MC 6.017 Salmonella/Shigella Susceptibility Reporting

Purpose

This procedure provides instruction and guidance for routine testing and selective and cascade susceptibility reporting on Salmonella/Shigella species.

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.

Policy Statements

This procedure applies to Microbiologists who perform susceptibility testing.

Special Safety Precautions

Microbiologists are subject to occupational risks associated with specimen handling.

- *Biohazard Containment*
- *Biohazardous Spills*
- *Safety in the Microbiology Laboratory*

Procedure

1. Antibiotics appropriate for routine testing and reporting for *Salmonella/Shigella* species include:
    - Ampicillin
    - Ciprofloxacin
    - Levofloxacin
    - Imipenem
    - Ertapenem
    - Meropenem
    - Trimethoprim-Sulfamethoxazole
    - Cefotaxime
    - Ceftriaxone
2. Perform susceptibilities using Vitek cards N806, MicroScan NUC101 or Kirby Bauer Methods.
3. Not all antibiotics are available on every panel.
    - Vitek N806 will be the primary method of testing.
    - MicroScan and Kirby Bauer are 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 Tab. Modifications will be under the **VITMIC** keyboard under the Susceptibility tab.
5. MicroScan and Kirby Bauer results will be entered manually under the **MMIC** and **KB** keyboards respectively 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 for all sources.
3. There will be exceptions based on the method used for testing.
4. There will be 3 antibiotics routinely reported for all sources.
    - Ampicillin
    - Ciprofloxacin
    - Trimethoprim Sulfa

Figure 1 Selective reporting with 3 antibiotics reported

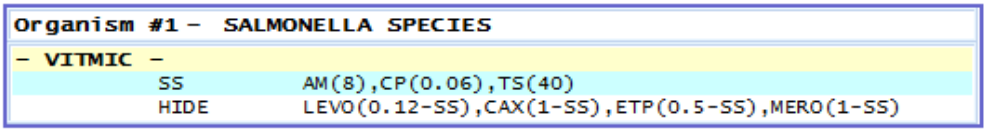
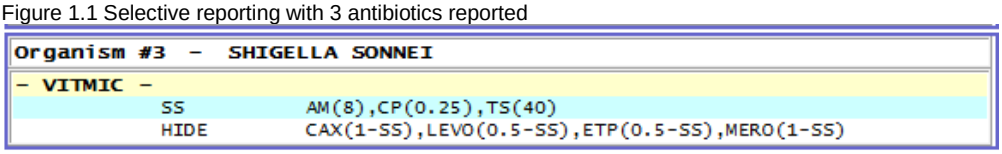


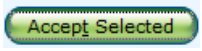
Figure 1.1 Selective reporting with 3 antibiotics reported

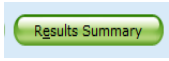


5. If any carbapenem is resistant, confirm result by alternate method. Report in Sunquest if confirmed resistant. Resistant carbapenems will be reported regardless of selective or cascade reporting.

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**

- If Ciprofloxacin is R → report Levofloxacin
- If Salmonella on a non-stool → report Ceftriaxone

Figure 2 Levofloxacin released due to Ciprofloxacin resistance, Ceftriaxone released due to non-stool culture.

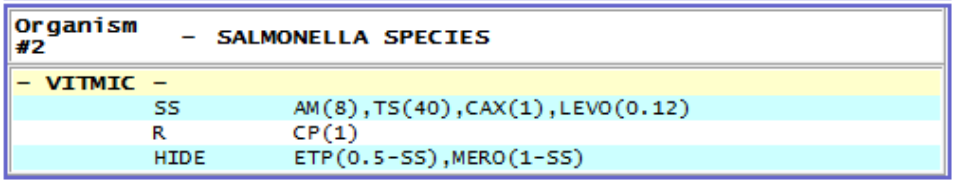
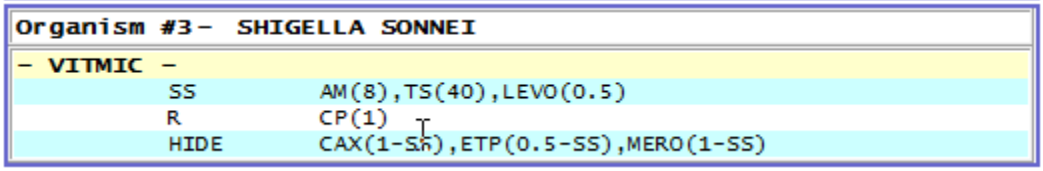


Figure 3 Levofloxacin released due to Ciprofloxacin resistance. Ceftriaxone not released for *Shigella* species.

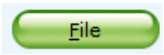


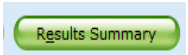
3. All other antibiotics on the panel that are not part of the cascade are hidden. Do not release and report. Hidden antibiotics include:
    - Ertapenem
    - Meropenem

4. With a provider request, antibiotics may be released.

Cascade Reporting-MicroScan Method

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

1. For MicroScan method, hidden antibiotics will be released when File 

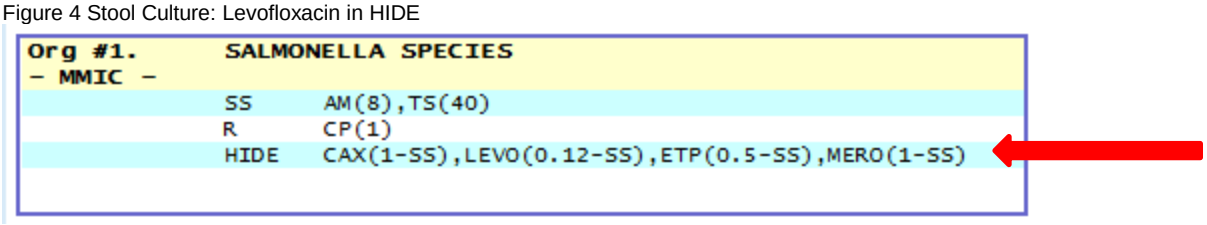
is clicked. The released Results will be visible in Results Summary. 

2. Enter **all** results listed, manually, under the **MMIC** keyboard. Antibiotics will be released following the cascade rules.

Method: **MicroScan**

- If Ciprofloxacin is R → report Levofloxacin
- If Salmonella on a non-stool → report Ceftriaxone

Figure 4 Stool Culture: Levofloxacin in HIDE



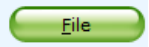
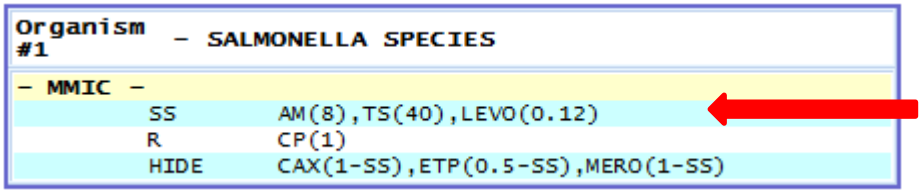
3. It will appear as the results are hidden but Sunquest will release from HIDE automatically after results are filed. 

Figure 5 Stool Culture: Levofloxacin released due to Ciprofloxacin resistance



4. All other antibiotics on the panel that are not part of the cascade are hidden. Do not release and report. Hidden antibiotics include:
    - Ertapenem
    - Meropenem

5. With a provider request, antibiotics may be released.

Cascade Reporting-Kirby Bauer Method

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

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

Method: **Kirby Bauer**

- If Salmonella on a non-stool → report Ceftriaxone

Figure 6-Blood Culture, Ceftriaxone released

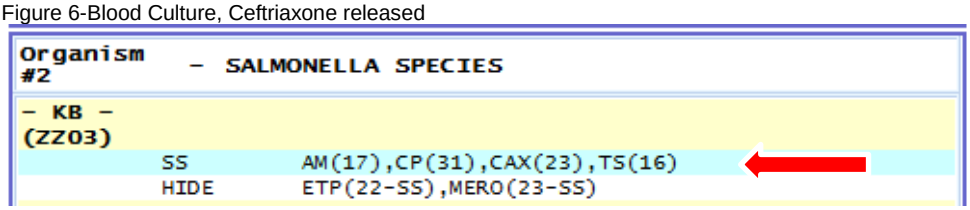
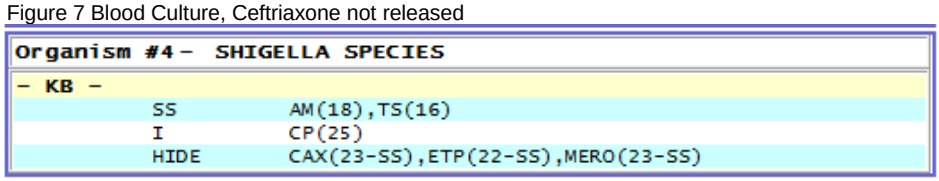


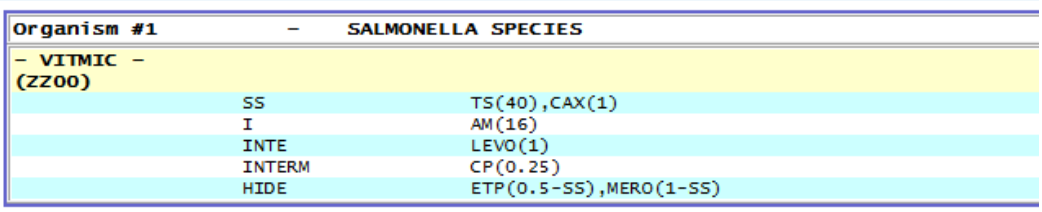
Figure 7 Blood Culture, Ceftriaxone not released



2. All other antibiotics on the panel that are not part of the cascade are hidden. Do not release and report. Hidden antibiotics include:
   - Ertapenem
   - Meropenem
3. With a provider request, antibiotics may be released.

Intermediate Interpretations

As there are multiple MIC intermediate interpretations for *Salmonella* species, additional Intermediate codes were created. You may see either I, INTE or INTERM. All 3 codes translate to Intermediate. See example below:



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.

Antibiotic	Product Limitations
Ertapenem	Perform alternate method with MIC of 0.25-0.5

Appendix

Salmonella species

Vitek N806 card / MicroScan

Reported antibiotics- Stool		
Disk (Abbrev.)	Sunquest code	Drug Name
AM	AM	Ampicillin
CIP	CP	Ciprofloxacin
SXT	TS	Trimethoprim/Sulfa
Hidden antibiotics		
CRO	CAX	Ceftriaxone
LVX	LEVO	Levofloxacin
ETP	ETP	Ertapenem
MEM	MERO	Meropenem

→ If Non-Stool: Also report Ceftriaxone

→ If Ciprofloxacin is R: Report Levofloxacin

Kirby-Bauer
Use EBAC stamper

Reported antibiotics- Stool		
Disk (Abbrev.)	Sunquest code	Drug Name
AM	AM	Ampicillin
CIP	CP	Ciprofloxacin
SXT	TS	Trimethoprim/Sulfa
Hidden antibiotics		
CRO	CAX	Ceftriaxone
ETP	ETP	Ertapenem
MEM	MERO	Meropenem

→ If Non-Stool: Also report Ceftriaxone

Shigella species

Vitek N806 card / MicroScan

Reported antibiotics- Stool		
Disk (Abbrev.)	Sunquest code	Drug Name
AM	AM	Ampicillin
CIP	CP	Ciprofloxacin
SXT	TS	Trimethoprim/Sulfa
Hidden antibiotics		
CRO	CAX	Ceftriaxone
LVX	LEVO	Levofloxacin
ETP	ETP	Ertapenem
MEM	MERO	Meropenem

→ If Ciprofloxacin is R: Report Levofloxacin

Kirby-Bauer
Use EBAC stamper

Reported antibiotics- Stool		
Disk (Abbrev.)	Sunquest code	Drug Name
AM	AM	Ampicillin
CIP	CP	Ciprofloxacin
SXT	TS	Trimethoprim/Sulfa
Hidden antibiotics		
CRO	CAX	Ceftriaxone
ETP	ETP	Ertapenem
MEM	MERO	Meropenem

References

1. bioMerieux Vitek 2 AST-N806 Gram Negative Susceptibility Card 424709 2023-07
2. bioMerieux Vitek 2 AST-XN30 Gram Negative Susceptibility Card 424639 20235-04
3. Beckman Coulter Diagnostics. 250 South Kraemer Boulevard. Brea, CA 92821-6232 USA, MicroScan® Dried Gram Negative (8/2022).
4. CLSI M100 edition 34 Performance Standards for Antimicrobial Susceptibility Testing 2024

Training Plan/ Competency Assessment

Training Plan	Initial Competency Assessment
1. Employee must read the procedure. 2. Employee will observe trainer performing the procedure. 3. Employee will demonstrate the ability to perform procedure, record results and document corrective action after instruction by the trainer.	1. Direct observation.

Historical Record

Version	Written/Revised by:	Effective Date:	Summary of Revisions
1	Susan DeMeyere	12/17/2024	Initial version