

Salmonella	Nontyphoidal	Typhoidal
Species	Numerous serotypes (e.g., <i>S. enteritidis</i> , <i>S. typhimurium</i>)	<i>S. enterica</i> serotype Typhi and Paratyphi A, B, and C
Microbiology	GNR, facultative intracellular, facultatively anaerobic; oxidase (-); produce H ₂ S	
Reservoirs	Reptiles, amphibians, live poultry <u>Buzzwords</u> : Turtles, petting zoos	Only humans
Transmission	Most commonly foodborne (poultry & eggs)	Ingestion of contaminated food & water
Risk factors	<ul style="list-style-type: none"> • Immunosuppression • ↓ gastric acid • Altered GI flora (recent abx) 	<ul style="list-style-type: none"> • Travel to endemic areas • Poor sanitation • Chronic: Think gallbladder
Pathophysiology	Ingestion → intestine → invade small intestine lymph tissue (Peyer's patch) → intracellular survival → Inflammation of GI lumen due to immune response	
		Spread through the reticuloendothelial system
Clinical manifestations (* can also occur in typhoidal , but quite rare)	<ol style="list-style-type: none"> 1. Gastroenteritis 2. Bacteremia 3. Metastatic spread * <ul style="list-style-type: none"> ○ Aortitis ○ UTI (a/w schistosomiasis) ○ Osteo (kids, sickle cell) ○ CNS (common in neonates) 4. Reactive arthritis 	<ul style="list-style-type: none"> • <u>Week 1</u>: Rising fever, bacteremia • <u>Week 2</u>: High grade fever, rose spots • <u>Week 3</u>: hepatosplenomegaly, intestine perforation (↑↑ Peyer's patch)
Treatment	<u>Immunocompetent / low risk</u> : Supportive therapy (Tx may cause harm) <u>Tx options</u> : fluoroquinolone, azithromycin, bactrim, 3G cephalosporin, carbapenem	
Drug resistance	<u>Asia</u> : High rates of fluoroquinolones resistance → azithromycin preferred <u>Pakistan & Iraq</u> : Extensive resistance, may need to use carbapenem Stool cultures are important. In first week of typhoidal may be negative... Bone marrow culture can be helpful if stool Cx negative	

Yersinia	Yersiniosis (besides Y pestis)
Microbiology	<ul style="list-style-type: none"> • Y enterocolitica & Y pseudotuberculosis • Facultative intracellular GNR; bipolar staining (“safety pin”)
Transmission & reservoirs	<ul style="list-style-type: none"> • Mainly transmitted from food, sometimes waterborne • Reservoir for Y enterocolitica is healthy pigs, grows in their tonsils
Risk factors	<ul style="list-style-type: none"> • Immunocompromise, age <5 y/o, iron overload states
Similarities to Salmonella	<ul style="list-style-type: none"> • Cause febrile diarrhea by invasion of Peyer’s patches • Blocks phagocytosis/intracellular killing • Spreads through lymph system (similar to typhoidal salmonella)
Clinical manifestations of acute yersiniosis	<ul style="list-style-type: none"> • Gastroenteritis / Mesenteric lymphadenitis: Febrile diarrhea, more subacute than other causes (can last weeks) • Pseudoappendicitis: mesenteric lymphadenitis in terminal ileum that mimics appendicitis • Pharyngitis: Can look like scarlet fever; caused by Yersinia growing in tonsils (because it loves lymph tissue)
Complications	<ul style="list-style-type: none"> • Extraintestinal complications less common than in salmonella • Can still have bacteremia, especially if high risk host • Post-infectious sequelae are common, namely reactive arthritis (like NTS) & erythema nodosum
Treatment	<ul style="list-style-type: none"> • Supportive treatment for most everyone • Treatment suggested for those with “risk factors” (above) or extraintestinal disease <ul style="list-style-type: none"> ○ Ceftriaxone + gentamicin ○ Quinolones + gentamicin ○ Bactrim & doxy (step down therapy)
Drug resistance	<u>Often resistant to:</u> Penicillin, ampicillin, macrolides, +/- fluoroquinolones