

## **Phage Type and Antimicrobial Resistance Trends among Human *Salmonella* Serotype Typhimurium Isolates in NARMS 1997-1998: Continued Dominance of DT104 R-Type ACSSuT**

*Fiorentino T, Rossiter S, Westerman J, Holland B, Stamey K, Howard R, Sexton J, Headrick M, Goldbaum R, Barrett T, Angulo F, and the NARMS Working Group*

**Background:** *Salmonella* Typhimurium (ST), the most frequently isolated serotype of *Salmonella* in the United States, causes approximately 25% of the estimated 1.4 million human *Salmonella* infections annually. Phage-types in "Definitive Type (DT)104 complex" (104, 104A, 104B, 104C, and U302) have emerged as a prevalent ST subtype worldwide. DT104 complex isolates are resistant to ampicillin, chloramphenicol, streptomycin, sulfonamides and tetracycline (R-type ACSSuT), and may be gaining additional resistance to other antimicrobials. To evaluate trends among ST, we reviewed data from the National Antimicrobial Resistance Monitoring System (NARMS) for Enteric Bacteria.

**Methods:** After serotyping, the 17 state and local public health laboratories participating in NARMS send every tenth *Salmonella* isolate to CDC for antimicrobial susceptibility testing to 17 antimicrobial agents and, for ST isolates, phage-typing.

**Results:** In 1997-1998, 26% (706) of 2687 serotyped *Salmonella* isolates were ST; 27% (326/1221) in 1997 and 26% (380/1466) in 1998. Antimicrobial susceptibility and phage typing were completed for 700 ST isolates. Phage-types in the DT104 complex were the dominant phage-type in 1997 (36%) and 1998 (38%). Among the DT104 complex, the percent of isolates that were R-type ACSSuT decreased from 81% in 1997 to 70% in 1998; however, the percent of these isolates that were additionally resistant to kanamycin (R-type ACKSSuT) increased from 5% to 9%. A high proportion of ST isolates (30% each year) reacted to the typing phages, but the pattern of the reaction did not match a phage type pattern of any adopted "Definitive Type"; such a pattern is known as "reacts but does not conform" (RDNC). R-type AKSSuT increased among RDNC isolates from 2% to 8%. Some isolates (18% in 1997 and 12% in 1998) did not react with any typing phages (untypeable). Among untypeable isolates, R-type ACSSuT increased from 12% to 23% and additional resistance to kanamycin among these isolates increased from 8% to 16%. There were small fluctuations among the minority of other phage-types, the most interesting change occurred among the pansusceptible PT 46 isolates, which increased from <1% to 5%.

**Conclusion:** Isolates of the DT104 complex which are R-type ACSSuT remained the dominant ST subtype in the United States, accounting for 28% of ST isolates, and 7% of all *Salmonella*. Because a high proportion of ST isolates, particularly R-type AKSSuT isolates, were RDNC or untypeable, there is a need to explore further RDNC and untypeable isolates by subtyping or other methods.

**Suggested citation:**

Fiorentino T, Rossiter S, Westerman J, Holland B, Stamey K, Howard R, Sexton J, Headrick M, Goldbaum R, Barrett T, Angulo F, and the NARMS Working Group. Phage type and antimicrobial resistance trends among human Salmonella serotype Typhimurium isolates, 1997-1998; continued dominance of DT-104 R-Type ACSSuT. 2nd International Conference on Emerging Infectious Diseases. Atlanta, GA, July 2000.