Salmonella spp (LTR62263)

Edit Approved By: Solomon, Natalia (05/03/2022) **Revision: 6.00**

Organism

Salmonella spp.

Clinical

These organisms are widely distributed in a variety of animals (birds, reptiles, mammals). Human infections are most commonly caused by ingestion of contaminated food, water or milk, by direct contact with animals, or less frequently, by contact with infected humans.

Salmonella infections may cause several gastrointestinal clinical syndromes including: 1) gastroenteritis (mild to severe); 2) enteric fever (typhoid fever); 3) asymptomatic carrier state. Extraintestinal infections include urinary tract infections, skin/soft tissue infections, osteomyelitis, meningitis, endocarditis, bacteremia, and septicemia.

Usual susceptibility pattern

These organisms do not possess chromosomal beta-lactamases and are usually susceptible to ampicillin, cephalosporins and carbapenems. Resistance to beta lactams may be due to penicillinases, ESBL, plasmid mediated AmpC cephalosporinase and Class A (KPC) carbapenemase. Although usually susceptible in vitro to aminoglycosides as well as 1st and 2nd generation cephalosporins, the poor intracellular penetration of these agents makes them suboptimal in the treatment of salmonella infections. Quinolone resistance is increasing.

For *S. typhi* and *S. paratyphi* (typhoid fever), there has been increased resistance noted to ampicillin, TMP-SMX, chloramphenicol and quinolones. Low level fluoroquinolone resistance (not detected by automated systems) has been associated with clinical failure in patients with extraintestinal salmonella infections (especially *S. typhi*).

Note: Ceftriaxone (biliary excretion) is preferred over cefotaxime in the management of *Salmonella* spp. infections.

Susceptibility method

VITEK2. Additional tests (Disc diffusion or Etest method) are performed using Mueller-Hinton agar incubated in ambient air at 35°C for 16-20 hours.

Note: For Etest use 0.5 McFarland suspension in saline.
For mucoid strains use 1.0 McFarland.

Salmonella spp., Continued

Susceptibility reporting

	CSF/ Brain	Blood/ Sterile Body Site/ Endo-vascular Catheter	Stool +	Urine	Other	Comments
Ampicillin	✓	✓	✓	✓	✓	
Azithromycin		*	*			*Report 1st line for S. typhi only Etest method **See Special considerations**
Cefixime			2	2		2nd line if ampicillin I/R
Ceftriaxone	✓	✓	2	✓	✓	2nd line if ampicillin I/R If patient < 1 mo - report cefotaxime instead of ceftriaxone using the same interpretation. **See Special considerations**
Ciprofloxacin		✓	✓	✓	✓	Do not report in patients < 18 y
Doxycycline				3		3rd line if cefixime and cipro I/R For patients ≤17 y report 3rd line if cefixime I/R If patient <8y **See Special considerations**
Ertapenem		2		2		2nd line if ceftriaxone I/R If S do not report in patients < 3 months
Imipenem		2		2		2nd line if ceftriaxone I/R.
Meropenem	2	2		2		2nd line if ceftriaxone I/R
Nitrofurantoin				✓		Add comment: For uncomplicated lower UTI only #f1
TMP-SMX	*	✓	✓	✓	✓	* Report only at physician request

+ See Note

Note

<table>
<tr><td>Stool</td><td>Salmonella typhi and Salmonella paratyphi (except S. paratyphi B var java):
• report susceptibility testing results</td></tr>
<tr><td></td><td>Other Salmonella sp. stool isolates (including S. paratyphi B var java)

<table><tr><th>IF …</th><th>THEN …</th></tr><tr><td>• patient < 12 months or > 65 years of age
• patient with immunosuppression
• patient is a food handler
• susceptibility requested by physician</td><td>Perform susceptibility testing according to reporting chart

Add comment 21392</td></tr><tr><td>None of the above</td><td>Add comment 21392</td></tr></table>
For S. paratyphi B var java also add free text comment below.</td></tr>
<tr><td>Non-Stool</td><td>Report susceptibility results on all isolates</td></tr>
<tr><td></td><td></td></tr>
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Special considerations

Azithromycin:	For **blood culture** isolates of ***S. typhi*** add comment: "Azithromycin can be used only for treatment of UNCOMPLICATED typhoid fever. Expert consultation is advised." **(21094)**
Ceftriaxone:	Ceftriaxone is preferred as this agent achieves higher intraluminal concentrations than cefotaxime.
Doxycycline:	If reporting doxycycline on <8 years add the following comment: "Doxycycline can now be prescribed for children <8y for short-course (<21 d) therapy; OTHER tetracyclines are still contraindicated for this age group." **(27664)**

Interpretation

For Etest, report actual MIC result.
For interpretation (S, I, and R) report according to nearest higher doubling dilution **(Appendix 1)**.

Use **CLSI** interpretive document for **Enterobacterales**.

Note: For Beta-lactam drugs – Refer to Beta-lactam Resistance Detection Charts.

For azithromycin, add comment:
"Susceptibility testing for this organism was performed by a non-reference method and/or required modifications to the standard test conditions. Results are probable but not definite." **(21303 and 23380)**