Resistance in Enterobacteriaceae from Blood in the UK and Ireland Reaching a Plateau?

C2-3913

R. Reynolds[1], R. Hope[2] and The BSAC Extended Working Party on Bacteraemia Resistance Surveillance[1]

[1]British Society for Antimicrobial Chemotherapy, Birmingham, B1 3NJ [2]Health Protection Agency, London, NW9 5HT

rreynolds@bsac.org.uk

48th ICAAC / 46th IDSA, 25 - 28 Oct 2008, Washington

Background

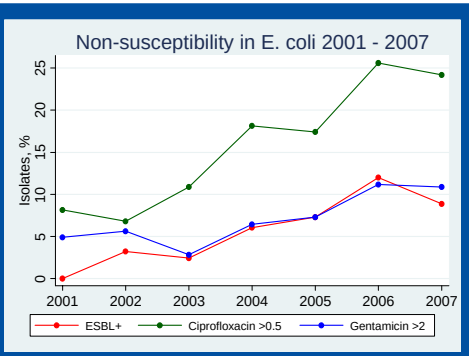
E. coli is the commonest cause of bacteraemia in the UK, estimated to cause >30,000 cases per year, with other Enterobacteriaceae causing more than half as many cases again. Antimicrobial resistance has been an increasing problem in recent years.

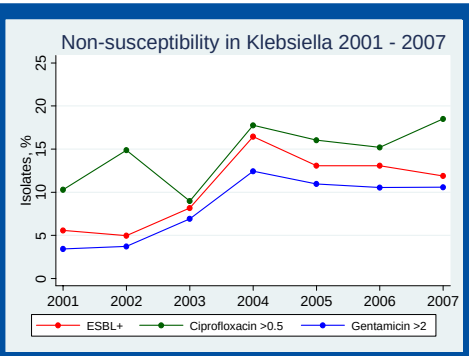
Methods

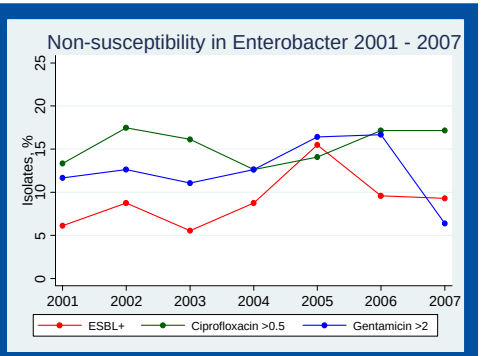
25 laboratories across the UK and Ireland have each supplied up to 10 isolates of major groups of Enterobacteriaceae to the BSAC Bacteraemia Resistance Surveillance Programme each year since 2001. MICs are determined centrally by the BSAC agar dilution method, ESBL production inferred from phenotypes, and $bla_{CTX\text{-}M}$ genes sought by PCR.

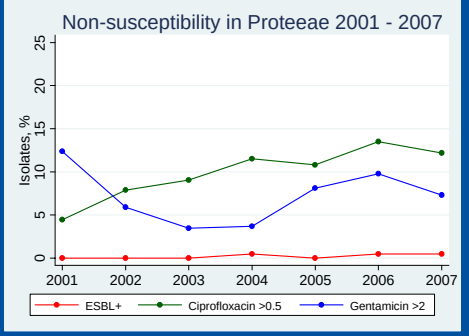
Results

- 998 Enterobacteriaceae were tested in 2007 (see table), and similar numbers in previous years.
- After a rapid rise from 2001 to 2006, the prevalence of ESBL production and ciprofloxacin non-susceptibility in *E. coli* was little changed in 2007. Similarly-rising ESBL production and ciprofloxacin non-susceptibility in *Klebsiella* levelled off from 2004, as did ciprofloxacin non-susceptibility in Proteeae. Changes in *Enterobacter* have been less pronounced.
- Hospitals' voluntary reports showed similar patterns (Health Protection Agency LabBase system).
- CTX-M enzymes now predominate among ESBL-producing *E. coli* and *Klebsiella*, but not *Enterobacter*.
- Resistance to ciprofloxacin and gentamicin was common in CTX-M producers - 95 & 32%, respectively, in *E. coli,* and 95 & 79% in *Klebsiella* in 2007 - but carbapenems remained active.
- Resistance in *E. coli*, *Klebsiella* and *Enterobacter* was independently associated with species and patient care factors, as illustrated for ciprofloxacin in 2007.





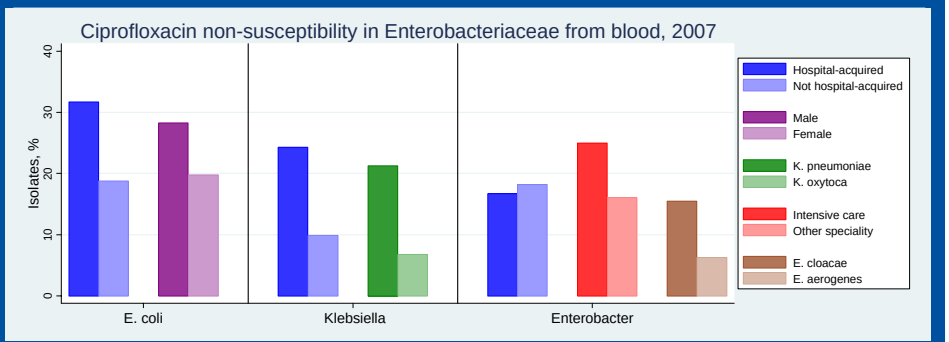




2007	MIC mg/L	Non-susceptibility in 998 Enterobacteriaceae from blood									
		E. coli n = 248		*Klebsiella* n = 227		*Enterobacter* n = 204		Proteeae n = 205		others n = 114	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
CIP	>0.5	60	(24)	42	(19)	35	(17)	25	(12)	29	(25)
GEN	>2	27	(11)	24	(11)	13	(6)	15	(7)	7	(6)
DOR	>1	0	(0)	0	(0)	1	(0.5)	0	(0)	0	(0)
ETP	>0.5	0	(0)	5	(2)	39	(19)	0	(0)	2	(2)
IPM	>2	0	(0)	0	(0)	1	(0.5)	70	(34)	1	(1)
MEM	>2	0	(0)	0	(0)	1	(0.5)	0	(0)	0	(0)
TGC	>1	0	(0)	29	(13)	21	(10)	inherently NS		18	(16)
ESBL	positive	22	(9)	27	(12)	19	(9)	1	(0.5)	3	(3)
CTX-M	positive	19	(8)	19	(8)	2	(1)	1	(0.5)	1	(1)

Conclusions

- The prevalence of ESBL and other resistances in Enterobacteriaceae from blood in the UK and Ireland appears to have stabilised recently.
- Resistance can vary with species, and other factors e.g. hospital-acquisition, hospital speciality and patient sex.
- The level of resistance still demands careful choice of empirical therapy.



Working Party Members (Sept 2008): A. MacGowan[1] (Chair), M. Allen[2], D. Biek[3], D. Brown[4], K. Bush[5], R. Charters[6], J. Dennison[7], D. Felmingham[8], R. Hope[9], D. Lewis[10], D. Livermore[9], M. Lockhat[11], C. Longshaw[12], R. Reynolds[1], C. Thomson[6], A. White[13].

Organism ID and Susceptibility Testing 2007 collection: G. Brick[9], R. Hope[9].

Collecting Laboratories: *See* www.bsac.org.uk *or* White 2008, JAC 62 (Suppl 2) ii3 - ii14

[1]North Bristol NHS Trust ; [2]Novartis; [3]Cerexa; [4]Addenbrookes Hospital, Cambridge; [5]Johnson&Johnson ; [6]Astellas; [7]Pfizer; [8]Consultant Clinical Scientist; [9]Health Protection Agency, London; [10]HPA South West ; [11]AstraZeneca; [12]Wyeth; [13]Tony White Ltd.

Methods: Reynolds 2008, JAC 62 (Suppl 2) ii15 - ii28; Reynolds 2008, JAC 62 (Suppl 2) ii29 - ii39

Central Laboratory: HPA, Centre for Infections, London.

Sponsors 2001 - 2007: Astellas, AstraZeneca, Cubist, Johnson & Johnson, MSD, Novartis, Pfizer, Theravance and Wyeth. **Support:** BSAC.

Correspondence: Dr. R. Reynolds, BSAC Resistance Surveillance Co-ordinator. Department of Medical Microbiology, Southmead Hospital, Bristol, BS10 5NB, UK.

rreynolds@bsac.org.uk

www.bsac.org.uk

BSAC
british society for antimicrobial chemotherapy