

Strategies for Implementing Antibiotic Stewardship Program in an Institution

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ABSTRACT

Antibiotics have revolutionized the practice of medicine and antibiotic stewardship programs are being put in place so that the benefits of this revolution are not offset by its rampant and unscientific use. The antimicrobial stewardship program is in its infancy. It has much scope for growth and a tremendous potential for promoting evidence-based therapy for infectious disease. An attempt is made in this article to put together strategies for its effective implementation in healthcare facilities.

Keywords: Antibiotic stewardship program, Antibiotics, Strategies.

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INTRODUCTION

The commitment of all pediatricians should always be toward the evidence-based selection of antibiotics for a given illness; its administration at the recommended dose and duration; while ensuring adequate monitoring and audit of usage—and that is the essence of an antibiotic stewardship program (ASP).

Therefore, the objectives of the movement are to develop a comprehensive long-term program to maximize antimicrobial benefit, avoid adverse reactions and drug allergies, improve outcomes, reduce the cost of treatment of infectious disease, avoid the development of antimicrobial resistance to the extent possible, and create protocols for combating emerging resistance.^{1–4} The emergence of drug resistance and the colonization or infection with these organisms is the “collateral damage” that results from the injudicious use of antibiotics.⁵

WHO 2019 AWaRE CLASSIFICATION ANTIBIOTICS⁶

On October 1, 2019 WHO released The 2019 WHO AWaRE Classification Database of antibiotics on the recommendation of the WHO Expert Committee on Selection and Use of Essential Medicines. It includes details of 180 antibiotics classified as Access, Watch, or Reserve, with their pharmacological classes, Anatomical Therapeutic Chemical (ATC) codes, and WHO Essential Medicines List status. The AWaRE database compliance is an indication of optimal use and monitoring of antibiotics in a country. The data published suggests wide country to country differences in the use of AWaRE antibiotics in hospitalized neonates and children.⁷ India stands 27th in the pediatric and 33rd in the neonatal survey, respectively, from among 56 countries.

STRATEGIES FOR IMPLEMENTATION OF ANTIBIOTIC STEWARDSHIP PROGRAM IN AN INSTITUTION

Antimicrobial Stewardship Team

The team, led by a physician, should include an infectious disease physician, a clinical pharmacist with infectious disease training, a clinical microbiologist, and an information system specialist.

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Support of clinicians and nurses is to be ensured by involving key persons of each group in this committee.

Interventions

Front End Approach—Formulary Restriction and Preauthorization⁸

Restrictions may be placed on the prescribing of certain antimicrobials on a hospital's formulary. Such restrictions may be based on who can prescribe an antimicrobial (e.g., certain services or expertise), or on acceptable criteria for use of the antimicrobial in the institution. It involves the preapproval of orders before dispensing a drug. Approval is often obtained through consultation between the prescriber and someone responsible for assessing the appropriateness of the request (often an infectious disease specialist and/or infectious disease pharmacist).

This approach is “restrictive” stewardship and may be used in conjunction with prospective audit with intervention and feedback to oversee both initial and ongoing use of restricted agents. This strategy has proved to significantly reduce the expenditure of the targeted drug⁹ but could result in increased use of antimicrobials that are not restricted.

Back End Approach—Prospective Audit and Feedback⁸

This strategy employs the clinical decisions support software (CDSS) systems to prospectively audit antimicrobial use and send feedback to the prescriber to tailor specific antibiotic therapy for a given patient or infection. It would be possible to periodically review certain groups of infections, e.g., ESBL urinary tract infection

so that children receive optimal therapy and recommendations for de-escalation may be evolved guided by culture and sensitivity or polymerase chain reaction (PCR) report;¹⁰ or a group of children, e.g., immunocompromised children, to constitute hospital antibiotic guidelines. This method of stewardship has been shown to decrease antimicrobial use, cost of treatment, and the number of new prescriptions of antimicrobials; in addition to ensuring clinician satisfaction.¹¹

OTHER STRATEGIES THAT NEED TO BE IN PLACE

Facility-specific Clinical Practice Guidelines

Periodic dissemination and implementation of evidence-based institutional guidelines on appropriate initiation of oral antibiotics, the transition from IV to oral antibiotics, strategies for de-escalation, the shortest effective duration of therapy, and changing from broad-spectrum to targeted therapy; is an effective way of standardizing prescribing practices based on local epidemiology.

Antimicrobial “Time out”

A stop order will alert clinicians to revise antimicrobial agents after 72 hours of initiation depending on culture and sensitivity testing results, response to therapy, present condition, and facility needs.¹²

Pharmacy-driven Interventions

Clinical pharmacists play an important role in the development, review, and implementation of ASP guidelines and policies; provide clinical advice, data of audits, and feedback to optimize antimicrobial prescribing; and identifying medication errors, among other activities.¹³ These inputs would aid the primary physician in making an appropriate clinical judgment for the therapy of a given case.

Educational Interventions

Updates to improve prescriber and patient knowledge of appropriate antibiotic use at regular intervals are an essential component of ASP of a health facility.¹⁴

Microbiology and Laboratory Inputs

Antibiotic stewardship program needs to work with the microbiology to develop stratified antimicrobial susceptibility tests according to the latest Clinical and Laboratory Standard Institute (CLSI) guidelines.¹⁵

The use of serial procalcitonin (PCT) for intensive care unit (ICU) patients with suspected infection could be recommended by ASP.¹⁶ Stop Antibiotics on Procalcitonin guidance Study (SAPS), the largest procalcitonin trial to date, demonstrated a reduction in both antibiotic exposure and mortality in critically ill patients.¹⁷ However, if the institution ICU has a robust ASP, the comparative cost-effectiveness of PCT monitoring needs to be evaluated.¹⁸

Selective reporting—A strategy where susceptibilities of broad-spectrum agents and those drugs at risk for over-prescription are deliberately withheld; and cascade reporting—wherein antimicrobial agents of each class are ranked based on the spectrum of activity, popularity, the potential for the over-prescribing, risk of drug resistance and cost; are microbiology inputs to reduce the use of broad-spectrum, expensive antibiotics; and guide de-escalation without affecting outcome while managing serious infections.¹⁹

Antimicrobial Measurements

Defined daily dose (DDD), day of therapy (DOT), length of therapy (LOT), antimicrobial-free days, cost of therapy, measures of antimicrobial appropriateness (not developed to the degree that makes them useful and widely applicable), the proportion of patients receiving therapy as per facility guideline or algorithm, appropriate use of microbiology inputs, the proportion of patients converted to oral therapy, and process measures (documenting an indication for the antimicrobial, filling in an antimicrobial order form, or mandating an infectious diseases consult) are used as measures to monitor antimicrobial therapy.²⁰ Documentation of all these data should be utilized to revise and update the in-house protocols for ASP.

SUMMARY

The silent epidemic of antibiotic resistance has made it mandatory that institutions develop guidelines for the appropriate use of antimicrobials and create a robust system for monitoring and audit of antibiotic use.

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