Como medir a eficácia de um programa de uso responsável de antimicrobianos na prática

Dr Jaime Rocha CRM 17227
Clínica Médica e Infectologia

Conflitos de interesse

- Pfizer
- Novartis
- Sanofi
- AztraZeneca
- Lilly
- Angem
- DASA
- Unimed

Conflitos de interesse

- Eu acredito em uso racional
- Eu penso como clínico

Como medir a eficácia

- NÃO SEI

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ALLIANCE FOR THE PRUDENT USE OF ANTIBIOTICS

APUA

Preserving the Power of Antibiotics®

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News-Newsletter Vol. 29 No. 1

APUA Recommended Stewardship Resources and Sample Tools

Online Resources for Antibiotic Stewardship*

Comprehensive Web sites from national and international organizations with information on many aspects of

News

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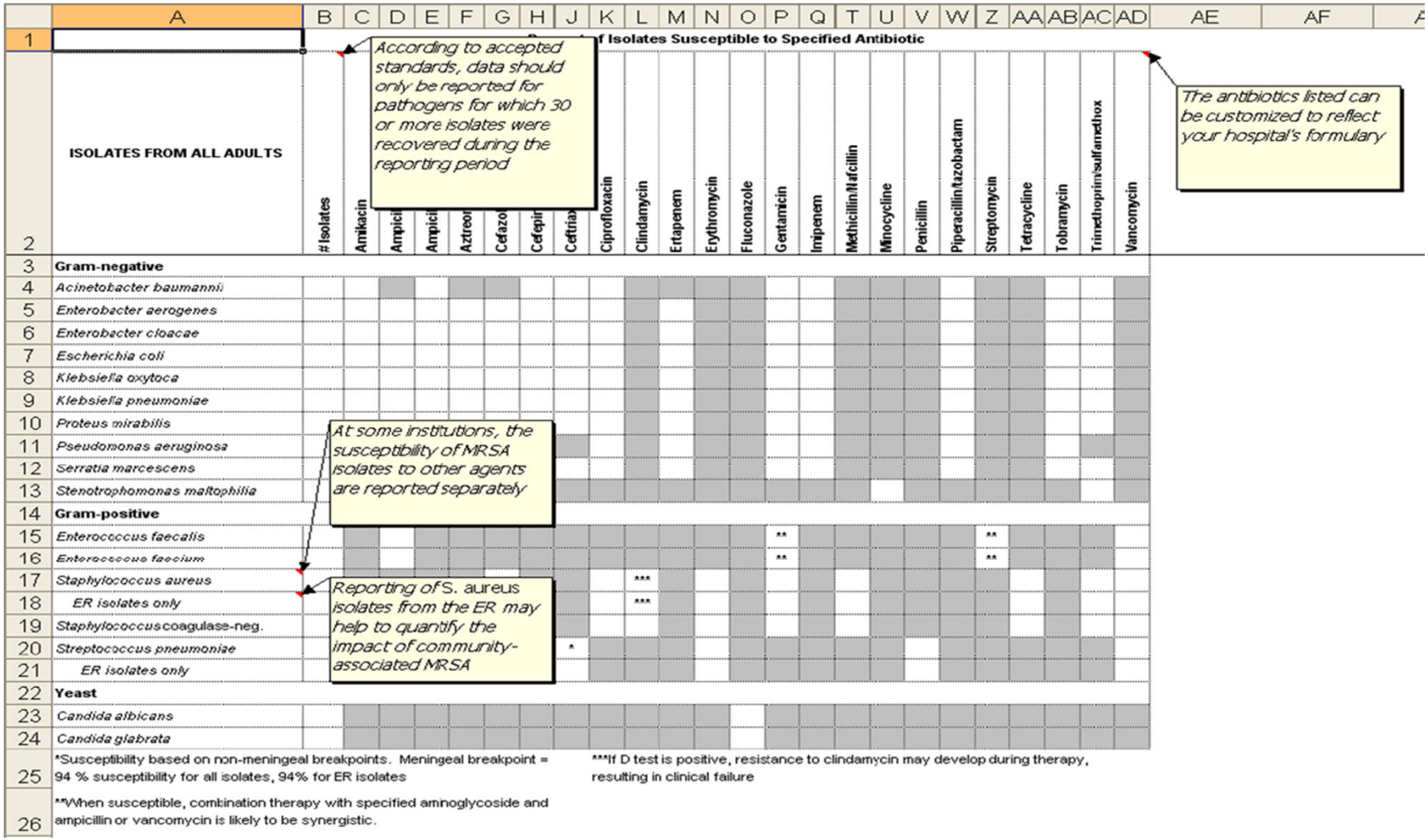

According to accepted standards, data should only be reported for pathogens for which 30 or more isolates were recovered during the reporting period
The antibiotics listed can be customized to reflect your hospital's formulary
At some institutions, the susceptibility of MRSA isolates to other agents are reported separately
Reporting of S. aureus isolates from the ER may help to quantify the impact of community-associated MRSA
Isolates Susceptible to Specified Antibiotic
ISOLATES FROM ALL ADULTS
#Isolates
Amikacin
Ampici
Ampici
Aztreon
Cefazo
Cefepir
Ceftriax
Ciprofloxacin
Clindamycin
Ertapenem
Erythromycin
Fluconazole
Gentamicin
Imipenem
Methicillin/Mafcillin
Minocycline
Penicillin
Piperacillin/tazobactam
Streptomycin
Tetracycline
Tobramycin
Trimethoprim/sulfamethox
Vancomycin
Gram-negative
Acinetobacter baumannii
Enterobacter aerogenes
Enterobacter cloacae
Escherichia coli
Klebsiella oxytoca
Klebsiella pneumoniae
Proteus mirabilis
Pseudomonas aeruginosa
Serratia marcescens
Stenotrophomonas maltophilia
Gram-positive
Enterococcus faecalis
Enterococcus faecium
Staphylococcus aureus
ER isolates only
Staphylococcus coagulase-neg.
Streptococcus pneumoniae
ER isolates only
Yeast
Candida albicans
Candida glabrata
*Susceptibility based on non-meningeal breakpoints. Meningeal breakpoint = 94 % susceptibility for all isolates, 94% for ER isolates
**When susceptible, combination therapy with specified aminoglycoside and ampicillin or vancomycin is likely to be synergistic.
***If D test is positive, resistance to clindamycin may develop during therapy, resulting in clinical failure

Ventilator-associated/Healthcare-associated/ Hospital-acquired pneumonia ORDER SHEET for ADULT PATIENTS

DATE: **TIME:** **(24-hour clock)**

Patient Allergies:	Weight (Kg):	Serum Creatinine:	Creatinine Clearance (mL/min):

MEDICATION ORDERS ONLY
(INCLUDES IV MEDICATIONS)

Order Set A. No Risk factors for Multi-drug Resistant Organisms (see Risk Assessment for Multi-drug Resistant Organisms)

☐ Ceftriaxone 1g IV Q24 hours x 72 hours
OR
☐ Moxifloxacin 400 mg ☐ IV or ☐ PO Q24 hours x 72 hours

Consider adding Vancomycin if history of infection or colonization with MRSA
☐ Vancomycin _____mg IV Q _____ hours x 72 hours [a]

Consider adding Azithromycin for coverage of atypical organisms
☐ Azithromycin 500 mg ☐ IV or ☐ PO Q 24 hours x 72 hours

Order Set B. Risk factors for Multi-drug Resistant Organisms (see Risk Assessment for Multi-drug Resistant Organisms) AND not intubated

Drug 1:
☐ Cefepime 2g IV Q8 hours x 72 hours [a,b]
☐ Cefepime_____g IV Q _____x 72 hours [b]

OR if patient has recent history of hives, anaphylaxis or Stevens-Johnson syndrome to penicillin or cephalosporin:
☐ Aztreonam 2 g IV Q8 hours x 72 hours [a,b]
☐ Aztreonam _____ mg IV Q _____hours x 72 hours

AND

Drug 2:
☐ Vancomycin _____mg IV Q _____hours x 72 hours [a]

Order Set C. Risk factors for Multi-drug Resistant Organisms (see Risk Assessment for Multi-drug Resistant Organisms) AND intubated:

Drug 1:
☐ Cefepime 2g IV Q8 hours x 72 hours [a,b]
☐ Cefepime _____g IV Q _____x 72 hours [b]

OR if patient has recent history of hives, anaphylaxis or Stevens-Johnson syndrome to penicillin or cephalosporin:
☐ Aztreonam 2 g IV Q8 hours x 72 hours [a,b]
☐ Aztreonam _____mg IV Q _____hours x 72 hours [b]

AND Drug 2: Tobramycin [a,c]
☐ Tobramycin _____mg IV ONCE
- If CrCl > 40 ml/min use extended interval dose (6 mg/kg, use ideal or dosing weight)
- If CrCl ≤ 40 ml/min use traditional dosing (3 mg/kg, use ideal or dosing weight)

AND Drug 3:
☐ Vancomycin _____mg IV Q _____hours x *72 hours* [a]

OR
☐ Linezolid 600mg ☐ IV or ☐ PO Q12hours x *72 hours*

FOOTNOTES
[a] Adjust dose for renal dysfunction. See Tufts-MC Antibiotic Guidebook or Tufts-MC Pharmacy website.
[b] If patient recently received a ß lactam or quinolone or has history of ESBL, please call AMT for consideration of therapy targeting ESBLs.
[c] For patients with acute renal failure and/or CKD, ciprofloxacin may be considered as a second agent; however gram negative organisms are frequently quinolone resistant. Please call AMT with questions.

24-0088 (5.5/11) (Rev. 5) 500 ß

PHYSICIAN'S ORDERS
(EXCLUDES MEDICATION ORDERS)

Respiratory Specimen Order (select one)
☐ Sputum gram stain and culture (if a sputum has been processed by the laboratory in the last ***72 hours***, use standard micro requisition but write in "new pneumonia")

If patient is intubated and no antibiotic changes have been made in the last ***72 hours*** (changes made in the last 6 hours are acceptable) and bronchoscopy cannot be performed:

☐ **Mini Bronchoalveolar Lavage (Mini-BAL)** for quantitative culture (Page respiratory to perform, do not hold antibiotics until obtained, use standard micro requisition but write in "quantitative mini-BAL culture" and attach designated sticker)

Laboratory Orders:
☐ Blood cultures x 2
☐ Legionella urinary antigen

Other Orders:
☐ Continuous pulse oximetry OR ☐ Pulse oximetry Q _____hours
☐ Chest X-ray in A.M. PA/LAT OR ☐ Chest X-ray in A.M. portable

☐ **Check a tobramycin serum concentration 2 hours and 8 hours AFTER the infusion of tobramycin is completed and contact pharmacy for further dosing assistance**

Risk Assessment for Multi-drug Resistant Organisms

Step 1: My patient has a NEW pneumonia that developed in the hospital AND:
- Is currently hospitalized for 5 days or more OR
- Has received antibiotics for 5 days or more in the last 30 days OR
- Has Immunosuppressive disease or therapy

If answer is YES (to 1 or more), then…
- if not intubated – Order Set B
- if intubated – Order Set C

If NO – go to step 2 below

Step 2: My patient has pneumonia and one or more of the following risk factors for drug resistant organisms:

Criteria 1
- Recent hospitalization 5 or more days in last 30 days OR
- Residence in a nursing home or long-term care facility OR
- Home infusion therapy (i.e. tpn, chemotherapy) OR
- Chronic Dialysis (>30 days) OR
- Recipient of home wound care OR
- Has Immunosuppressive disease or therapy

AND
Criteria 2: TWO of the following THREE risk factors:
1. Requires ICU admission
2. Three or more days of antibiotics in the past 6 months
3. Inability to perform self care

- **Does NOT meet criteria 1= Order Set A**
- **Criteria 1 but NOT Criteria 2: Order Set A + Vancomycin**
- **Criteria 1 and Criteria 2, not intubated = Order Set B**
- **Criteria 1 and Criteria 2, intubated = Order Set C**

Physician's Name (Print): _____ Physician's Signature: _____ Pager # _____

White - Medical Records Yellow - Pharmacy

ANTIBIOTIC AUDIT REPORT

Patient Information

Name _____ Admit Date _____

Record No. _____ Unit _____

DOB/Age _____ Service _____

Gender _____ Admit Source _____

Age _____ Allergies _____

Weight (kg) _____ _____

Clinical Information

Admitting Diagnosis _____

Prior Medical History _____

_____

_____

Recent Antibiotics Y / N _____

Immunocompromised Y / N _____ Septic Y / N

Suspected Site of Infection: Lungs Abdomen Urine/Bladder Bloodstream

Other: _____

Tmax _____ WBC _____ CrCl _____

Culture Results Date Site Pathogen

_____

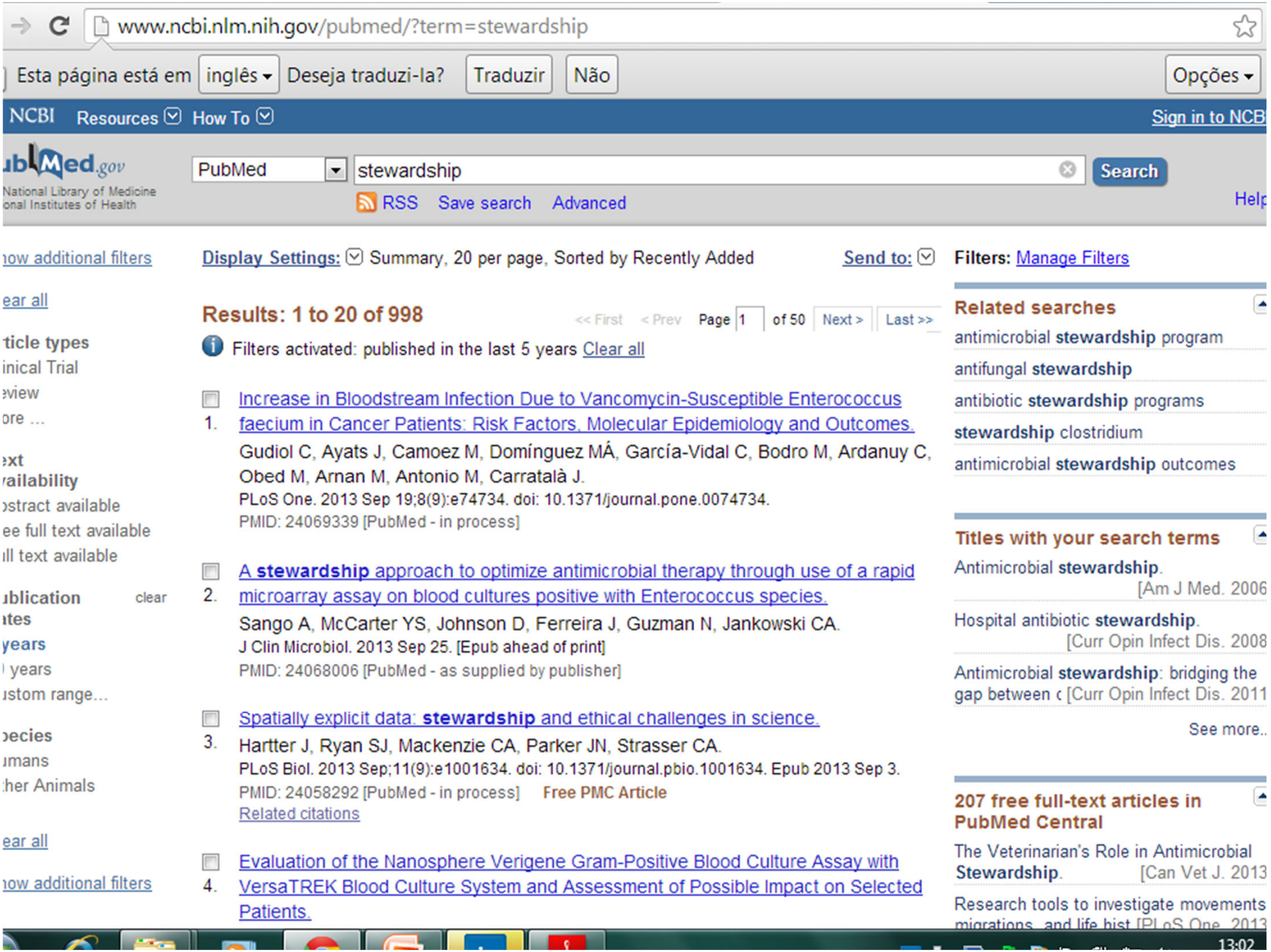
_____

_____

_____

Antibiotic Information

Date	Agent	Dose	Route	Prescriber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Other Animals
Clear all
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Results: 1 to 20 of 998
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1. Increase in Bloodstream Infection Due to Vancomycin-Susceptible Enterococcus faecium in Cancer Patients: Risk Factors, Molecular Epidemiology and Outcomes.
Gudiol C, Ayats J, Camoez M, Domínguez MÁ, García-Vidal C, Bodro M, Ardanuy C, Obed M, Arnan M, Antonio M, Carratalà J.
PLoS One. 2013 Sep 19;8(9):e74734. doi: 10.1371/journal.pone.0074734.
PMID: 24069339 [PubMed - in process]
2. A stewardship approach to optimize antimicrobial therapy through use of a rapid microarray assay on blood cultures positive with Enterococcus species.
Sango A, McCarter YS, Johnson D, Ferreira J, Guzman N, Jankowski CA.
J Clin Microbiol. 2013 Sep 25. [Epub ahead of print]
PMID: 24068006 [PubMed - as supplied by publisher]
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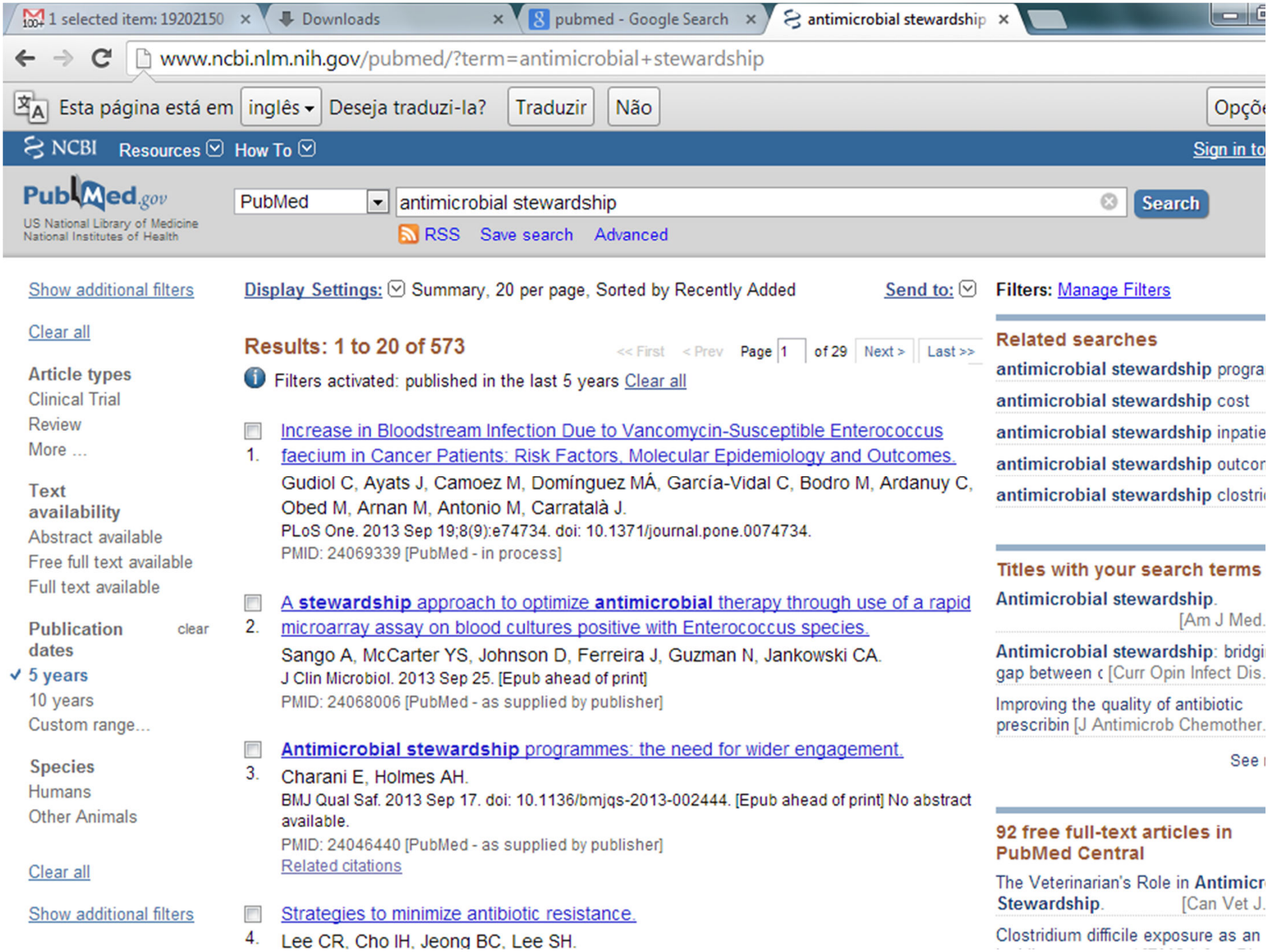
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Species
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1. Increase in Bloodstream Infection Due to Vancomycin-Susceptible Enterococcus faecium in Cancer Patients: Risk Factors, Molecular Epidemiology and Outcomes.
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PLoS One. 2013 Sep 19;8(9):e74734. doi: 10.1371/journal.pone.0074734.
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Antimicrobial stewardship: bridgi gap between c [Curr Opin Infect Dis.
Improving the quality of antibiotic prescribin [J Antimicrob Chemother.
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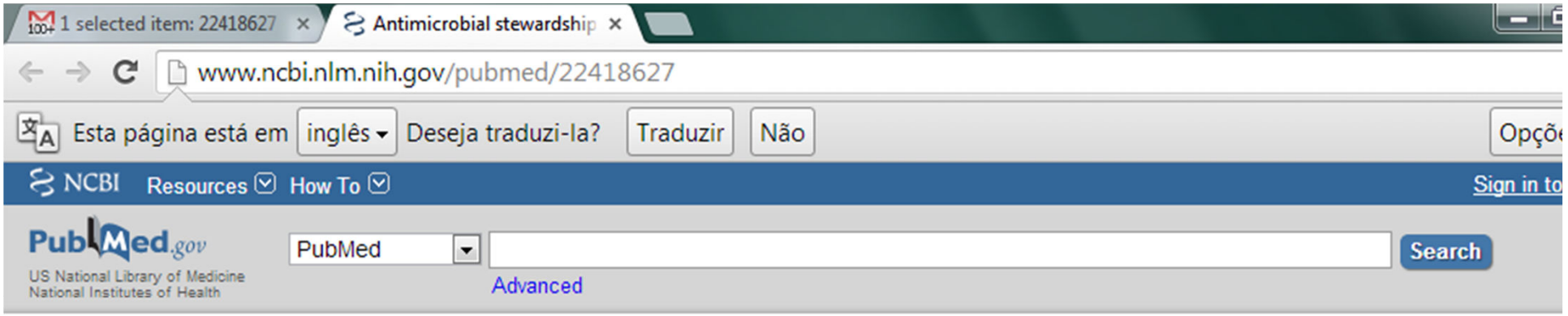
Clostridium difficile exposure as an



Infect Control Hosp Epidemiol. 2012 Apr;33(4):331-7. doi: 10.1086/664755.

Antimicrobial stewardship--the state of the art in 2011: focus on outcome and methods.

McGowan JE.

Department of Epidemiology, Rollins School of Public Health, Emory University, Atlanta, Georgia 30322, USA. jmcgowa@emory.edu

Abstract

Antimicrobial stewardship programs attempt to optimize prescribing of these drugs to benefit both current and future patients. Recent regulatory and other incentives have led to widespread adoption of such programs. Measurements of the success of these programs have focused primarily on process measures. However, evaluation of outcome measures will be needed to ensure sustainability of these efforts. Outcome efforts to date provide some evidence for improved care of individual patients, some evidence for minimizing emergence of resistance, and ample evidence for cost reduction. Attention to evaluation methods must be increased to provide convincing evidence for the continuation of such programs.

PMID: 22418627 [PubMed - indexed for MEDLINE]

Publication Types, MeSH Terms, Substances

LinkOut - more resources

Como medem

REVIEW

SPECIAL FOCUS REVIEW: ANTIMICROBIAL STEWARDSHIP

Virulence 4:2, 151–157; February 15, 2013; © 2013 Landes Bioscience

Antimicrobial stewardship

A review of prospective audit and feedback systems and an objective evaluation of outcomes

Gladys W. Chung,[1] Jia En Wu,[1] Chay Leng Yeo,[1] Douglas Chan[2] and Li Yang Hsu[3,*]

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Keywords: antimicrobial stewardship, prospective audit and feedback, antimicrobial resistance, antibiotics, cost effectiveness, quasi-experimental study design

CORE STRATEGIES

Strategy	Rationale
Prospective audits with intervention and feedback to the prescriber	Performed by infectious diseases physician or clinical pharmacist with infectious diseases trading Can assist in reducing inappropriate use of antimicrobials
Formulary restrictions	Can lead to immediate and significant reductions in use and cost of antimicrobials Role of preauthorization requirements has not been established and may shift use to other antimicrobial agent leading to increased resistance Where preauthorization is used, monitoring is necessary

STRATEGIES FOR CONSIDERATION BASED ON LOCAL PRATICE PATTERNS

Strategy	Rationale
Education	Provides foundation to influence prescribing behaviors and accept antimicrobial stewardship Education alone has marginal effect in changing behavior
Guidelines and Clinical Pathways	Develop using multidisciplinary approach and local microbiological information (e.g., resistance patterns to improve utilization); implement through education and provider feedback
Antimicrobial Order Forms	Can be an effective component of a stewardship program and assist with practice guidelines
Streamlining or De-escalating Therapy	Used on the basis of microbiology culture reports and pharmacokinetic and pharmacodynamic drug characteristics. Can result in decreased antimicrobial exposure and cost savings
Optimizing Antibiotic Dose	Based on the individual patient characteristics, causative organism, site of infection, and characteristics of the drug
Converting from Parenteral to Oral	Determined by patient condition; can decrease length of stay and costs

Dados possíveis de mensuração direta

- DDD
- DOT
- Taxas de resistência
- Custo direto
- Custo indireto e QALYs
- Mortalidade atribuída

Não serve pra nada

- Não foi isso que eu disse
- Efetivo na perspectiva de quem

Paraquedas não serve pra nada

J Antimicrob Chemother 2011; **66**: 1223–1230
doi:10.1093/jac/dkr137 Advance Access publication 2 April 2011

Journal of Antimicrobial Chemotherapy

Impact of antimicrobial stewardship in critical care: a systematic review

Reham Kaki[1], Marion Elligsen[2], Sandra Walker[2–4], Andrew Simor[1,4], Lesley Palmay[2] and Nick Daneman[1,4]*

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Received 15 December 2010; returned 23 January 2011; revised 3 March 2011; accepted 5 March 2011

Objectives: To evaluate the current state of evidence for antimicrobial stewardship interventions in the critical care unit.

Methods: We performed a systematic search of OVID MEDLINE, Embase and Cochrane electronic databases from 1996–2010. Studies were included if they involved any experimental intervention to improve antimicrobial utilization in the critical care setting.

Results: Thirty-eight studies met the inclusion criteria, of which 24 met our quality inclusion criteria. The quality of research was poor, with only 3 randomized controlled trials, 3 interrupted time series and 18 (75%) uncontrolled before-and-after studies. We identified six intervention types: studies of antibiotic restriction or pre-approval (six studies); formal infectious diseases physician consultation (five); implementation of guidelines or protocols for de-escalation (two); guidelines for antibiotic prophylaxis or treatment in intensive care (two); formal reassessment of antibiotics on a pre-specified day of therapy (three); and implementation of computer-assisted decision support (six). Stewardship interventions were associated with reductions in antimicrobial utilization (11%–38% defined daily doses/1000 patient-days), lower total antimicrobial costs (US$ 5–10/patient-day), shorter average duration of antibiotic therapy, less inappropriate use and fewer antibiotic adverse events. Stewardship interventions beyond 6 months were associated with reductions in antimicrobial resistance rates, although this differed by drug–pathogen combination. Antibiotic stewardship was not associated with increases in nosocomial infection rates, length of stay or mortality.

Conclusions: More rigorous research is needed, but available evidence suggests that antimicrobial stewardship is associated with improved antimicrobial utilization in the intensive care unit, with corresponding improvements in antimicrobial resistance and adverse events, and without compromise of short-term clinical outcomes.

Keywords: antibacterial agents, drug resistance, microbial, critical care, intensive care, infection

Journal of Antimicrobial Chemotherapy (2009) **63**, 816–825
doi:10.1093/jac/dkp004
Advance Access publication 6 February 2009

JAC

Cost-effectiveness analysis of an antimicrobial stewardship team on bloodstream infections: a probabilistic analysis

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Received 2 September 2008; returned 31 October 2008; revised 16 December 2008; accepted 31 December 2008

***Objectives*: We sought to determine the cost-effectiveness of Antimicrobial Stewardship Teams (ASTs) on the reduction of morbidity and mortality associated with nosocomial bacteraemia.**

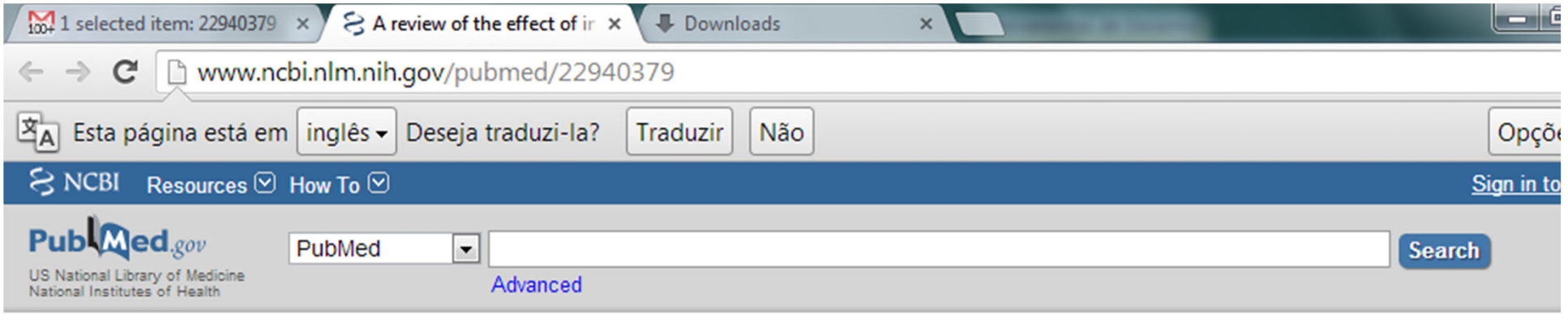
***Methods*: A decision analytic model compared costs and outcomes of bacteraemic patients receiving standard treatment with or without an AST consult. Patients with a bacteraemic event during their hospital admission were included in the model. Effectiveness was estimated as quality-adjusted life years (QALYs) over the lifetime of patients. Model variables and costs, along with their distributions, were obtained from the literature and expert opinion. Incremental cost-effectiveness ratios (ICERs) were calculated to estimate the cost per QALY gained from the hospital perspective. Uncertainty in ICERs was evaluated with probabilistic sensitivity analyses. The cost-effectiveness of clinical decision support systems was evaluated as a secondary analysis.**

***Results*: Implementing an AST for bacteraemia review cost $39737 (95% CI $27272–53017) and standard treatment cost $39563 (95% CI $27164–52797). The difference in effectiveness between the two strategies was 0.08 QALYs, and the base case ICER from the probabilistic analysis was $2367 per QALY gained [95% CI dominant (less costly, more effective) to $24379]. Results from the probabilistic sensitivity analysis demonstrated there was more than a 90% likelihood that an AST would be cost-effective at a level of $10000 per QALY.**

***Conclusions*: Maintaining an AST to improve care for bacteraemia is cost-effective from the hospital perspective. The estimate of $2367 per QALY gained for the AST intervention compares favourably with many currently funded healthcare interventions and services.**

Keywords: cost–benefit analysis, bacteraemia, bacteremia, antimicrobial stewardship programme, clinical decision support

Considerações adicionais



ELSEVIER FULL-TEXT ARTICLE

Vaccine. 2012 Oct 12;30(46):6509-14. doi: 10.1016/j.vaccine.2012.08.031. Epub 2012 Aug 29.

A review of the effect of immunization programs on antimicrobial utilization.

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Abstract

The objective of this review is to summarize and evaluate the literature pertaining to antimicrobial utilization with respect to implementation of immunization programs or within clinical studies assessing vaccine effectiveness. A literature search was performed using the search terms vaccine; immunization; antimicrobial; antibiotic; influenza; pneumococcal; haemophilus; meningococcal in MEDLINE (1948-May 2012), EMBASE (1980-May 2012), International Pharmaceutical Abstracts (1970-May 2012), Google, and Google Scholar. Identified clinical or epidemiological studies were included if antimicrobial utilization was listed as a reported outcome. Seven articles (three randomized controlled trials and four epidemiological studies) were identified and included in the review. These studies reported outcomes associated with pneumococcal and influenza immunization programs. All studies reported decreased antibiotic use associated with initiation of immunization programs or increased uptake of available vaccines. Large-scale epidemiological studies confirm population-wide decreases observed from short-term randomized controlled trials. Antibiotic reductions ranged from 5 to 10% in randomized controlled trials to relative reductions of 64% in epidemiological studies. These findings suggest that immunization programs may reduce antibiotic utilization. As such, vaccination status queries and updates should become part of routine care for both hospitalized and non-hospitalized patients. Immunization programs should be considered as part of institution-wide antimicrobial stewardship programs.

PMID: 22940379 [PubMed - indexed for MEDLINE]

J Antimicrob Chemother 2012; **67**: 12–16
doi:10.1093/jac/dkr425 Advance Access publication 6 October 2011

Journal of Antimicrobial Chemotherapy

Ethical dilemmas in antibiotic treatment

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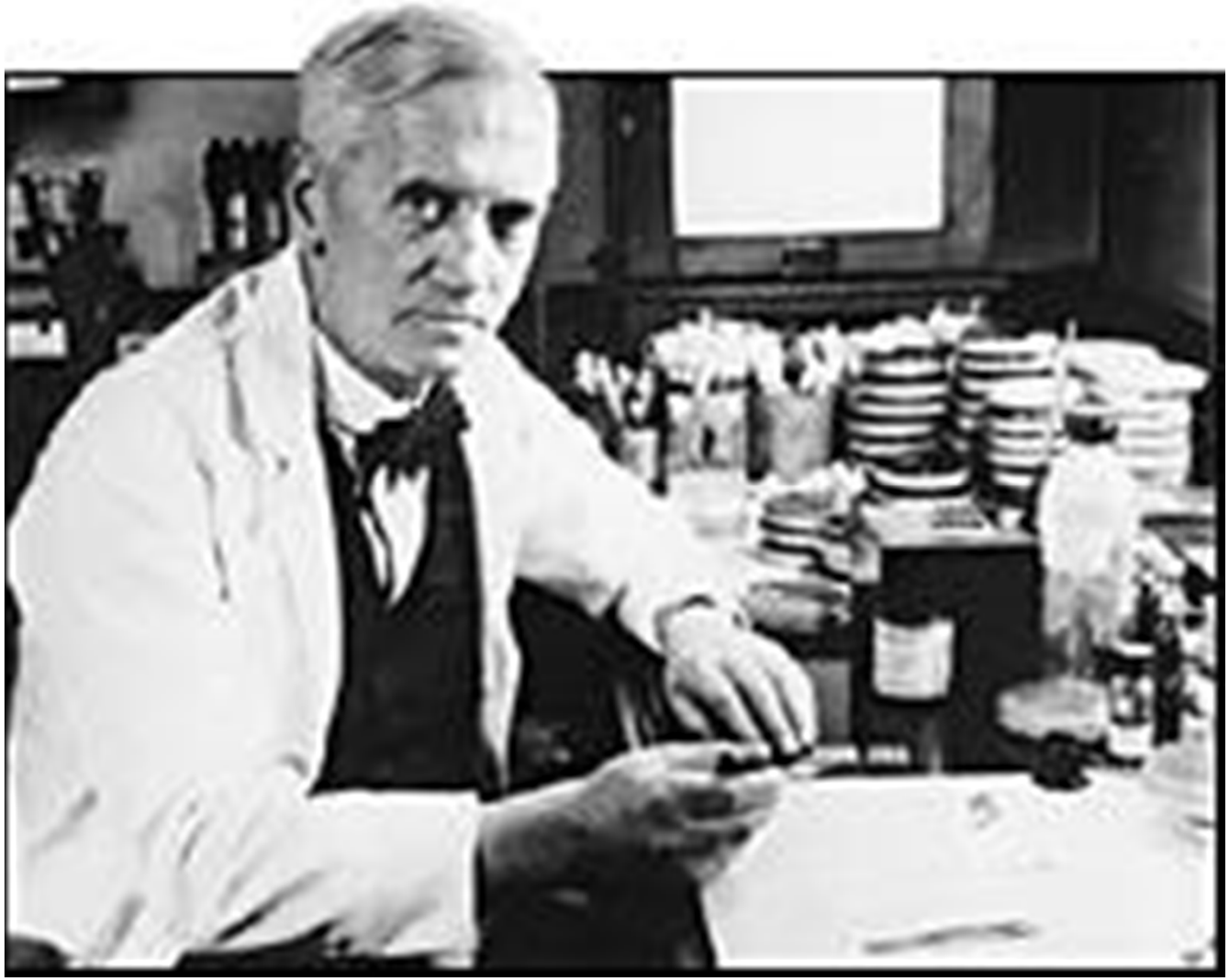
*Corresponding author. Department of Medicine E, Beilinson Hospital, Petah-Tiqva 49100, Israel. Tel: +972-3-9376501; Fax: +972-3-9376512; E-mail: leibovic@post.tau.ac.il

Patients with moderate to severe infections are given less than maximum empirical antibiotic treatment in order to reduce the rise in resistance. This practice involves two ethical dilemmas: whether the danger to a present patient should be increased (even if by a small degree) to benefit future, unidentified patients; and whether this should be done without the consent of the patient, disregarding the patient's autonomy. We argue that future patients have a right to come to no harm. Future patients being unidentified, practitioners of medicine have a duty to protect their rights and weigh them against the rights of the present patient. A decision on the collective (guidelines, decision support systems) is a convenient way to do that. Using a temporal discount rate to show that the life of present patients has pre-eminence, to some degree, over future patients does not solve the immediacy of the plight facing a present, identified patient with a very severe infection. We think there are good grounds to take into less account considerations of future resistance for such a patient, or in a formal analysis, to make the ratio of benefits to the present versus future patients dependent on the severity of disease of the present patient. None of these solve the problem of patients' autonomy. We see no other way but to argue that the right of future patients to come to less harm outweighs the right of the present patient to share in decisions on antibiotic treatment.

Keywords: ethics, antibiotic therapy, rights of unidentified people, professional duties



USO RACIONAL DE ANTIMICROBIANOS

"As lições retiradas do tempo de guerra devem ser transferidas aos médicos civis. Essencialmente nós devemos assegurar que a condição clínica tenha resposta ao antimicrobiano, que material seja coletado para cultura e teste microbiológico e que o organismo seja susceptível, que a dose seja adequada e que o antibiótico atinja o sítio da infecção"

Alexander Fleming

Penicillin:it's practical pplication.London:Butterworth, 1946:iii-vi

Nossa responsabilidade é com o paciente

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