

What is Antimicrobial Stewardship: the Definitions, the Goals

Bojana Beović

UMC Ljubljana

Faculty of Medicine, University of Ljubljana

Slovenia



Univerza v Ljubljani
Medicinska fakulteta

univerzitetni klinični center ljubljana
University Medical Centre Ljubljana



The Evolution of the Definition

Society for Healthcare Epidemiology of America and Infectious Diseases Society of America Joint Committee on the Prevention of Antimicrobial Resistance: Guidelines for the Prevention of Antimicrobial Resistance in Hospitals

David M. Shlaes, Dale N. Gerding, Joseph F. John, Jr.,
William A. Craig, Donald L. Bornstein,
Robert A. Duncan, Mark R. Eckman, William E. Farrer,
William H. Greene, Victor Lorian, Stuart Levy,
John E. McGowan, Jr., Sindy M. Paul, Joel Ruskin,
Fred C. Tenover, and Chatrchai Watanakunakorn

Appropriate antimicrobial stewardship that includes optimal selection, dose, and duration of treatment, as well as control of antibiotic use,

Clinical Infectious Diseases 1997;25:584–99

Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship

Timothy H. Dellit,¹ Robert C. Owens,² John E. McGowan, Jr.,³ Dale N. Gerding,⁴ Robert A. Weinstein,⁵
John P. Burke,⁶ W. Charles Huskins,⁷ David L. Paterson,⁸ Neil O. Fishman,⁹ Christopher F. Carpenter,¹⁰ P. J. Brennan,⁹
Marianne Billeter,¹¹ and Thomas M. Hooton¹²

Clinical Infectious Diseases 2007;44:159–77

: antimicrobial stewardship, an activity that includes appropriate selection, dosing, route, and duration of antimicrobial therapy.

Implementation Science and Antibiotic Stewardship

- Antibiotic stewardship is about implementation of guidelines and other evidence-based principles.**
- Implementation of antibiotic stewardship principles should reach all physicians prescribing antibiotics.**

SHEA/IDSA/PIDS POLICY STATEMENT

Policy Statement on Antimicrobial Stewardship by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Pediatric Infectious Diseases Society (PIDS)

ANTIMICROBIAL STEWARDSHIP REFERS TO COORDINATED INTERVENTIONS DESIGNED TO IMPROVE AND MEASURE THE APPROPRIATE USE OF ANTIMICROBIAL AGENTS.

Goals and Objectives of AS

The goal

the end toward which effort is directed

The objective

specific, measurable steps toward which effort is directed

The interventions



The Goals of Antimicrobial Stewardship

Improved patient's outcomes (incl. less adverse events).

Control of antimicrobial resistance.

At reasonable cost.

Improved Patient's Outcomes in Studies on Antimicrobial Stewardship Interventions

- **Decrease of mortality** (infection related)
- **Decrease of infection rate** (with resistant bacteria)
- **Increase of clinical success rate** (definition depends on the type of infection)
- **Reduced toxicity**
- **Decrease in length of stay**
- **Decrease in ICU length of stay/admission**
- **Decrease of re-admission rate**
- **Decrease of *Clostridium difficile* infections**

Control of Antimicrobial Resistance as a Goal of AS

- **Abundance of studies showing at least temporal effect.**
- **Most studies assess restrictive interventions.**
- **The causal relationship difficult to measure because of concurrent infection control programmes.**
- **The „squeezing the baloon“ phenomenon.**

Cost Reduction as a Goal of AS

- **Abundance of studies, mostly restrictive interventions.**
- **Most studies assessed the reduction of cost related to the decreased use of drugs and not the reduction of cost because of improved patients' care and reduced resistance.**
- **Reduction of cost makes AS appealing for hospital administrators.**
- **The reduction of cost because of introduction of generic antibacterial drugs is greater than the reduction of cost caused by AS interventions.**

Akpan MR, et al. *Antibiotics* 2016, 5, 5;doi:10.3390/antibiotics5010005
Schuts EC, et al. *Lancet Infect Dis* 2016 Jul;16(7):847-56.

Improved Patient's Outcomes and Antimicrobial Stewardship

Outcomes...remain the ultimate validators of the effectiveness and quality of medical care

Donabedian A. Milbank Q 2005;83(4):691–729.

But:

- **Difficult to measure**
- **Difficult to establish the causal relationship between the intervention and the improved outcomes.**

Objectives of Antimicrobial Stewardship

...structure or process oriented.

...may serve as quality indicators for AS programmes.

...the importance of a causal relationship between an objective and a goal.

Antimicrobial stewardship objectives

Empirical antibiotic treatment according to guidelines

Blood cultures

Cultures from the site of infection

De-escalation

Adjustment of dose to renal function

Switch from intravenous to oral treatment

Documented plan of treatment

Therapeutic drug monitoring

Discontinuation of treatment if infection is not confirmed

Presence of local guidelines

Local guidelines in adherence to national

List of restricted antimicrobials

Bedside consultations

Assessment of patient's adherence

Does the AS Objectives Have an Impact on AS Goals? (Does the Objectives Really Matter?)

OBJECTIVES

- ✓ empirical therapy according to guidelines
- ✓ de-escalation of therapy
- ✓ switching from intravenous to oral treatment
- ✓ therapeutic drug monitoring
- ✓ use of a list of restricted antibiotics
- ✓ bedside consultations



GOALS

Clinical outcomes
Adverse events
Costs
Resistance rates

AS Interventions

- **Structural**
- **Persuasive**
- **Restrictive**

Interventions to improve antibiotic prescribing practices for hospital inpatients (Review)

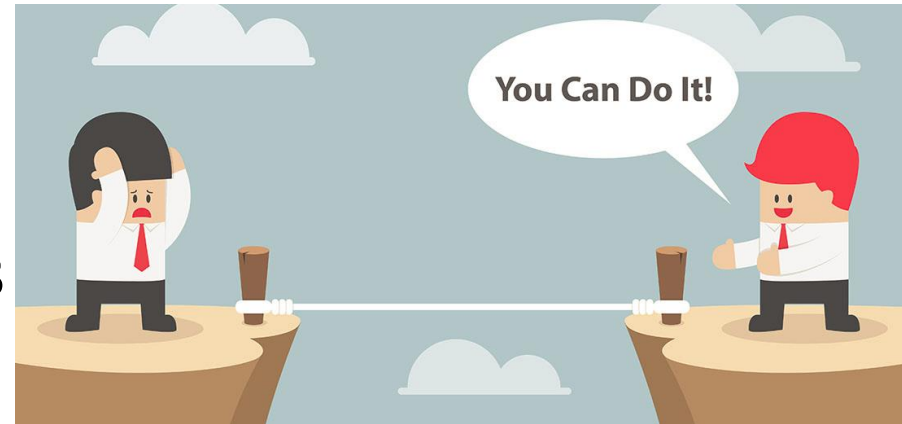
Davey P, Brown E, Charani E, Fenelon L, Gould IM, Holmes A, Ramsay CR, Wiffen PJ, Wilcox M



**THE COCHRANE
COLLABORATION®**

Persuasive Interventions...

- **distribution of educational materials**
- **educational meetings**
- **local consensus processes**
- **educational outreach visits**
- **local opinion leaders**
- **reminders provided verbally, on paper or on computer**
- **audit and feedback**



Restrictive Interventions...

- selective reporting of laboratory susceptibilities
- formulary restriction
- requiring of prior authorization of prescriptions
- therapeutic substitutions
- automatic stop orders
- antibiotic policy change strategies
(cycling, rotation...)



Davey P, Brown E, Charani E, Fenelon L, Gould IM, Holmes A, Ramsay CR, Wiffen PJ, Wilcox M. Interventions to improve antibiotic prescribing practices for hospital inpatients. Cochrane Database of Systematic Reviews 2013, Issue 4. Art. No.: CD003543

Structural Interventions...

- **changing from paper to computerized records**
- **rapid laboratory testing**
- **computerized decision support systems**
- **introduction or organization of quality monitoring mechanisms**



Davey P, Brown E, Charani E, Fenelon L, Gould IM, Holmes A, Ramsay CR, Wiffen PJ, Wilcox M. Interventions to improve antibiotic prescribing practices for hospital inpatients. Cochrane Database of Systematic Reviews 2013, Issue 4. Art. No.: CD003543

Antimicrobial Stewardship and Patient Safety

The simplest **definition** of **patient safety** is the prevention of errors and adverse effects to **patients** associated with health care.

**„ANTIMICROBIAL SAFETY“
IS PATIENT SAFETY RELATED TO ANTIMICROBIALS**

**The objectives of antimicrobial stewardship
which are directly related to patient safety:**

- reduction of *C. difficile* infections
- reduction of IV line related events (switch to oral)
 - reduction of drug-drug interactions
 - reduction of allergic reactions
- prevention of surgical site infections
- reduction of inappropriate dosing (TDM)