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Prepared by QA Committee		
Issued by: Laboratory Manager	Revision Date: 9/12/2022	
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Urinary Tract Infection Workup

I. Introduction

Urinary tract infections (UTI) are one of the most commonly encountered acute infectious diseases. Most UTIs occur as a result of bacteria ascending the urethra and entering the urinary bladder.

Urine specimens for culture are collected when the following syndromes are suspected: cystitis, pyelonephritis, asymptomatic bacteriuria, and less commonly acute prostatitis, pyelonephric abscess, and urosepsis.

Among the bacteria most commonly isolated from patients with acute uncomplicated cystitis are *Escherichia coli, Klebsiella* species, and other Enterobacterales and *Staphylococcus saprophyticus*. Hospitalized patients and patients with complicated urinary tract infections are commonly infected with *E. coli, Klebsiella* species, *Proteus mirabilis*, other Enterobacterales, *Pseudomonas aeruginosa* and enterococci. *Corynebacterium urealyticum* and Group B Streptococcus are markers of colonization in pregnant women.

Urine specimens can be divided into categories based on clinical criteria, the possibility of urethral contamination, and the extent of microbiological work-up.

For diagnosis of Urinary Tract Infection:

- Voided urines (non-sterile): Midstream urine (MSU)

Neonatal bagged urine Indwelling catheter (Foley catheter) urine Ileal conduit urine

Suprapubic catheter urine

- In and out catheter / catheter insertion urine / bladder irrigation

- Aseptically collected urine: Nephrostomy urine

cystoscopy urine

Suprapubic aspirate

For diagnosis of Prostatitis:

- Segmented urine and expressed prostatic secretion (EPS). See Prostatitis

<u>Workup</u>

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For diagnosis of Male infertility:

- Seminal fluid. See Genital Manual

Quantitative cultures of urine specimens are critical for diagnosis. The criteria to be used for distinguishing significant from non-significant growth may vary depending on the type of urine specimen received for culture.

Urine specimens arriving in the laboratory must be accessioned and processed as soon as possible.

II. Specimen Collection and Transplant

See Pre-analytical Procedure - Specimen Collection QPCMI02001

III. Reagents/Materials/Media

See Analytical Process - Bacteriology Reagents_Materials_Media List QPCMI10001

IV. Procedure

A. Processing of Specimens:

See Specimen Processing Procedure

Asymptomatic Bacteriuria Urine Hold Processing: See Specimen Processing Procedure for procedure to handle requests to process Asymptomatic Bacteriuria - Urine "Hold" specimens.

a) Direct Examination:

<u>Gram stain</u>: Not routinely performed. If specifically requested, perform Gram stain directly on unspun specimen.

<u>Fungal stain</u>: Not routinely performed. If dimorphic fungus or cryptococcus specifically requested, see Mycology Manual for staining and interpretation.

Eosinophil stain: Not routinely performed. If requested, stain slide and examine for the presence of eosinophils due to inter-tissue nephritis.

B. Interpretation of cultures:

Examine plates after appropriate incubation time. UNIVERSITY HEALTH NETWORK/MOUNT SINAI HOSPITAL, DEPARTMENT OF MICROBIOLOGY

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a) **Cultures with no growth:**

Discard no growth routine cultures after 18-24 hrs incubation.

- **Exceptions**:
- Urine specimens processed after 1600 hrs (plates from the "After 4 p.m." basket) - re-incubated until 1400 hrs and re-examine

b) Cultures with growth:

- 1. If colonies are too small re-incubate for another 24hrs.
- 2. Count the colonies and multiply by the appropriate dilution factor in SI units.

Inoculation Loop size	Colony count/L
0.001 mL	$1 \text{ colony} = 1 \text{ x } 10^6 \text{ CFU/L}$
0.01 mL	$1 \text{ colony} = 0.1 \text{ x } 10^6 \text{ CFU/L}$

- 3. Workup cultures according to the criteria in Tables 1, 2 and 3 below. The tables are meant to serve as a guide only.
- 4. Save Group B streptococcus isolates for 10 days at room temperature in case further susceptibility testing is required
- 5. Save positive yeast cultures for 10 days at room temperature in case further work-up is required.

List of Uropathogens and Non-Uropathogens:

Uropathogens	Non-uropathogens (normal skin/urogenital flora)
Enterobacterales	Lactobacillus
Pseudomonas aeruginosa	diphtheroids (not C. urealyticum)
Other gram negative bacilli	viridans Streptococci (not A. uriae)
Enterococcus species	Streptococcus anginosus group
beta-haemolytic streptococci (Group A,	Streptococcus gallolyticus
B, C, G, >0.5mm colonies)	Bacillus species
Yeast	
Aerococcus urinae*	
Aerococcus sanguinicola*	
Corynebacterium urealyticum	
Staphylococcus aureus	
Staphylococcus saprophyticus - (females	
12 - 60 yrs only)	
Other coagulase negative staphylococci	
(including Staphylococcus lugdenensis)*	

* Consider as **uropathogens** only when pure/predominant over non-uropathogens

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TABLE 1: Criteria for the identification and susceptibility testing of organisms isolated from Voided Urines (MSU, neonatal bagged urine, indwelling catheter, Foley catheter urine, ileal conduit urine, and suprapubic catheter).

No. of Types of Organisms ^{1, 2, 3}	No. of colonies of each type	Colony count/L of <u>uropathogens</u>	Work up for uropathogens	Report
1	<10	<10 x 10 ⁶ CFU/L	No work-up	No significant
				<u>growth</u>
1	<u>></u> 10	$\geq 10 \text{ x } 10^6 \text{ CFU/L}$	$\underline{ID} + \underline{Sens}$	<u>10-100 x E6 cfu/L</u>
2	Both ≥100	≥100 x 10 ⁶ CFU/L	$\underline{ID} + \underline{Sens}$ on both	<u>>100 x E6 cfu/L</u>
2	One ≥100	$\geq 100 \text{ x } 10^6 \text{ CFU/L}$	$\underline{ID} + \underline{Sens}$	<u>>100 x E6 cfu/L</u>
	One <100	<100 x 10 ⁶ CFU/L	Ignore	
2	Both <100	<100 x10 ⁶ CFU/L	No work-up	No significant
				<u>growth</u>
≥3	All <u>uropathogens</u> <100		No work-up	No significant
				<u>growth</u>
≥3	Any <u>uropathogen</u> >100		No work-up	Mixed growth

ID =<u>Identification</u>; = Susceptibility testing as appropriate

Note: 1. When counting the types of organisms, do not include <10 colonies of <u>non-uropathogens</u>.

2. Do not workup or report any number of colonies of **<u>non-uropathogens</u>**

3. For female ages 12-60 yrs, workup any amount of beta-haemolytic streptococcus to rule out Group B streptococcus. (Reporting – follow **Reporting Table for GBS**)

TABLE 2: Criteria for identification and susceptibility testing of organisms isolated from In and Out Catheter/Catheter Insertion urines, Bladder Irrigation urines.

No. of Types of	No. of colonies of each	Colony count/L	Work-up for	Report
Organisms ^{1, 2, 3}	type	of <u>uropathogens</u>	uropathogens	
1	<10	<10 x 10 ⁶ CFU/L	No work-up	No significant
				<u>growth</u>
1	<u>></u> 10	≥10 x 10 ⁶ CFU/L	$\underline{ID} + \underline{Sens}$	<u>10-100 x E6 cfu/L</u> or
				<u>>100 x E6 cfu/L</u>
2	Both ≥10	≥10 x 10 ⁶ CFU/L	$\underline{ID} + \underline{Sens}$	<u>10-100 x E6 cfu/L</u> or
				<u>>100 x E6 cfu/L</u>
2	One <u>></u> 10	$\geq 10 \text{ x } 10^6 \text{ /L}$	$\underline{ID} + \underline{Sens}$	<u>10-100 x E6 cfu/L</u> or
				<u>>100 x E6 cfu/L</u>
	One <10 or factor of 10x	Use phrase - Light		Describe ⁴
	less	growth -on LIS		
		TEST Comment		
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No. of Types of Organisms ^{1, 2, 3}	No. of colonies of each type	Colony count/L of <u>uropathogens</u>	Work-up for uropathogens	Report
		(do not enter as ISOLATE)		
3	≥10	<u>≥1</u> 0 x 10 ⁶ CFU/L	<u>ID</u> + <u>Sens</u>	<u>10-100 x E6 cfu/L</u> or <u>10-100 x E6 cfu/L</u>
	Other(s) <10 or factor of 10x less	Use phrase - Light growth -on LIS TEST Comment (do not enter as ISOLATE)		Describe ⁴
≥4	All <u>uropathogens</u> <10		No work-up	<u>No significant</u> <u>growth</u>
≥4	Any <u>uropathogen</u> >10		No work-up	Mixed growth

ID = Identification; Sens = Susceptibility testing as appropriate

- 2. Do not workup or report any number of colonies of **<u>non-uropathogens</u>**.
- For female ages 12-60 yrs, workup any amount of beta-haemolytic streptococcus to rule out Group B streptococcus. (Reporting – follow <u>Reporting Table for GBS</u>)
- 4. Describe as Gram positive cocci, Gram positive bacilli, Gram negative bacilli.

TABLE 3: Criteria for the identification and susceptibility testing of organisms isolated from aseptically collected urine, suprapubic aspirates, cystoscopy urine and nephrostomy urine.

No. of Types of Organisms	No. of colonies of each type	Colony count/ L	Work-up
Any#	Any	Quantitate using appropriate dilution factor	ID & Sens

Inoculation Loop size	Colony count/L
0.001 mL	$1 \text{ colony} = 1 \text{ x } 10^6 \text{ CFU/L}$
0.01 mL	$1 \text{ colony} = 0.1 \text{ x } 10^6 \text{ CFU/L}$

ID = Identification; Sens = Susceptibility testing as appropriate

C. Susceptibility Testing:

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Note: 1. When counting the types of organisms, do not include <10 colonies of <u>non-uropathogens</u>.

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Refer to Susceptibility Testing Manual

V. Reporting

Direct Smear (if requested):

Gram Stain: "(No) Pus cells seen. (No) Bacteria seen" (without quantitation)

Eosinophil Stain: Negative report: "No Eosinophil seen" Positive report: "Eosinophils present"

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Negative Culture Reporting:

Result Category	Reporting			
	C&S	C&S + routine fungus	C&S + routine fungus requested and	Cryptococcus or
		requested and no	FUNGUS test ordered	specific filamentous
		FUNGUS test ordered		fungus requested
	"No growth"	"No growth. Routine urine	C&S TEST - "No growth"	C&S TEST - "No
No growth		fungal cultures screen for		growth"
		significant growth of yeast	Fungus TEST - "No growth. Routine urine	Fungus TEST – as per
		only. Filamentous fungi	fungal cultures screen for significant growth	Mycology manual.
		will not be ruled out unless	of yeast only. Filamentous fungi will not be	
		a specific request is made"	ruled out unless a specific request is made"	
		(pick from TEST window	(pick from TEST window keypad - }NGU)	
		keypad - }NGU).		
	"No significant	"No significant	C&S TEST - "No significant	C&S TEST - "No
No significant	growth" (pick	growth. Routine urine	growth. Routine urine fungal cultures screen	significant growth"
growth	from TEST	fungal cultures screen for	for significant growth of yeast only.	(pick from TEST
	window keypad	significant growth of yeast	Filamentous fungi will not be ruled out	window keypad -
• Growth with	- }NSG)	only. Filamentous fungi	unless a specific request is made." (pick from	}NSG)
no workup		will not be ruled out unless	TEST window keypad - }NSGU)	
		a specific request is made."	Fungus TEST - "No significant	Fungus TEST - as per
		(pick from TEST window	growth. Routine urine fungal cultures screen	Mycology manual.
		keypad - }NSGU)	for significant growth of yeast only.	
			Filamentous fungi will not be ruled out	
			unless a specific request is made." (pick from	
			TEST window keypad - }NSGU)	

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Result Category	Reporting			
	C&S	C&S + routine fungus	C&S + routine fungus requested	Cryptococcus or
		requested and no	and FUNGUS test ordered	specific filamentous
		FUNGUS test ordered		fungus requested
	"Mixed growth. Suggest	"Mixed growth.	C&S TEST - "Mixed growth.	C&S TEST - "Mixed
Mixed growth	repeat specimen if	Suggest repeat	Suggest repeat specimen if	growth. Suggest repeat
	patient's symptoms	specimen if patient's	patient's symptoms suggest a	specimen if patient's
	suggest a urinary tract	symptoms suggest a	urinary tract infection."	symptoms suggest a
	infection."	urinary tract infection."	(Pick from LIS TEST window	urinary tract
	(Pick from LIS TEST	(Pick from LIS TEST	keypad "Mixed }MIXG")	infection."
	window keypad "Mixed	window keypad		(Pick from LIS TEST
	}MIXG")	"Mixed }MIXG")		window keypad
				"Mixed }MIXG")
			Fungus TEST - "Mixed growth.	Fungus TEST - as per
			Suggest repeat specimen if	Mycology manual.
			patient's symptoms suggest a	
			urinary tract infection."	
			(Pick from LIS TEST window	
			keypad "Mixed }MIXG")	

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Positive Culture Reporting:

Result Category	Reporting			
	C&S	C&S + routine fungus	C&S + routine fungus requested and	Cryptococcus or specific
		requested and no	FUNGUS test ordered	filamentous fungus
		FUNGUS test ordered		requested
Growth with	Morphologic description of organism with corre		sponding colony count/L - choose from LIS I	SOLATE window keypad:
workup		\ <=10 for	$\leq 10 \text{ x E6 cfu/L},$	
Preliminary		\ <100 for	10-100 x E6 cfu/L,	
report		\>100 for 2	>100 x E6 cfu/L.	
Growth with	Organism name	Organism name with	C&S TEST - Organism name with	C&S TEST - Organism
workup	with corresponding	corresponding colony	corresponding colony count/L (choose	name with corresponding
Final report	colony count/	count/L (choose from LIS	from LIS ISOLATE window keypad as	colony count/L (choose
	L (choose from	ISOLATE keypad) and	above) and susceptibility testing results.	from LIS ISOLATE
	LIS ISOLATE	susceptibility testing	Add "No significant yeast isolated.	window keypad as above)
	window keypad as	results.	Routine urine fungal cultures screen for	and susceptibility testing
	above) and	Add "No significant	significant growth of yeast only.	results.
	susceptibility	yeast isolated. Routine	Filamentous fungi will not be ruled out	
	testing results.	urine fungal cultures	unless a specific request is made."(pick	
		screen for significant	from TEST window keypad - }NYSU)	
		growth of yeast only.	Fungus TEST - (pick from TEST	Fungus TEST - as per
		Filamentous fungi will	window keypad - }NYSU) as above	Mycology manual.
		not be ruled out unless a		
		specific request is		
		made."(pick from TEST		
		window keypad }NYSU)		

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Growth of Group B streptococci from Female12-60 years:

Result Category	Reporting
	Report as Isolate with corresponding colony count/L. Add ISOLATE Comment "This organism is
Significant amount	intrinsically susceptible to penicillin. If treatment is required AND this patient cannot be treated with
	penicillin, empiric treatment with nitrofurantoin or levofloxacin is generally successful for bacteriuria. If
	advice regarding antimicrobial treatment is desired, please contact the medical microbiologist on-call.
	NOTE REGARDING PREGNANT PATIENTS:
	Any women with GBS bacteriuria in any concentration during her pregnancy should also receive intrapartum
	chemoprophylaxis. Reference: J Obs Gyn Can 2004; 26(9):826-32. If this patient is pregnant AND cannot be
	treated with penicillin, please contact the Microbiology Department within 48 hours for susceptibility tests
	to help guide intrapartum chemoprophylaxis." (Pick from LIS ISOLATE window keypad "\GBSU for
	female 12-60y")
	Report TEST Comment: "Group B streptococcus isolated but in amounts too small to suggest a GBS urinary
Non-significant amount	tract infection. However, any woman with GBS bacteriuria in any concentration during her pregnancy
	should receive intrapartum chemoprophylaxis. Reference: J Obs Gyn Can 2004; 26(9):826-32. This
	organism is intrinsically susceptible to penicillin. If this patient is pregnant AND cannot be treated with
	penicillin, please contact the Microbiology Department within 48 hours to request susceptibility testing."
	(Pick from LIS TEST window keypad "Group B }GBsm")
	"Mixed growth, including Group B streptococcus (GBS). Suggest repeat specimen if patient's symptoms
Mixed growth with GBS	suggest a urinary tract infection. Any women with GBS bacteriuria during her pregnancy, even in mixed
	growth, should receive intrapartum chemoprophylaxis. Reference: J Obs Gyn Can 2004; 26(9):826-32. This
	organism is intrinsically susceptible to penicillin. If this patient is pregnant AND cannot be treated with
	penicillin, please contact the Microbiology Department within 48 hours to request susceptibility testing."
	(Pick from LIS TEST window "Mixed }wGBS")

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Growth of Group B streptococci from Men/Women not of Childbearing Age <12 or >60 years:

Result Category	Reporting			
	Report as Isolate with corresponding colony count/L. Add ISOLATE Comment "This			
Significant amount	organism is intrinsically susceptible to penicillin. If treatment is required AND this patient			
	cannot be treated with penicillin, empiric treatment with nitrofurantoin or levofloxacin is			
	generally successful for bacteriuria. If advice regarding antimicrobial treatment is desired,			
	please contact the medical microbiologist on-call." (Pick from LIS ISOLATE window			
	keypad "\GBS")			

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Prostatitis Work up

I. Introduction

Bacterial cultures of segmented lower urinary tract specimens can be used to differentiate urethritis/cystitis and prostatitis depending on the different quantitation of growth in the different segmented specimens.

Segmented quantitation culture specimens include initial stream sample of urine (VB1), a midstream urine sample (VB2), an aliquot of expressed prostatic secretion (EPS) and a post prostatic massage secretion (VB3).

When seminal fluid is sent with VB1, 2 or 3, it should be treated as EPS. Occasionally, only a pre-massage (VB1 or VB2) and post-massage (VB3) urine specimen will be received.

II. Specimen Collection and Transplant

See Pre-analytical Procedure - Specimen Collection QPCMI02001

III. Reagents/Materials/Media

See Analytical Process - Bacteriology Reagents_Materials_Media List QPCMI10001

IV. Procedure

A. Processing of Specimens:

See Specimen Processing Procedure

a) Direct Examination:

<u>Gram stain</u>: Not routinely performed. If specifically requested, perform Gram stain directly on unspun specimen.

b) Culture:

See Specimen Processing Procedure

B. Interpretation of cultures:

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Examine plates after appropriate incubation time.

a) Cultures with no growth:

Discard no growth routine cultures after 18-24 hrs incubation. Except:

- Urine specimens processed after 1600 hrs (plates from the "After 4 p.m." basket) reincubated until 1400 hrs and re-examine
- When yeast or non-specified fungus is requested re-incubate for another 24 hrs at room temperature.
- If colonies are too small re-incubate for another 24hrs.

b) **Cultures with growth:**

- 1. For each plate, count the colonies and multiply by the appropriate dilution factor in SI units.
- 2. Workup cultures according to the criteria in Tables 4.

TABLE 4: Segmented Urine and Expressed Prostatic Secretion (EPS)

Inoculation Loop size	Colony count/L	Work-up
0.001 mL 0.01 mL	1 colony = 1 x 10 ⁶ CFU/L 1 colony = 0.1 x 10 ⁶ CFU/L	Uropathogens: Quantitate, ID + susceptibility Non-uropathogens: Quantitate, minimal workup for ID (describe in broad groups, coag neg staph, viridans strep, etc). No susceptibility

Note: Consider coagulase-negative staphylococcus as <u>uropathogens</u> only when present in amounts >10-fold more that other <u>non-uropathogens</u>.

See <u>Identification</u> and Methods for Common Urinary Tract Isolates for workup.

TABLE 5: Integration	erpretatio	n Guide fo	or Typical Res	ults of Segme	ented Urine	and EPS	Cultures
-		-			-		

Pre-massa	ge samples	Prostatic massage sample	Post-massage sample	Possible Diagnosis
VB1	VB2	EPS	VB3	
-	_	+	-	Prostatitis
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Pre-massa	ge samples	Prostatic massage sample	Post-massage sample	Possible Diagnosis
-	-	+	+	Prostatitis
+	+	+	+	Cystitis+Prostatitis
+	+	-	++ (10 fold >VB2)	Cystitis+Prostatitis
+	+	-	+	Urethritis/Cystitis
+	_	-	-	Contamination
_	_	-	-	No infection

+ = growth of the same isolate type in each sample

C. Susceptibility Testing:

Refer to Susceptibility Testing Manual

VI. Reporting

Segmented Urine and Expressed Prostatic Secretion for diagnosis of Prostatitis:

Direct Smear (if requested):

Gram Stain: "(No) Pus cells seen. (No) Bacteria seen" (without quantitation)

Culture:

No growth Report:

"No Growth"

Growth Report:

Growth with no work-up:

Report as TEST Comment "highest colony count - choose from LIS TEST window keypad: }<1 for <1 x E6 cfu/L, }<10 for 1-9 x E6 cfu/L, }<100 for 10-100 x E6 cfu/L, }>100 for >100 x E6 cfu/L and Skin/Urethral Flora"

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Growth with work-up:

Organism name with corresponding (highest colony count choose from LIS ISOLATE window keypad: \<1 for <1 x E6 cfu/L, \<10 for 1-9 x E6 cfu/L, \<100 for 10-100 x E6 cfu/L, \>100 for >100 x E6 cfu/L) and appropriate susceptibility testing results.

VII. References

- Murray P.R., Baron E.J., Pfaller M.A., Yolken R.H. 2003. Manual of Clinical Microbiology, 8th ed. ASM Press, Washington, D.C.
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Appendix I – Appearance of Common Uropathogens on BUTI (Brilliance) Agar

Gram negative bacteria:



Figure 1: Left – NLF E.coli, Right – LF E.coli

Both display burgundy/pink colonies on BUTI. No growth on CNA. Visual *E.coli* identification acceptable. No MS needed. Requires antimicrobial sensitivities if of significant amount.

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Figure 2: Left and Right – K. pneumoniae

Klebsiella, Enterobacter, Citrobacter display blue/green colonies on BUTI. No growth on CNA.

Requires identification and antimicrobial sensitivities if significant amount.



Figure 3: Left – *P. aeruginosa*, Right – mucoid *P. aeruginosa:* Display brown/beige colonies on BUTI. No growth on CNA. UNIVERSITY HEALTH NETWORK/MOUNT SINAI HOSPITAL, DEPARTMENT OF MICROBIOLOGY

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Requires identification and antimicrobial sensitivities if of significant amount.

Gram positive bacteria:



Figure 4: Staphylococcus species

Display colourless colonies on BUTI. Growth on CNA. Requires identification and antimicrobial sensitivities as required.

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Figure 5: Enterococcus species

Display blue colonies on BUTI. Growth on CNA. Requires identification and antimicrobial sensitivities.



Figure 6: Beta-hemolytic streptococcus:

Display violet, blue or colourless colonies on BUTI. Growth on CNA with hemolysis. Requires identification and antimicrobial sensitivities if requested.

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Record of Edited Revisions

Manual Section Name: Urine Culture Manual

Page Number / Item	Date of Revision	Signature of
		Approval
Annual Review	May 26, 2004	Dr. T. Mazzulli
Annual Review	May 12, 2005	Dr. T. Mazzulli
Annual Review	April 10, 2006	Dr. T. Mazzulli
Specimen collection procedure – see <u>Pre-analytical</u>	April 10, 2006	Dr. T. Mazzulli
Procedure - Specimen Collection QPCMI02001		
Specimen processing procedure - See Specimen	April 10, 2006	Dr. T. Mazzulli
Processing Procedure QPCMI06003		
Modify urine category page 2	April 10, 2006	Dr. T. Mazzulli
Removed Specimen Rejection Criteria; refer to Specimen	April 10, 2006	Dr. T. Mazzulli
Rejection Criteria QPCMI06001		
Modified Interpretation of Culture wording Page 3	April 10, 2006	Dr. T. Mazzulli
<i>C. urealyticum</i> and <i>A. uriae</i> added to the ID table Page 6	April 10, 2006	Dr. T. Mazzulli
New Reporting category and phrases Page 7, 8	April 10, 2006	Dr. T. Mazzulli
New Table of Contents page	April 10, 2006	Dr. T. Mazzulli
New section and workup table for segmented urine and	April 10, 2006	Dr. T. Mazzulli
EPS		
Work-up any amount of beta-haemolytic strep to rule out	April 10, 2006	Dr. T. Mazzulli
GBS in females 12-60 years.		
Report \geq 3 types of uropathogens as "mixed growth"	April 10, 2006	Dr. T. Mazzulli
Urine Reporting	August 03, 2006	Dr. T. Mazzulli
Prostatitis Workup Reporting	August 03, 2006	Dr. T. Mazzulli
Urine interpretation tables 1 and 2 – modified "mixed	September 14, 2006	Dr. T. Mazzulli
growth"		
Modified Urine "mixed growth" reporting phrase	September 14, 2006	Dr. T. Mazzulli
Annual Review	August 13, 2007	Dr. T. Mazzulli
Annual Review	August 15, 2008	Dr. T. Mazzulli
Annual Review	August 10, 2009	Dr. T. Mazzulli
Annual Review	June 18, 2010	Dr. T. Mazzulli
GBS reporting phrases	June 18, 2010	Dr. T. Mazzulli
Suprapubic/Asceptically collected urine processing to	June 18, 2010	Dr. T. Mazzulli
10uL and 100uL loops		

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Page Number / Item	Date of Revision	Signature of Approval
Annual Review	June 20, 2011	Dr. T. Mazzulli
Annual Review	June 30, 2012	Dr. T. Mazzulli
Annual Review	August 25, 2013	Dr. T. Mazzulli
Modify Headers	June 11, 2014	Dr. T. Mazzulli
Modify Table of Contents		
Annual Review		
Add on Streptococcus anginosus group and	December 23, 2014	Dr. T. Mazzulli
Streptococcus gallolyticus as non-uropathognes		
Addition of Appendix 1	February 1, 2015	Dr. T. Mazzulli
Addition of link Urine Hold to work up	April 30, 2015	Dr. T. Mazzulli
Annual Review		
Annual Review	April 20, 2016	Dr. T. Mazzulli
Update CPS4 to Brilliance BUTI media		
Updated UHN/MSH logo in header		
Removed Asymptomatic Bacteriuria - Urine hold study	January 31, 2017	Dr. T. Mazzulli
link. Study transferred to routine specimen processing		
manual. Replaced link with one to specimen processing		
manual.		
Annual Review	April 20, 2017	Dr. T. Mazzulli
Annual Review	April 15, 2018	Dr. T. Mazzulli
Annual Review	September 14, 2019	Dr. T. Mazzulli
Minor format change		
Annual review	September 25, 2020	Dr. T. Mazzulli

Full document review included in all updates. Bi-annual review conducted when no revision had been made within 2 years.

Page Number / Item	Date of Revision	Edited by:
Removed reincubate additional 24hr for suprapubic/yeast	January 21, 2021	Dorna Zareianjahromi
fungus request. Specified beta-hem strep in list of		
uropathogens		
Minor formatting change	April 11, 2021	Jessica Bourke
Nomenclature update – Enterobacterales	April 19, 2021	Wayne Chiu
Added Aerococcus sanguinicola as possible uropath	May 19, 2022	Wayne Chiu
Added bladder irrigation sample to table 2 workup	Sep 2, 2022	Wayne Chiu

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