



System-Wide Implementation of a New Urine Culture to Optimize Diagnostic Stewardship

Presented by:

Lisa Parlich, MT (ASCP), MPH, CIC

Co-Written by:

Christina Silkaitis, MT (ASCP), MBA, CIC FAPIC

Raymond Gunn, MJ, CT (ASCP)

Asra Salim, MPH, CPH, FAPIC

Bill Eberlein



Northwestern Medicine

The Academic Health system spans the Chicago area in over 12 counties and 383 zip codes in small towns, suburban and urban communities.



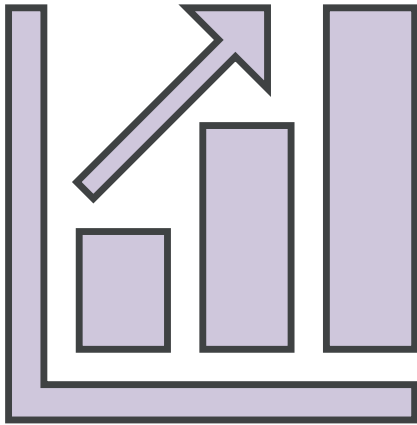
BEST HOSPITALS
US News
RANKINGS

Northwestern Memorial Hospital
US News Honor Roll Hospital

11 NM Hospitals
1 Comprehensive AMC
1 Large, Specialized Complex Care
4 Complex Care
3 Community
2 Inpatient Rehab

Outpatient Locations	More than 200
Physicians	5,500
Inpatient Admissions	104,000
Outpatient Registrations	2.2 million

Situation



- Each hospital utilizes a Urinalysis (UA) with Reflex to Culture order
 - Culture is performed automatically if the UA results as abnormal
- Current order set is associated with:
 - Overutilization of urine cultures due to low threshold of UA reflex culture criteria
 - Oversensitivity in detecting urinary tract infections in critical care (CC) patients

Project Goal

- Decrease inappropriate urine cultures on asymptomatic patients
- Reduce overreporting of CAUTI to focus on genuine quality initiatives



Solution

- Developed and implemented a new urine order at two hospitals: *Urinalysis with Hold for Culture (UA/Hold)*
 - Only includes Adult Critical Care (CC) population
 - Excluded: Patients who are pregnant, neutropenic, or undergoing a urologic procedure
 - Culture will **not** automatically be performed if UA is abnormal
 - Urine culture is only available to order if UA results are abnormal (>10 WBCs)
 - Relies on the provider to use clinical judgment to add on the urine culture order if clinical criterion is met

How does it work?

UA/Hold Order Panel

- Upon selecting a Urine Culture order, the following order panel is presented to the provider

Urine Culture ✓ Accept

Choose one of the following options:

Patient is Neutropenic, Pregnant, Undergoing Urologic Procedure, or a Neonate

Patient is NOT Neutropenic, Pregnant, Undergoing Urologic Procedure, or a Neonate

Next Required ✓ Accept

Patients With Exclusion Criteria

- If the patient is neutropenic, pregnant or undergoing a urologic procedure, the first option is selected
- The order panel pre-selects a Urinalysis with Microscopic and Urine Culture for ordering by the provider

Urine Culture ✓ Accept

Choose one of the following options:

Patient is Neutropenic, Pregnant, Undergoing Urologic Procedure, or a Neonate

If the patient is neutropenic, pregnant, undergoing a urologic procedure or a neonate/newborn, a UA w/ microscopic and urine culture is recommended.

Urinalysis with Microscopic
ONE TIME, First occurrence today at 1353, Routine

Culture: Urine
ONE TIME, First occurrence today at 1353, Routine

Patient is NOT Neutropenic, Pregnant, Undergoing Urologic Procedure, or a Neonate

ⓘ Next Required ✓ Accept

Adult Critical Care Patients

- If the patient is NOT neutropenic, pregnant, or undergoing a urologic procedure, the second option is selected
- If another urinalysis has not been completed in the past 48 hours, the UA/Hold is preselected for ordering

Urine Culture ✓ Accept

Choose one of the following options:

Patient is Neutropenic, Pregnant, Undergoing Urologic Procedure, or a Neonate

Patient is NOT Neutropenic, Pregnant, Undergoing Urologic Procedure, or a Neonate

No Urinalysis Order or Result

You are ordering a urine culture without a documented Urinalysis order or result within the past 48 hours.

Please select the appropriate order below if a prior order doesn't exist. If an order has been placed within the last 48 hours, please wait for the result before proceeding.

Urinalysis with Hold for Culture (Adult ICU Only) (NMH)
ONE TIME, First occurrence today at 1403, Routine

Next Required ✓ Accept



Positive Urinalysis Result

- When the urinalysis is resulted, and if the criterion is met (>10 WBCs), an add-on urine culture can be selected by the ordering provider if clinically indicated

Urine Culture ✔ Accept

WBC > 10

UA WBC

Date	Value	Ref Range	Status
06/24/2020	15		Final

Urinalysis Orders (48h ago, onward)

Start

06/24/20 1353 **Urinalysis w/Microscopic, reflex culture ONE TIME**
Specimen Source: Urine Voided
Question: Specimen Type Answer: Urine Catheterized

UA WBC is greater than 10 -- urine culture may be indicated.

Culture: Urine
ADD-ON, First occurrence today at 1400, Add-On

Next Required ✔ Accept

Negative Urinalysis Result

- If criterion is NOT met (WBC<10), an override reason must be selected to order a culture

Urine Culture ✔ Accept

Choose one of the following options:

Patient is Neutropenic, Pregnant, Undergoing Urologic Procedure, or a Neonate

Patient is NOT Neutropenic, Pregnant, Undergoing Urologic Procedure, or a Neonate

WBC < 10

UA WBC	Value	Ref Range	Status
06/24/2020	5		Corrected

Urinalysis Orders (48h ago, onward)

Start	Order	Specimen Source
06/24/20 1526	Urinalysis with Hold for Culture (Adult ICU Only) (NMH) ONE TIME	Urine Voided

The most recent urinalysis result on the patient is negative for criterion, i.e. WBC < 10.

If you would like to order a urine culture please specify an override reason below.

Culture: Urine ✔ Accept ✖ Cancel

Add-on: No add-on specimen found

Frequency: ADD-ON 1 Time Routine 1 time Draw in AM Daily 4am Add-On

Starting: 6/24/2020 Today Tomorrow At: 1534

First Occurrence: Today 1534

Scheduled Times

06/24/20 1534

Priority: Add-On Routine STAT

Specimen Src: Urine Voided Urine Voided Urine - Clean Catch Urine - Foley Cath Urine Suprapubic Aspirate

Urine Suprapubic Catheter Bladder

Source Info/Comment

Override reason (WBC < 10)

New Urgency, Frequency, Dysuria, Hematuria, Flank or Costovertebral Angle Tenderness

New / Worsening Sepsis Without Alternative Diagnosis

Fever / Altered Mental Status Without Alternative Diagnosis

Spinal Cord Injury Patient: Increased Spasticity / Autonomic Dysreflexia / Sense of Unease

Other (Please Specify)

Comments: Add Comments (F6)

Phase of Care:

Recipient	Modifier	Add PCP
		Add My List
		Build My Lists
		Clear All

Class:

✔ Accept ✖ Cancel

Next Required ✔ Accept

Hospitals 1 & 2: Results

February 2021 - February 2022

	Total UA with Hold Orders	Total Positive UA Total Negative UA	Cultures added from +UA	Cultures added from -UA	Cultures Avoided (Positive UAs)
Hospital 1	1,674	529 (32%) 1,145 (68%)	94 (18%)	24 (2%)	435
Hospital 2	242	63 (26%) 179 (74%)	13 (21%)	1 (.6%)	50
TOTAL	1,916	592 (31%) 1,324 (69%)	107 (18%)	25 (2%)	485

Expansion of the Order

- Due to the success of the new order, it was expanded to five additional acute care facilities in late December 2022
- Data collected January-September 2023 demonstrates the effectiveness of the implementation



Hospitals 3-7: Results

January 2023 - September 2023

	Total UA with Hold Orders	Total Positive UA Total Negative UA	Cultures added from +UA	Cultures Avoided (Positive UAs)
Hospital 3	161	37 (23%) 124 (77%)	7 (19%)	30
Hospital 4	39	3 (8%) 36 (92%)	1 (33%)	2
Hospital 5	162	55 (34%) 107 (66%)	20 (36%)	35
Hospital 6	94	27 (29%) 67 (71%)	9 (33%)	18
Hospital 7	59	20 (34%) 39 (66%)	8 (40%)	12
TOTAL	515	142 (28%) 373 (72%)	45 (32%)	97

Data Dashboard

- EDW report created to monitor implementation and identify gaps

[UA_Hold - Summary](#) | [UA_Hold - Pt Level Details](#)

NM UA WITH HOLD: SUMMARY

Data through 9/29/2023 10:34:00 AM | Last refreshed at 10/5/2023 11:18:30 AM

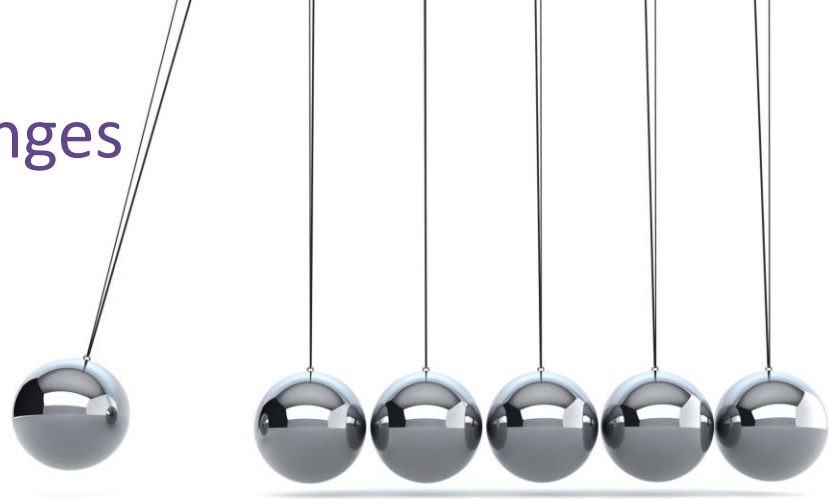
START DATE	END DATE	FACILITY	ORDERING UNIT	UA RESULT	CX ABNORMAL?	UC PRESENT W/IN 2 DAYS PRIOR
1/1/2023	9/30/2023	(Multiple values)	(All)	(All)	(All)	(All)

TOTAL # OF UA ORDERS	UA RESULT BREAKDOWN		UA RESULTING IN CX				POSITIVE CX BY URINARY CATHETER IN PLACE WITHIN 2 DAYS		
	(-) UA	(+) UA	(-) UA		(+) UA		(-) UA		(+) UA
			Neg Cx	Pos Cx	Neg Cx	Pos Cx	No U. Catheter Present	U. Catheter Present	U. Catheter Present
515	72.43%	27.57%	8.0%	16.0%	40.0%	36.0%	30.8%	38.5%	30.8%

Implementation Challenges

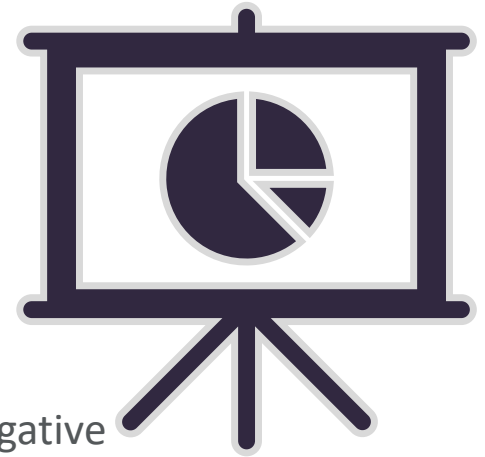
- Prior to go-live:
 - EMR laboratory validation
 - Changes in laboratory workflow
 - Communication across a large health system

- After go-live:
 - EDW report validation
 - Clinician orders outside of panel



Next Steps

- Continue to monitor implementation data
- Review of cultures added on to negative UA and override reasons
- Investigate orders occurring outside of order panel
- Implement at additional Facilities
- Evaluation of utility outside of critical care population
- Addition of “renal transplant <1 month ago” to exception criteria
- Add required UTI symptom question to order
- Add verbiage to discourage add-on urine cultures if UA is negative
- Addition of a sidebar report that displays the presence of an urinary catheter



Questions?

Thank You