



AST EQA scheme for human *Salmonella* and *Campylobacter* infections in EU/EEA

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AMR monitoring in humans - methods



- Data on AMR submitted to the European Surveillance System (TESSy) annually as part of data collection for EFSA-ECDC European Union Summary Report on Zoonoses
- AMR data collected for *Salmonella*, *Campylobacter*, STEC/VTEC
 - S/I/R interpreted data
 - Methods: disc diffusion, E-test and broth dilution
- EU case definition for generic AMR proposed
 - Clinical breakpoints (MIC or DD) according to EUCAST

Antimicrobials currently collected in TESSY



<i>Salmonella</i> (11)	<i>Campylobacter</i> (7)
Ampicillin	Amoxicillin/clavulanic acid
Cefotaxime	Ampicillin
Chloramphenicol	Ciprofloxacin
Ciprofloxacin	Erythromycin
Gentamicin	Gentamicin
Nalidixic acid	Nalidixic acid
Streptomycin	Tetracyclines
Sulphonamides	
Tetracyclines	
Trimethoprim (co-trimoxazole)	

Resistance in human infections for *Salmonella* spp. in 2010 (Total cases N=99,020)

Antimicrobial (MSs)	Number of tested strains	Resistant	Range
Ampicillin (19)	25,525	28,0 %	11,6 %- 58,5 %
Cefotaxime (16)	24,251	1,0%	0,1 % - 4,3 %
Chloramphenicol (15)	20,874	6,7%	1,2 % - 21,3 %
Ciprofloxacin (19)	24,927	8,6%	0,0 % - 15,3 %
Gentamicin (17)	23,447	6,7%	0,0 % - 94,1 %
Kanamycin (14)	20,288	1,7%	0,3 % - 4,5 %
Nalidixic acid (15)	22,117	15,3%	6,6 % - 28,7 %
Streptomycin (16)	21,642	19,8%	7,2 % - 60,5 %
Sulphonamides (14)	18,774	25,4%	7,2 % - 64,7 %
Tetracyclines (15)	21,086	28,4%	7,4 % - 60,2 %
Trimethoprim (17)	23,726	8,3%	2,2 % - 10,6 %

Resistance in human infections with *Salmonella* Enteritidis (N=43,563) and *Salmonella* Typhimurium (N=21,671)

Antimicrobial*	<i>Salmonella</i> Enteritidis		<i>Salmonella</i> Typhimurium	
	Tested N	Resistant	Tested N	Resistant
Ampicillin	8,314	7,2%	6,466	64,0%
Cefotaxime	7,731	0,4%	6,146	1,1%
Chloramphenicol	6,831	0,6%	5,041	20,2%
Ciprofloxacin	7,949	9,3%	6,412	4,7%
Gentamicin	7,218	2,7%	6,081	5,8%
Nalidixic acid	6,904	18,7%	5,734	8,9%
Streptomycin	6,826	1,1%	5,485	44,1%
Sulphonamides	6,182	2,4%	4,383	57,1%
Tetracyclines	6,870	3,6%	5,180	58,5%
Trimethoprim	7,559	3,2%	5,981	11,7%

*Range of reporting countries by antimicrobial: 13-18 Member States

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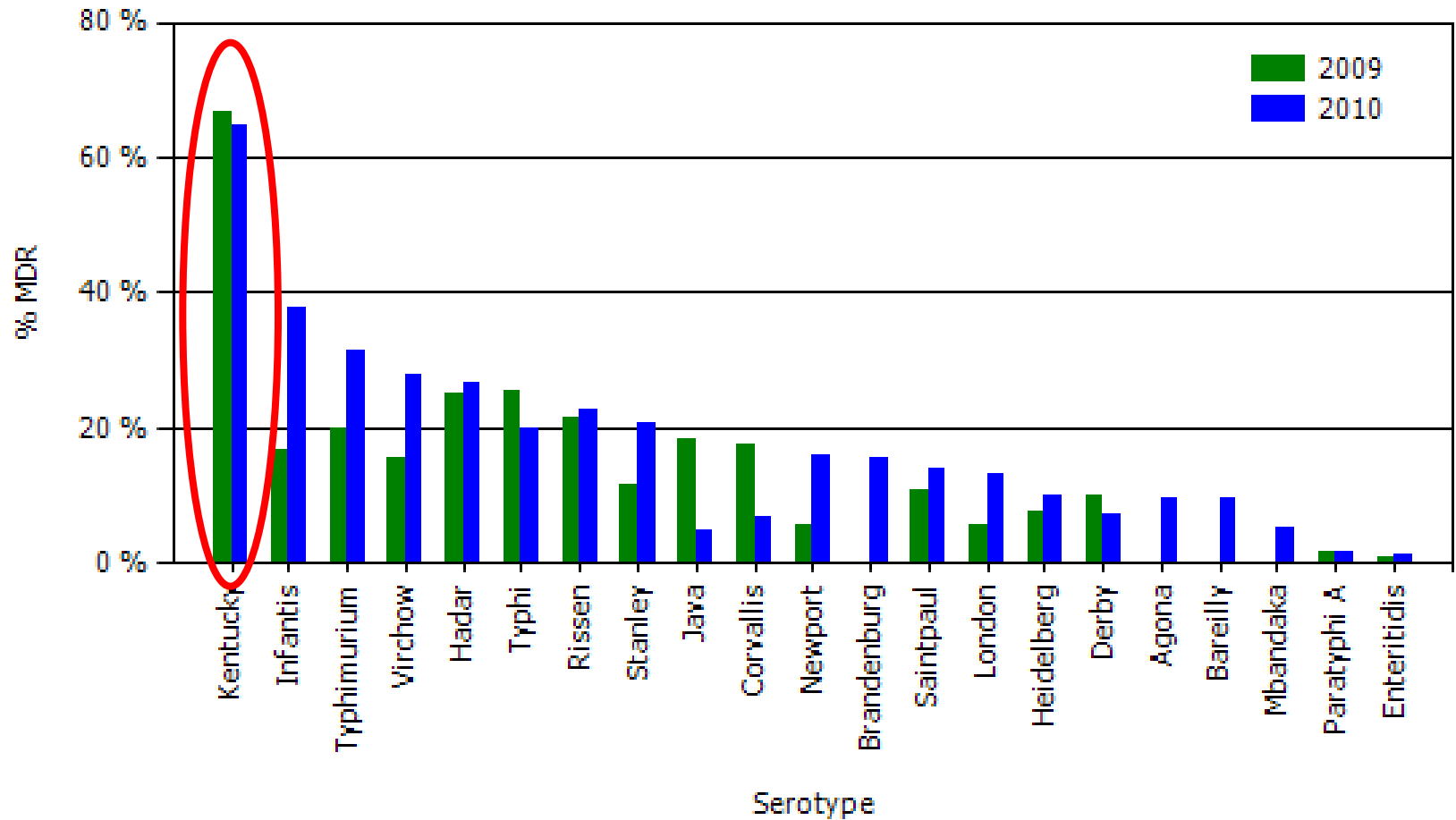
*Range of reporting countries by antimicrobial: 13-18 Member States

Resistance in human strains of *Campylobacter jejuni* and *Campylobacter coli* in 2010*

Antimicrobial *	<i>Campylobacter jejuni</i>		<i>Campylobacter coli</i>	
	Tested N	Resistant	Tested N	Resistant
Amoxicillin	4,129	1,9%	607	0,2%
Ampicillin	4,417	29,4%	627	25,2%
Ciprofloxacin	9,728	51,6%	1,163	66,0%
Erythromycin	8,969	1,7%	1,099	11,0%
Gentamicin	4,375	0,3%	698	0,1%
Nalidixic acid	5,278	49,8%	751	69,0%
Tetracyclines	3,956	20,6%	370	32,2%

*Range of reporting countries by antimicrobial: 3-10 Member States

MDR-monitoring of *Salmonella* spp. - quarterly report example Q1/2010



At least 20 isolates per serotype tested, MDR for ≥ 4 antimicrobials

External quality assurance – *Salmonella* and *Campylobacter* AST

(Scheme organised by EU Reference Laboratory for AST)



DTU Food
National Food Institute

- ECDC objective:
 - To enable comparison between public health and veterinary laboratories
 - To identify general problematic areas
- 10 countries participated
 - 10 laboratories for *Campylobacter*
 - 9 laboratories for *Salmonella*
- 8 *Salmonella* and 8 *Campylobacter* strains distributed
- EQA expected results: ECOFF values
- Reported results: mainly clinical break points

EQA AST preliminary results

■ Methods used:

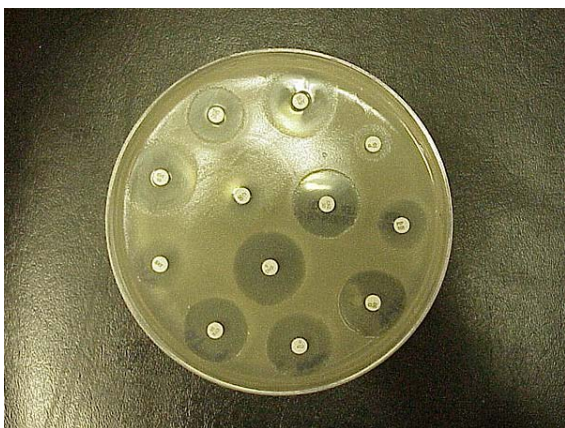
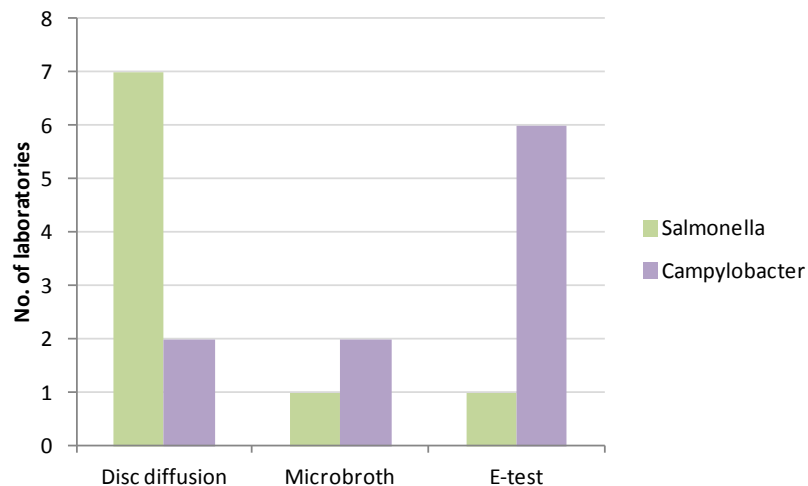


Image: Wikimedia Commons

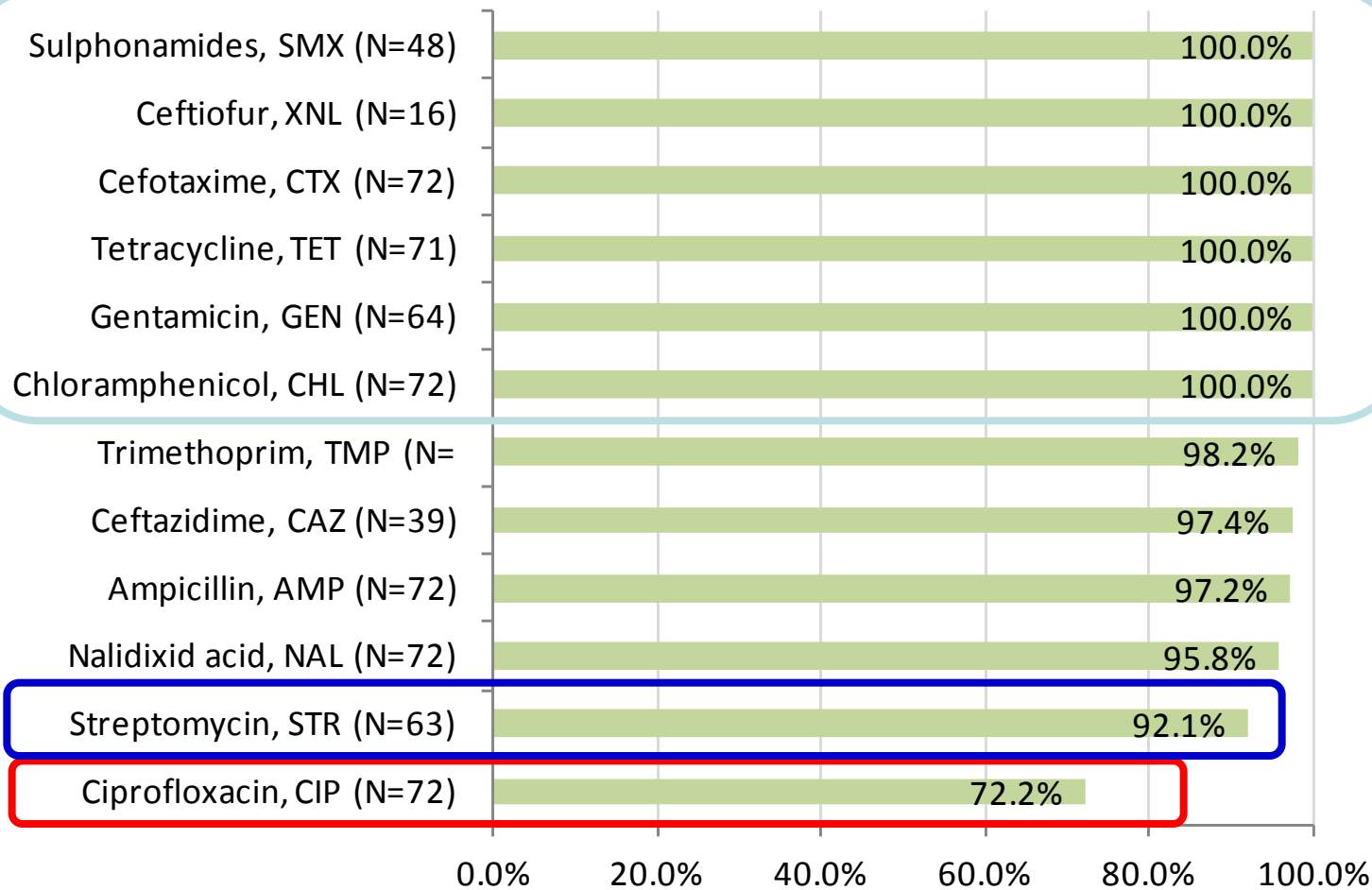
■ Correct AST results

- *Salmonella* : 685 / 717 (**96%**)
- *Campylobacter* : 403 / 408 (**99%**)

■ ESBL production (*Salmonella*)

- 59 / 72 tests correct (**82%**)
- 3 laboratories 100% correct

Salmonella AST results by antimicrobial, 9 laboratories, 2011



Salmonella Ciprofloxacin results

- 72 tests by 9 laboratories:
 - 20 incorrect results (28%) by 6 labs
- Most (19/20) incorrect results S when R expected
- Most incorrect results for strains S 6.3 and S 6.7
- Disc contents 5 µg (DD method)
- QC tests OK for all laboratories

	3 labs with all results correct	6 labs with incorrect results
Method	1 DD, 1 MIC, 1 E-test	6 DD
S breakpoint (DD) mm	30	21 - 30
R breakpoint (DD) mm	29	15 - 30
Mean (SD) for DD mm	25	29 (± 2.9) (N=19)
Range (DD) mm	25	Range 24 – 34

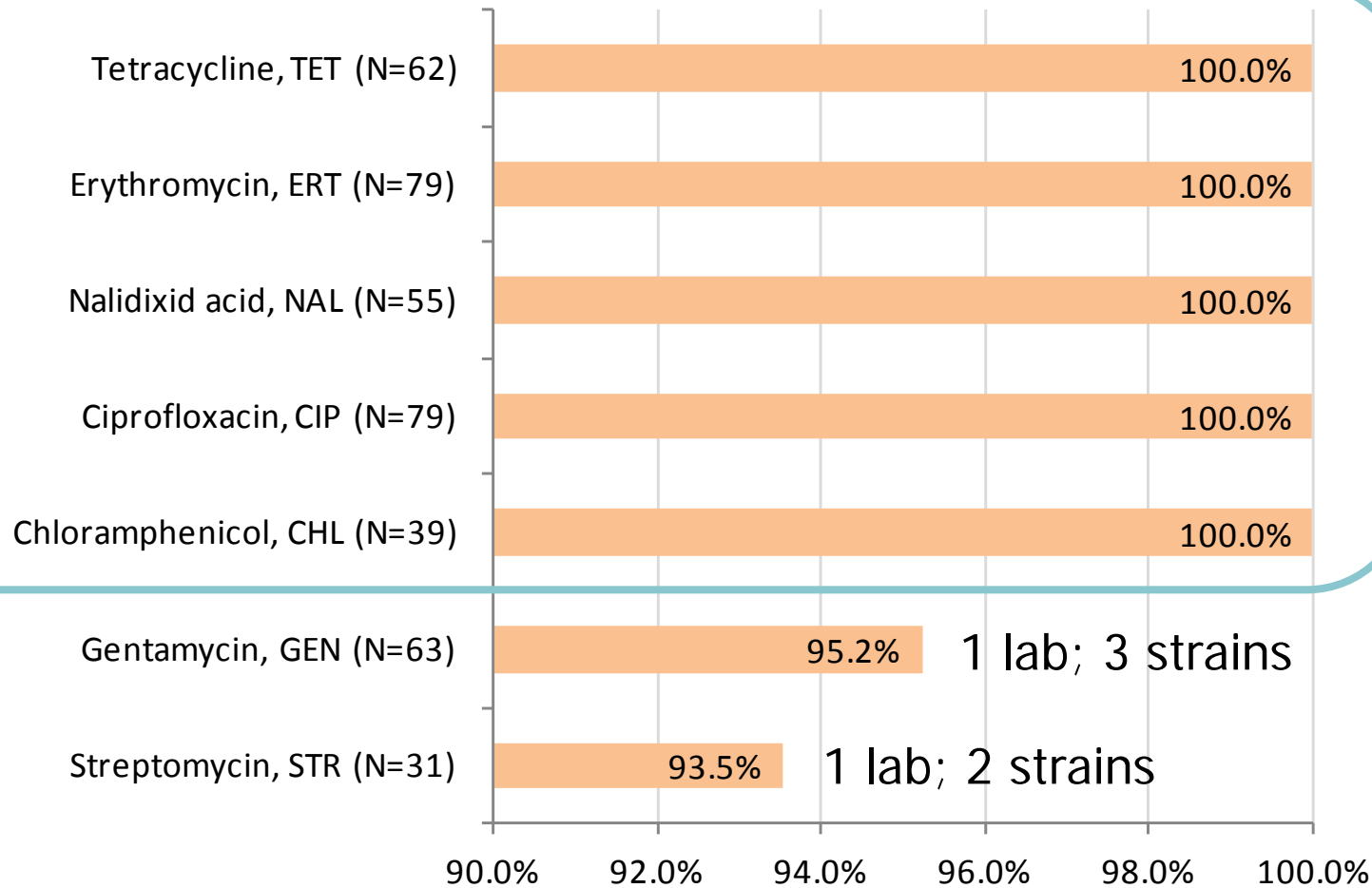
Salmonella Streptomycin results

- 63 tests by 8 laboratories:
 - 5 incorrect results (8%) by 4 labs
- All incorrect results for strains S 6.2 and S 6.6
- Disc contents 10 µg (DD method), variable brands
- QC OK for all laboratories

	4 labs with all results correct	4 labs with 5 incorrect results (S instead of R)
Method	3 DD, 1 MIC	3 DD, 1 E-test
S breakpoint (DD) mm	14, 32, -	15,15,15
R breakpoint (DD) mm	13, 11, -	11,11,12
Mean (SD) for DD mm	12* (± 1.4) (N=7)	16* (± 1.3) (N=4)
Range (DD) mm	9-13	15-18

*Significant difference between measured results (t-test, $p < 0.01$)

Campylobacter AST results by antimicrobial, 10 laboratories, 2011



Conclusions

- EQA results for *Campylobacter* very good; no general problem

- EQA results for *Salmonella*:
 - Ciprofloxacin, standardisation needed for DD method:
 - High uncertainty
 - Highly variable interpretation criteria
 - Relatively wide intermediate zones (3-6 mm)

 - Streptomycin, DD method requires further assessment:
 - Significant difference between incorrect and correct measurements
 - Slightly variable interpretation criteria

Next steps: work in progress

- **Aim in 2012:**
 - Drafting AMR monitoring objectives, panels of antimicrobials to be monitored => into **EU protocol for harmonised monitoring of *Salmonella* and *Campylobacter* infections in humans**

- **May 2012:** Expert consultation on AST methods, break points, joint needs for analyses of human, animal, and food data

- **July – December 2012:**
 - Pilot testing of voluntary reporting of quantitative AMR to TESSy
 - Network's consultations on draft EU protocol

- **November-December 2012:**
 - Discussion with MSs Surveillance focal points; EU protocol

- **Spring 2013:** Joint meeting of FWD Network with EFSA Task Force on Zoonoses data collection on AMR

Thank you!

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