Stable or Falling Antimicrobial Resistance in Community-Acquired Respiratory Pathogens in the UK

BACKGROUND
The BSAC Respiratory Resistance Surveillance Programme has monitored antimicrobial resistance in the pathogens causing community-acquired lower respiratory infection in the UK and Ireland since the winter of 1999-2000. The present analysis excludes the Republic of Ireland.

METHODS
Around 20 centres contributed up to 50 (non-duplicate, non-cystic fibrosis) S. pneumoniae, 50 H. influenzae and 25 M. catarrhalis isolates each winter from October to April, to be tested centrally by the BSAC agar dilution method. Trends were analysed by logistic regression, including time (days from start of study) and centre, and power was assessed by simulation.

ABBREVIATIONS
PEN penicillin, β-LAC β-lactamase, ERY erythromycin, TET tetracycline, CIP ciprofloxacin, R resistant/resistance, OR odds ratio for resistance, per 5 years.

RESULTS - See tables and charts

CONCLUSIONS
- Resistance levels in community-acquired respiratory pathogens in the UK have remained generally low over seven winters.
- Tetracycline resistance in H. influenzae, already rare in 1999, became rarer.
- β-Lactamase production in M. catarrhalis, already over 90% in 1999 rose further.
- Most key resistances, e.g. penicillin non-susceptibility in S. pneumoniae, showed no change, in a study with high power to detect a doubling of the odds over 5 years.
- Relatively low antibiotic consumption may contribute to the stability of resistance.

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ABSTRACT
The centres, and the number and timing of the isolates they submitted, were taken as given. Different levels of baseline resistance with different degrees of trend (odds ratio for 5 years) were simulated 1000 times to produce datasets with the same overall resistance rate as observed in reality. Logistic regression was applied to these datasets. Power is the proportion of cases in which regression identified a trend significant at 5% level. When there is no trend (OR=1) the ‘power’ should be 5% by design. The inter-centre variation seen in the study was also included in the simulation, mimicked by treating log-odds ratios for centre as Normally distributed with SD 0.5.

For combinations in which trend was insignificant, there was over 95% power to detect a doubling of odds over 5 years (e.g. per-NS rising from 4.2 to 8.0%). For a 1.5-fold change in 5 years (e.g. from 4.8 to 7.1%), power was usually below 80%.

Data from the ESAC project show that England (84% of the UK population) had lower outpatient antibiotic consumption than the European average in 2003 and, within that, relatively low consumption of cephalosporins and fluoroquinolones. Consumption fell by 12% between 1997 and 2003. JAC (2006) 58, 401-431. www.esac.ua.ac.be.