



University of Dundee

Structured antibiotic 'time-out' audits as recommended by the CDC reduce antibiotic use and costs

Davey, Peter G.

Published in:
Evidence-Based Nursing

DOI:
[10.1136/eb-2014-102046](https://doi.org/10.1136/eb-2014-102046)

Publication date:
2016

Document Version
Peer reviewed version

[Link to publication in Discovery Research Portal](#)

Citation for published version (APA):

Davey, P. G. (2016). Structured antibiotic 'time-out' audits as recommended by the CDC reduce antibiotic use and costs. *Evidence-Based Nursing*, 19(1), 24. DOI: 10.1136/eb-2014-102046

General rights

Copyright and moral rights for the publications made accessible in Discovery Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from Discovery Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain.
- You may freely distribute the URL identifying the publication in the public portal.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Non-Open Access article acknowledgement: This article has been accepted for publication in Evidence-Based Nursing following peer review. The definitive copyedited, typeset version "Structured antibiotic 'time-out' audits as recommended by the CDC reduce antibiotic use and costs" is available online at: <http://ebn.bmj.com/content/19/1/24.com>

Category: Nursing issues

Study type: Quantitative - other

Bazian's declarative title: Structured antibiotic 'time-out' audits as recommended by the CDC reduce antibiotic use and costs.

Citation: Lee TC, Frenette C, Jayaraman D, *et al.* Antibiotic self-stewardship: trainee-led structured antibiotic time-outs to improve antimicrobial use. *Ann Int Med* 2014;**161**:S53–8.

Commentary

Implications for practice and research

- Self-monitoring is a highly effective behaviour change technique, which should be more widely used in improving prescribing in hospitals and more generally in changing professional practice.
- Further research is required on how this intervention can be sustained and spread at scale.

Context

The aims of antimicrobial stewardship are to ensure effective, timely treatment of patients with infection and to minimise collateral damage from unnecessary use of antimicrobials (*Clostridium difficile* infection and spread of antimicrobial resistance). In hospitals junior doctors make complicated antimicrobial prescribing decisions. The context in which these decisions take place is also challenging, where workplace cultures often fail to promote learning and feedback and where hierarchy sometimes works against rational antimicrobial prescribing.¹

Methods

The setting was two internal medicine units in one university hospital in Canada. The design was quantitative and quasi-experimental. The intervention applied self-monitoring through a structured checklist, which residents used to audit their antibiotic prescribing twice weekly. Residents were supported through monthly educational sessions, which included feedback of results from the audits with discussion about management of future patients. The effect of the intervention on prescribing outcomes was estimated through segmented regression analysis of time series data before and after the intervention. Incidence rate ratios were used to analyse other outcomes (*C difficile* infection, mortality, ICU transfers and length of stay).

Findings

The intervention was associated with a 46% (US\$69,424) reduction in antibiotic costs. This was achieved through an immediate reduction in the use of carbapenem antibiotics together with a slower, sustained reduction in use of moxifloxacin. Adherence with the auditing process was 80%. Rates of *C difficile* infection decreased from 24.2 to 19.6 per 10 000 patient days (incidence rate ratio 0.8 (CI 0.5 to 1.3)). There were no differences in average length of stay, median number of ICU transfers or in hospital mortality.

Commentary

A recent systematic review of antimicrobial stewardship for hospital inpatients concluded that both the content and reporting of interventions fell short of scientific principles and practices. There is a strong evidence base regarding Behaviour Change Techniques (BCTs) in other contexts that should be applied to antimicrobial stewardship now if we are to further our understanding of what works, for whom, why and in what context.² Self-monitoring and feedback have been found to be effective techniques within interventions across a range of behaviours, including physical activity, healthy eating³ and reducing excessive alcohol consumption.⁴ The effects of self-monitoring and feedback can be understood within control theory, a model of self-regulation derived from empirical research in social, clinical and health psychology.⁵ Control theory postulates that behaviour change is most likely if feedback about one's performance is accompanied by a comparison with a performance target and that behaviour change is improved further by providing strategies to reduce any observed discrepancies between one's target performance and one's actual performance. This theory predicts, therefore, that self-monitoring would be more effective if combined with one or more of the techniques that are theorised to have synergistic effects: providing feedback; goal setting; and action planning.

This study by Lee and colleagues is a marked improvement on 116 studies published before the end of December 2012. Reporting of BCTs was poor, with little detail of BCT characteristics. Feedback was only reported for 17 (13.8%) of the interventions and self-monitoring was used in only one intervention.² The study by Lee and colleagues is therefore a very important addition to the literature as it demonstrates that self-monitoring of hospital antibiotic prescribing by medical residents, combined with feedback and action planning, can be sustained with 80% adherence over a full year. The intervention was implemented in two internal medicine units and the challenge will be to spread this both in terms of ambition (safe reduction in total use of antibiotics in addition to improving choice) and spread across the hospital. Practical advice on building measurement into daily clinical practice was published over 15 years ago⁶ and should be more widely applied to antimicrobial stewardship.²

Commentator details

Name: Peter G Davey

Affiliation: University of Dundee - Medical Education Institute

Correspondence address: University of Dundee - Medical Education Institute, Mackenzie Building, Kirsty Semple Way, Dundee, DD24BF, United Kingdom.

Email: p.g.davey@dundee.ac.uk

References

1. Mattick K, Kelly N, Rees C. A window into the lives of junior doctors: narrative interviews exploring antimicrobial prescribing experiences. *J Antimicrob Chemother* 2014; **69**: 2274-83.
2. Davey P, Peden C, Charani E et al. Time for action-Improving the design and reporting of behaviour change interventions for antimicrobial stewardship in hospitals: Early findings from a systematic review. *Int J Antimicrob Agents* 2015; **45**: 203-12.
3. Dombrowski SU, Sniehotta FF, Avenell A et al. Identifying active ingredients in complex behavioural interventions for obese adults with obesity-related co-morbidities or additional risk factors for co-morbidities: a systematic review. *Health Psychology Review* 2010; **6**: 7-32.
4. Michie S, Whittington C, Hamoudi Z et al. Identification of behaviour change techniques to reduce excessive alcohol consumption. *Addiction* 2012; **107**: 1431-40.
5. Carver CS, Scheier MF. Control theory: a useful conceptual framework for personality-social, clinical, and health psychology. *Psychol Bull* 1982; **92**: 111-35.
6. Nelson EC, Splaine ME, Batalden PB et al. Building measurement and data collection into medical practice. *Ann Intern Med* 1998; **128**: 460-6.

Competing interests

None