

Evolving antimicrobial resistance in enteric pathogens

Karen H. Keddy

Enteric Diseases Reference Unit

National Institute for Communicable Diseases

National Health Laboratory Service

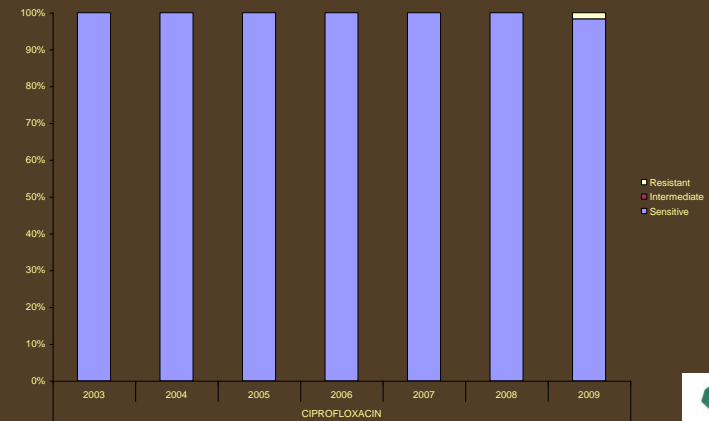
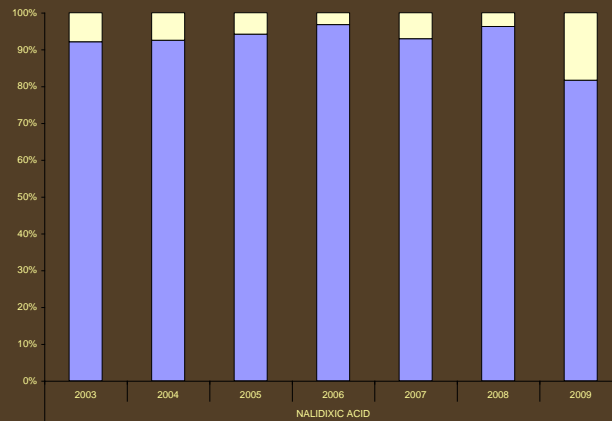
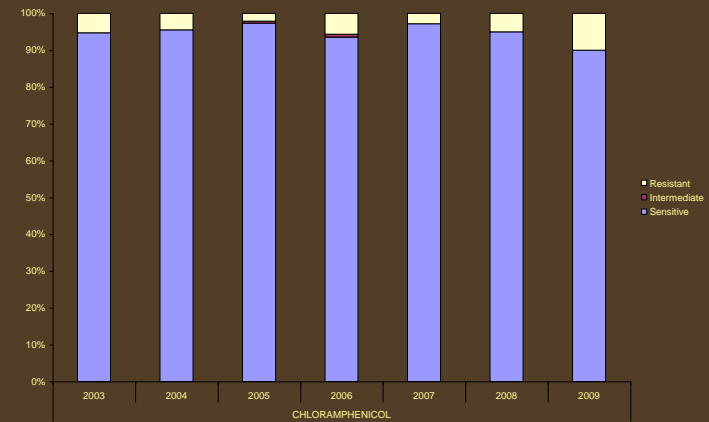
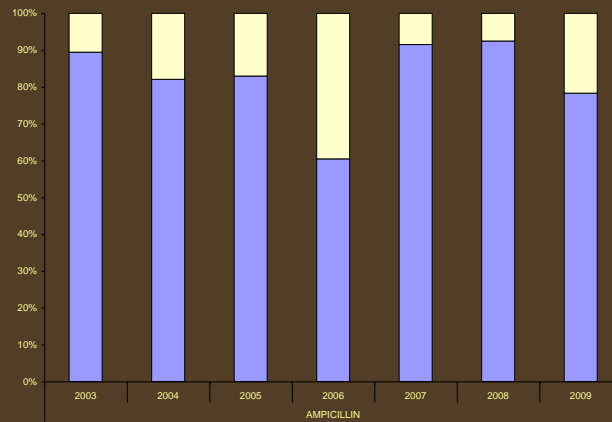
GERMS-SA

- National active laboratory-based surveillance: microbiology reference units of NICD since 2003.
- All diagnostic microbiology laboratories in South Africa are encouraged to submit isolates from patients fulfilling relevant case definition.
- Data supplemented by audits are conducted wherever possible to identify missing cases, which are then included in the database.

Enteric Diseases Reference Unit

- *Salmonella* species, including *Salmonella* Typhi and NTS.
- *Vibrio cholerae*, specifically *V. cholerae* O1.
- *Shigella* species
- Diarrhoeagenic *Escherichia coli*, including EHEC.
- *Campylobacter* (from 2010)

Salmonella Typhi



Quinolone resistance: *Salmonella Typhi*

- 6% of isolates between 2003 & 2009 (n=629).
- 20% of isolates in 2009 (n=60).
- 2003-2007*:
 - All isolates were negative by PCR screening for *qnr* genes
 - All isolates amino-acid mutations in both GyrA and ParC.
 - Mutations in GyrA and ParC in combination with active efflux of antibiotic out of the bacterial cell.

*Smith *et al*, Epidemiol Infect 2010

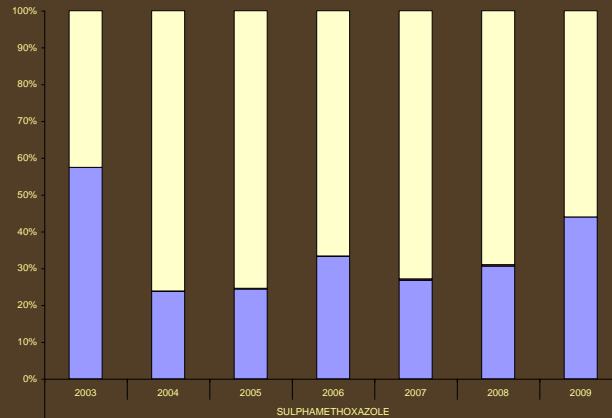
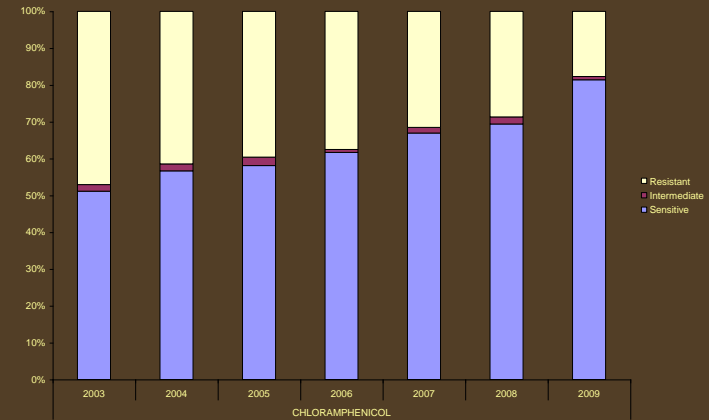
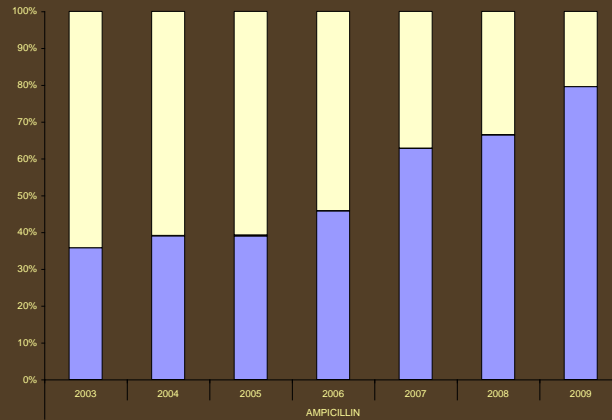
FQ resistance: *Salmonella Typhi*

- 65 y/o Cape Town resident – contact from Bangladesh.
- Ciprofloxacin MIC: 4 µg/ml.
- Single amino-acid mutation in GyrA (Ser83 to Tyr) with the QnrS1 protein and active efflux*.
- Plasmid mediated quinolone resistance co-transferred from *Salmonella Typhi* with ESBL production†.

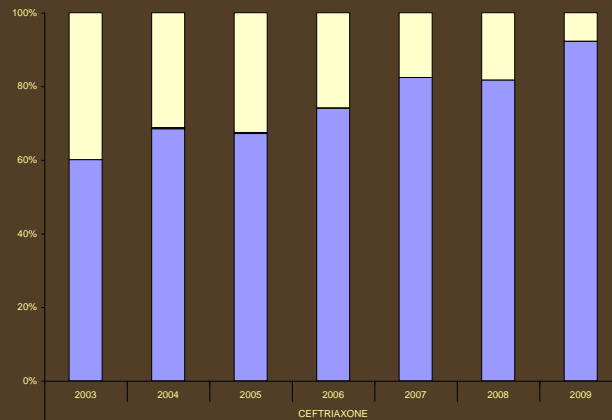
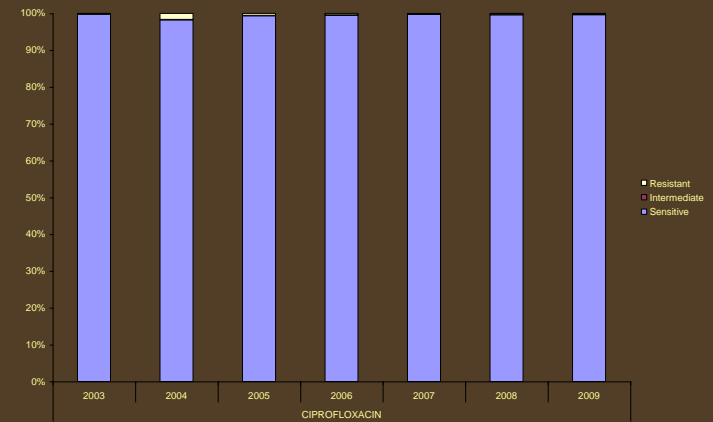
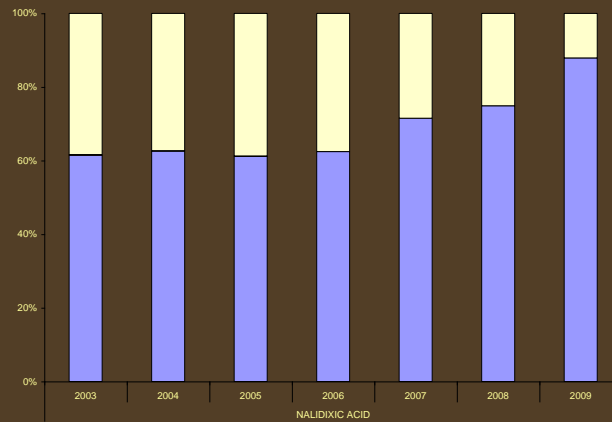
*Keddy *et al*, submitted

†Pfeifer *et al*, EID 2009

Non-typhoidal *Salmonella*



Non-typhoidal *Salmonella*



NTS

ESBL production

- Specific *Salmonella* serotypes more commonly affected.
- Strong association with nosocomial isolates.
- TEM63 & TEM131* and CTX-M-37†.

*Kruger *et al*, AAC 2004

†Govinden *et al*, Int J Antimicrob Agents 2009

NTS

Quinolone and FQ Resistance

- Nosocomial association (MDR).
- Chromosomally (*gyrA/B*; *parC/E*)* and plasmid (*qnr*) mediated†.

*Govinder, MSc 2009

†Govinder *et al*, JMM 2009



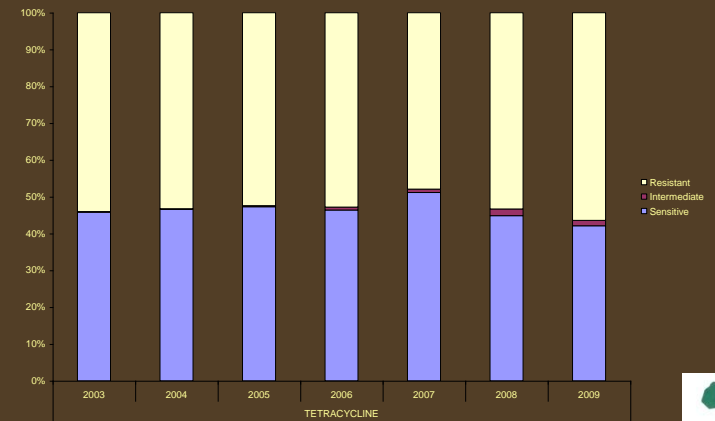
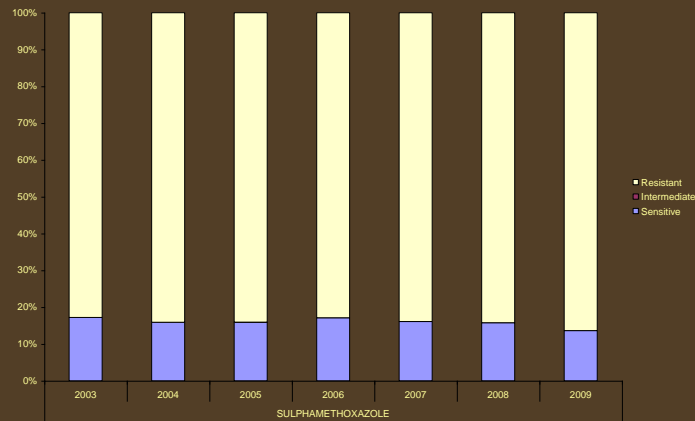
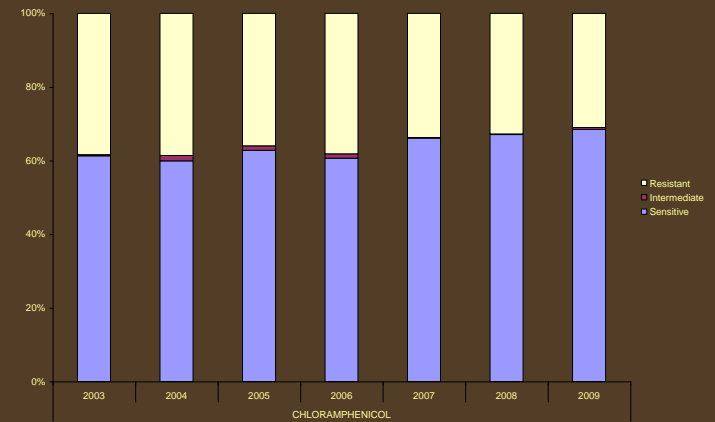
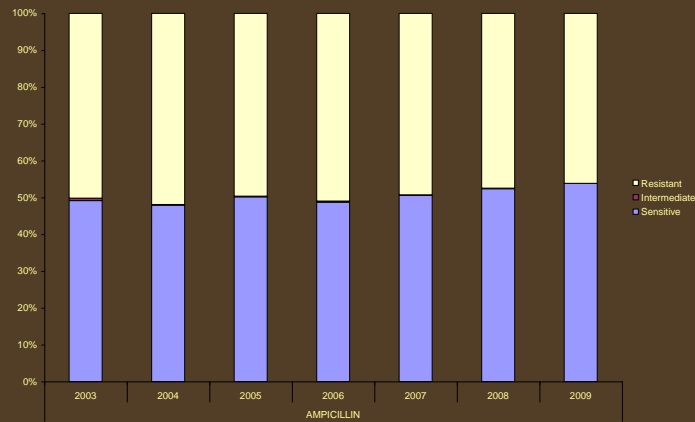
NTS

Role of antimicrobials in environment

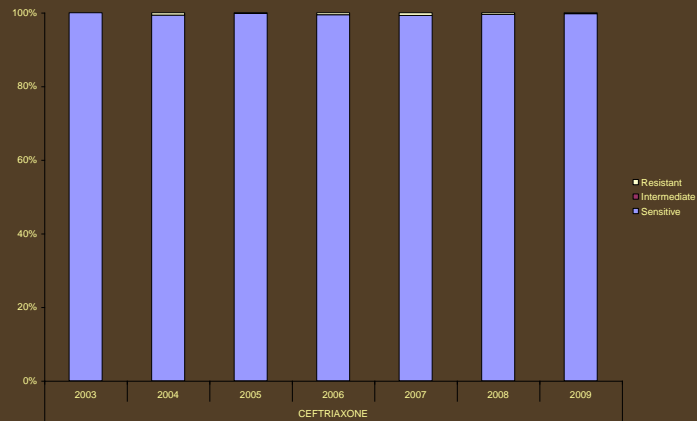
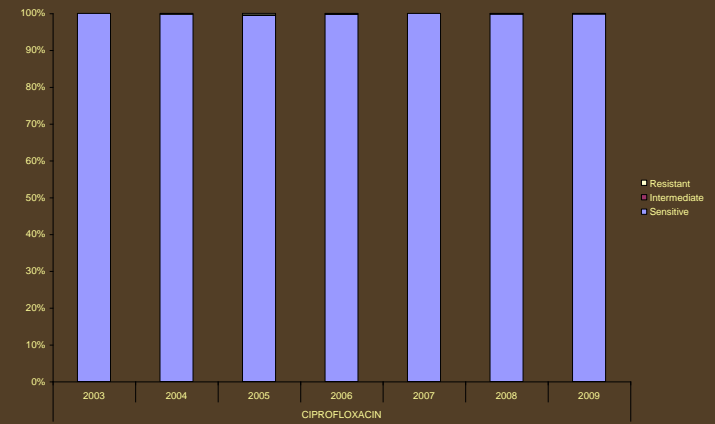
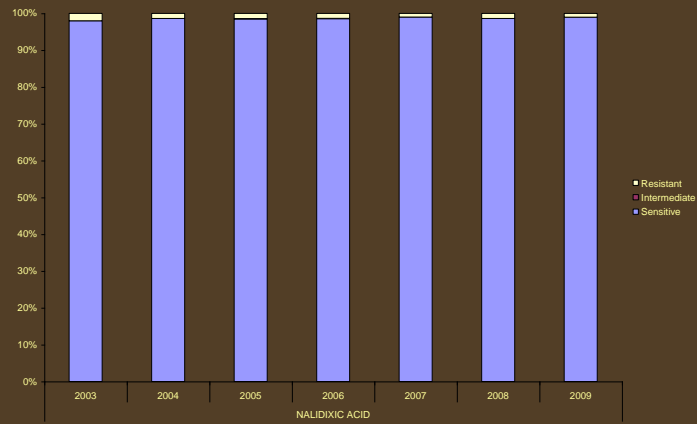
- Not studied in RSA context.
- Evidence of common *Salmonella* Typhimurium strains circulating among humans and animals*.
- Initial research being undertaken.
- Role of antimicrobial therapy for STIs?

*Dwarika, MSc 2009

Shigella



Shigella



Shigella resistance

- Isolates primarily from stool.
- Resistance to 1st line antibiotics constant.
- Resistance to quinolones and FQ cause for concern.
- ESBL production possibly noscomial association.
- Role of oral 3rd generation cephalosporins for STIs?

Acknowledgments

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 - NHLS - RT