Antimicrobial stewardship: an evidence-based, antimicrobial self-assessment toolkit (ASAT) for acute hospitals

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Objectives: To describe the methodology in developing an antimicrobial self-assessment toolkit (ASAT).

Methods: The ASAT was developed through a National Pharmacy Reference Group using an evidence-based approach of published information and national reports to identify criteria for inclusion. These were subdivided into domains that addressed:

1. Antimicrobial management within the Trust—structures and lines of responsibility and accountability—high-level notification to the Board.
2. Operational delivery of an antimicrobial strategy—operational standards of good antimicrobial stewardship.
3. Risk assessment for antimicrobial chemotherapy.
5. Education and training—training needs and delivery of education and training for all who issue, prescribe and administer antimicrobials.
6. Antimicrobial pharmacist—systems in place for ensuring their optimum use.
7. Patients, Carers and the Public—information needs of patients, carers and the public.

Results: A web-based toolkit was developed using information from national reports and guidance on antimicrobial stewardship. The toolkit offers a checklist for hospitals to self-assess their organizations’ levels of antimicrobial stewardship.

Conclusions: The ASAT offers a web-enabled, version-controlled instrument for the assessment of antimicrobial stewardship in acute hospitals. It may offer a sensitive instrument to assess longitudinal progress on antimicrobial stewardship in an individual institution or act as a benchmark with similar organizations. Further work is ongoing to evaluate and further refine the ASAT.

Keywords: anti-infectives, antimicrobial stewardship, audit

Introduction

The relationship between the use of antimicrobials and the development of resistance is complex and many studies have demonstrated suboptimal usage.¹⁻⁷ Antimicrobial stewardship is an obligation in UK and EU statute,⁸⁻¹⁰ and there have been a number of reports from the Department of Health and other national organizations that have advocated that systems for appropriate control and use of antimicrobials should be in place in healthcare institutions.¹⁰⁻²⁵ See Table 1.

Many of the high-level recommendations from these reports and guidance documents contain references to earlier definitive studies. All these recommendations might be usefully condensed into a single workable instrument that would: (i) assist hospitals in addressing antimicrobial stewardship; and (ii) help the focus for acute hospital trusts in reducing healthcare-associated
infections and antimicrobial resistance in general, and rates of methicillin-resistant *Staphylococcus aureus* (MRSA) bacteraemia and *Clostridium difficile*-associated infection in particular.26

The overall objectives of the antimicrobial self-assessment toolkit (ASAT) project are: (i) to develop an evidence-based toolkit for assessment of antimicrobial stewardship in acute hospitals; (ii) to evaluate the face validity of the toolkit; and (iii) to publish a web version of the toolkit.

This paper describes the methodology that was adopted in developing the ASAT.

**Methods**

Self-assessment toolkits (SATs) are not new. They have been advocated for measuring programme outcomes27 and as a quality improvement tool.28 The Department of Health’s Saving Lives programme, for promoting infection prevention, has a SAT that addresses all the domains advocated within the Report.29

The ASAT was developed through a National Pharmacy Reference Group established as part of the current work programme of the Prescribing Group of the Department of Health’s Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection (ARHAI).

An evidence-based approach was adopted using published information and national reports to identify criteria for inclusion. These were subdivided into domains that addressed:

1. **Antimicrobial management within the Trust**—structures and lines of responsibility and accountability—high-level notification to the Board.
2. **Operational delivery of an antimicrobial strategy**—operational standards of good antimicrobial stewardship that included: antimicrobial guidelines and formularies; restriction of broad-spectrum agents; restriction of second- and third-generation cephalosporins; restriction of fluoroquinolones; restriction of clindamycin; intravenous to oral switch; and timing of the first dose of antimicrobial for surgical prophylaxis.
3. **Risk assessment for antimicrobial chemotherapy**—important safety considerations for the selection and use of antimicrobials.58,59
4. **Clinical governance assurance**—ensuring the level of adherence to the standards.24,60–62
5. **Education and training**—training needs and delivery of education and training for all who issue, prescribe and administer antimicrobials.24,63–65
6. **Antimicrobial pharmacist**—systems in place for ensuring their optimum use.66–71
7. **Patients, Carers and the Public**—information needs of patients, carers and the public.72

These domains were converted into a spreadsheet and piloted in a number of centres by the National Pharmacy Reference Group. The matrix was tested for face validity.

Domain 1 to be satisfied, as informing hospital boards that systems are in place is an obligation of the Health and Social Care Act 2008, Code of Practice for the NHS on the prevention and control of healthcare-associated infections and related guidance. Domain 2 has been the subject of much guidance over the years and describes the operational systems that should be in place in order to promote good antimicrobial stewardship within hospitals. This domain measures standards that are in place. The safety of medicines has been a major feature in the programme of actions and alerts that have come from the National Patient Safety Agency and that have been informed from a drive to reduce errors and promote safety in the use of medicines. Domain 3 identifies standards that are relevant to the safety of medicines in general and of antimicrobials in particular.

Domain 4 seeks to assess whether there is audit and feedback of the standards for antimicrobial stewardship, i.e. how the standards are embedded in practice.

Clinical audit and feedback of compliance with standards are an essential part of any continuing quality improvement programme. Clearly, there should be more emphasis on this in all institutions. Hospitals are strongly recommended to participate in and feedback the results of the annual European Surveillance of Antibiotic Consumption (ESAC) Point Prevalence Studies as a standardized audit tool. See http://app.esac.ua.ac.be/public/index.php/en_gb/home (7 August 2010, date last accessed).

**Results and discussion**

The aim of this paper is to describe the methodology that was adopted in developing the ASAT. The ASAT represents currently the best available cluster of standards that have been developed through evaluative studies, governmental and professional reports, and recommendations from expert groups.

The current version has gone through 15 iterations before a final pilot and is available as a web version at http://www.researchdirectorate.org.uk/asat/asat.asp (7 August 2010, date last accessed).
highlighted in a recent Public Accounts Committee Report, which stated that ‘One of the greatest threats to infection control is the increase in antibiotic resistance but generally hospitals do not yet have robust electronic prescribing systems that enable them to monitor whether antibiotics are being used effectively.’

Domain 5 seeks to measure education and training in antimicrobial stewardship. Comprehensive education and training in antimicrobial stewardship is essential to any quality improvement programme, and this should be highlighted at undergraduate, and pre- and post-registration levels for all professional groups who use antimicrobials.

The Hospital Pharmacy Initiative to promote the availability of antimicrobial pharmacists (AMPs) to all hospital trusts in England would be expected to be in place. However, lack of availability of suitably skilled pharmacists and recruitment and retention challenges have meant that this has not always been possible.

Domain 6 seeks to examine the extent of AMP presence and activity.

Domain 7 seeks to report how much information is provided to patients and their carers on the administration of antimicrobials. This section was constructed following discussion with the patient organization ‘National Concern for Healthcare Infections’. Information for patients and carers on medicines has frequently been highlighted as a big issue following national patient surveys. The Care Quality Commission’s essential standards of quality and safety registration identifies that people who use services ‘Wherever possible will have information about the medicine being prescribed made available to them or others acting on their behalf.’

The ASAT was designed to allow hospitals to assess their level of antimicrobial stewardship against a standardized matrix/template, and to identify areas for development and prioritization. Further work needs to be conducted to assess the relationship between scores from the individual domains and actual performance in antimicrobial stewardship and infection prevention in terms of outcomes that matter, e.g. antimicrobial resistance rates and healthcare-associated infection rates.

Conclusions
The ASAT offers a web-enabled, version-controlled instrument for the assessment of antimicrobial stewardship in acute hospitals. It may offer a sensitive instrument to assess longitudinal progress on antimicrobial stewardship in an individual institution or act as a benchmark with similar organizations.

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Transparency declarations
J. C. is a member of the Department of Health’s Advisory Committee on ARHAI and is Chair of the Prescribing sub-group. He is a member of the Persons Appointed Panel of the Medicines Healthcare Products Regulatory Agency (MHRA). K. H. has been on BSAC Council. T. H. has received consultancy fees from Novartis. P. H. has recently received speaker’s fees, sponsorship for conference attendance or consultancy fees from Abbott, Amgen, AstraZeneca, Gilead, GlaxoSmithKline, Janssen-Cilag, Napp, Novartis, Ortho-Biotech, Pfizer, Roche, Sando, Sanofi-Aventis, Schering-Plough, UCB Pharma and Wyeth. C. J. has been on BSAC Council. He has recently received funds for speaking at a symposium organized by Conventus Healthcare Ltd and has received sponsorship to attend a conference from Janssen-Cilag. W. L. is on BSAC Council. P. W. has recently received speaker’s fees, sponsorship for conference attendance and consultancy fees from Astellas, Novartis, Pfizer and Wyeth. Other authors: none to declare.

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