Serotypes and Antimicrobial Resistance in Salmonella

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Introduction: The National Antimicrobial Resistance Monitoring System
(NARMS) was developed in 1996 as a collaborative effort between the FDA,
USDA, and CDC to monitor antimicrobial resistance development in enteric
organisms in humans and animals. Salmonella was selected as the sentinel
organism.

Material and Methods: Resistance between swine isolates collected in 1997-
2000 from federally inspected slaughter and processing plants (SI), and diagnostic
laboratories (DI; the National Veterinary Services Laboratory and participating
veterinary diagnostic laboratories) were tested against 17 antimicrobial drugs using
the Sensititre™ system (Trek Diagnostics, Inc.).

Results: From 1997 - 2000 (Note: 2000 data are preliminary) the most frequent
serotype from SI was S. Derby. In 1997, resistance was observed (in decreasing
order of frequency to Tetracycline (Tet; 56%), Streptomycin (Str; 41%),
Sulfamethoxazole (Sul; 37%) and Apramycin (Apr; 4%). From 1998-2000, percent
resistance to TetStrSul was ≥ 44% in each year; however, in addition to AprR,
resistance was also observed to Ampicillin (Amp), Chloramphenicol (Chl),
Gentamicin (Gen), and Kanamycin (Kan) in 1998, Amikacin (Ami),
Amox.Clavulanic Acid (Am/Cl), and Cefetimor (Cefti) in 1999 and of Cephathrin
(Cep) in 2000. No resistance to AprR, was observed in 2000. For 1997-2000, the
second most common serotype among SI was Typhimurium followed by
Heidelberg in 1997 and Johannesburg for 1998-2000. Typhimurium isolates were
more resistant than any other serotype. Heidelberg was only resistant to
KanStrTet while little resistance was observed among the Johannesburg isolates.
Conversely, for diagnostic isolates (DI), the top serotype from 1997-2000 was
The third most common serotypes were S. mbandaka, Heidelberg, Derby, and
Heidelberg for 1997-2000, respectively. Regardless of serotype, resistance was
higher among the DI as compared to SI. Additionally, multiple resistance was more likely to occur among DI versus SI.

**Conclusions:** Although *Salmonella* serotypes and antimicrobials to which resistance was observed were similar from 1997–2000, higher levels of resistance were found in diagnostic isolates. This should be expected since diagnostic isolates are more likely to be recovered during clinical disease for which antimicrobial therapy had been initiated. Further characterization of the isolates may identify common serotypes that persist through to slaughter and processing.