

## MC 6.034 Enterococcus Susceptibility Reporting

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**Purpose** This procedure provides instruction and guidance for routine testing and selective and cascade susceptibility reporting on *Enterococcus* species.

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**Principal and Clinical Significance** The decisions for the most appropriate antimicrobial agents to test and report are made with input from Pharmacy, Infectious Disease and the Clinical Laboratory. The goal is to provide clinically relevant information that will decrease the chance of developing antibiotic resistance, harmful effects of inappropriate antimicrobial use and avoid reporting results that could adversely affect patient care using selective and cascade reporting rules.

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**Policy Statements** This procedure applies to Microbiologists who perform susceptibility testing.

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**Special Safety Precautions** Microbiologists are subject to occupational risks associated with specimen handling.

- [Biohazard Containment](#)
- [Biohazardous Spills](#)
- [Safety in the Microbiology Laboratory](#)

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**Procedure**

1. Examples of *Enterococcus* species:
  - *Enterococcus faecalis*
  - *Enterococcus faecium*
  - *Enterococcus avium*
  - *Enterococcus cassseliflavus*
  - *Enterococcus durans*
  - *Enterococcus gallinarum*
  - *Enterococcus raffinosus*
2. Antibiotics appropriate for routine testing and reporting for *Enterococcus* species include:
  - Ampicillin
  - Penicillin
  - Vancomycin
  - Gentamicin synergy
  - Daptomycin
  - Linezolid
  - Streptomycin synergy
  - Nitrofurantoin-Urine only
  - Ciprofloxacin-urine only
  - Levofloxacin-urine only
  - Tetracycline-urine only
3. Perform susceptibilities using Vitek cards GP67 or Kirby Bauer Method.
  - Vitek AST-GP67 will be the primary method of testing.
  - Kirby Bauer is back up if testing fails.
  - Do not perform testing on multiple methods to cover all the antibiotics. It is acceptable if cascaded antibiotics are not reported.

4. Vitek results will be accepted under the Online Results tab. Modifications will be under the **VITMIC** keyboard under the Susceptibility tab.
5. Kirby Bauer results will be entered manually under the **KB** keyboards under the Susceptibility tab.
6. ETEST or send out results will be entered manually under the **MMIC** keyboards under the Susceptibility tab.

### Selective Reporting

1. Antibiotics will be reported in a specific order indicating the first and subsequent preferences of the Antimicrobial Stewardship Committee and Infectious Disease physicians
2. Antibiotics will be reported depending on the source, if the sample is a urine or non-urine.
3. There will be exceptions based on the method used for testing.
4. For **urine sources**, these 3 antibiotics will be reported routinely, in this order.
  1. Ampicillin
  2. Nitrofurantoin
  3. Gentamicin synergy

Figure 1 -Only AM, FD and GMSS are reported. All other antibiotics are in HIDE

Organism #1	- ENTEROCOCCUS FAECALIS
- VITMIC -	
SS	AM(8), FD(32), GMSS(SS)
HIDE	VA(4-SS), LZD(2-SS), P(8-SS), CP(1-SS), LEVO(2-SS), STRS(SS), TE(4-SS)

5. For **non-urine sources**, these 2 antibiotics will be reported routinely, in this order.
  1. Ampicillin
  2. Gentamicin synergy

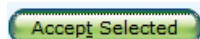
Figure 2-Only AM and GMSS are reported. All other antibiotics are in HIDE.

Organism #1	- ENTEROCOCCUS FAECALIS
- VITMIC -	
SS	AM(8), GMSS(SS)
HIDE	VA(4-SS), LZD(2-SS), P(8-SS), STRS(SS)

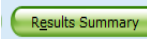
### Cascade Reporting-Vitek Method

If resistance is encountered, additional antibiotics will automatically be released.

1. For Vitek method, hidden antibiotics will be released when Accept Selected is clicked.



The released results will be visible in Results Summary.



2. Results can be edited under the **VITMIC** keyboard but is not needed to report the cascaded antibiotics.

### Method: Vitek -All sources

- If Ampicillin is R \* → report Vancomycin
  - If Vancomycin is R \*\* → report Linezolid

Figure 3- Example with resistance from a urine source

Organism #2 - ENTEROCOCCUS FAECIUM		
- VITMIC -		
SS	GMSS(SS), LZD(2)	
R	AM(16), FD(128), VA(32)	
HIDE	P(16-R), CP(4-R), LEVO(8-R), STRS(SS), TE(16-R)	

Figure 4 Example with resistance on non-urine.

Organism #2 - ENTEROCOCCUS FAECIUM		
- VITMIC -		
SS	GMSS(SS), LZD(2)	
R	AM(16), VA(32)	
HIDE	P(16-R), STRS(SS)	

- \*\* Vancomycin resistance needs to be confirmed by Etest.
- \* Ampicillin resistance on *E. faecalis* needs to be confirmed by Kirby Bauer.
- All other antibiotics on the panel that are not part of the cascade are hidden. Do not release and report. Hidden antibiotics include:
  - Penicillin
  - Ciprofloxacin
  - Levofloxacin
  - Tetracycline
  - Streptomycin synergy
- Requested antibiotics may be released with a provider request.

#### Cascade Reporting- MicroScan Method

If additional antibiotics are requested or ETEST performed, use the MMIC keyboard and release from HIDE.

- Enter results manually under the **MMIC** keyboard.
- Click the check mark under SUP to remove from HIDE.

Figure 5 MMIC

Keyboard **MMIC - MICROSCAN MIC** Off

	S	H	O	B	Organism
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENTEROCOCCUS FAECALIS (STRAIN 2)
5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ENTEROCOCCUS FAECIUM (STRAIN 2)

☒ Suppress all

Drug Code	Drug Name	SUP	Result	Interpretation
<<DAP>>	DAPTOMYCIN	<input checked="" type="checkbox"/>	4	SUSCEPTIBLE DOSE DE.. NOT REPORT>>
<<DOXY>>	DOXYCYCLINE	<input checked="" type="checkbox"/>		

- Click on File. File Result will be un-hidden.

Figure 6 Daptomycin or Doxycycline requested. SDD is susceptible dose dependent with *E. faecium*.

Organism #5 - ENTEROCOCCUS FAECIUM (STRAIN 2)		
- MMIC -		
SDD	DAP(4)	

- Requested antibiotics may be released with a provider request.

**Cascade  
Reporting-  
Kirby Bauer  
Method**

If resistance is encountered, additional antibiotics will automatically be released.

1. Enter **all** listed results manually under the **KB** keyboard. Antibiotics will be released following the cascade rules.

## Method: Kirby Bauer – urine source

- If Ampicillin is R → report Vancomycin

Figure 7 Example with resistance to Ampicillin, Vancomycin reported

<b>Organism #4</b>		<b>- ENTEROCOCCUS FAECALIS (STRAIN 2)</b>	
<b>- KB -</b>			
	SS	FD(17),VA(17)	
	R	AM(15)	
	HIDE	P(15-SS),CP(21-SS)	

2. Perform KB day of use QC for Nitrofurantoin.

## Method: Kirby Bauer – non-urine source

- If Ampicillin is R → report Vancomycin

Figure 8 Example with resistance to Ampicillin, Vancomycin reported.

<b>Organism #4</b>		<b>- ENTEROCOCCUS FAECIUM (STRAIN 2)</b>	
<b>- KB -</b>			
	SS	VA(17)	
	R	AM(16)	
	HIDE	P(14-R)	

3. Vancomycin resistance needs to be confirmed by Etest, when reported.
4. All other antibiotics on the panel that are not part of the cascade are hidden. Do not release and report. Hidden antibiotics include:
  - Penicillin
  - Ciprofloxacin
5. Requested antibiotics may be released with a provider request.

**Method  
Performance  
Specifications**

1. Usually, only the Vitek card AST-GP67 will be required for testing *Enterococcus* species.
2. Set up Nitrofurantoin day of QC with urine sources with the Kirby Bauer method.
3. Ampicillin resistance on *E. faecalis* needs to be confirmed by Kirby Bauer method.
4. Vancomycin resistance needs to be confirmed by Etest.

**Vitek  
Product  
Limitations**

Results for an antibiotic/organism combination may have limitations and may be suppressed from reporting. Refer to table below for specific limitations.

**AST-GP67 card for Enterococcus species**

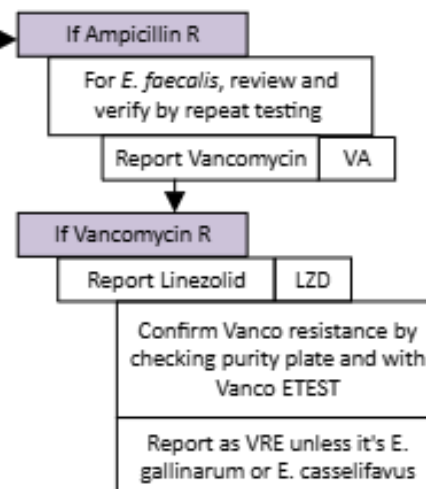
Antibiotic	Product Limitations
Linezolid	Linezolid will be suppressed when resistant on <i>Enterococcus</i> species.

**Appendix**

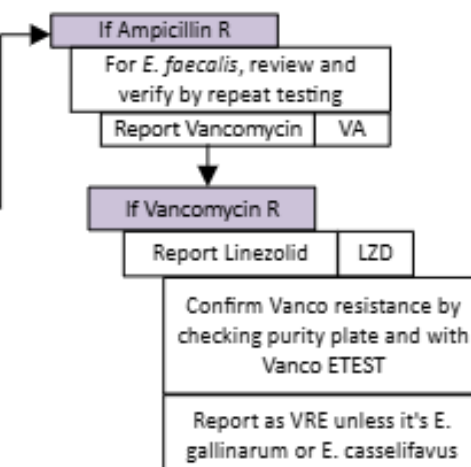
Additional Tables and Flowcharts

**Vitek**

Enterococcus sp.- Urine	
Antibiotics that are reported- Urine	
Sunquest code	Drug Name
AM	Ampicillin
FD	Nitrofurantoin
GMSS	Gentamicin Synergy
Hidden antibiotics	
VA	Vancomycin
LZD	Linezolid
P	Penicillin
CP	Ciprofloxacin
LEVO	Levofloxacin
STRS	Streptomycin Synergy
TE	Tetracycline



Enterococcus sp.- Non-Urine	
Antibiotics that are reported- Non-Urine	
Sunquest code	Drug Name
AM	Ampicillin
GMSS	Gentamicin Synergy
Hidden antibiotics	
VA	Vancomycin
LZD	Linezolid
P	Penicillin
STRS	Streptomycin Synergy



## Kirby-Bauer

Enterococcus sp.- Urine		
Antibiotics that are reported- Urine		
Disk (Abbrev.)	Sunquest code	Drug Name
AM	AM	Ampicillin
F/M	FD	Nitrofurantoin- Needs QC
Hidden antibiotics		
VA	VA	Vancomycin
P	P	Penicillin
CIP	CP	Ciprofloxacin

If Ampicillin R  
For *E. faecalis*, review and verify by repeat testing  
Report Vancomycin VA

When testing vanco against enterococci, plates should be held a full 24 hours for accurate detection of resistance.

Enterococcus sp.- Non-Urine		
Antibiotics that are reported- Non-Urine		
Disk (Abbrev.)	Sunquest code	Drug Name
AM	AM	Ampicillin
Hidden antibiotics		
VA	VA	Vancomycin
P	P	Penicillin

If Ampicillin R  
For *E. faecalis*, review and verify by repeat testing  
Report Vancomycin VA

When testing vanco against enterococci, plates should be held a full 24 hours for accurate detection of resistance.

## MicroScan

Enterococcus sp.	
Hidden antibiotics	
Sunquest code	Drug Name
DAP	Daptomycin
DOXY	Doxycycline

References

- bioMerieux Vitek 2 AST-GP67 Gram Positive Susceptibility Card 045513 2018-01
- CLSI M100 edition 34 Performance Standards for Antimicrobial Susceptibility Testing 2024

Training Plan/ Competency Assessment	Training Plan	Initial Competency Assessment
	<ol style="list-style-type: none"> <li>Employee must read the procedure.</li> <li>Employee will observe trainer performing the procedure.</li> <li>Employee will demonstrate the ability to perform procedure, record results and document corrective action after instruction by the trainer.</li> </ol>	<ol style="list-style-type: none"> <li>Direct observation.</li> </ol>

Historical  
Record

Version	Written/Revised by:	Effective Date:	Summary of Revisions
1	Susan DeMeyere	3/25/2025	Initial version