UW TASP
tele-antimicrobial stewardship program

January 27, 2022

UW-TASP | Flex Program | HRSA

- QI Project: Asymptomatic Bacteriuria

Today's Schedule

Reflecting on Reflexing:
A Pro/Con Debate

Chloe Bryson-Cahn MD &
Zahra Kassamali Escobar PharmD

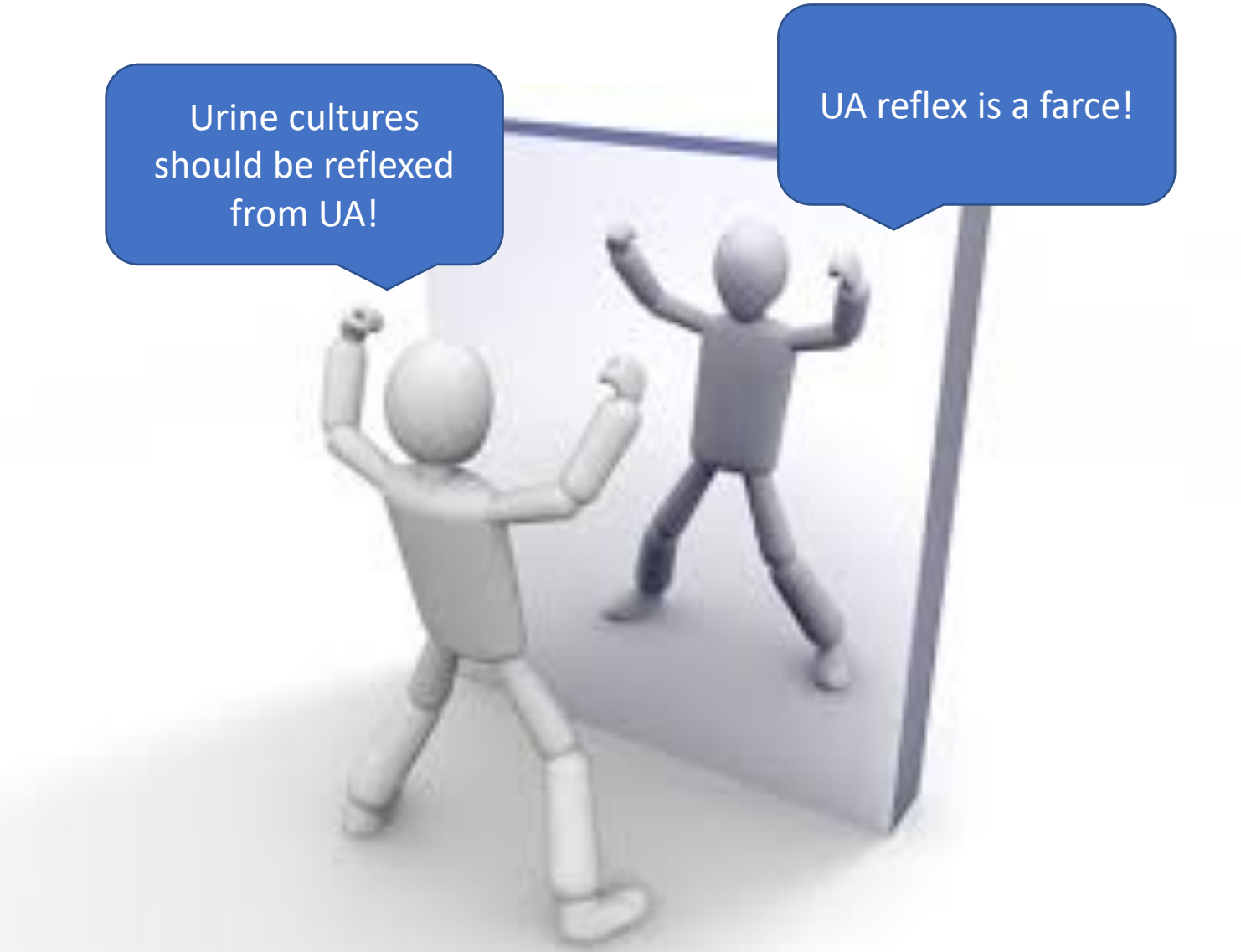
New Data Collection Tool

Whitney Hartlage, PharmD

The Objective of this Cohort

To locally adapt antimicrobial stewardship strategies and optimize patient care

Reflecting on Reflexing



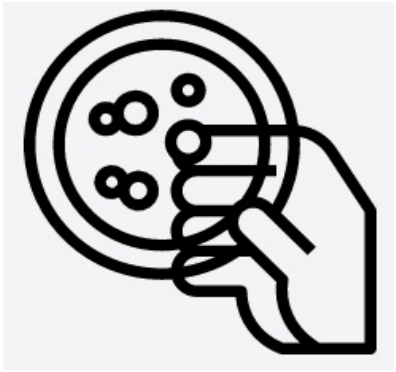
Positive Predictive Value & Negative Predictive Value

- PPV - probability that someone with a positive test actually has the disease
- NPV – probability that someone with a negative test actually has NO disease

Ideal State (non-sepsis)

+ Abx

- No Abx



+ modify/start antibiotics

- Stop abx?

Ideal State (non-sepsis)

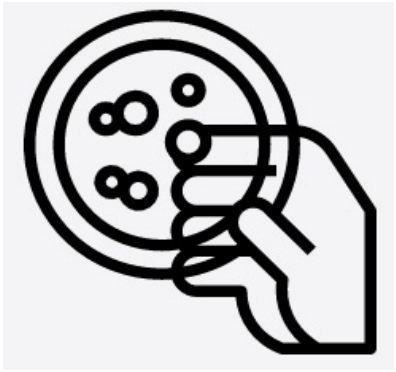
Symptomatic patient

Symptomatic pyuria

\+ Abx

\- No Abx

+ culture consistent with real UTI



\+ modify/start antibiotics

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The Problem

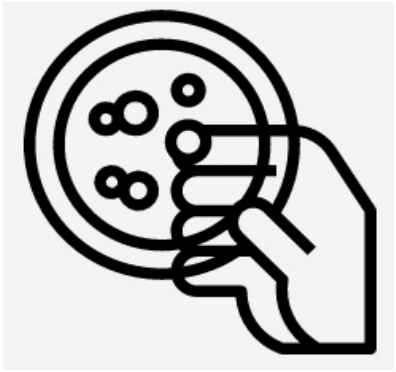
Symptomatic AND Asymptomatic patients

Symptomatic AND Asymptomatic pyuria

\+ Abx

\- No Abx

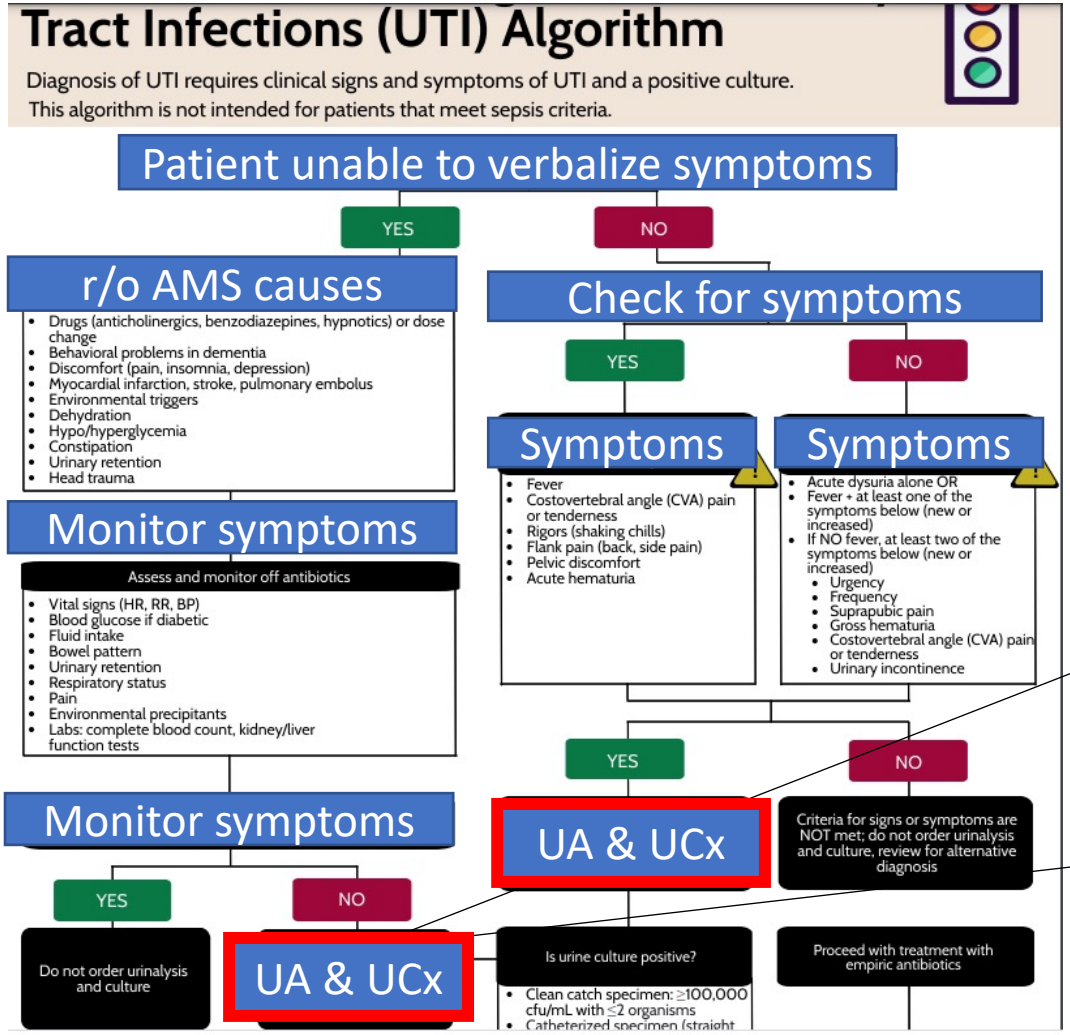
Cultures are a mix of real UTI and ASB



\+ modify/start antibiotics

\- Stop abx?

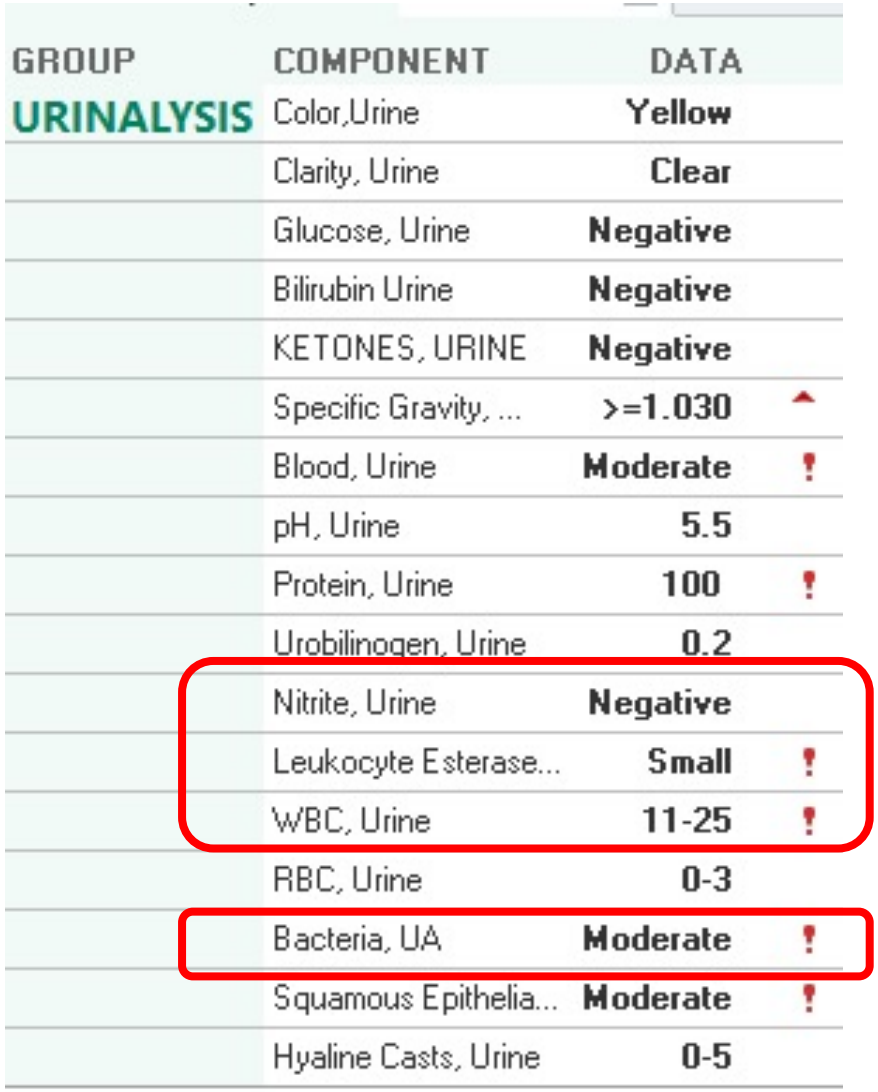
Laboratory Diagnostics and UTI:



Note: Using UA/Urine culture doesn't come in until the bottom of this algorithm

If specific urinary signs symptoms or fever, then obtain urinalysis and culture

Urine Analysis: What are we looking at?



GROUP	COMPONENT	DATA	
URINALYSIS	Color,Urine	Yellow	
	Clarity, Urine	Clear	
	Glucose, Urine	Negative	
	Bilirubin Urine	Negative	
	KETONES, URINE	Negative	
	Specific Gravity, ...	>=1.030	▲
	Blood, Urine	Moderate	!
	pH, Urine	5.5	
	Protein, Urine	100	!
	Urobilinogen, Urine	0.2	
	Nitrite, Urine	Negative	
	Leukocyte Esterase...	Small	!
	WBC, Urine	11-25	!
	RBC, Urine	0-3	
	Bacteria, UA	Moderate	!
	Squamous Epithelia...	Moderate	!
	Hyaline Casts, Urine	0-5	

UA Component	Indicates Presence of	Normal range
Nitrite	Gut bacteria (e.g. *E.coli*)	Negative
Leukocyte Esterase	WBCs	Negative
WBC	Pyuria	(0, 5)
Bacteria	Bacteria	None

Urine Analysis:
Pros of starting with this test (clinical)

- Rapid turnaround
- Point of Care Test (POCT)
- High negative predictive value (NPV*) to rule-out UTI

***NPV** = probability that someone with a negative test actually has NO disease

Humphries and Bard. J Clin Microbiol 2016;54(2):254-258.

Urine Analysis:
Pros of starting w this test (stewardship)

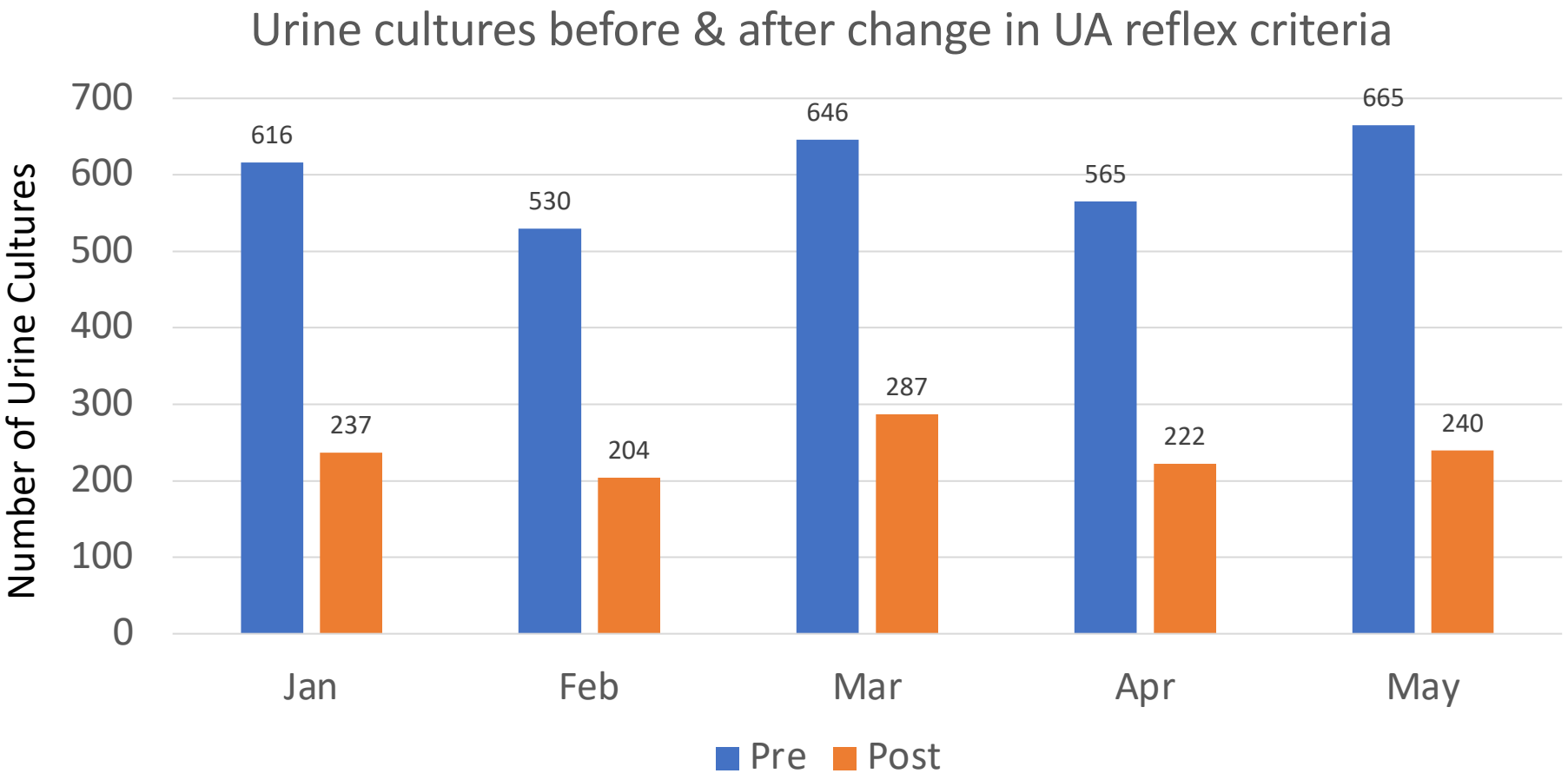
- Reduces burden of urine cultures in micro lab

- Avoid unnecessary initial antibiotics

- Negative result to change the diagnostic momentum

Humphries and Bard. J Clin Microbiol 2016;54(2):254-258.

Reducing burden of urine cultures in micro lab



Valley Medical Center. Urine cultures reflexed from UA before and after UA criteria change. Jan-May 2021.

Challenge: What Reflex Criteria to Use?

	Microscopic Analysis Reflex Criteria	Current Culture Reflex Criteria (any 1 of the following)	Future Culture Reflex Criteria (Requires both)
Nitrites	Positive	Positive	N/A
Leukocyte Esterase	≥ Small	≥ Small	N/A
Blood	≥ Trace	N/A	N/A
Protein	≥ 30 mg/dL	N/A	N/A
WBC	N/A	>5 / hpf	> 10 / hpf
Bacteria (microscopic)	N/A	N/A	≥ Moderate

Valley Medical Center Reflex Urine Criteria Change. 8/5/2020

A Little more on Reflex Criteria to Use

UA Component	Indicates Presence of	Normal range	Negative Predictive Value Likelihood of negative urine culture	Positive Predictive Value Likelihood of positive urine culture
Nitrite	*E.coli, K.pneumo,* other gut bacteria	Negative	86%	38% (24-52) Increasing variables = increased PPV
Leukocyte Esterase	WBCs	Negative	93%	
WBC	Pyuria	(0, 5)	92%	
Bacteria	Bacteria	None	96%	

Humphries and Bard. J Clin Microbiol 2016;54(2):254-258.
Pallin. Open Forum Infect Dis 2014; 1(1) doi: 10.1093/ofid/ofu019.
Marques. Einstein(Sao Paolo) 2017; 15(1) doi: 10.1590/S1679-45082017AO3936

Urine Analysis:
Cons of starting with this test

- Patients with ASB can have a positive UA
- Presence of pyuria is much higher among inpatients
  - 90% of LTCF
  - 90% HD
- Low positive predictive value (PPV*) – does not rule-in UTI

***PPV** - probability that someone with a positive test actually has the disease

Humphries and Bard. J Clin Microbiol 2016;54(2):254-258.

The Problem

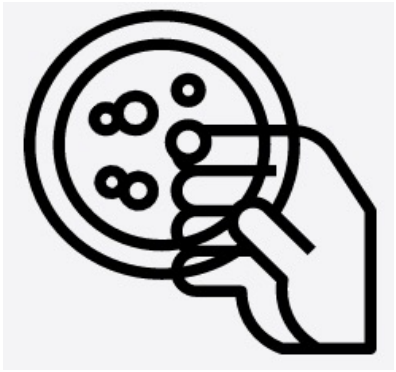
Symptomatic AND Asymptomatic patients

Symptomatic AND Asymptomatic pyuria

\+ Abx

\- No Abx

Cultures are a mix of real UTI and ASB



\+ modify/start antibiotics

\- Stop abx?

The Fix? Reflexive Culture

\+ Abx

\- No Abx

\+ modify/start antibiotics

\- Stop abx?

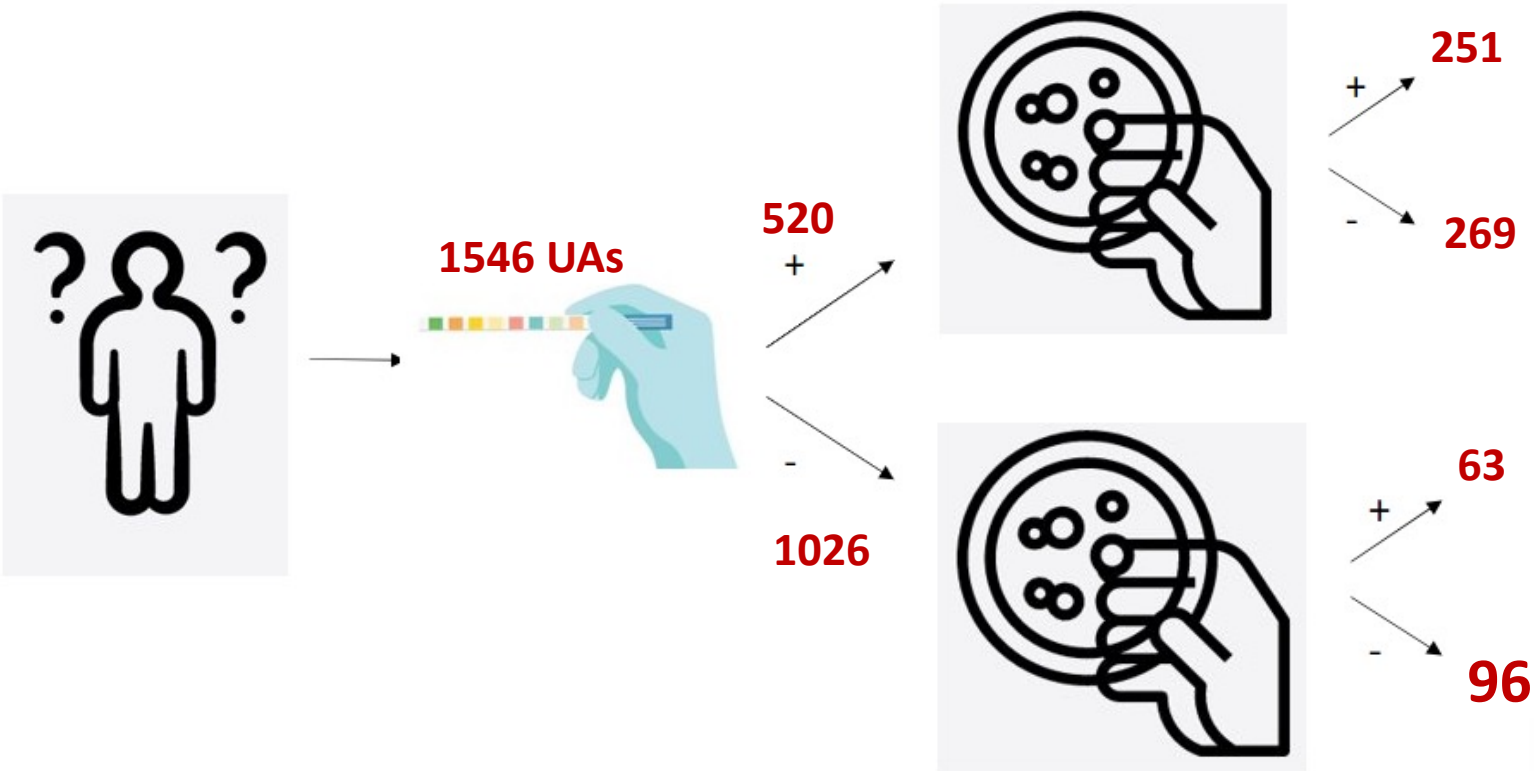
Question: Does this help?

That High NPV

- NPV of UA is high (for urine culture results)
  - Meaning the probability is high that someone with a negative culture will have a negative UA
  - So all those urines that we reflexed away from doing were going to be negative anyhow!

Show me the data

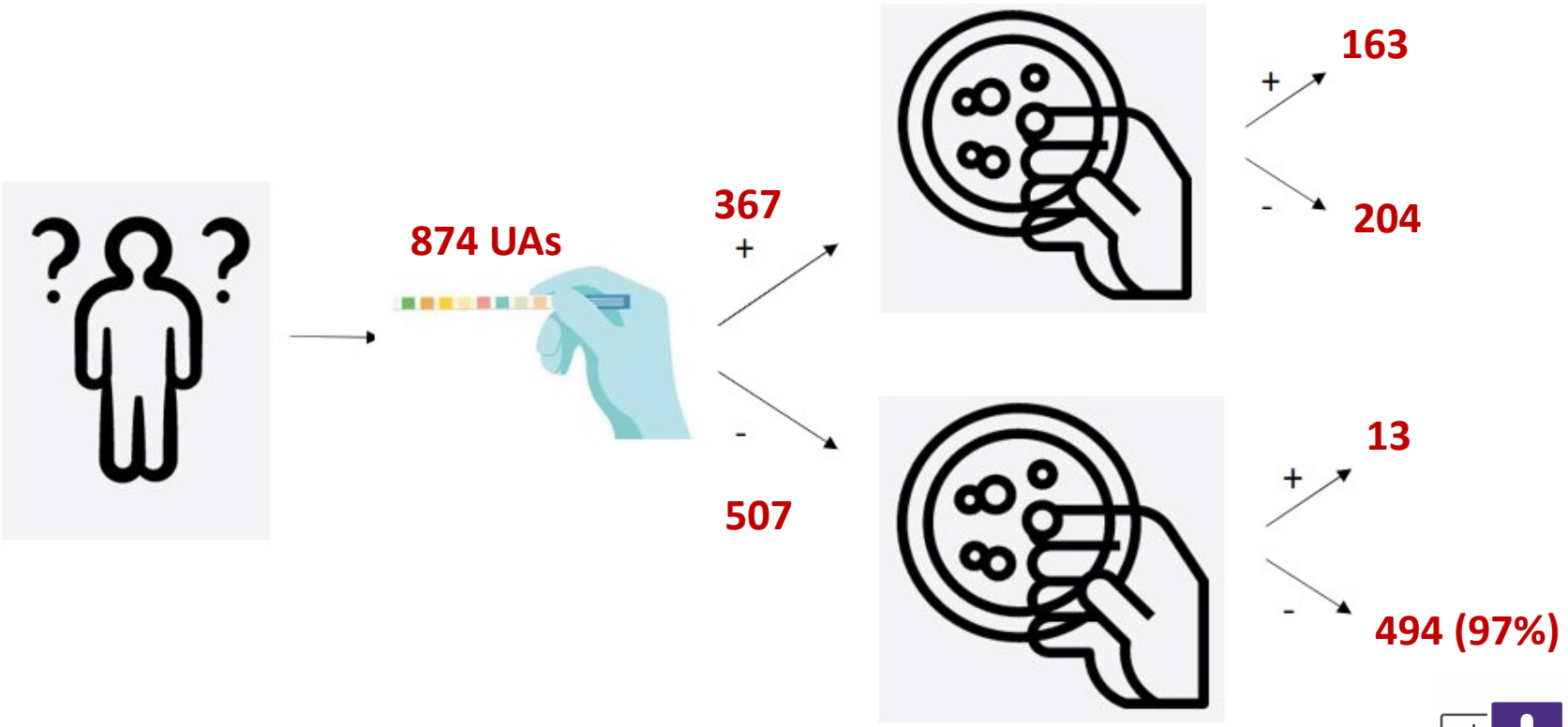
ED Review, 6 months
72% female, median 39 yrs
20% culture positive
Using WBC criteria >5



Jones, J Emerg Med, 2014

Show me the data

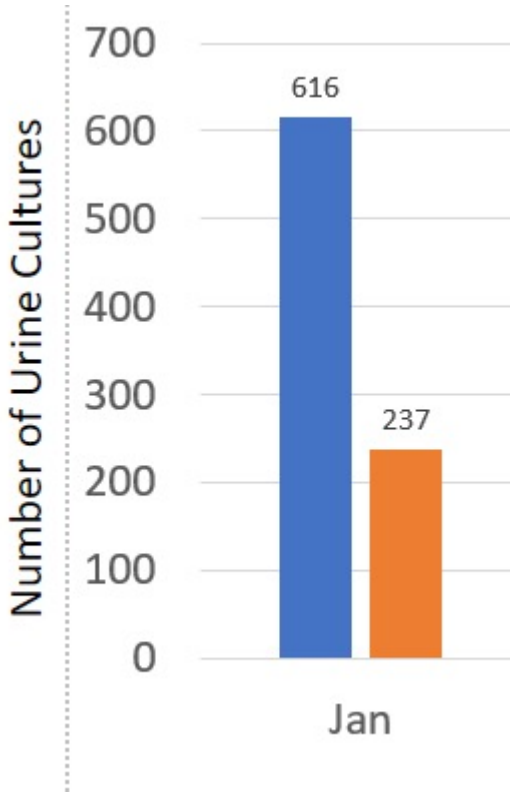
Urology clinic review, 2006
All male patients
20% culture positive
Using WBC criteria >5



Fok, Urology, 2010

What about that amazing data Zahra showed?

Decreasing the number of cultures your lab is doing



Decreasing overtreatment of ASB by decreasing + cx

ZE Zahra Escobar <Zahra_Escobar@Valleymed.org>
Tue 9/28/2021 10:51 AM
To: Rupali Jain; Chloe Bryson-Cahn; Jeannie Chan; Alyssa Y. Castillo <ayc20@uw.edu>

FYI- here's how changing UA to urine culture criteria changed the total number of urine cultures run at Valley.

Zahra

CB Chloe Bryson-Cahn
Tue 9/28/2021 1:00 PM
To: Zahra Escobar; Rupali Jain; Jeannie Chan; Alyssa Y. Castillo <ayc20@uw.edu>

Amazing!

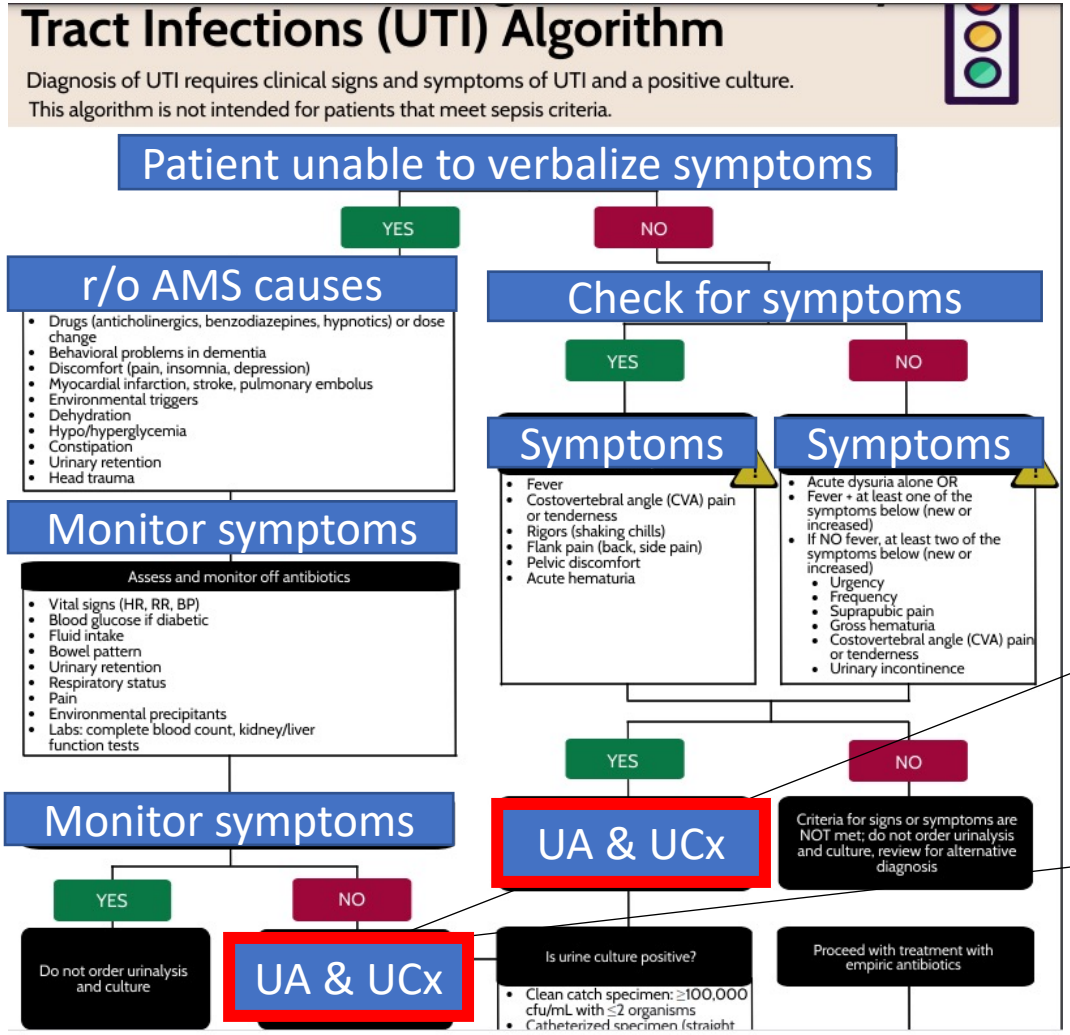
Would be very cool to look at the number of positive urine cultures as well in the pre/post period

-Chloe

ZE Zahra Escobar <Zahra_Escobar@Valleymed.org>
Tue 9/28/2021 1:05 PM
To: Chloe Bryson-Cahn

I am out of the office, returning 8/19/21. I will respond to your email when I return.

UTI is a *clinical* diagnosis



Note: Using UA/Urine culture doesn't come in until the bottom of this algorithm

If specific urinary signs symptoms or fever, then obtain urinalysis and culture

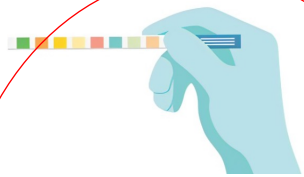
Urine Analysis: Local Considerations

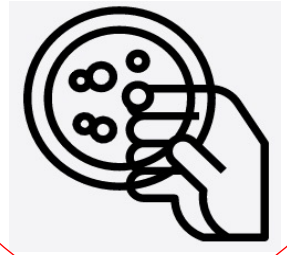
- How are prescribers diagnosing UTI?
  -  Based on symptoms (keep up the good work!)
  -  Based on urine culture (consider UA reflex)
- Where are urine cultures done &
- Who follows-up on positive results?
  -  UA reflex may help reduce # of cultures
- What is the turnaround time on urine culture?
  -  Delays in identifying or treating non-UTI etiologies

Designing a Local Strategy

- How are prescribers diagnosing UTI?
- Where are urine cultures done & how are they ordered (UA with reflex? Direct order?)
- Who follows-up on positive results?
- What is the turnaround time on urine culture?

3/3 Mental models leading to over-testing





+

Abx

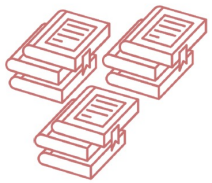
-

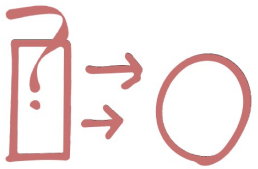
No Abx

Reflexive Testing

More Data, More Comfort

Misunderstanding normal vs. abnormal

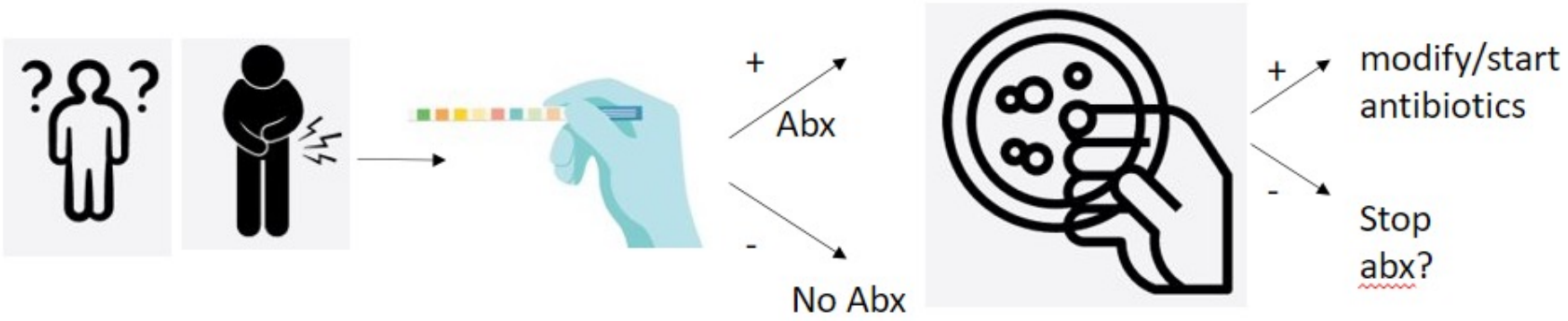




Vaughn. Asymptomatic Bacteriuria: Tips and Tricks to Reduce the Urge to Treat. UW-TASP. 25 January 2022.
Vaughn et al. Ann Intern Med 2019. https://doi.org/10.7326/M18-3442

Designing a Local Strategy

- How are prescribers diagnosing UTI?
- Where are urine cultures done & how are they ordered (UA with reflex? Direct order?)
- Who follows-up on positive results?
- What is the turnaround time on urine culture?



Process Mapping + Data Collection =

DATA

DATA

DATA

DATA MANAGEMENT

DATA

DATA

Spreadsheets

DATA TOOLS

DATA

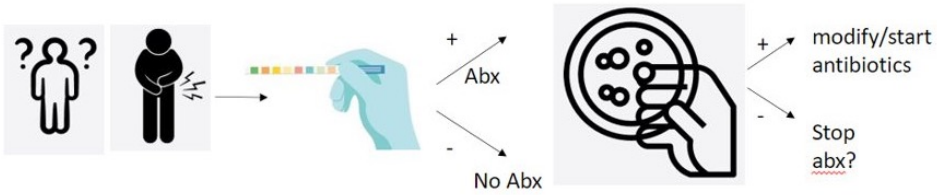
DATA

citations

Homework: Plan/Study

Designing a Local Strategy

- How are prescribers diagnosing UTI?
- Where are urine cultures done & how are they ordered (UA with reflex? Direct order?)
- Who follows-up on positive results?
- What is the turnaround time on urine culture?



- **Set improvement goal**
- Predict what will happen
- Who, what, when, where, how
- Decide what data to gather

And if you've done that:

Implement change

Study changes after intervention

Data Collection form

Next Session:

Thursday March 3

The Data in the Details

Dolly Parting Advice

On mapping your local process:

“Find out [why] you are [ordering urine cultures] and do it on purpose”

Next Session: Thursday March 3

The Data is in the Details

Image Citations

- Noun Project
- https://media.istockphoto.com/