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Antibacterial usage in English NHS hospitals as part of a national Antimicrobial Stewardship Programme☆

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ABSTRACT

Antimicrobial resistance (AMR) has become a global problem for health care services, with fewer antimicrobials entering the market and some pathogenic organisms becoming resistant to commonly used antimicrobials. Antimicrobial stewardship (AS), including evidence-based standard setting, education and communication, and audits of practice, has become a key method of preventing the rise in the rise in AMR. Data on antibiotic consumption are often obtained through prospective and retrospective point prevalence audits of antibiotic usage, but such studies are very resource intensive and only provide a snapshot of consumption. The objective of the study reported here was to examine longitudinal total antibacterial usage at a national level and cross-sectional usage at an individual hospital trust level using a commercial database that captures antimicrobial prescribing from at least 99% of English hospital Trusts.

☆ This paper is based on material that was presented at the Public Health England Annual Conference 2013.

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Background

Antimicrobial resistance (AMR) has become a global problem for health care services, with fewer antimicrobials entering the market and some pathogenic organisms becoming resistant to commonly used antimicrobials.[1] Antimicrobial stewardship (AS), including evidence-based standard setting, education and communication, and audits of practice, has become a key method of preventing the rise in AMR.[2] Over the past 10 years, the UK has seen a number of national initiatives to promote AS and address the rise in AMR. Examples include *Essential Steps to Safe, Clean Care: Reducing Healthcare-Associated Infections*[3]; *Saving Lives*[4]; *The SACAR Antimicrobial Framework*[5]; Clostridium difficile *Infection: How to deal with the Problem*[6]; *Clean, Safe Care: Reducing Infections and Saving Lives* [7]; *The Health and Social Care Act 2008, Code of Practice*[8]; *Start SMART then FOCUS*[9] and the *UK Five-Year Antimicrobial Resistance Strategy*.[10]

Although the importance of measuring antimicrobial consumption has repeatedly been highlighted, particularly in secondary care, the ability to undertake such analysis has been hampered by the lack of readily available data and, until recently, analysis of antibiotic acquisition costs has been the only way to estimate usage. Electronic prescribing (EP) and electronic medicines administration have the potential to provide better data, with patient-linked information on antimicrobial selection linked to diagnosis, microbiological results and outcomes. But fewer than 10% of English NHS hospitals have EP in place. Moreover, among hospitals that have implemented EP, there is a lack of standardized data husbandry.

Data have also been obtained through prospective and retrospective point prevalence audits of antibiotic usage,[11,12] but such studies are very resource intensive and only provide a snapshot of consumption. The objective of the study reported here was to examine longitudinal total antibacterial usage at a national level and cross-sectional usage at an individual hospital trust level using a commercial database that captures antimicrobial prescribing from at least 99% of English hospital trusts.

Method

Hospital pharmacies in England provide aggregate monthly data on all medicines issued to patients, wards and clinics to IMS ((http://www.imshealth.com), a leading provider of information, services and technology for the health care industry), through an agreement that reimburses the hospital trusts for these data. As well as in-patient prescribing, IMS data also include outpatient prescribing from hospitals, genitourinary medicine (GUM) clinics and other prescribing to ambulatory patients. Occupied Bed-Days (OBD) data were obtained from Hospital Episode Statistics (http://www.hscic.gov.uk/hes). Data on issues of antimicrobials to wards, clinics and so on were converted to WHO Defined Daily Doses (DDDs).[13] Where DDD data were not available then Average Daily Quantities (ADQ) were used (http://www.hscic.gov.uk/media/9376/Average-daily-quantity-ADQ-values-2012-13/pdf/adqs_2012_13.pdf).

Results

Longitudinal analysis

The five-year trend in total antibacterial use in English hospitals between 2008 and 2012 is shown in Fig. 1. There was a 4·1% increase in total usage over this time period. Fig. 2 shows the changes in groups of antibacterials. There was a marked increase in the use of co-amoxiclav (+56·6%) (Fig. 3) and a reduction in the use of flucloxacillin (−15·2%) and, aminopenicillins, (amoxicillin and ampicillin: −12·6%). Fig. 4 shows the reduction in the use of cephalosporins with a fall in first-generation cephalosporins (cefadoxil, cefalexin and cefradine: −40·7%), second-generation cephalosporins (cefaclor and cefuroxime: −54·7%) and third generation cephalosporins (cefixime, cefotaxime, cefpodoxime, ceftazidime and ceftriaxone: −4·3%). There was also a fall in fluoroquinolones, mainly oral ciprofloxacin (−23·8%).

Counterbalancing these reductions, there was a substantial increase in the use of carbapenems (94·8%), mainly meropenem (Fig. 5), and also in the use of broad-spectrum antipseudomonal penicillins, particularly piperacillin/tazobactam (142·3%) (Fig. 6).

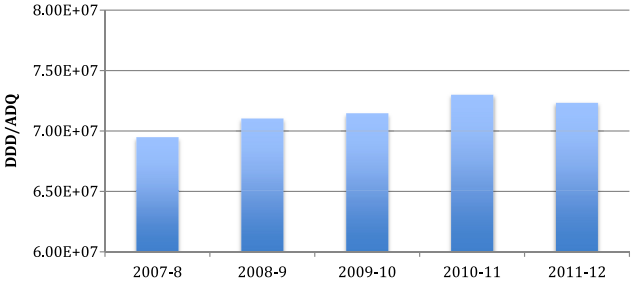

Fig. 1 − Total use of antibacterials in English hospitals *n* = 165.

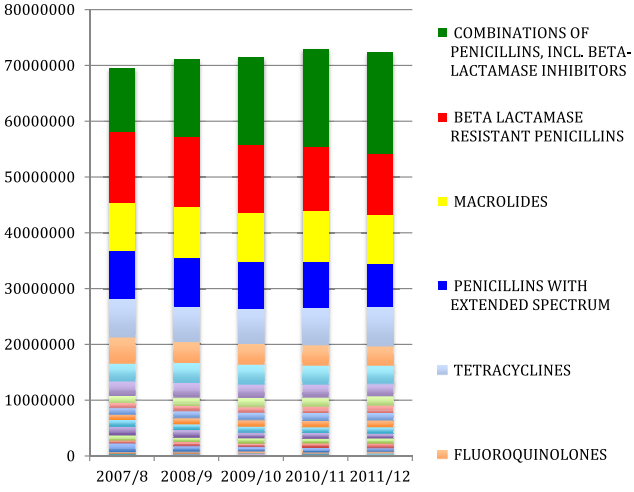

Fig. 2 − Antibacterial usage for English hospitals *n* = 165.