

Antimicrobial stewardship: English Surveillance Programme for Antimicrobial Utilization and Resistance (ESPAUR)

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The clinical, public health and economic implications of antimicrobial resistance present a major threat to future healthcare. Antimicrobial use is a major driver of resistance, and antimicrobial stewardship programmes are increasingly being advocated as a means of improving the quality of prescribing. However, to increase their impact and assess their success, a better understanding of antimicrobial usage, both in primary and secondary care, and linkage with antimicrobial resistance data are required. In England, national summaries of primary care dispensing data are issued annually by the Health and Social Care Information Centre. However, there is currently no routine public reporting of antimicrobial usage in hospitals. In response to the threat posed by antimicrobial resistance, as highlighted in the Report of the Chief Medical Officer and on the request of the Department of Health, Public Health England has developed a new national programme, the English Surveillance Programme for Antimicrobial Utilization and Resistance (ESPAUR). The programme will bring together the elements of antimicrobial utilization and resistance surveillance in both primary and secondary care settings, alongside the development of quality measures and methods to monitor unintended outcomes of antimicrobial stewardship and both public and professional behaviour interventions. This article reports on the background to the programme development, the current oversight group membership and the public reporting structure.

Keywords: antibiotic prescribing, primary care, secondary care, quality measures

Introduction

Antimicrobial resistance (AMR) is a major personal and public health issue that poses a significant threat to future healthcare delivery. In 2009, the European Centre for Disease Prevention and Control estimated that 25 000 patients per year died from an infection caused by multidrug-resistant bacteria in the European Union.¹ Infections due to selected multidrug-resistant bacteria in the region result in extra healthcare costs and productivity losses of at least €1.5 billion each year.¹ Moreover, a recent review demonstrated that although the additional cost of resistance varied from less than £3 to more than £20 000 per patient episode in hospital, the studies evaluated did not consider worst-case scenarios (in which antibiotics were no longer an option) and hence the true overall cost of AMR could be much greater.²

Antimicrobial prescribing

There is a striking lack of development of new drugs active against multidrug-resistant Gram-negative bacteria, particularly those producing carbapenemases.³ As the use of antimicrobials is a known major driver for resistance,⁴ understanding the volume and type of antimicrobials utilized and their relationships with

AMR is essential for developing interventions to prevent, or at least decelerate, the worst-case scenario of a post-antibiotic future.

In England, antimicrobial stewardship measures, including national initiatives and regulatory frameworks, as well as local hospital and primary care programmes, have been developed over the past several years.^{5,6} These aim to improve the quality of prescribing through behavioural change by encouraging prescribers to adopt antimicrobial stewardship initiatives, including following local policies and restricting their use of certain antibiotics. Cultural and behavioural determinants have been shown to influence antimicrobial prescribing, resulting in variations in practice locally, regionally, nationally and internationally.^{7–9} In general, prescribing has been shown to be influenced by several factors, including the cultural beliefs of the patient and the prescriber, patient demand, socio-economic factors and clinical autonomy.^{7,8}

There appears to be evidence of a shift in general practitioners' attitudes, especially towards central policy initiatives, with slow acceptance of the need for external scrutiny and national standards.⁷ Moreover, in secondary care, the influence of so-called 'prescribing etiquette' is repeatedly demonstrated, whereby there is a reluctance on the part of junior members of staff to alter their prescribing practice owing to the precedent set by more senior

prescribers.^{9–11} A recent Cochrane review demonstrated that feedback given by a colleague or supervisor, either written or verbal, is most effective if provided more than once, with clear targets and action plans.¹² While there may be pockets of such behaviour across England, consistent feedback on the quality and quantity of antimicrobial prescribing is not available and no quality measures of antimicrobial prescribing are embedded in practice.

Prescribing in primary care

Understanding local, regional and national variation in antimicrobial prescribing is essential for assessing the impact of interventions to change prescribing behaviour. Prescribing data need to be linked to antimicrobial resistance data and patient outcomes to ensure that both positive and negative potential outcomes are evaluated. In England, national summaries of primary care dispensing data (in units dispensed and cost) for antibiotics (British National Formulary Chapter 5.1) and trend charts are issued annually by the Health and Social Care Information Centre and NHS Business Services Authority. Data on NHS primary care antimicrobial dispensing shows an increase of 17.1% in the number of antibiotic items dispensed over the period 2002–2012. The year-on-year increase for 2012 over 2011 was 6.1%.¹³ These data provide a useful basis for monitoring antimicrobial use in primary care in England, with the caveats that they are not linked to clinical patient-level data and there are no data on the supply of medication direct to the patient (e.g. out-of-hours services or via the Internet or private sources).

Prescribing in secondary care

By contrast with the situation for primary care, data on the antimicrobials issued and used in hospitals are not routinely available. However, a recent study of aggregate English hospital data provided by IMS Health supports the findings of the national Point Prevalence Survey in 2011.^{5,14} Both studies showed that the use of the broad-spectrum antibiotics co-amoxiclav, carbapenems (primarily meropenem) and piperacillin/tazobactam has increased markedly over the past 5 years, while there has been a significant reduction in the use of quinolones and cephalosporins, with no overall change in the number of hospital inpatients receiving antibiotics, remaining at 1 in 3 patients over the last 5 years.^{14,15} It is important to note that the reductions in the use of quinolones and cephalosporins, which may well reflect concern about their association with the development of *Clostridium difficile* infections, were associated with a decline in non-susceptibility to cephalosporins and quinolones among bloodstream isolates of Enterobacteriaceae.¹⁶

Establishment of the English Surveillance Programme for Antimicrobial Utilization and Resistance (ESPAUR)

In response to the threat posed by AMR, as highlighted in the 2011 report of the Chief Medical Officer¹⁷ and as part of the UK strategy for tackling AMR, Public Health England (PHE) has developed a new national programme, ESPAUR, to bring together the elements of

- Public Health England
- Department of Health
- NHS England
- Department of Health Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infections (ARHAI)
- Health and Social Care Information Centre
- IMS Health
- Rx-info Ltd (software provider for pharmacy in secondary and primary care)
- British Society for Antimicrobial Chemotherapy
- UK Clinical Pharmacy Association: Infection Management Group
- Care Quality Commission
- National Institute for Health and Care Excellence Medicines and Prescribing Centre
- British National Formulary
- Pharmaceutical Adviser's Group
- Frontline secondary care Chief Pharmacist and Community Pharmacist via the Royal Pharmaceutical Society
- Royal Colleges of Nurses, Physicians, General Practitioners and Surgeons

Figure 1. Key stakeholders represented on the membership of the oversight group of the ESPAUR.

antimicrobial utilization and resistance surveillance from both primary and secondary care alongside the development of quality measures and methods to monitor unintended clinical outcomes of future antimicrobial stewardship and both public and professional behaviour interventions. The oversight group for this programme (Figure 1) is professionally led by PHE, with the membership comprising a range of relevant stakeholders from the NHS (including primary, secondary and mental health trusts) and national and professional bodies. Members are drawn from a range of fields, interested organizations and professional bodies who have expertise or interest in antimicrobial stewardship, epidemiology and data capture and analysis. This oversight group was convened in July 2013 and will develop key priorities and action plans. The group will report on progress quarterly within PHE and annually to the Department of Health, as well as its Expert Committee on Antimicrobial Resistance and Healthcare-Associated Infections through a publicly available report.

There is no doubt that national policy and guidance can influence prescribers. In Sweden, the Strategic Programme for the Rational Use of Antimicrobial Agents and Surveillance of Resistance (STRAMA) antimicrobial stewardship initiative reported a reduction in antibiotic use and lowered AMR rates over 10 years, without measurable negative consequences.¹⁸ With the development of ESPAUR in England, PHE aims to measure the consequences of policy and guidance interventions through a cohesive surveillance programme on antimicrobial utilization and AMR across the healthcare economy at a local, regional and national level. The ultimate aim is to improve patient safety, not only today but for the foreseeable future.

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Transparency declarations

None to declare.

References

- 1 European Centre for Disease Prevention and Control and the European Medicines Agency. ECDC/EMA Joint Technical Report. The Bacterial Challenge: Time to React. 2009. http://www.ecdc.europa.eu/en/publications/Publications/0909_TER_The_Bacterial_Challenge_Time_to_React.pdf (11 August 2013, date last accessed).
- 2 Smith R, Coast J. The true cost of antimicrobial resistance. *BMJ* 2013; **346**: f1493.
- 3 Boucher HW, Talbot GH, Benjamin DK Jr et al. 10×'20 progress—development of new drugs active against Gram-negative bacilli: an update from the Infectious Diseases Society of America. *Clin Infect Dis* 2013; **56**: 1685–94.
- 4 Hillier S, Roberts Z, Dunstan F et al. Prior antibiotics and risk of antibiotic-resistant community-acquired urinary tract infection: a case-control study. *J Antimicrob Chemother* 2007; **60**: 92–9.
- 5 Ashiru-Oredope D, Sharland M, Charani E et al. Improving the quality of antibiotic prescribing in the NHS by developing a new Antimicrobial Stewardship Programme: Start Smart—Then Focus. *J Antimicrob Chemother* 2012; **67** Suppl 1: i51–63.
- 6 Moore M, McNulty C. European Antibiotic Awareness Day 2012: TARGET antibiotics through guidance, education, and tools. *Br J Gen Pract* 2012; **62**: 621–2.
- 7 Mason A. New medicines in primary care: a review of influences on general practitioner prescribing. *J Clin Pharm Ther* 2008; **33**: 1–10.
- 8 Hulscher ME, Grol RP, van der Meer JW. Antibiotic prescribing in hospitals: a social and behavioural scientific approach. *Lancet Infect Dis* 2010; **10**: 167–75.
- 9 Charani E, Edwards R, Sevdalis N et al. Behavior change strategies to influence antibiotic prescribing in acute care: a systematic review. *Clin Infect Dis* 2011; **53**: 651–62.
- 10 Armstrong D, Ogden J. The role of etiquette and experimentation in explaining how doctors change behaviour: a qualitative study. *Social Health Illn* 2006; **28**: 951–68.
- 11 Lewis PJ, Tully MP. Uncomfortable prescribing decisions in hospitals: the impact of teamwork. *J R Soc Med* 2009; **102**: 481–8.
- 12 Ivers N, Jamtvedt G, Flottorp S et al. Audit and feedback: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev* 2012; issue 6: CD000259.
- 13 Health and Social Care Information Centre. 2012. <http://www.hscic.gov.uk/catalogue/PUB11291> (15 August 2013, date last accessed).
- 14 Health Protection Agency (HPA). *HCAI and Antimicrobial Point Prevalence Survey—England*. <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/AntimicrobialResistance/HCAIPointPrevalenceSurvey/> (15 August 2013, date last accessed).
- 15 Hospital Infection Society. *The Third Prevalence Survey of Healthcare-Associated Infections in Acute Hospitals*. 2006. <http://www.neli.org.uk/integratedcprd.nsf/5fbbcc8a843b38108025755b005ea3f0/bc6fc77502e5fdfa80257217004094c3?OpenDocument> (15 August 2013, date last accessed).
- 16 Livermore DM, Hope R, Reynolds R et al. Declining cephalosporin and fluoroquinolone non-susceptibility among bloodstream Enterobacteriaceae from the UK: links to prescribing change? *J Antimicrob Chemother* 2013; **68**: 2667–74.
- 17 Davies S. Annual Report of the Chief Medical Officer 2011: Volume Two. Infections and the Rise of Antimicrobial Resistance. <http://www.dh.gov.uk/health/2013/03/cmvo-vol2/> (15 August 2013, date last accessed).
- 18 Mölstad S, Erntell M, Hanberger H et al. Sustained reduction of antibiotic use and low bacterial resistance: 10-year follow-up of the Swedish Strama programme. *Lancet Infect Dis* 2008; **8**: 125–32.