European Union Reference Laboratory Antimicrobial Resistance

DTU Food
National Food Institute

EQAS 2013

Salmonella and E. coli

EURL-AR workshop, April 7-8th, 2014

Participation

Salmonella

30 countries

34 sets of *Salmonella* results

E. coli

31countries

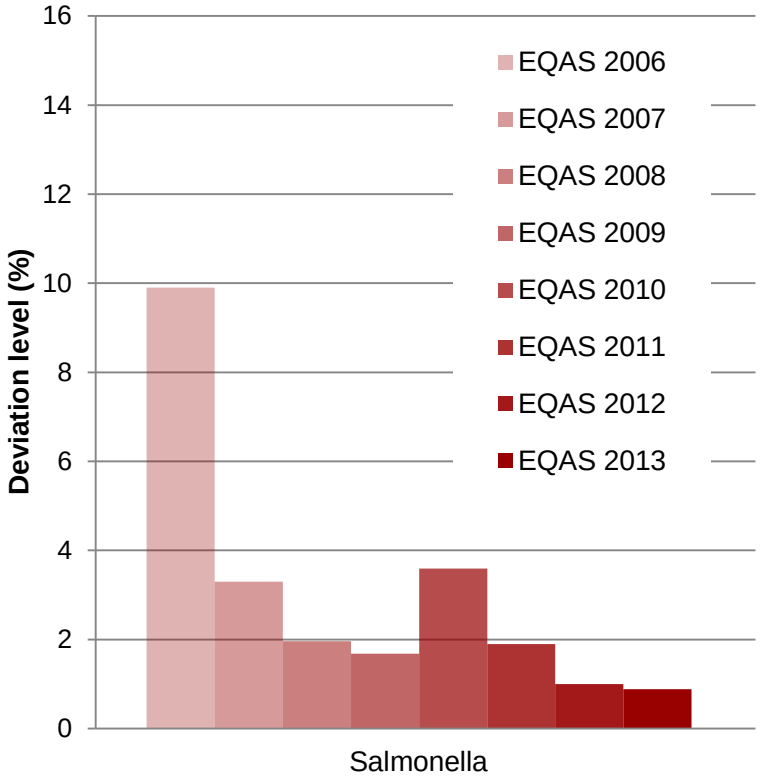
34 sets of *E. coli* results

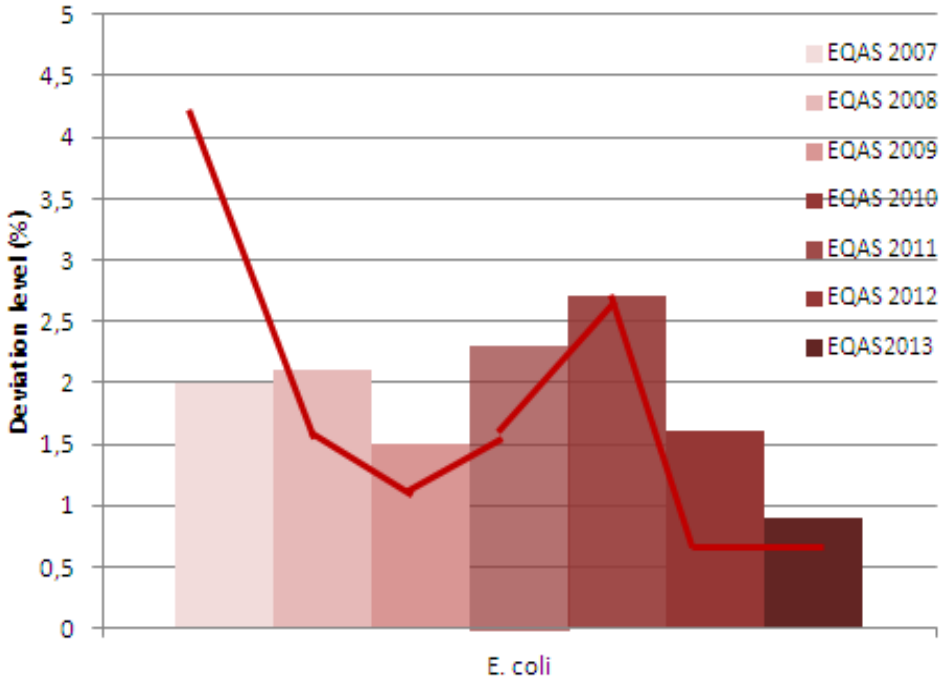
S-8.4/meropenem

- If only 75% of the results were correct (strain/antimicrobial combination) => further analysis of data:

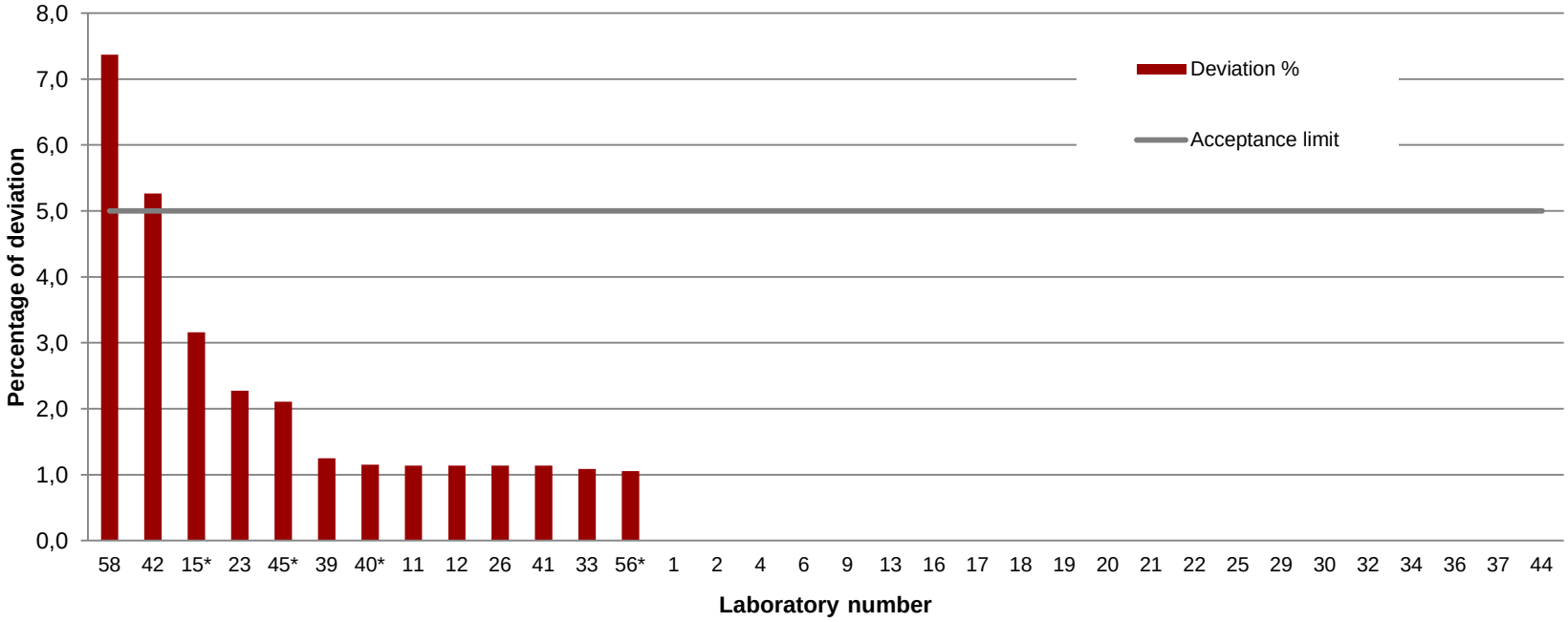
Lab no	Interpretation	MIC/DD-value	Method
2	R	0.19	MIC-value
9	R	0.25	MIC-value
15	S		zone diameter
16	R	0.25	MIC-value
20	S	25mm	MIC-value
29	R	27mm	MIC-value
30	S	<= 1	MIC-value
32	S	<=0.03	MIC-value
33	S	0.082	MIC-value
40	S	21	zone diameter
45	R	23.2	zone diameter
56	S	17	zone diameter
58	S	0.047	MIC-value

Comparison to former EQASs





Salmonella results – pr. lab



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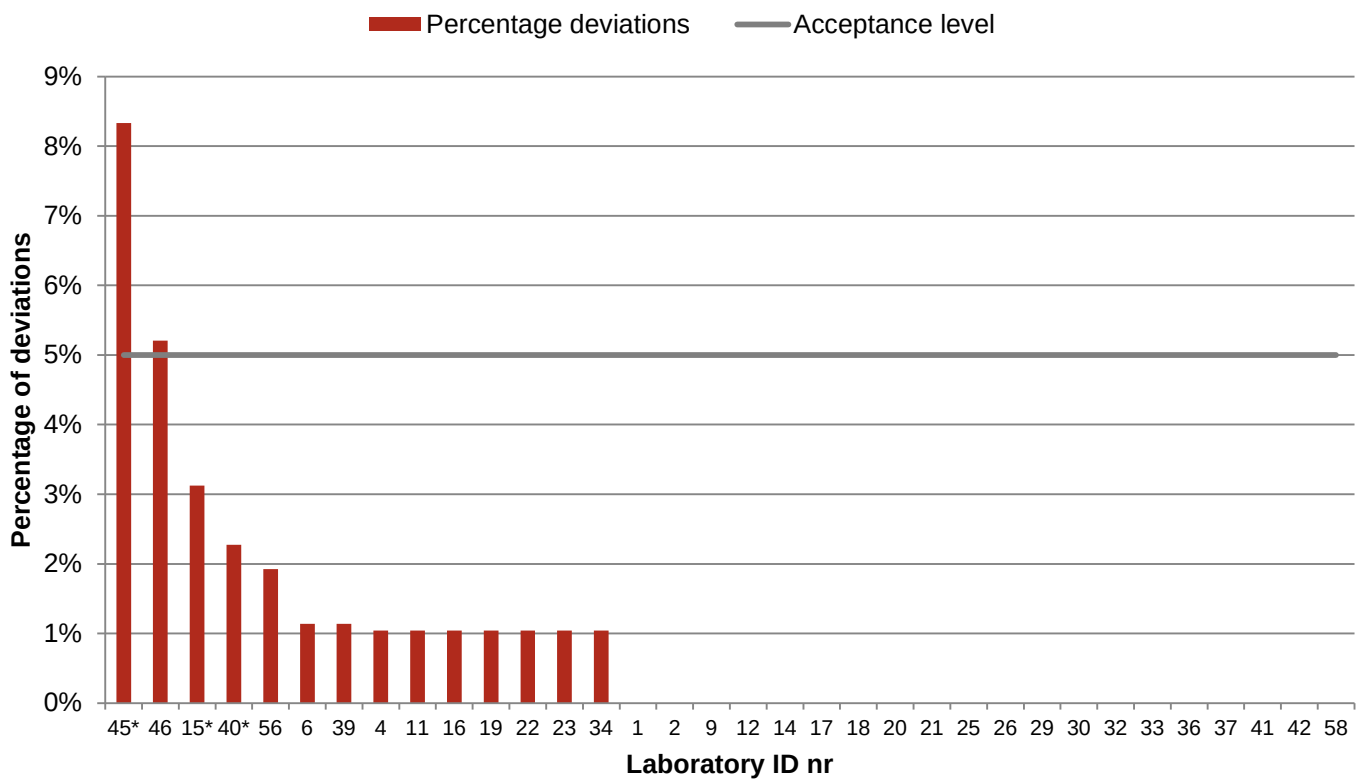
E. coli results – pr. lab



ESBL-producing test strains

ESBL-detection is mandatory in the *Salmonella* EQAS

Percentage reporting correct ESBL-results		Strain S-8.4	Strain S-8.5	Strain S-8.6	Strain S-8.7
ESBL-genes harboured in the test strain		VIM-2 TEM-1	CTX-M-9 TEM-1	CTX-M-3 OXA-30	TEM-52 TEM-1
ESBL-, pAmpC- and carbapenemase-producing strain – expected results		Carba	ESBL unusual	ESBL	ESBL
Obtained results	Confirmed ESBL-producer	NA	22/34 (65%)	33/34 (97%)	29/34 (85%)
	Confirmed pAmpC-producer	NA	-	-	-
	Confirmed carbapenemase-producer	NA	-	-	-
	Confirmed unusual phenotype	NA	11/34 (32%)	*1/34 (3%)*	*4/34 (12%)*
	Not ESBL-, pAmpC- or carbapenemase-producing	NA	*1/34 (3%)*	-	*1/34 (3%)*

Marked in grey: unexpected results

(one lab obtained six deviations in the ESBL-classification of the *Salmonella* test strains)

ESBL-producing test strains

ESBL-detection is mandatory in the *E. coli* EQAS

Percentage reporting correct ESBL-results		EC 7.2	EC 7.3	EC 7.4	EC 7.8
ESBL-genes harboured in the test strain		CTX –M-14	CMY-2	CTX-M-1	CMY-2
ESBL-, pAmpC- and carbapenemase-producing strain – expected results		ESBL Unusual	AmpC	ESBL	AmpC
Obtained results	Confirmed ESBL-producer	28/34 (82%)	-	32/34 (94%)	1/33 (3%)
	Confirmed pAmpC-producer	-	26/32 (81%)	-	26/33 (79%)
	Confirmed carbapenemase-producer	-	-	-	-
	Confirmed unusual phenotype	6/34 (18%)	1/32 (3%)	-	3/33 (9%)
	Not ESBL-, pAmpC- or carbapenemase-producing	-	4/32 (13%)	2/34 (6%)	3/33 (9%)

Labs #23 and 41 did not provide a final results for EC 7.3 and Lab # 23 did additionally not provide a result for strain EC 7.8

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UK NRL

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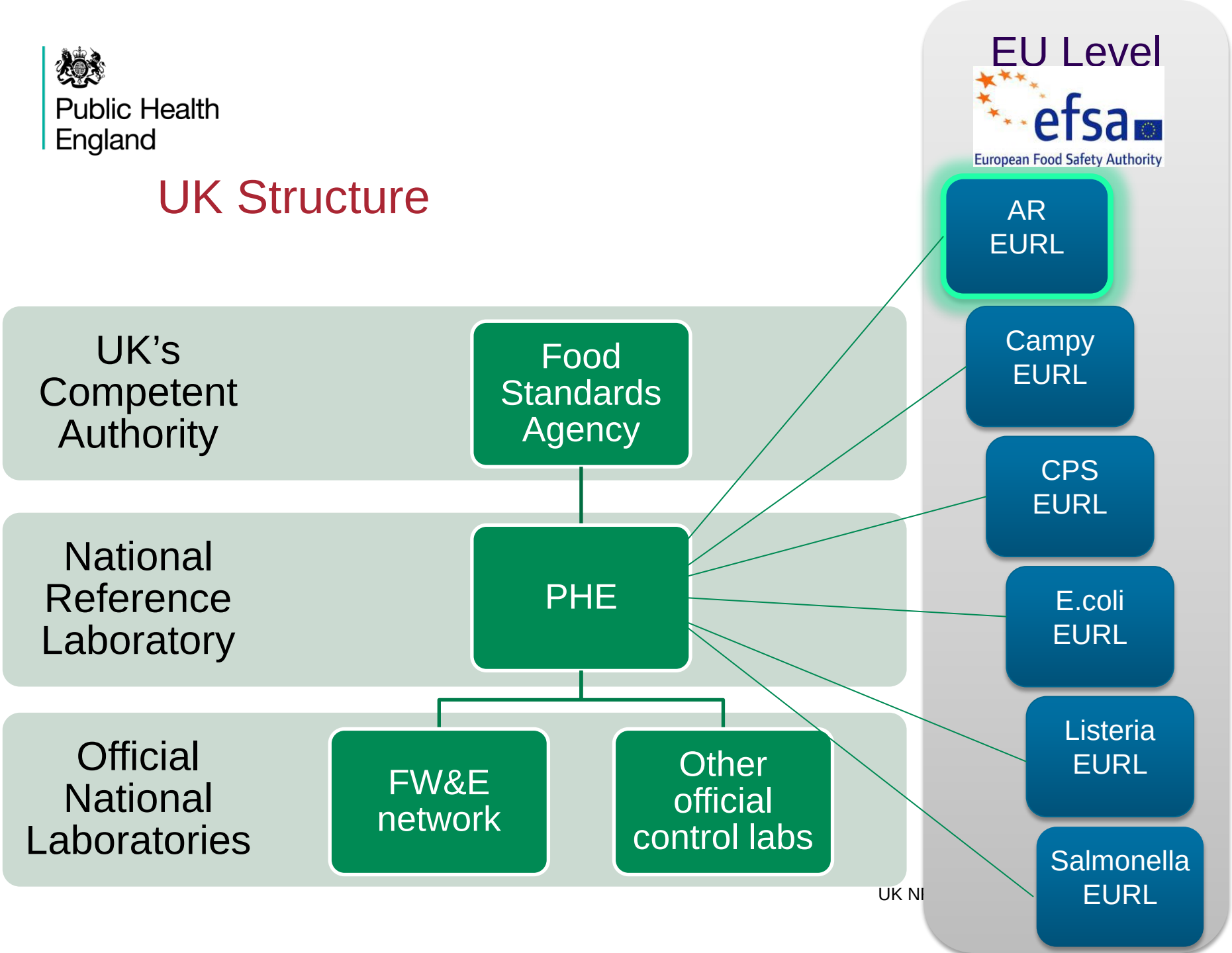
UK Structure



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UK personnel involved in Antimicrobial Resistance

<u>NRL Function</u>

- Jim McLauchlin, NRL Director and Head of FWE Network
  - Shona Neal, NRL Scientist
    - Julia McLean, NRL Administrator

<u>Salmonella and Campylobacter</u>

- Kathie Grant, Head of Gastrointestinal Bacteria Reference Unit
  - Elizabeth de Pinna, Section Head Salmonella Reference Services
    - Martin Day
  - Judith Richardson & Andy Lawson

<u>E.coli, enterococci & staphylococci</u>

- Neil Woodford, Head of Antimicrobial Resistance and Healthcare Associated Infections Reference Unit
  - Robert Hill, Susceptibility testing
  - Katie Hopkins, Head of Resistance Mechanisms Section

Public Health England

PHE 2012 Salmonella AR PT participation

- Generated 6.9% deviation
  - Unable to perform confirmatory ESBL tests that year
  - Antibiotic panel and concentrations used not appropriate
- Therefore decided to work with AMRHAI to improve method and allow better interpretation

	Antibiotic	Obtained	Expected
EURL S-7.1	Cefotaxime, CTX	S	R
	Chloramphenicol, CHL	S	R
	Nalidixic acid, NAL	S	R
	Trimethoprim, TMP	S	R
	Confirmed ESBL	No	Yes
EURL S-7.2	Confirmed ESBL	No	Yes
EURL S-7.3	Confirmed ESBL	No	Yes
EURL S-7.4	Cefotaxime, CTX	R	S
EURL S-7.6	Confirmed AmpC	No	Yes

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PHE improvements in Salmonella AR testing

- Make agar dilution plates in-house and ensure inoculation is 0.5 McFarland
- Antibiotics added to panel include:
  - Cefoxitin to capture AmpC strains
  - Ceftazidine as a 3rd gen cephlasporin
  - Ertapenem instead of meropenem; to capture carbapenemase strains
- Can now interpret for clinical (EUCAST) and food/vet (ECOFF)
- For 2014 round, WGS will be used in parallel with routine procedures

Has lead to 100% conformance in 2013 PT!!

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PHE *E.coli* AR PT participation

- 2012 participation conformed 100%
  - Only had MIC deviations within EURL controls for enterococci and staphylococci panels
  - Good competency, gave confidence in assay and interpretation

- 2013 generated 5.2% deviation
  - Just over 5% exceedance level
  - Full series of concentrations performed for agar dilution
  - Used E-tests for some of the antibiotics instead of agar dilution
  - Lack of resources and high workload

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PHE look-back exercise of 2013 *E.coli* AR PT

- Five incorrect results and re-tested strains
  - Three achieved same MIC as expected value
    - Inoculum density was either too high or too low
  - Two were re-classified as sensitive
    - ?wrong isolate tested or transcription error?
- Planning to recruit more staff to alleviate workload

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PHE AR PT participation - Conclusions

- Important to participate yearly, to ‘test’ system
- Will support UKAS accreditation; ISO/IEC 17025 (ISO/IEC 9000)
- Any deviations found are investigated
  - Processes can be changed
  - More difficult if due to staff shortages, etc
- Educational
  - Brings to light any unusual AR strains
  - Updates scientific community in breakpoint changes or antibiotics used

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Acknowledgements

- AR-EURL – for the slides and organising of EQA!
- Robert Hill and Neil Woodford, AMRHAI
- Martin Day/Shona Neal
- Staff in GBRU and AMRHAI

Thank You!

http://www.hpa.org.uk/ProductsServices/MicrobiologyPathology/SpecialistMicrobiologyServices/FoodWaterEnvironmentalMicrobiologyServices/NationalReferenceLaboratoryForFoodMicrobiology/ (or type ‘fwe nrl’ into Google!)

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