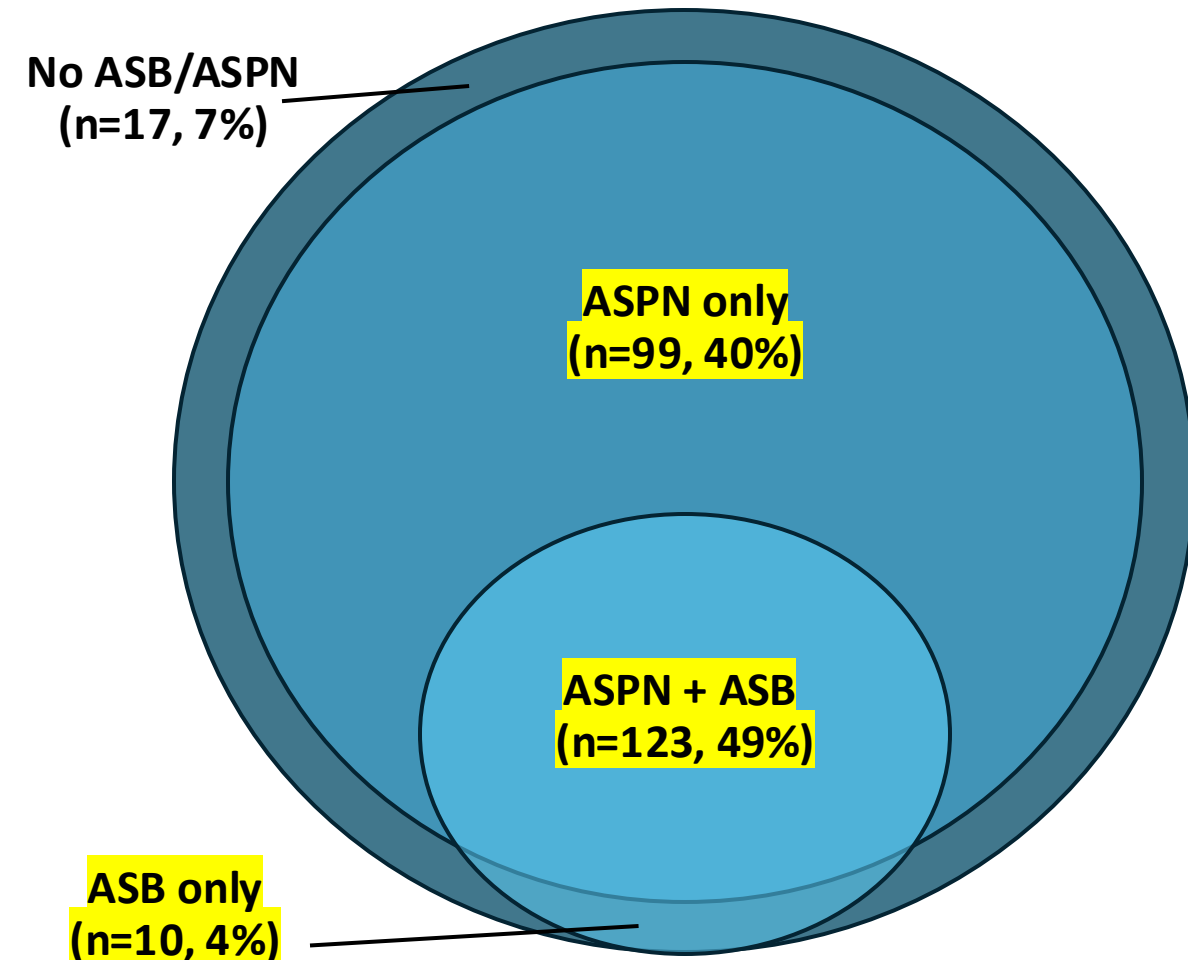
Asymptomatic, treated patients (n=249)



Among the patients inappropriately treated (n=249), how many would be captured using **both ASB + ASPN** metrics?

Results – Overlap Between ASB and ASPN

Asymptomatic, treated patients (n=249)



Notable findings:

- Significant overlap between groups (49%)
- An additional 90 (40%) patients met criteria for ASPN but NOT ASB

Suggests the current guidelines classification of **ASB** incompletely captures antibiotics prescribing, and that **ASPN** may be a broader measure to monitor and target unnecessary antibiotic use for UTI

Interpretation of Findings

- Why is ASPN more comprehensive?
 - Clinician misunderstanding in role of UA
 - Micro labs do not strictly flag abnormal culture results as $\geq 100,000$ CFU/mL
- **Distinction of ASB and ASPN has little clinical impact**, as asymptomatic patients should not receive treatment regardless of urine culture and/or UA results
- Distinction is **highly consequential from surveillance perspective**

Conclusion

- A **UA with pyuria and/or nitrituria in asymptomatic patients** is associated with **high rates of antibiotic treatment** in critical access hospitals
- Including patients with ASPN would **provide a more comprehensive means of quantifying unnecessary antibiotic prescribing** and **may better inform ASP efforts**

Thank you!

Concise Communication

Stewarding the inappropriate diagnosis and treatment of urinary tract infection: leveraging the urinalysis to understand true antibiotic overuse



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- Connie Malone (Banner)
- Cori Farrar (Newport)
- Crystal Carter (Lincoln)
- Donney Goutierrez (Bayou Bend)
- Jake Chaffee (Coulee)
- John Adams (Good Shepard)
- Joshua Burton (White Mountain)
- Kaylee Twohy (Klickitat)
- Lauren Wheeler (Olympic)
- Merilla Hopkins (Lincoln)
- Michael Groessinger (Valor)
- Ronda Reisdorph (Good Shepard)
- Sandy Edwards (Coulee)
- Sara Couch (Banner)
- Shelly Wisneiwski (Valor)
- Stephanie Neys (Valor)
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- Tara Olds (Banner)