

Genomic Epidemiology and Antimicrobial Resistance of Nontyphoidal *Salmonella* in Retail Meats in Hong Kong: A Comprehensive Surveillance Study Using Whole-Genome Sequencing

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Background: Nontyphoidal *Salmonella* remains the leading cause of foodborne outbreaks in Hong Kong, but comprehensive antimicrobial resistance data in retail meats are limited. Rising resistance to critical antibiotics threatens treatment efficacy for invasive salmonellosis.

Methods: From July 2022-June 2023, we collected 724 retail meat samples (beef, pork, chicken) across Hong Kong. *Salmonella* isolation followed FDA protocols with antimicrobial susceptibility testing against 14 antibiotics including ciprofloxacin, ceftriaxone, and azithromycin. Whole-genome sequencing using Nanopore technology enabled phylogenetic analysis. Ninety clinical isolates were included for comparative analysis.

Results: Overall *Salmonella* prevalence was 27.6%, highest in pork (50.6%) and fresh meat (46.2%). Dominant serotypes *S. typhimurium*, *S. Rissen*, *S. Derby*, and *S. London* mirrored local clinical patterns. High multidrug resistance (68.7%) and concerning non-susceptibility to ciprofloxacin (69.6%), ceftriaxone (7.8%), and azithromycin (8.3%) were observed. Phylogenetic analysis identified 36 clusters, with 17 containing both food and clinical isolates, demonstrating active transmission. Beef/pork serotypes showed clonal spread with chromosomal resistance, while chicken serotypes exhibited plasmid-mediated resistance.

Conclusion: This surveillance revealed concerning AMR transmission between Hong Kong's food supply and clinical cases. High prevalence in fresh pork and clonal circulation suggest upstream contamination requiring intervention. These findings provide baseline data for food safety strategies and demonstrate integrated genomic surveillance value in combating AMR *Salmonella*.

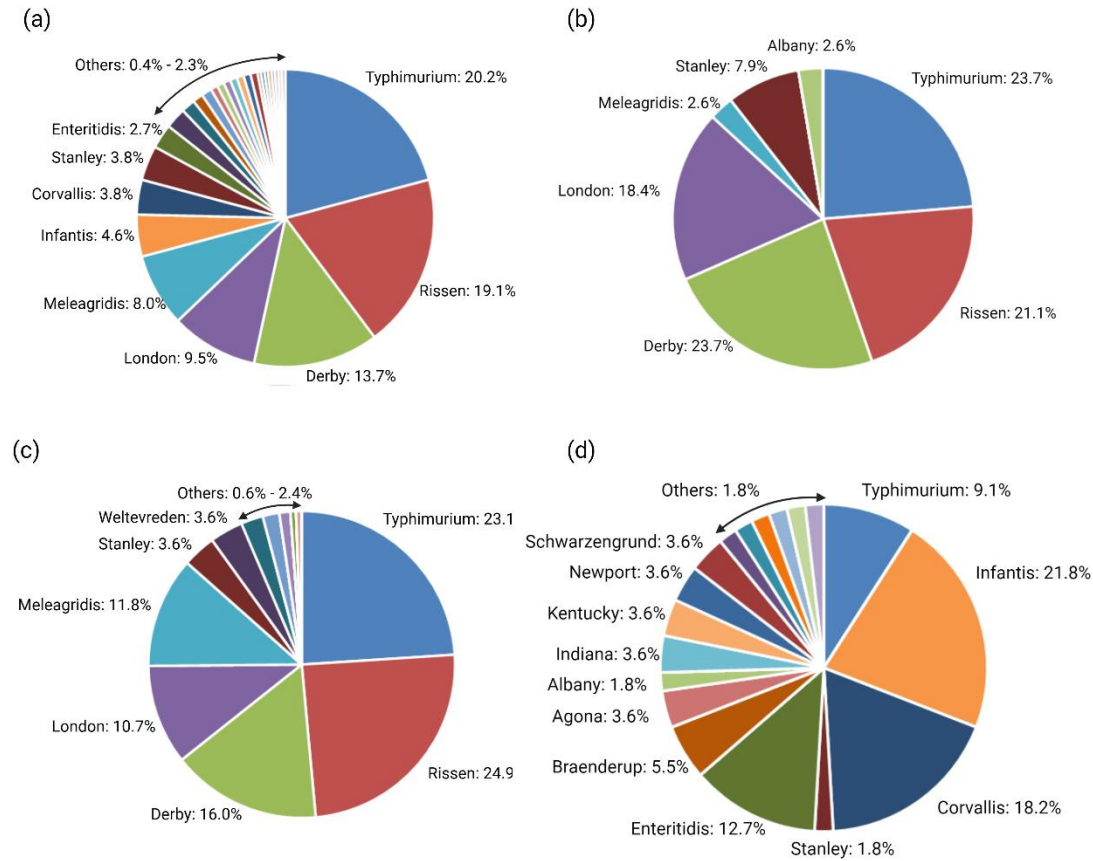


Figure 1. Serotype distribution of nontyphoidal *Salmonella* in (a) all meat samples, (b) beef, (c) pork and (d) chicken samples across Hong Kong.

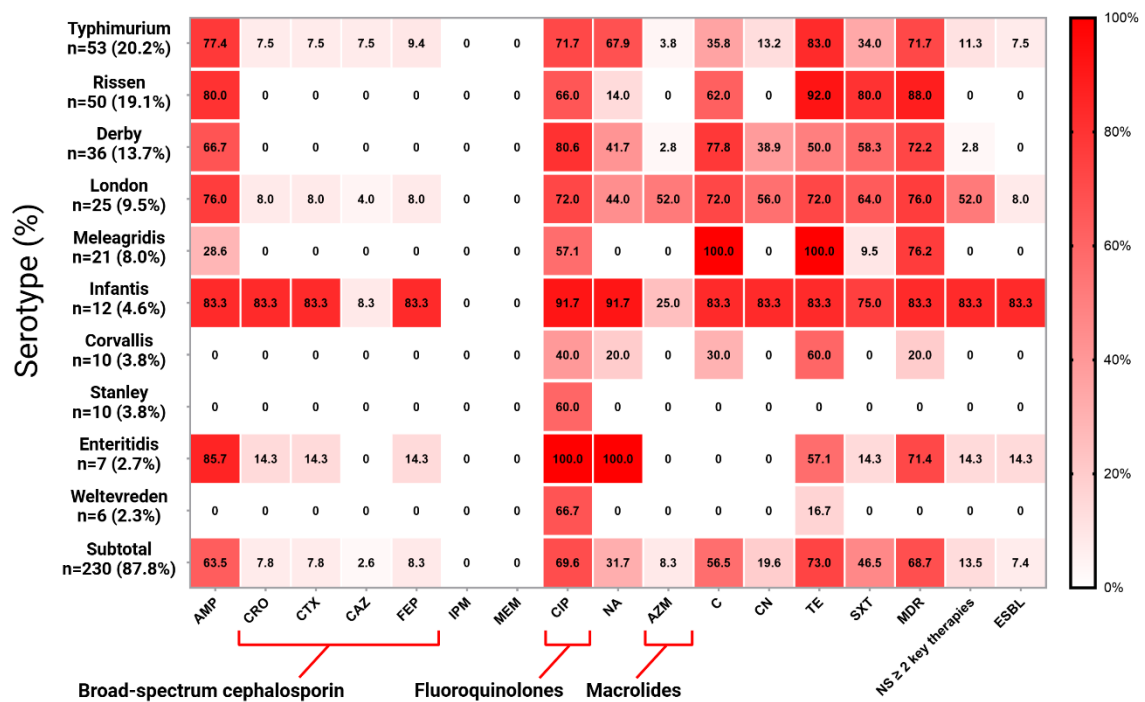
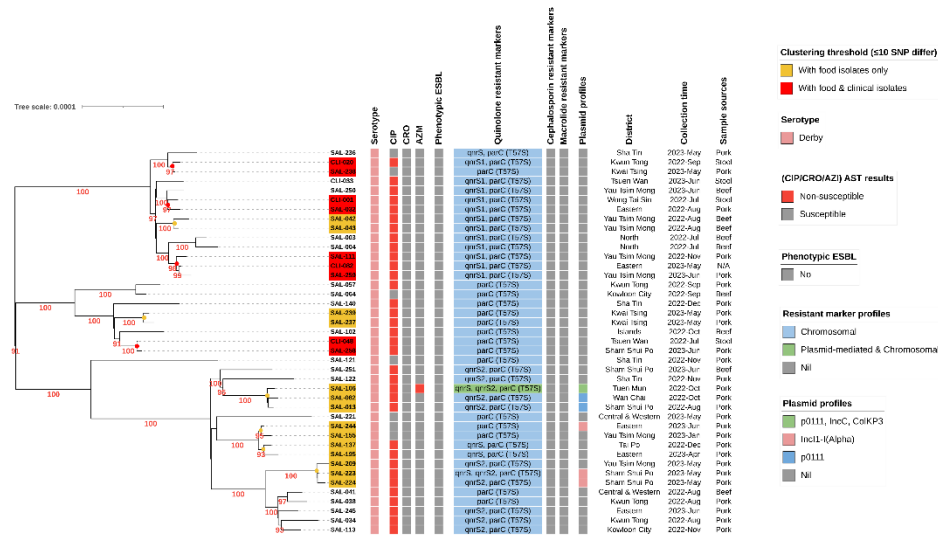


Figure 2. Antimicrobial resistance patterns of dominant *Salmonella* serotypes from retail meat.

(a)



(b)

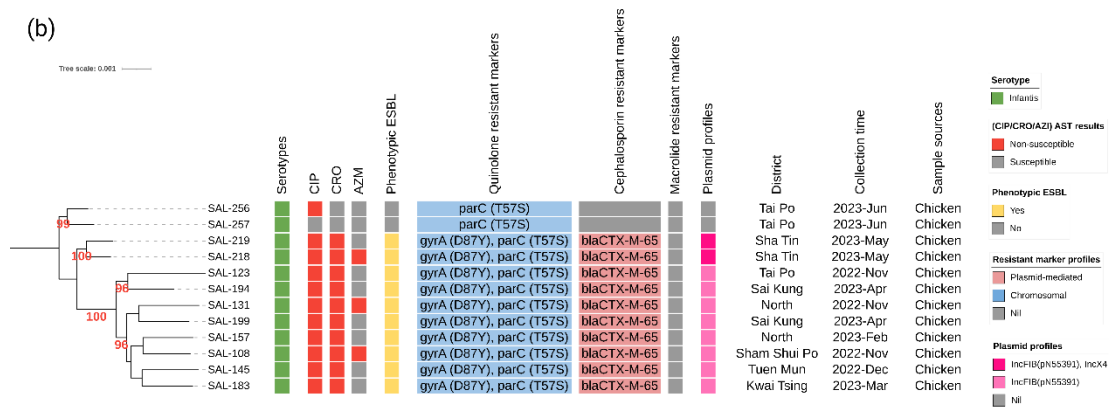


Figure 3. Phylogenetic analysis revealing (a) clonal spread among *S. Derby* and (b) plasmid-mediated resistance among *S. Infantis*.