



Establishing streptomycin epidemiological cut-off values for *Salmonella* and *E. coli*

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Introduction

- Streptomycin is an aminoglycoside use as a resistance marker in monitoring programs for *Salmonella* and *E. coli*
- Ring trials have reported discrepancies on results obtained for this antimicrobial
- Studies carried out in *E. coli* and *Salmonella* have proposed an epidemiological cut-off value of 8 mg/L for both species

Sunde M, Norstrom M. The genetic background for streptomycin resistance in *Escherichia coli* influences the distribution of MICs. J Antimicrob Chemother 2005; 56(1):87-90.

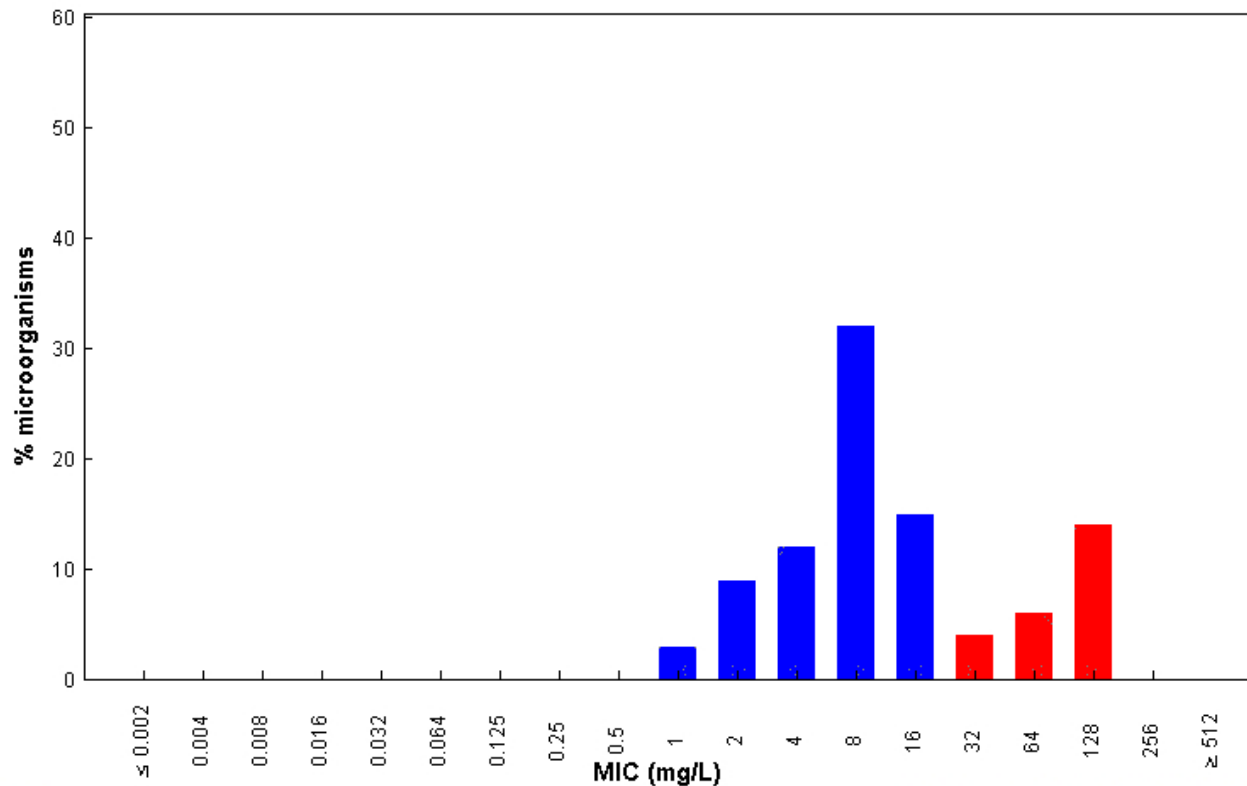
Doran G, NiChulain M, DeLappe N, O'Hare C, Corbett-Feeney G, Cormican M. Interpreting streptomycin susceptibility test results for *Salmonella enterica* serovar Typhimurium. Int J Antimicrob Agents 2006; 27(6):538-540.



EUCAST epidemiological cut-off value for *Salmonella*

Streptomycin / *Salmonella* spp EUCAST MIC Distribution - Reference Database

MIC distributions include collated data from multiple sources, geographical areas and time periods and can never be used to infer rates of resistance



MIC
Epidemiological cut-off: -

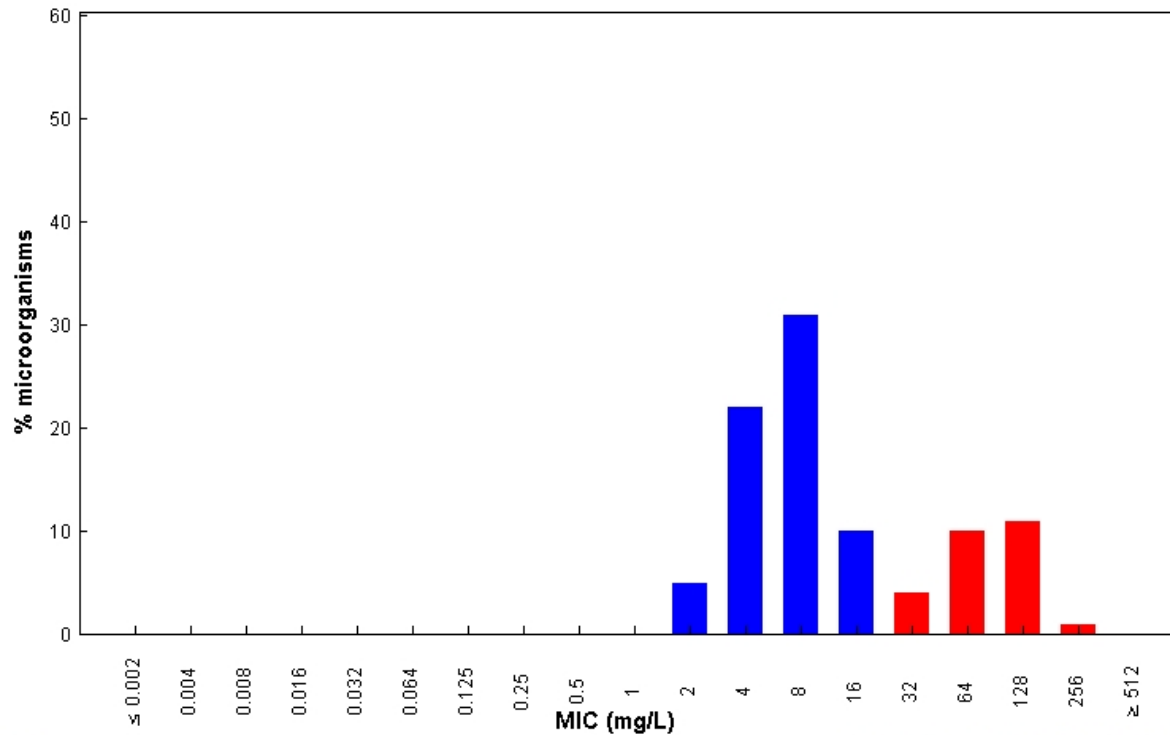
11403 observations (12 data sources)
Clinical breakpoints: S ≤ - mg/L, R > - mg/L



EUCAST epidemiological cut-off value for *E. coli*

Streptomycin / *Escherichia coli* EUCAST MIC Distribution - Reference Database

MIC distributions include collated data from multiple sources, geographical areas and time periods and can never be used to infer rates of resistance



MIC
Epidemiological cut-off: WT ≤ 16 mg/L

9917 observations (26 data sources)
Clinical breakpoints: S ≤ - mg/L, R > - mg/L

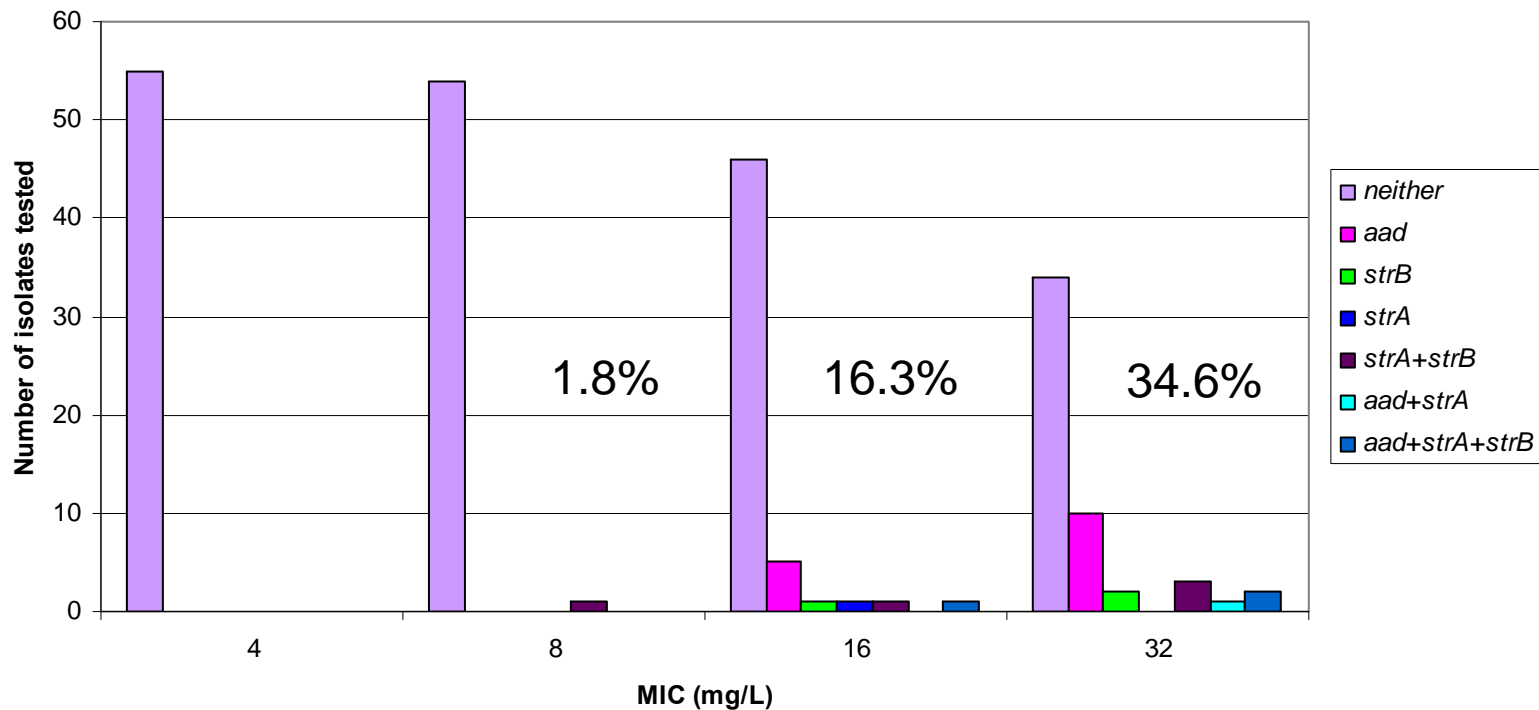


Materials and methods

- A total of 12 institutes provided data: Germany, Denmark, Norway, Sweden, Spain, Portugal, the Netherlands, France, Italy, Finland, UK and Canada
- Examined by PCR for the presence of the most common streptomycin resistance genes in Enterobacteriaceae (*aadA*, *strA* and *strB*)
 - 217 *Salmonella* and 208 *E. coli* exhibiting MICs between 4 and 32 mg/L
- Each country provided information on the streptomycin MIC distributions for both species during a year period

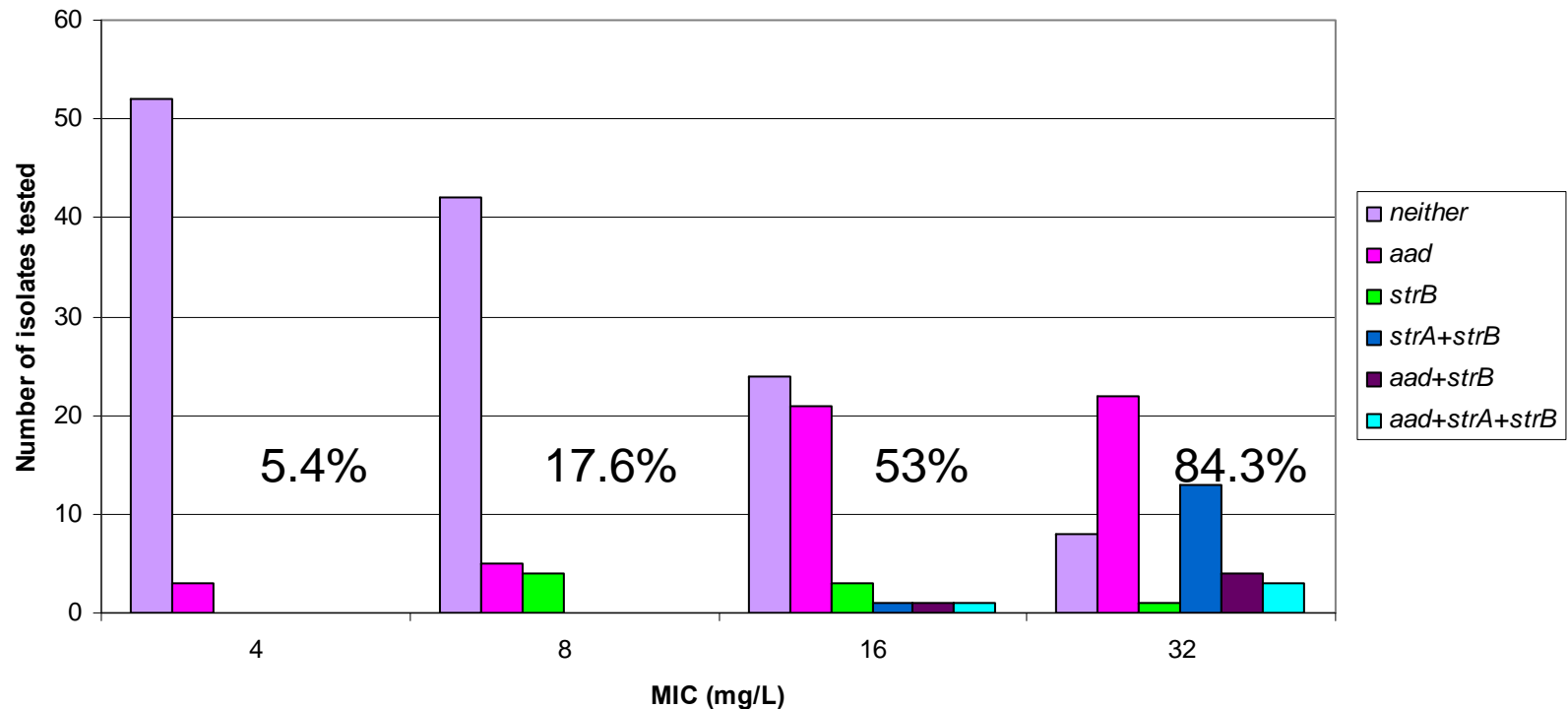


Streptomycin resistance genes in *Salmonella*



27/217 (9%) presented one, two or the three genes
19 *aadA*, 9 *strA* and 11 *strB*

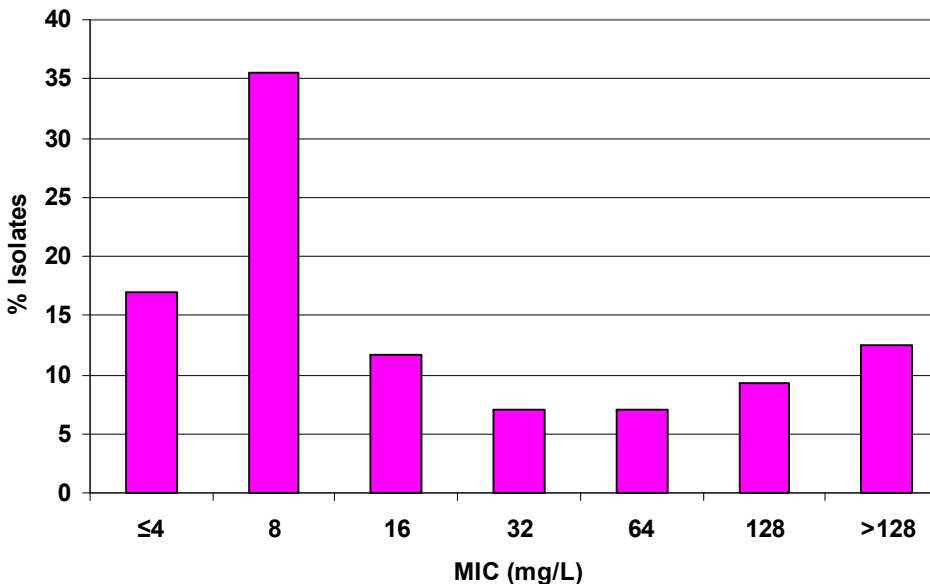
Streptomycin resistance genes in *E. coli*



80/208 (38.5%) presented one, two or the three resistance genes
69 *aadA*, 18 *strA* and 31 *strB*

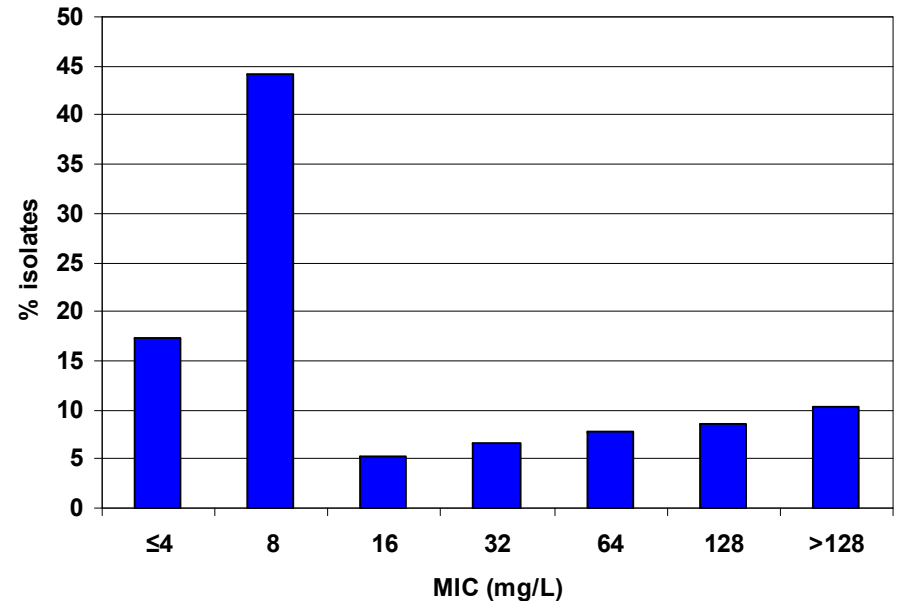
Distribution of streptomycin MIC distribution for *Salmonella* and *E. coli*

MIC distribution for *Salmonella*



Based on 9257 observations

MIC distribution for *E. coli*



Based on 5619 observations

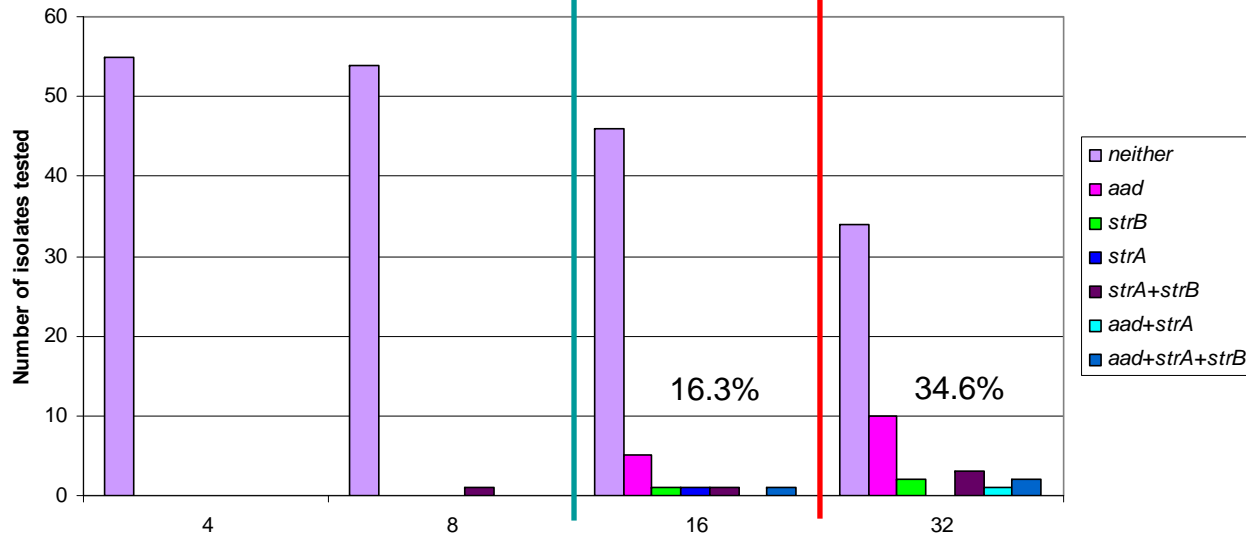


Conclusions

- Complexity of these studies due to a large proportion of isolates exhibiting high MICs despite the lack of a known mechanism of resistance
- The establishment of a common cut-off value based on evaluation of both, MIC distribution of the population and genetic characterization of resistance genes is vital to facilitate a global harmonisation of surveillance programmes

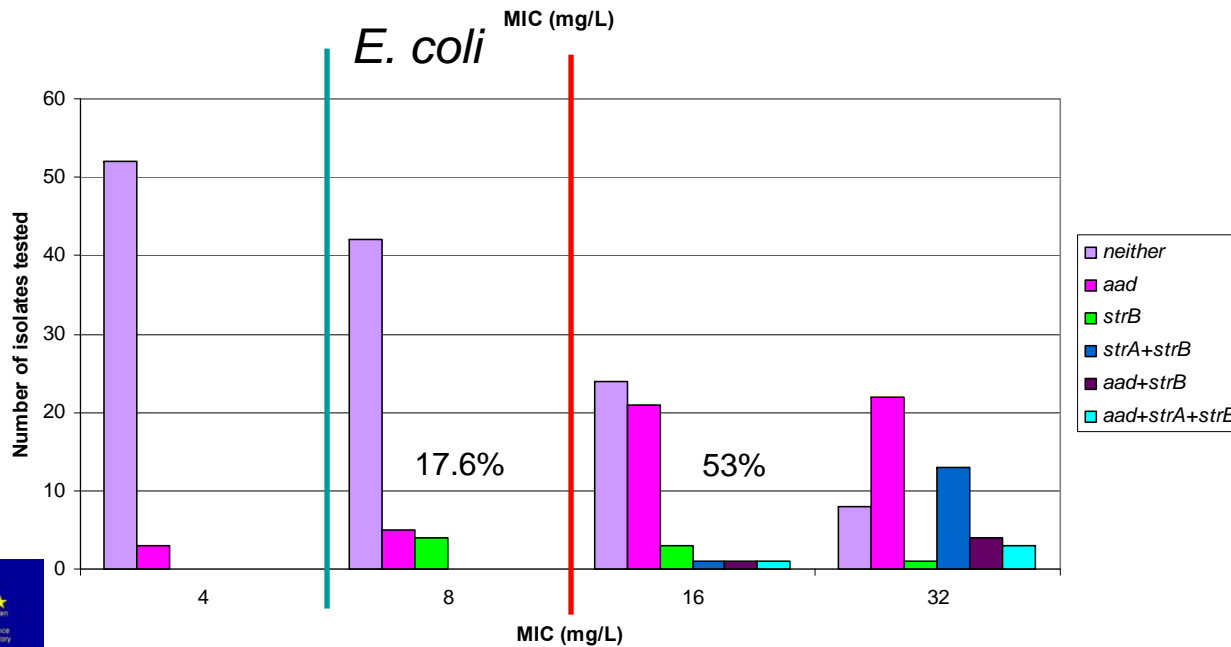


Salmonella



**> 8 or
> 16 mg/L?**

E. coli



**> 4 or > 8
mg/L?**



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