



Restrictive reporting of selected antimicrobial susceptibilities influences clinical prescribing



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Summary

Background: Cascade and restrictive reporting are useful strategies to enhance antibiotic stewardship programs.

Methods: We combined both strategies to improve the prescribing of antibiotics aimed at Gram-negative infections.

Results: For *Enterobacter aerogenes*, the susceptibility rates to amikacin increased from 10% to 100%; for third generation cephalosporins, these rates increased from 55% to 89%. The susceptibility rates of *E. aerogenes* to cefepime and piperacillin–tazobactam changed little, and the ampicillin susceptibility decreased from 30% in 2009 to 11% in 2010. For *Proteus mirabilis*, the susceptibility rates increased for third-generation cephalosporins (48% vs. 92%) and piperacillin–tazobactam (10% vs. 98%), with minimal changes for cefepime

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(96% vs. 93%), ampicillin (69% vs. 73%) and amikacin (96% vs. 84%). For *Pseudomonas aeruginosa*, the susceptibility rates improved slightly for third-generation cephalosporins (81% vs. 91%) but reduced for piperacillin–tazobactam (99% vs. 59%). Hospital-acquired *Clostridium difficile* infections decreased from 0.11 to 0.07 per 1000 patient days.

Conclusions: Selective reporting helps physicians choose the most appropriate antibiotics for their patients within a stewardship program, with reduced *C. difficile* infection.

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Introduction

The inappropriate use of antibiotics has societal consequences due to ecological effects on both patients and the environment [1,2]. These consequences include the emergence of antimicrobial resistance, which is a particularly ominous sign in the development of modern healthcare. Examples of this resistance include several pathogens, such as *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Enterobacter* species, all of which may be multi-drug resistant [3,4]. Formulary restriction is already known to lead to significant and immediate reductions in antimicrobial prescribing and cost [5]. Controlling antibiotic consumption impacts the resistance rates and forms the main basis of antimicrobial stewardship programs. Additional requirements include the monitoring and reporting of antibiotic resistance following laboratory characterization. The Clinical and Laboratory Standards Institute (CLSI) has published guidelines for the analysis and presentation of cumulative antimicrobial susceptibility testing [6]. In one study, the use of a clinical syndrome-wise categorization of antimicrobial agents achieved stable susceptibility of nosocomial isolates [7]. Adherence to the principles of antibiotic use and effective monitoring were useful in halting bacterial resistance [8].

The selective or cascade reporting of antimicrobial susceptibilities may be employed in an antimicrobial stewardship initiative [9]. In cascade reporting, antimicrobial agents of each class are ranked based on a spectrum of activity, popularity or potential for the over-prescribing risk of drug resistance and cost. Thus, the reported antibiogram should include the most appropriate and least expensive drugs, provided the organism is susceptible. Higher risk agents are only released if alternative options are lacking. In selective reporting, the susceptibilities of broad-spectrum agents and those drugs at risk for over-prescription are

deliberately withheld [5,9,10]. The CLSI guidelines specify antibiotics within categories that must be reported, e.g., group A and group B, which should be suppressed [11]. Group A is the suggested grouping of antimicrobial agents with FDA clinical indications that should be considered for routine testing and reporting on non-fastidious organisms by clinical microbiology laboratories in the United States. Group B represents the suggested grouping of antimicrobial agents with FDA clinical indications that should be considered for routine testing and reporting on fastidious organisms by clinical microbiology laboratories in the United States. The ultimate goal is to reduce antimicrobial consumption, particularly the use of broad-spectrum agents, to minimize the resistance potential. Selective reporting helps prescribers choose the most appropriate antimicrobial agent based on a susceptibility pattern. Additional strategies, such as antimicrobial order sheets, automatic stop orders and therapeutic substitution, are available to further enhance the best use of antibiotics [12]. We examined the effect of the selective reporting of selected broad-spectrum agents against pathogens with high resistance rates in our hospital.

Materials and methods

Hospital setting and infection control program

The Saudi Aramco Medical Services Organization (SAMSO) provides medical care for approximately 370,000 patients. The main hospital, Dhahran Health Center (DHC), is a 380-bed general hospital with five intensive care units (cardiac, medical, surgical, pediatric and neonatal). The hospital caters to a wide range of patients, including general medicine and surgery, intensive care and the management of hematological and solid organ malignancies. Over 36,000 patients are admitted

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