Declinare la antimicrobial stewardship in un ospedale multidisciplinare: prevenzione e trattamento delle infezioni del sito chirurgico

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REGIONE CAMPANIA

Direzione Generale per la tutela della salute ed il coordinamento del Sistema Sanitario Regionale

Ce.Rif.A.R.C.

CORSO DI FORMAZIONE AIDS PER DIRIGENTI MEDICI - XVI ANNUALITA' 2018

Programma

18 Ottobre – 20 Dicembre 2018

AUDITORIUM REGIONE CAMPANIA- CENTRO DIREZIONALE ISOLA C/3

Disclosures

- Consulente per ABBVIE, MSD, Correvio/Cardiome
- Grant da Gilead Sciences (Fellowship program)

AMR: an alarming situation on a global scale

05/21/16 Issue

Some people describe Darwinian evolution as "only a theory". Try explaining that to the friends and relatives of the 700,000 people killed each year by drug-resistant infections. Resistance to antimicrobial medicines, such as antibiotics and antimalarials, is caused by the survival of the fittest.

Unfortunately, fit microbes mean unfit human beings

The grim prospect

The evolution of pathogens is making many medical problems worse.

Time to take drug resistance seriously

Le resistenze causano nuove infezioni nosocomiali e complicanze

- In Europa ogni anno si presentano **400.000 infezioni** antibiotico-resistenti che generano circa **25.000 decessi/anno** e sono responsabili di un significativo assorbimento di risorse (sanitarie e non) che ammontano a **circa € 1,5 miliardi/anno** [3]

World Health Organization

LE INFEZIONI RESISTENTI AGLI ANTIBIOTICI COMPORTANO % DI MORTI PIÙ ELEVATE [4]

WHO Antimicrobial Resistance Global Report on Surveillance, 2014		Morti (%)		
	Outcome (numero di studi inclusi)	Resistenti	Non resistenti	RR (95% CI)
Escherichia coli resistente a:				
3rd gen. cephalosporins	Mortalità attribuibile al batterio (n = 4)	23,6	12,6	2,02 (1,41 to 2,90)
Fluoroquinolones	Mortalità attribuibile al batterio (n = 1)	0	0	
Klebsiella pneumoniae resistente a:				
3rd gen. cephalosporins	Mortalità attribuibile al batterio (n = 4)	20	10,1	1,93 (1,13 to 3,31)
Carbapenems	Mortalità attribuibile al batterio (n = 1)	27	13,6	1,98 (0,61 to 6,43)
Staphylococcus aureus resistente a:				
Methicillin (MRSA)	Mortalità attribuibile al batterio (n = 46)	26,3	16,9	1,64 (1,43 to 1,87)

ICA = Infezioni Correlate all'Assistenza

WHO. Antimicrobial Resistance. Global Report on Surveillance. 2014

IL PRESENTE

Estimates of Burden of Antibacterial Resistance

European Union
population 500m

25,000 deaths per year

2.5m extra hospital days

Overall societal costs
(€ 900 million, hosp. days)
Approx. €1.5 billion per year

Source: ECDC 2007

Thailand
population 70m

>38,000 deaths

>3.2m hospital days

Overall societal costs
US$ 84.6–202.8 mill. direct
>US$1.3 billion indirect

Source: Pumart et al 2012

United States
population 300m

>23,000 deaths

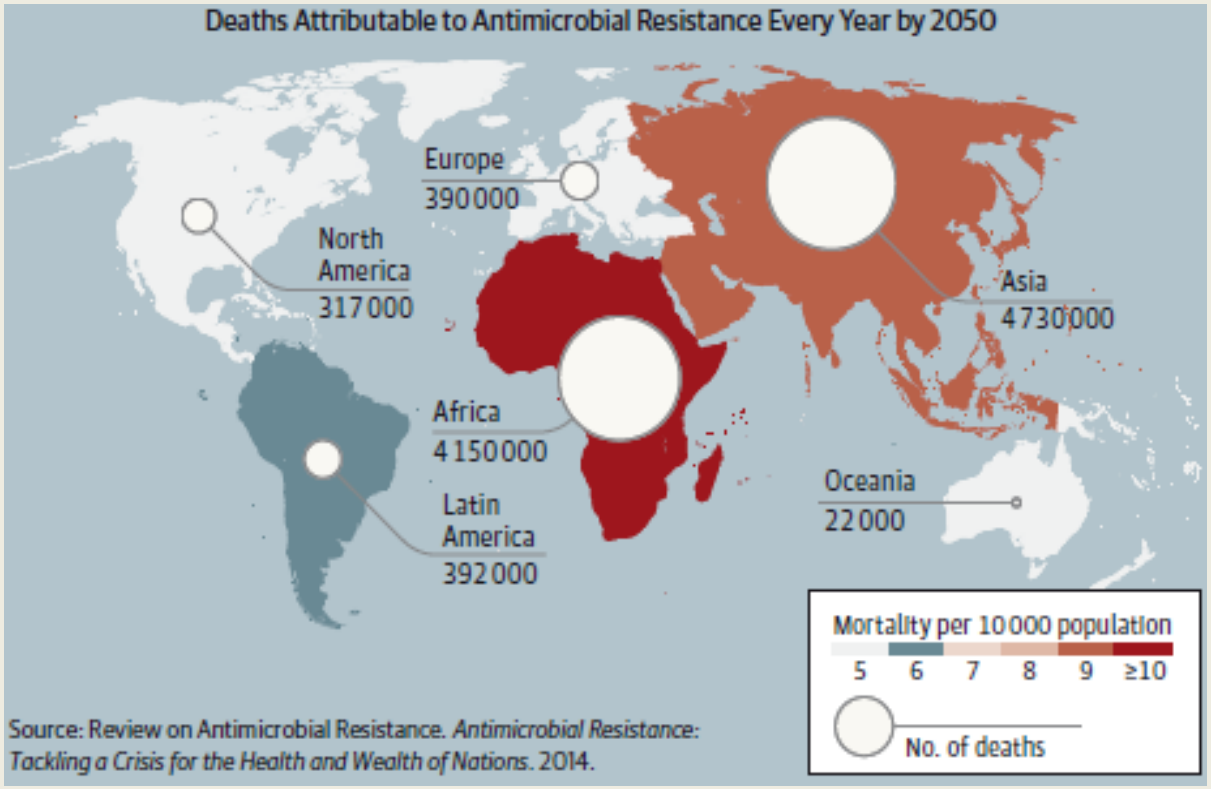
>2.0m illnesses

Overall societal costs
Up to $20 billion direct
Up to $35 billion indirect

Source: US CDC 2013

Global information is insufficient to show complete disease burden impact and costs

IL FUTURO



Si stima che dalle 500 alle 700 mila persone all'anno muoiono a causa dell'antibiotico-resistenza Entro il 2050 tale numero potrebbe arrivare a 10.000.000. Purtroppo, *drug discovery efforts are not keeping pace:* c'è un forte gap tra i MDRO (multidrug-resistant organism) e l'armamentario di nuovi farmaci atti a contrastarli.

Intensive Care Med (2017) 43:1464–1475
DOI 10.1007/s00134-017-4878-x

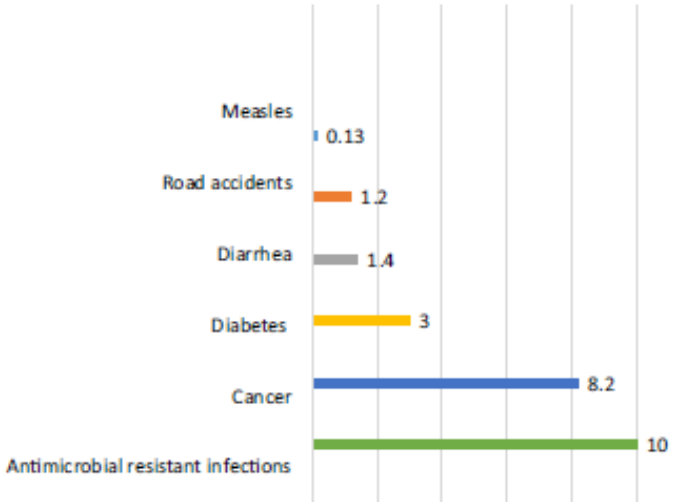
REVIEW

Antimicrobial resistance in the next 30 years, humankind, bugs and drugs: a visionary approach

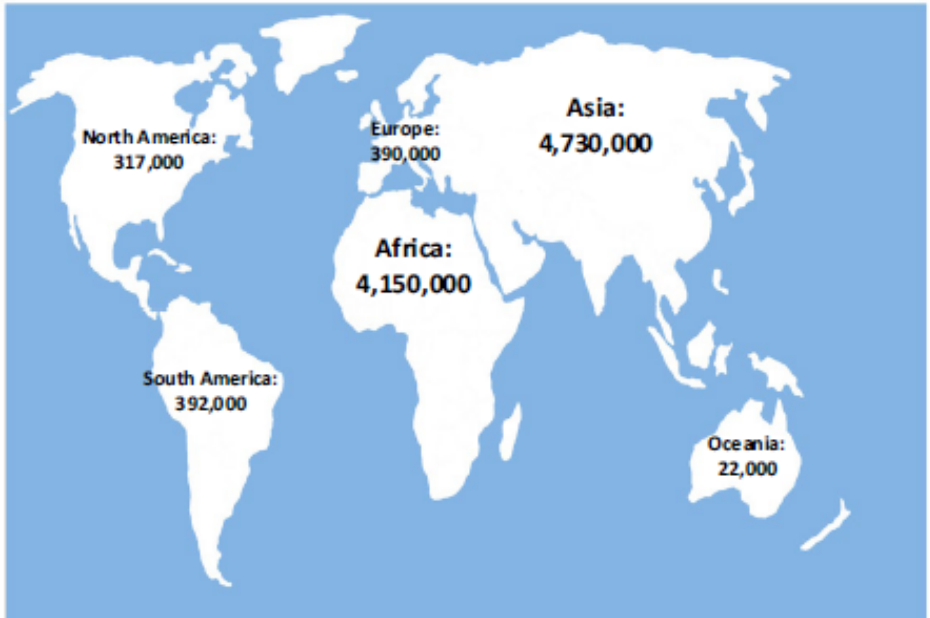
Matteo Bassetti[1*], Garyphallia Poulakou[2], Etienne Ruppe[3], Emilio Bouza[4,5,6,7], Sebastian J. Van Hal[8] and Adrian Brink[9,10]

The impact of antimicrobial resistance in 2050

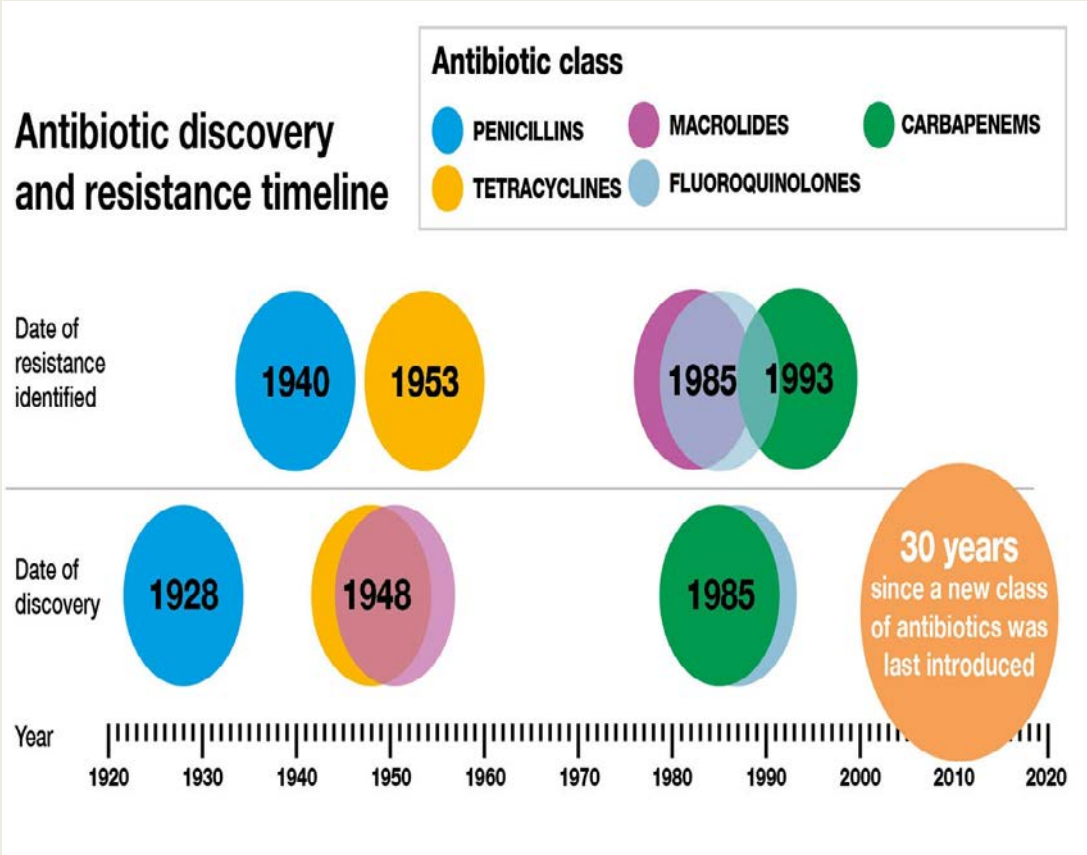
DEATHS PER ANNUM FOR ANTIMICROBIAL RESISTANT INFECTIONS AND OTHER CAUSES BY 2050 IN MILLIONS. [1] AND HTTP:// AMR-REVIEW.ORG/



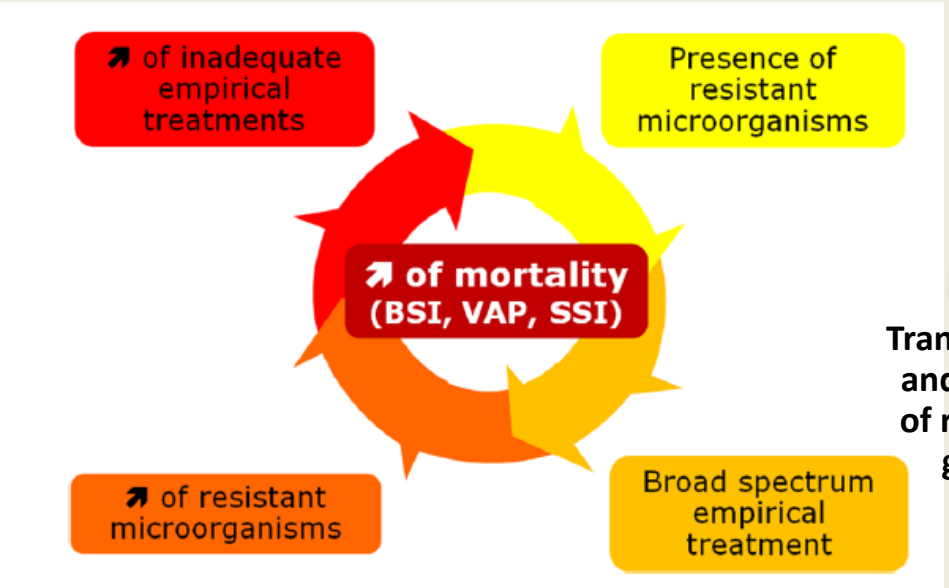
Death attributable to antimicrobial resistance every year by 2050 in different countries [1]

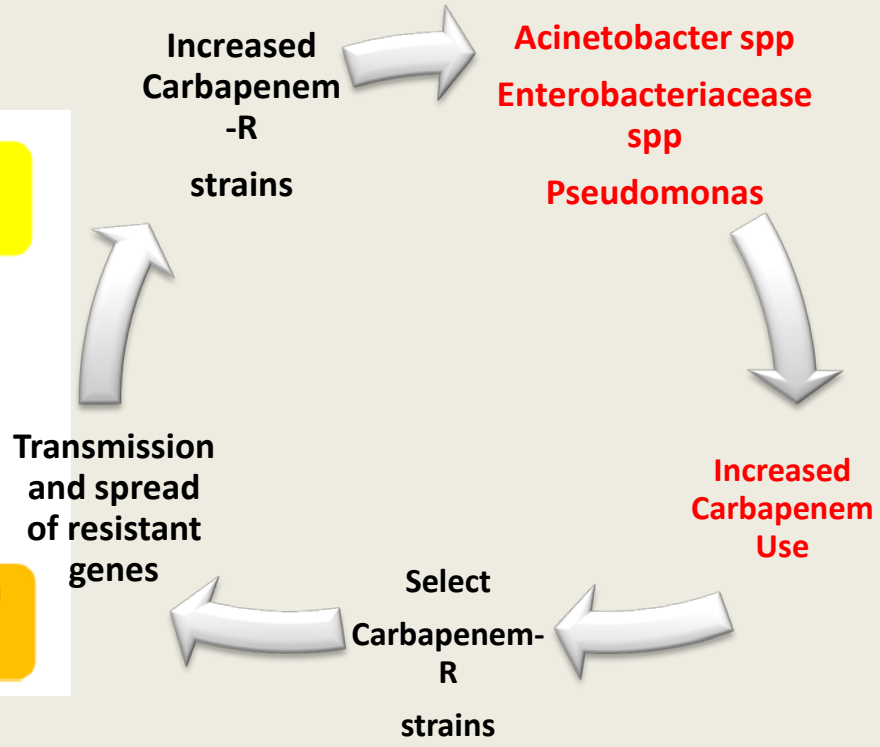


Di chi è la "colpa"?



The vicious circle of AMR development





Bassetti M et al. Intensive Care Med. 2015;41(5):776-95.

A systemati
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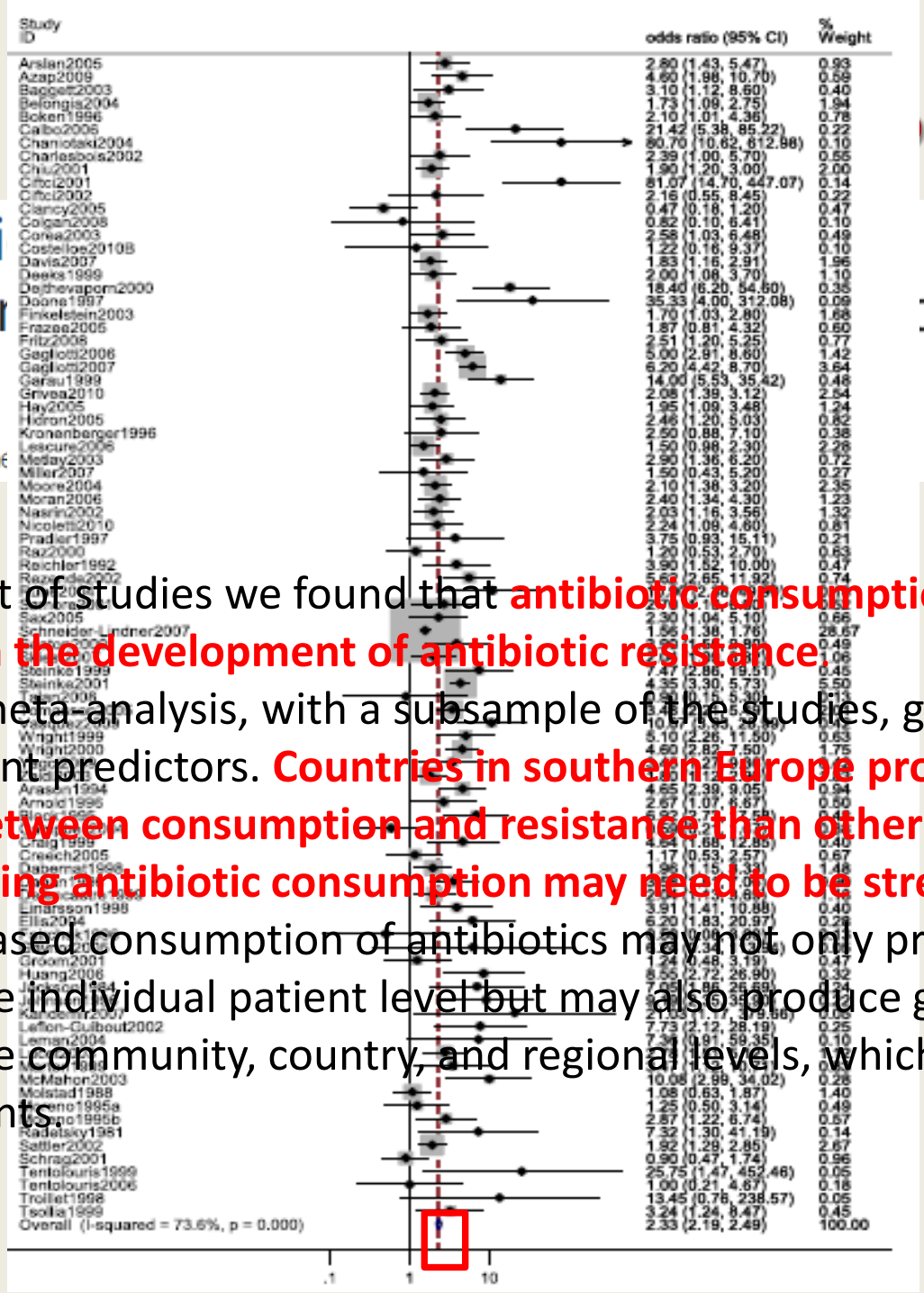
resistance

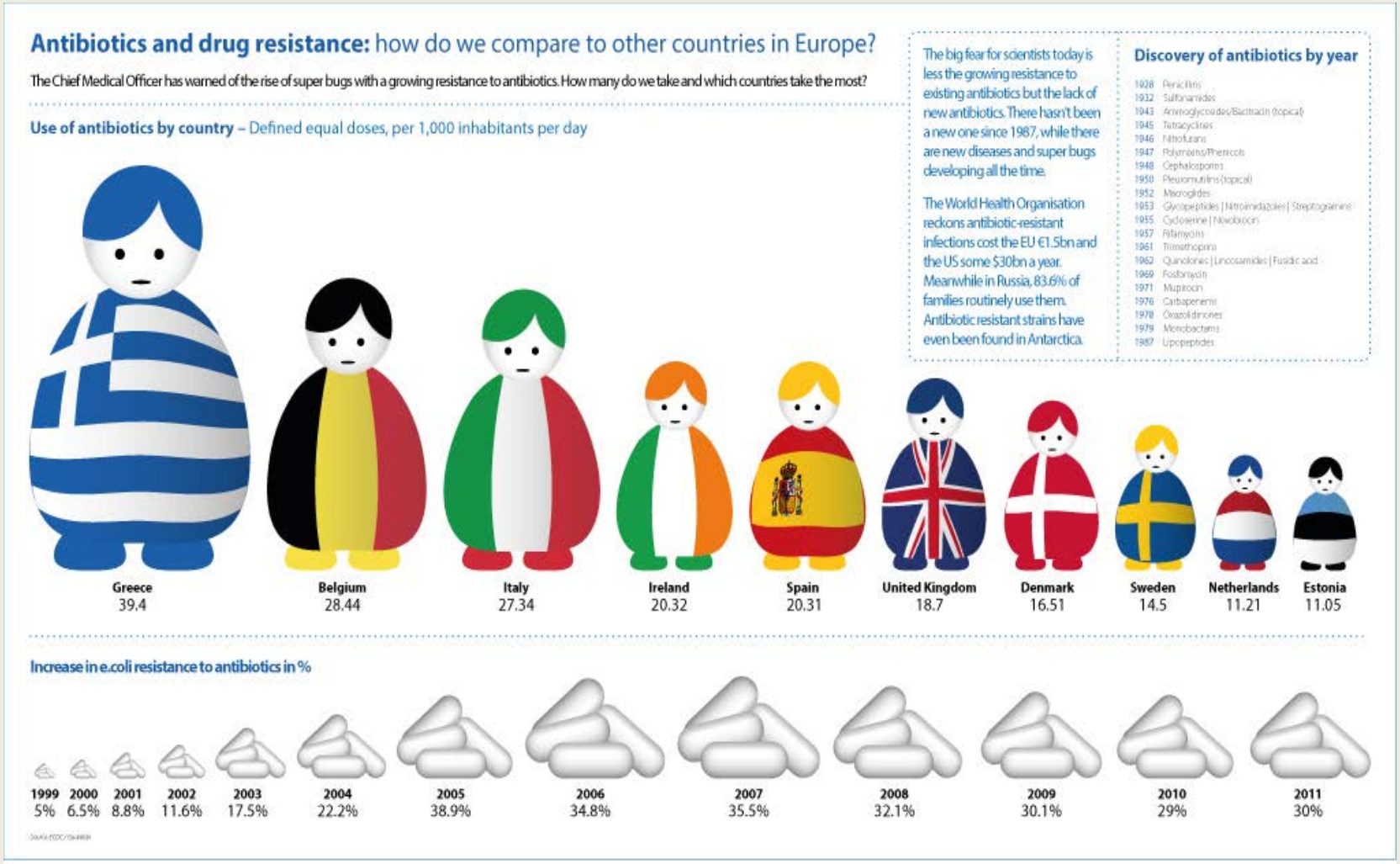
Brian G Bell[1*], Francois Sche

BMC Infectious Diseases

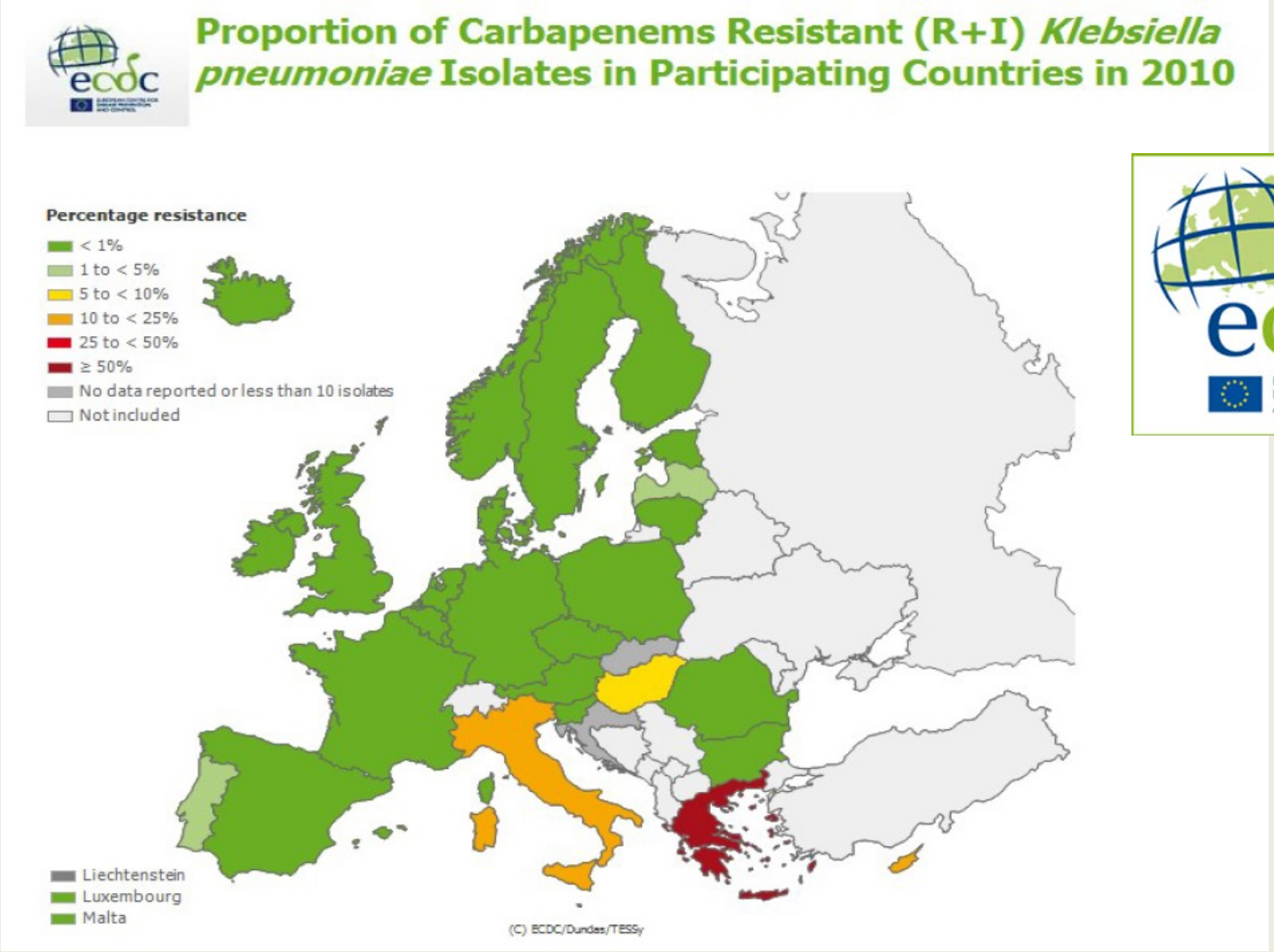


Using a large set of studies we found that **antibiotic consumption is associated with the development of antibiotic resistance**. A subsequent meta-analysis, with a subsample of the studies, generated several significant predictors. **Countries in southern Europe produced a stronger link between consumption and resistance than other regions so efforts at reducing antibiotic consumption may need to be strengthened in this area**. Increased consumption of antibiotics may not only produce greater resistance at the individual patient level but may also produce greater resistance at the community, country, and regional levels, which can harm individual patients.

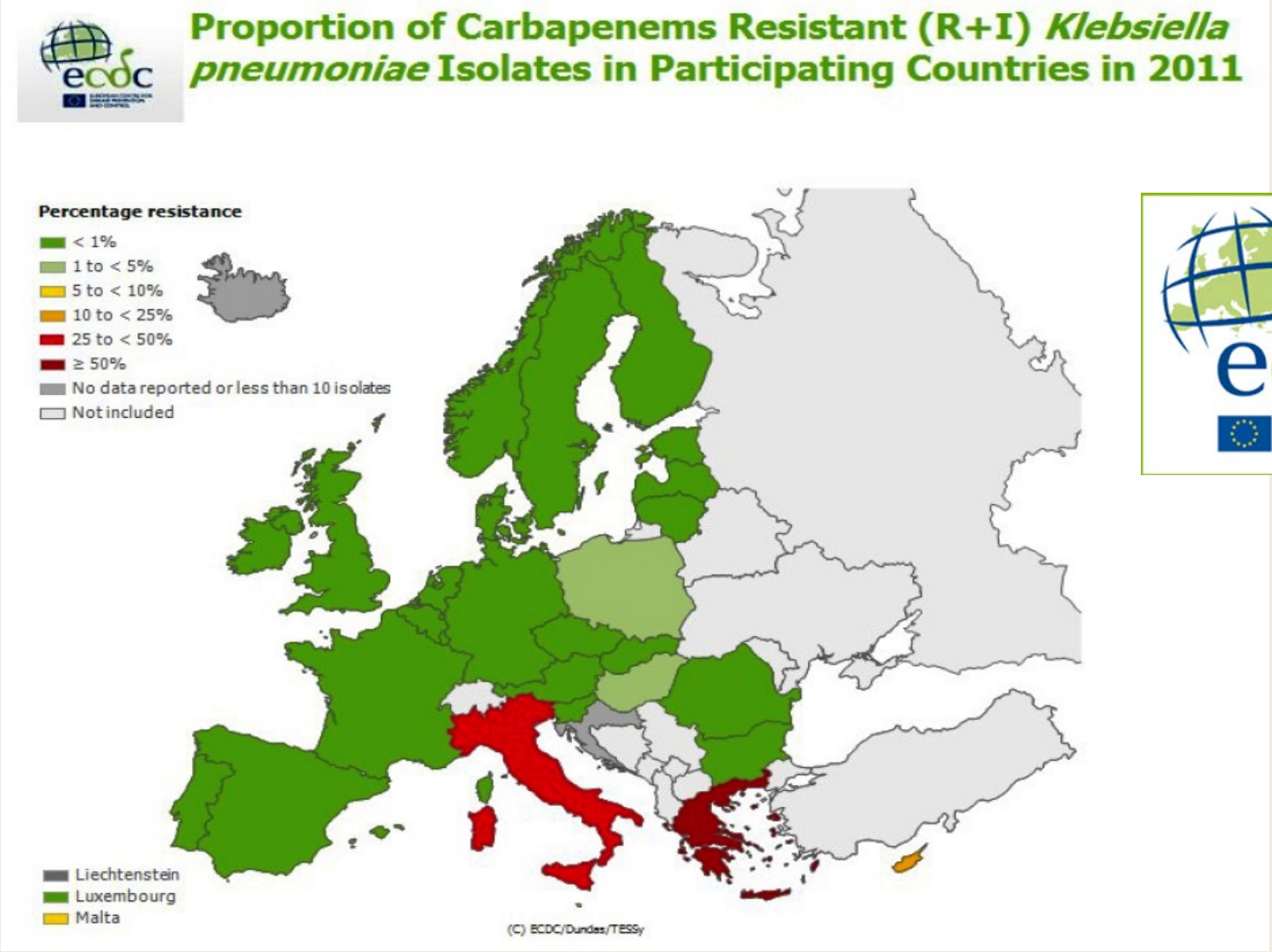
EUROPEAN SURVEILLANCE OF ANTIMICROBIAL CONSUMPTION NETWORK (ESAC-NET)



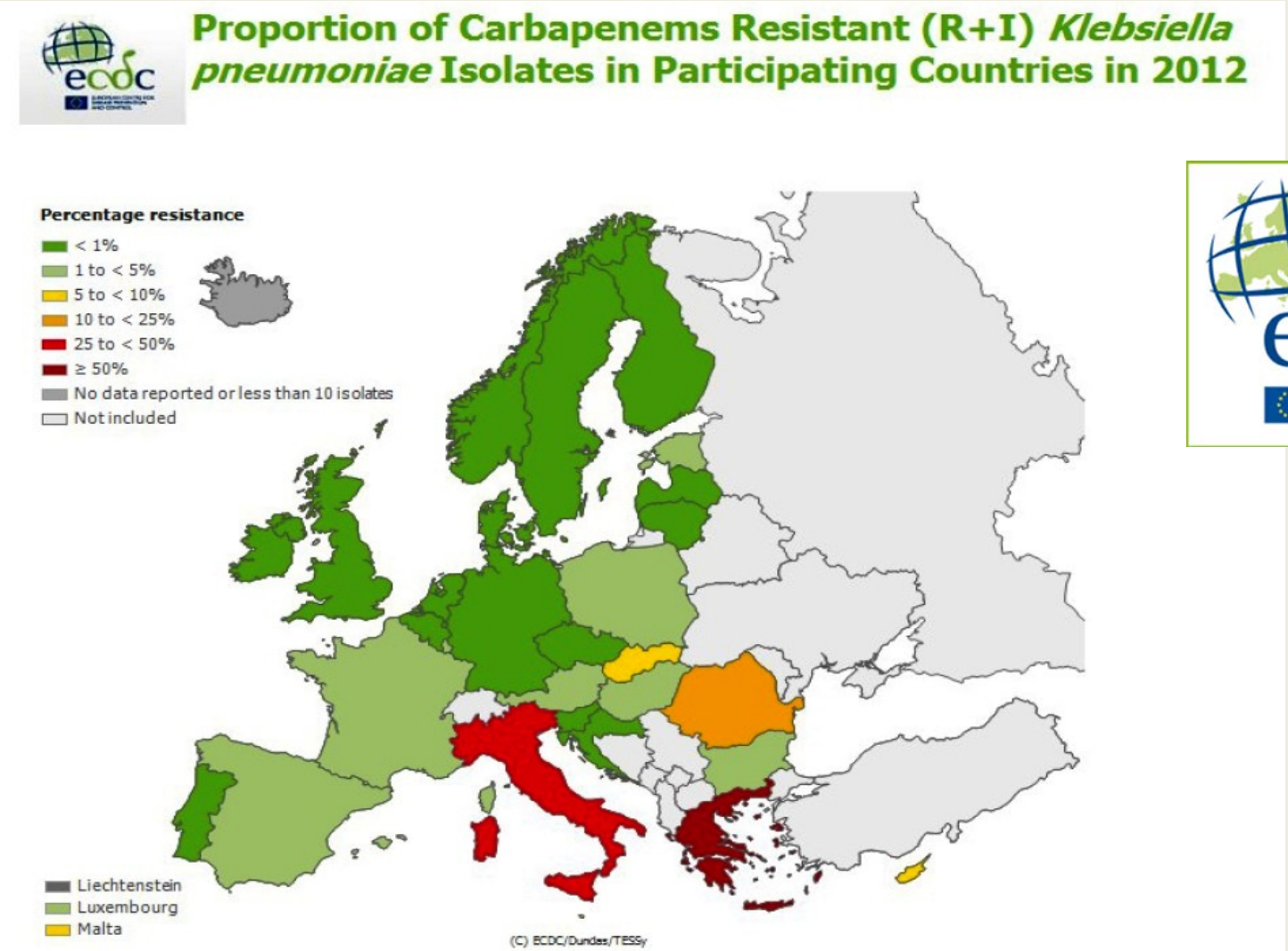
CR-Kp: LA SITUAZIONE EUROPEA (E ITALIANA) - 2010



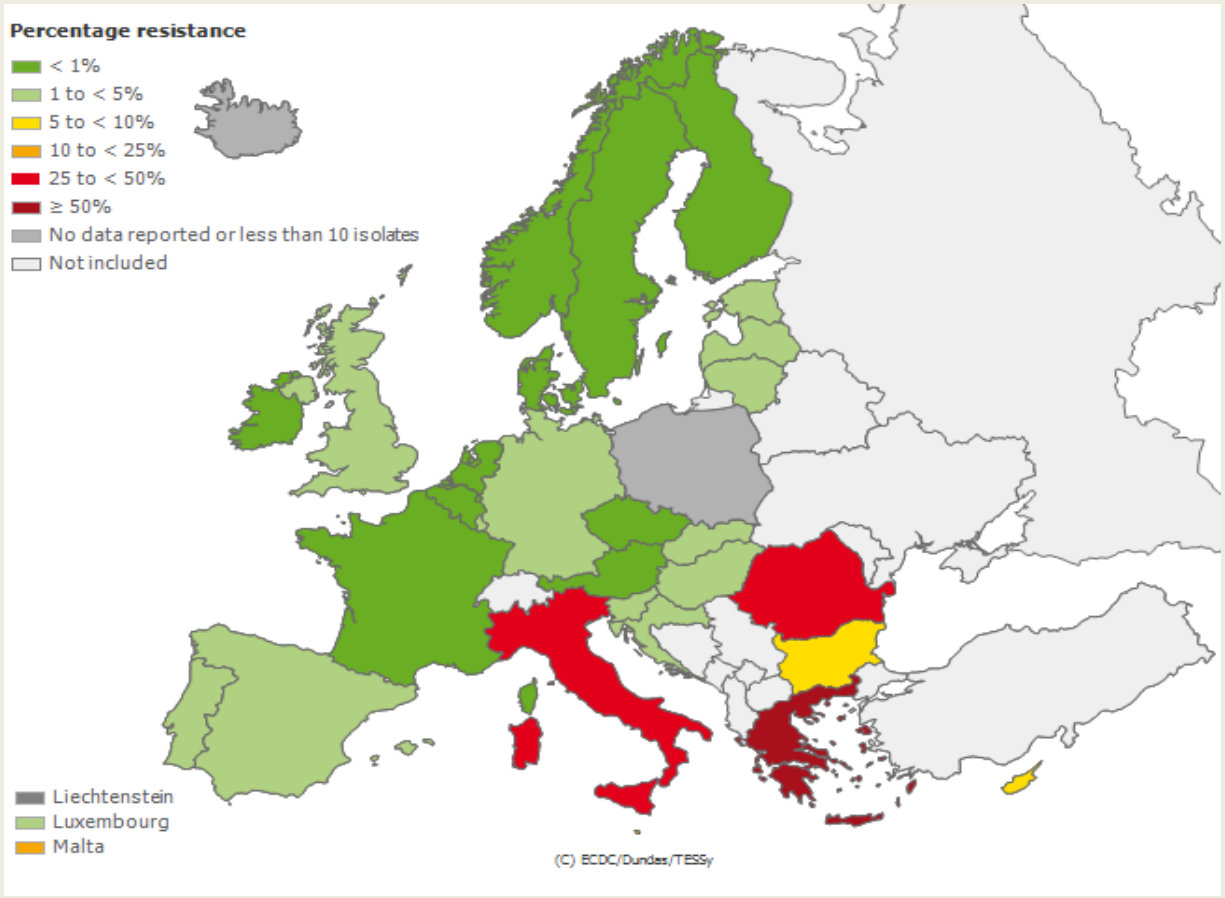
CR-Kp: LA SITUAZIONE EUROPEA (E ITALIANA) - 2011



CR-Kp: LA SITUAZIONE EUROPEA (E ITALIANA) - 2012



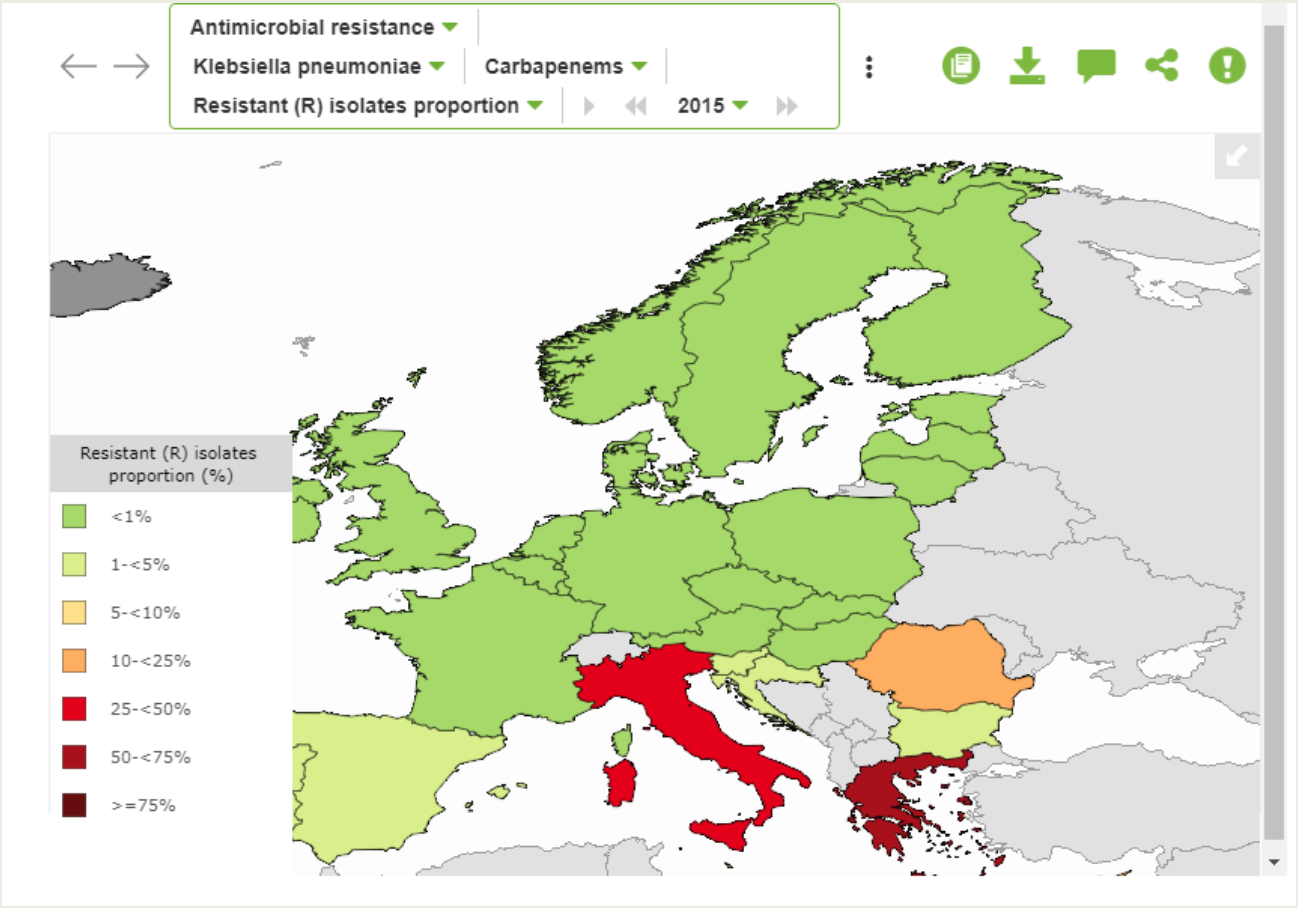
CR-Kp: LA SITUAZIONE EUROPEA (E ITALIANA) - 2014



ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

"Carbapenem-resistant K. pneumoniae is becoming increasingly common in Europe…None of the countries has a significant decreasing trend."

CR-Kp: LA SITUAZIONE EUROPEA (E ITALIANA) - 2015



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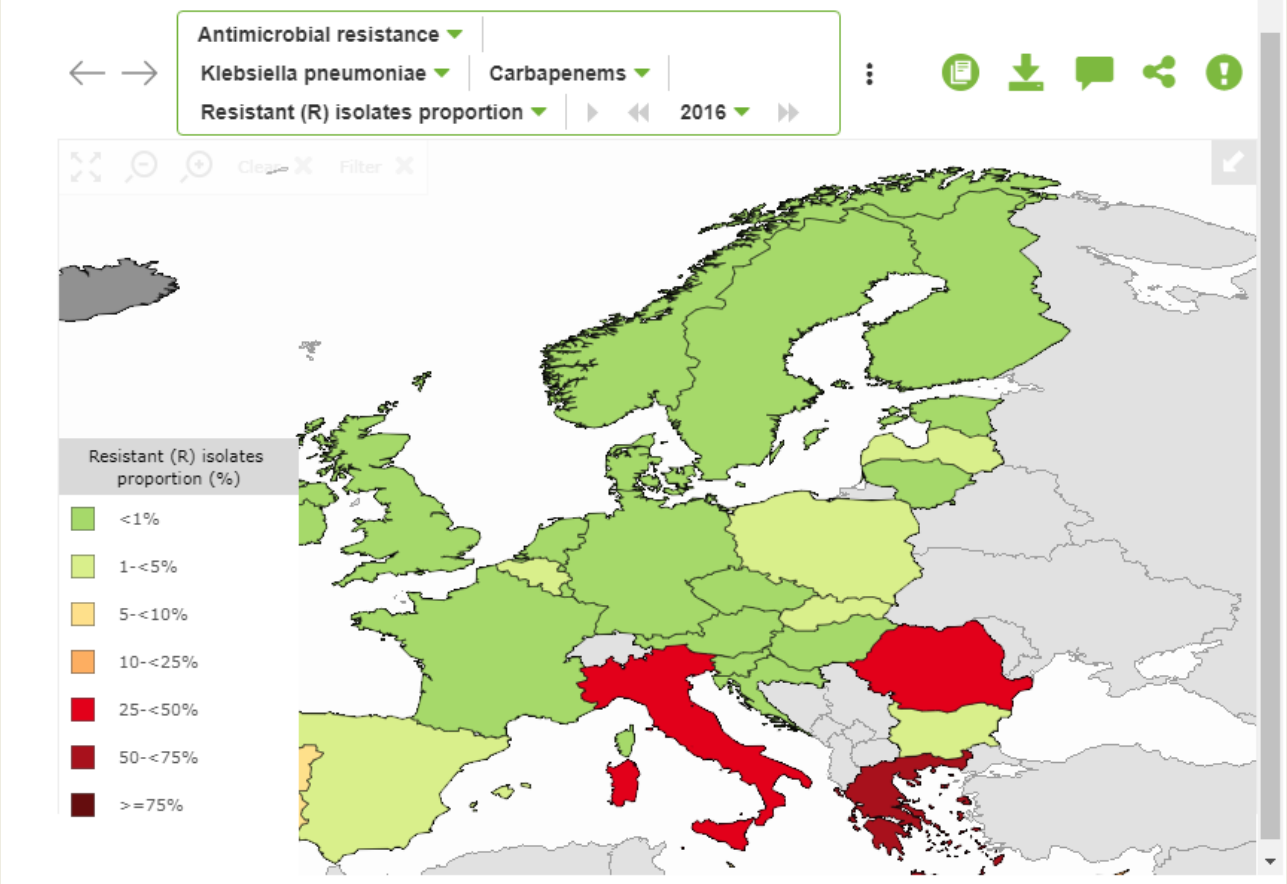
CR-Kp: LA SITUAZIONE EUROPEA (E ITALIANA) - 2016



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Clinical Microbiology and Infection 23 (2017) 793–798

Contents lists available at ScienceDirect

Clinical Microbiology and Infection

journal homepage: www.clinicalmicrobiologyandinfection.com

Review

What is antimicrobial stewardship?

O.J. Dyar [1,*], B. Huttner [2], J. Schouten [3], C. Pulcini [4], on behalf of ESGAP (ESCMID Study Group for Antimicrobial stewardshiP)

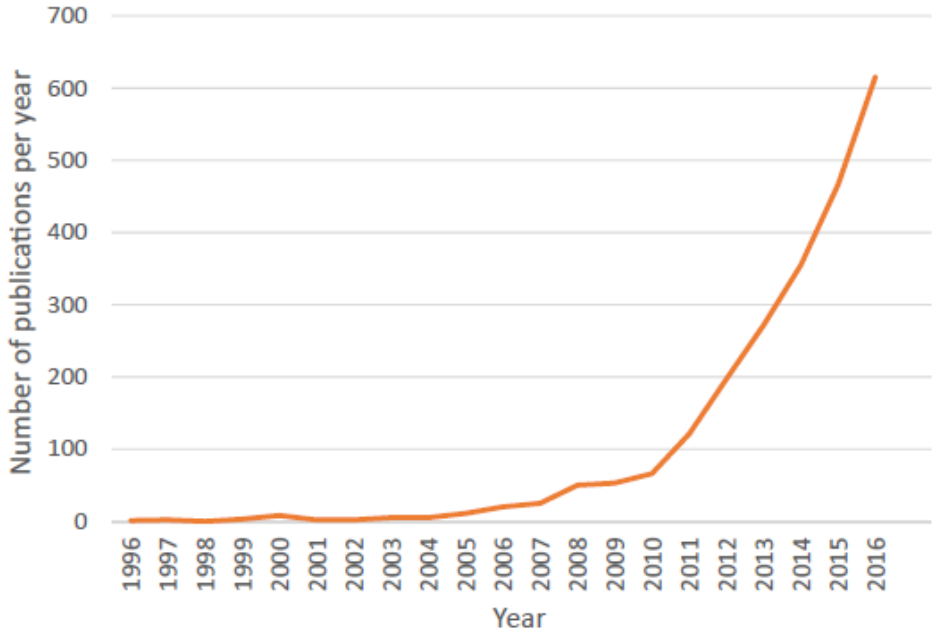

Fig. 1. Pubmed citations on antimicrobial or antibiotic stewardship over the past 20 years.

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What is antimicrobial stewardship?

Antimicrobial stewardship has been conceptualized in many ways, including as a set of coordinated interventions, as a programme, as a philosophy, and as an ethic. The origin of the word 'stewardship' is grounded in daily actions that are often multifaceted: the steward of a large household carefully and responsibly manages the household. As antimicrobial stewards, we need to carefully and responsibly manage antimicrobials. We suggest that it is best to view the collective daily actions within antimicrobial stewardship as a strategy. Strategy comes from the Greek *strategos* meaning a general, but coherent, set of manoeuvres carried out to overcome an enemy [21]. A key word here is 'general', rather than specific. Specific sets of manoeuvres (i.e. types of intervention) are within the local jurisdiction of those who translate strategy into operations. Furthermore, if the actions are not coherent, then they risk being in conflict with one another.

We suggest that antimicrobial stewardship can be defined as:

> A coherent set of actions which promote using antimicrobials responsibly.

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Table 2
How we can be good antimicrobial stewards

Actor	What it means to be good antimicrobial stewards	Example actions
Prescriber	I use antimicrobials responsibly by	• Making accurate diagnoses • Following local antimicrobial guidelines • Regularly reviewing the need for therapy
Nurse	I help ensure antimicrobials are used responsibly by	• Taking cultures at appropriate times
Patient	I use antimicrobials responsibly by	• Ensuring patients understand how to take antimicrobials on discharge • Taking antimicrobial courses as recommended by the prescriber • Not storing or using leftover antimicrobials
Antimicrobial stewardship team	We help others in our institution use antimicrobials responsibly by	• Developing guidelines for antimicrobial use • Supporting audit and feedback for prescribers • Educating prescribers
Hospital governance	Our institution uses antimicrobials responsibly by	• Ensuring sufficient sustainable and dedicated funding for antimicrobial stewardship teams • Monitoring antimicrobial use and resistance • Investing in a Clinical Decision Support System • Enabling formulary restrictions
Producer/farmer	I use antimicrobials responsibly by	• Diagnosing selectivity • Not using antimicrobials as growth promoters
Pharmaceutical company	Our company ensures antimicrobials are used responsibly by	• Limiting advertising of antimicrobials, especially broad spectrum • Helping ensure there is a continuous supply of antimicrobials
National policy maker	Our country uses antimicrobials by	• Prioritizing and funding antimicrobial stewardship activities • Supporting the use of quality metrics and pay for performance

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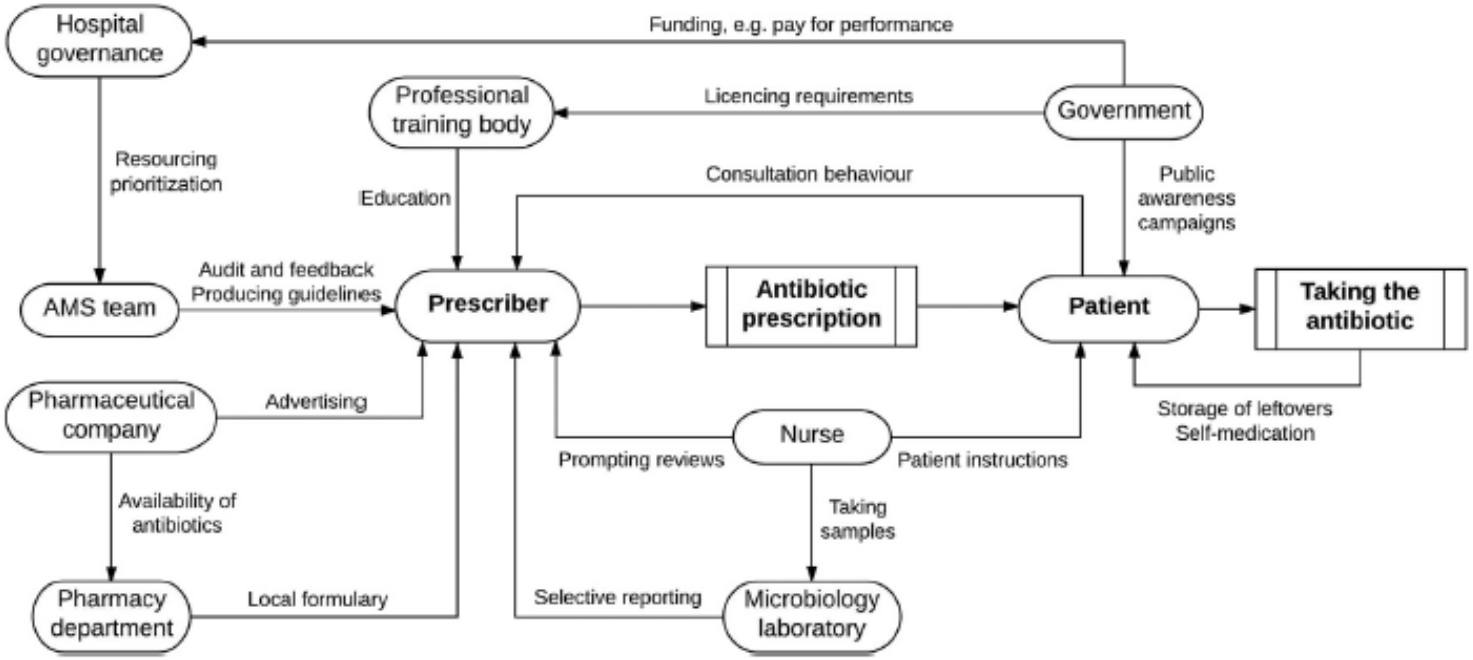


Fig. 2. Examples of actors and actions within antimicrobial stewardship. AMS, Antimicrobial stewardship.

ANTIMICROBIAL STEWARDSHIP: DEFINIZIONE

The Search for Good Antimicrobial Stewardship

DALE N. GERDING, MD

JOURNAL ON QUALITY IMPROVEMENT

"Treat infected patients at the dose and the duration likely to minimize the risk of resistance with low risk of failure and toxicity at a reasonable cost"

SYMPOSIUM ON ANTIMICROBIAL THERAPY

Antimicrobial Stewardship

SHIRA DORON, MD, AND LISA E. DAVIDSON, MD

Mayo Clin Proc. 2011;86(11):1113-1123

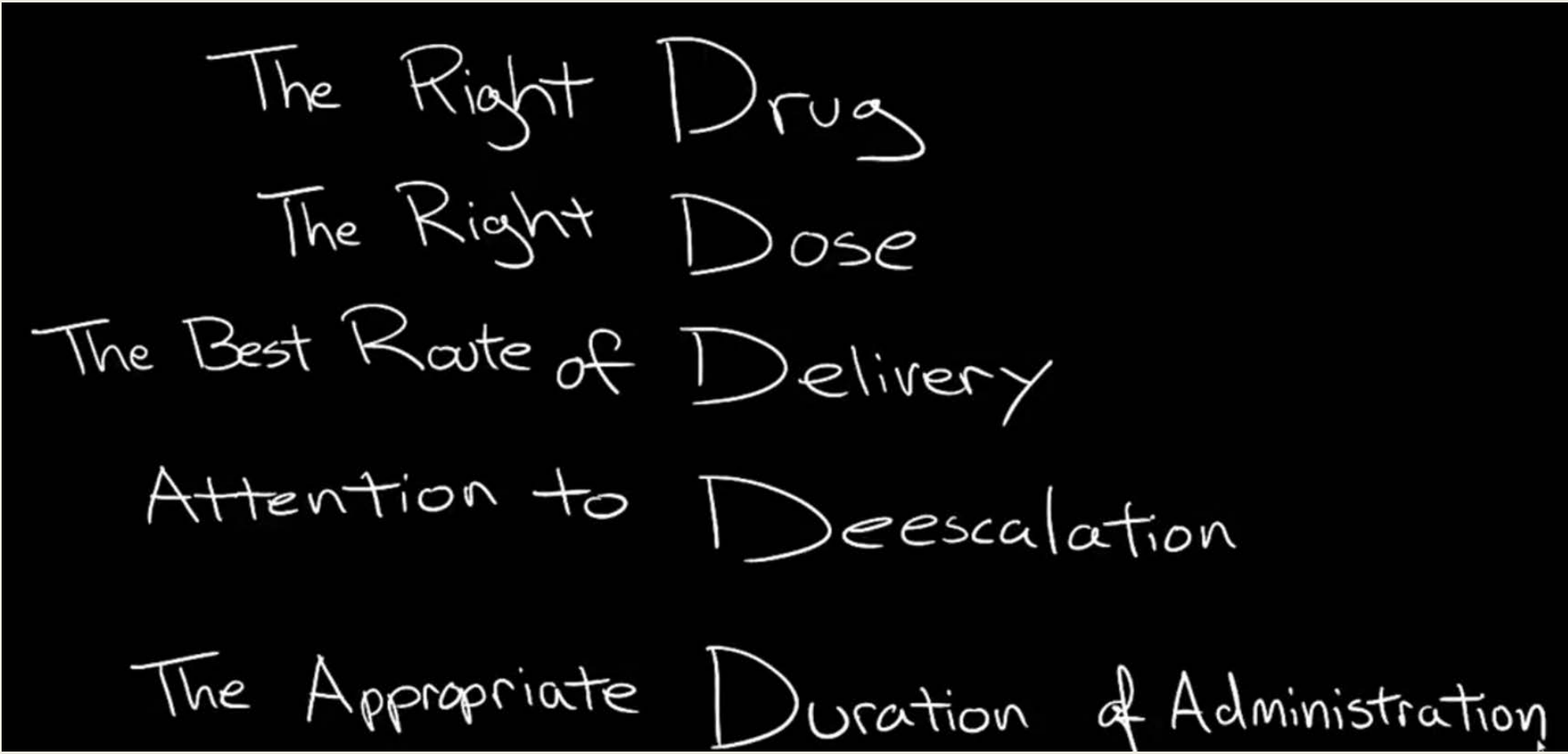
The goal of antimicrobial stewardship is **3-fold**.

The first goal is to work with health care practitioners to help each patient receive the most appropriate antimicrobial with the correct dose and duration.

The second goal is to prevent antimicrobial overuse, misuse, and abuse.

The third goal is to minimize the development of resistance.

RICAPITOLANDO: LE 5 D DELL'ASP



LINEE GUIDA IDSA

Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America

Barlam TF et al.

Clinical Infectious Diseases Advance Access published April 13, 2016

Clinical Infectious Diseases

IDSA FEATURES

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

- **Preauthorization and/or prospective audit and feedback**
- **Education and local GLs**
- **Target specific infectious diseases syndromes**
- **Target specific microrganisms (CDI)**
- **Application of PK/PD principles**
- **Allergy assessment**
- **De-escalation, switch to oral therapy, reduce duration of antibiotic therapy**
- **Stratified/selective/cascade antibiogram**
- **Rapid diagnostic testing**
- **Special settings (neutropenic-immunocompromised hosts, nursing homes, neonatal units)**
- **Treatment restriction**

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Preauthorization and/or prospective audit and feedback

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IDSA FEATURES

Preauthorization	
Advantages	Disadvantages
• Reduces initiation of unnecessary/ inappropriate antibiotics • Optimizes empiric choices and influences downstream use • Prompts review of clinical data/ prior cultures at the time of initiation of therapy • Decreases antibiotic costs, including those due to high-cos agents • Provides mechanism for rapid response to antibiotic shortages • Direct control over antibiotic use	• Impacts use of restricted agents only • Addresses empiric use to a much greater degree than downstream antibiotic agents and select for different antibiotic-resist patterns

Prospective Audit and Feedback	
Advantages	Disadvantages
• Can increase visibility of antimicrobial stewardship program • Can address de-escalation of antibiotics and duration of therapy	• Compliance voluntary • Typically labor-intensive • Success depends on delivery ethod of feedback to prescribers rescribers may be reluctant to hange therapy if patient is doing ell lentification of interventions may quire information technology upport and/or purchase of omputerized surveillance ystems lay take longer to achieve reductions in targeted antibiotic use

Preauthorization is a strategy to improve antibiotic use by requiring clinicians to get approval for certain antibiotics before they are prescribed. Prospective audit and feedback (PAF) is an intervention that engages the provider after an antibiotic is prescribed. Each type is associated with unique advantages and disadvantages (Table 1).

Front-end or back-end approach

Preauthorization and/or prospective audit and feedback

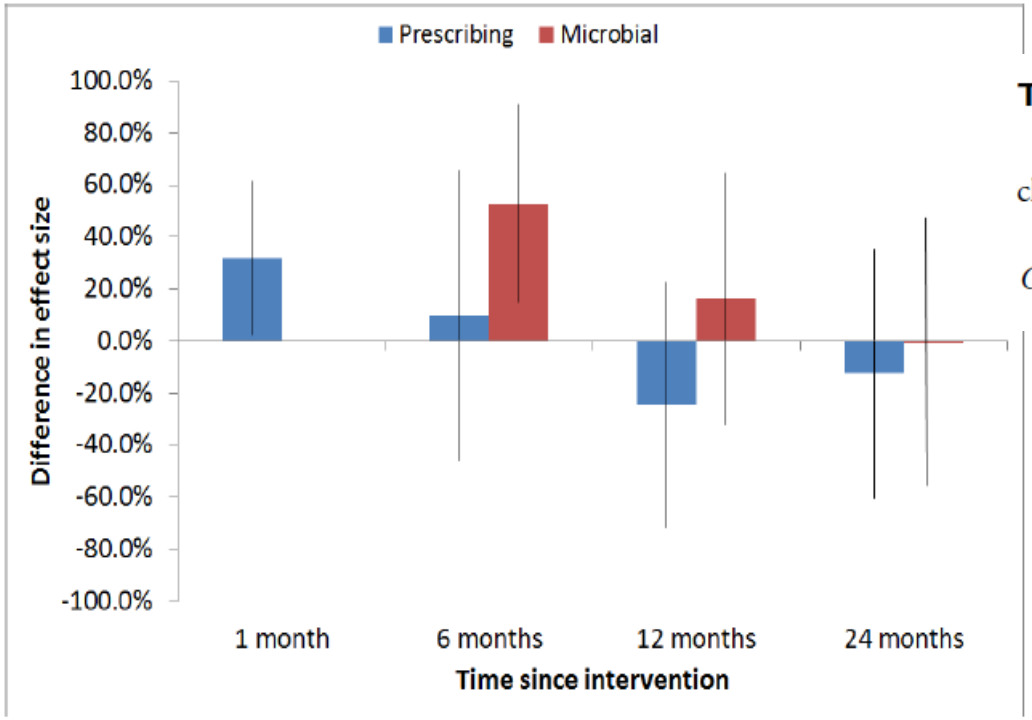
Interventions to improve antibiotic prescribing practices for hospital inpatients (Review)

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

Cochrane Library
Cochrane Database of Systematic Reviews

Cochrane Database of Systematic Reviews 2013, Issue 4. Art. No.: CD003543.
DOI: 10.1002/14651858.CD003543.pub3.

Figure 3. Meta-regression of the difference in effect size between restrictive and persuasive interventions at 1, 6, 12 and 24 months after the intervention. The difference is Restrictive minus Persuasive so positive values for the difference indicate greater effect size for Restrictive interventions and negative values indicate greater effect size for Persuasive interventions. The bars show 95% CI for the mean difference



Types of outcome measures

- Antibiotic prescribing process measures(decision to treat, choice of drug, dose, route or duration of treatment);
- Microbial outcome measure (colonization or infection with *Clostridium difficile* or antibiotic-resistant bacteria).

Dalla teoria alla pratica

Prevenzione e trattamento delle infezioni del sito chirurgico!

DALLA (PREI)STORIA…

ON THE

ANTISEPTIC PRINCIPLE IN THE PRACTICE OF SURGERY.*

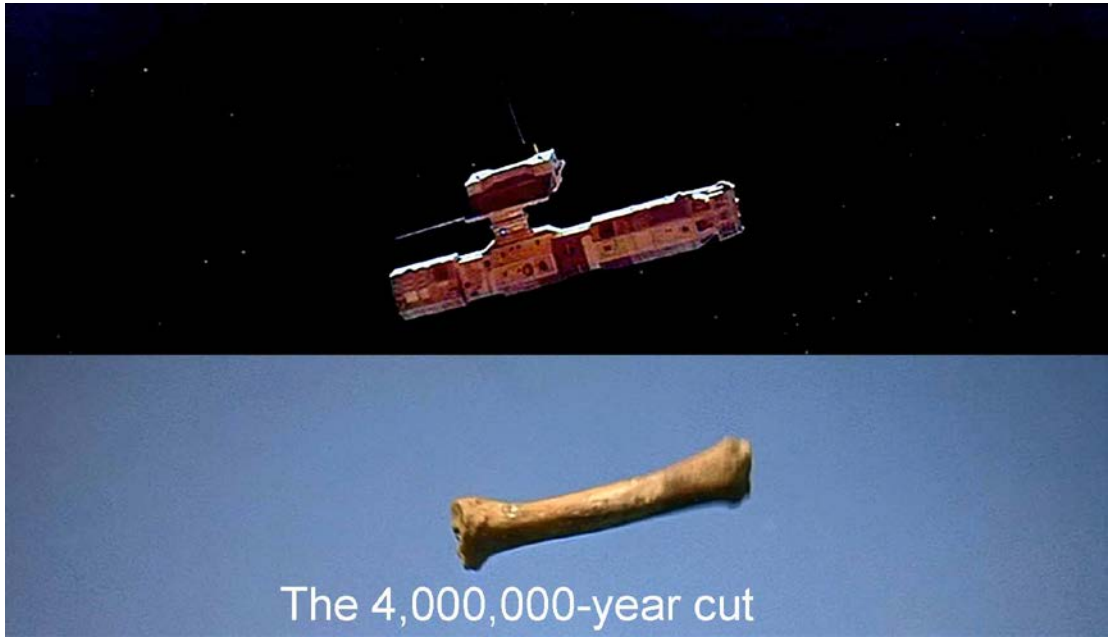
By JOSEPH LISTER, F.R.S.,
Professor of Surgery in the University of Glasgow.

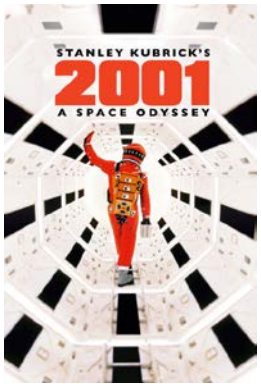
In the course of an extended investigation into the nature of inflammation, and the healthy and morbid conditions of the blood in relation to it, I arrived several years ago at the conclusion that the essential cause of suppuration in wounds is decomposition, brought about by the influence of the atmosphere upon blood or serum retained within them, and, in the case of contused wounds, upon portions of tissue destroyed by the violence of the injury.

To prevent the occurrence of suppuration with all its attendant risks was an object manifestly desirable, but till lately apparently unattainable, since it seemed hopeless to attempt to exclude the oxygen, which was universally regarded as the agent by which putrefaction was effected. But when it had been shown by the researches of Pasteur that the septic property of the atmosphere depended not on the oxygen, or any gaseous constituent, but on minute organisms suspended in it, which owed their energy to their vitality, it occurred to me that decomposition in the injured part might be avoided without excluding the air, by applying as a dressing some material capable of destroying the life of the floating particles. Upon this principle I have based a practice of which I will now attempt to give a short account.

skin for a very considerable distance, and this was inadmissible by the method described above, on account of the extensive sloughing of the surface of the cutis which it would involve. This difficulty has, however, been overcome by employing a paste composed of common whiting (carbonate of lime), mixed with a solution of one part of carbolic acid in four parts of boiled linseed oil, so as to form a firm putty. This application contains the acid in too dilute a form to excoriate the skin, which it may be made to cover to any extent that may be thought desirable, while its substance serves as a reservoir of the antiseptic material. So long as any discharge continues, the paste should be changed daily, and, in order to prevent the chance of mischief occurring during the process, a piece of rag dipped in the solution of carbolic acid in oil is put on next the skin, and maintained there permanently, care being taken to avoid raising it along with the putty. This rag is always kept in an antiseptic condition from contact with the paste above it, and destroys any germs that may fall upon it during the short time that should alone be allowed to pass in the changing of the dressing. The putty should be in a layer about a quarter of an inch thick, and may be advantageously applied rolled out between two pieces of thin calico, which maintain it in the form of a continuous sheet, which may be wrapped in a moment round the whole circumference of a limb if this be thought desirable, while the putty is prevented by the calico from sticking to the rag which is next the skin.* When all discharge has ceased, the use of the paste is discontinued, but the original rag is left adhering to the skin till healing by scabbing is supposed to be complete. I have at present in the hospital a man with severe compound fracture of both bones of the left leg, caused by direct violence, who, after the cessation of the sanious discharge under the use of the paste, without a

(L'EVOLUZIONE)





… AL PRESENTE

JAMA Surgery | Special Communication

Published online May 3, 2017.

Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017

Sandra I. Berríos-Torres, MD; Craig A. Umscheid, MD, MSCE; Dale W. Bratzler, DO, MPH; Brian Leas, MA, MS; Erin C. Stone, MA; Rachel R. Kelz, MD, MSCE; Caroline E. Reinke, MD, MSHP; Sherry Morgan, RN, MLS, PhD; Joseph S. Solomkin, MD; John E. Mazuski, MD, PhD; E. Patchen Dellinger, MD; Kamal M. F. Itani, MD; Elie F. Berbari, MD; John Segreti, MD; Javad Parvizi, MD; Joan Blanchard, MSS, BSN, RN, CNOR, CIC; George Allen, PhD, CIC, CNOR; Jan A. J. W. Kluytmans, MD; Rodney Donlan, PhD; William P. Schecter, MD; for the Healthcare Infection Control Practices Advisory Committee

World Health Organization

CDC

CENTERS FOR DISEASE CONTROL AND PREVENTION

Surgical site infections 1

Lancet Infect Dis 2016;

New WHO recommendations on preoperative measures for surgical site infection prevention: an evidence-based global perspective

*Benedetta Allegranzi, Peter Bischoff, Stijn de Jonge, N Zeynep Kubilay, Bassim Zayed, Stacey M Gomes, Mohamed Abbas, Jasper J Atema, Sarah Gans, Miranda van Rijen, Marja A Boermeester, Matthias Egger, Jan Kluytmans, Didier Pittet, Joseph S Solomkin, and the WHO Guidelines Development Group**

Surgical site infections 2

New WHO recommendations on intraoperative and postoperative measures for surgical site infection prevention: an evidence-based global perspective

Benedetta Allegranzi, Bassim Zayed, Peter Bischoff, N Zeynep Kubilay, Stijn de Jonge, Fleur de Vries, Stacey M Gomes, Sarah Gans, Elon D Wallert, Xiuwen Wu, Mohamed Abbas, Marja A Boermeester, E Patchen Dellinger, Matthias Egger, Petra Gastmeier, Xavier Guirao, Jianan Ren, Didier Pittet, Joseph S Solomkin, and the WHO Guidelines Development Group

DEFINIZIONI

Surgical site infection
Infection that occur in the part of the body where the operation took place. It occurs *within* 30 days post surgery or *up to a year* after the procedure in case of an implant.

Classification:

Superficial
- Infection occurs within 30 days of operation *and*
- Infection is confined to the skin and superficial layers around the incision *and at least one of the following:*
- Purulent discharge with or without laboratory confirmation, from the superficial incision
- Organism found on culture of tissue/pus taken aseptically from the incisional area

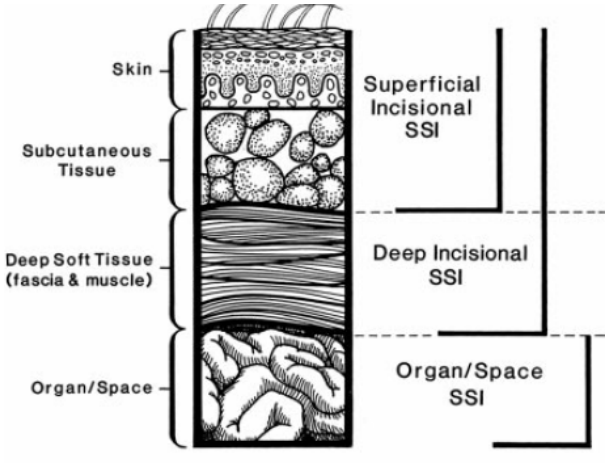
Deep
- Infection that occur within 30 days if no implant is in-situ or within a year if implant is in-situ and the infection appears to be related to the operation *and* the infection occurs in the deep tissues of the incision *and at least one of the following:*
  - Purulent drainage from the deep tissues but not from the organ space associated with the procedure
  - A deep incision spontaneously dehisces or is deliberately opened by the surgeon when the patient has at least one of the following symptoms: *fever, pain or tenderness unless culture negative*
  - An abscess or other evidence of infection in the deep tissue is found on clinical examination, re-opening, histopathological or radiological investigation
  - Diagnosis of a deep SSI by a surgeon or attending physician

Organ space SSI
- Infection occurs within 30 days if no implant, or within a year if implant and the infection seems to be related to the operation *and* infection occurs in any anatomical site (Organ/space) other than the incision, which was opened or manipulated during the procedure *and at least one of the following:*
  - Purulent discharge from a drain that was sited through a stab wound into the organ or space
  - Organism isolated from an aseptically collected specimen from the organ or space
  - An abscess or evidence of infection found on examination or re-operation or by histo-pathological or radiological examination
  - Diagnosis of an organ/space SSI made by the surgeon or attending physician

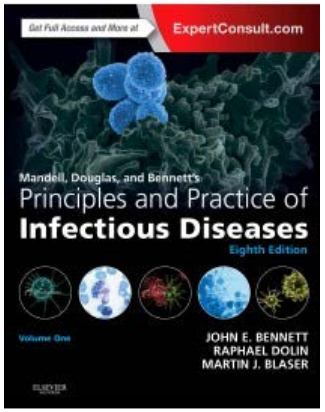
GUIDELINE FOR PREVENTION OF SURGICAL SITE INFECTION, 1999

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY

Alicia J. Mangram, MD; Teresa C. Horan, MPH, CIC; Michele L. Pearson, MD; Leah Christine Silver, BS; William R. Jarvis, MD; The Hospital Infection Control Practices Advisory Committee



FATTORI DI RISCHIO



Patient Factors
Diabetes mellitus/perioperative hyperglycemia
Concurrent tobacco use
Remote infection at time of surgery
Obesity
Low preoperative serum albumin
Malnutrition
Concurrent steroid use
Prolonged preoperative stay*
Prior site irradiation
Colonization with *Staphylococcus aureus*

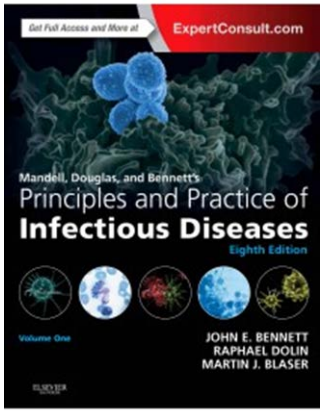
Proceduralist Factors
Surgical technique (poor hemostasis, tissue trauma)
Lapses in sterile technique and asepsis
Glove micropenetrations
Behavioral factors/proceduralist impairment

Procedural Factors
Shaving of site the night before procedure
Use of razor for hair removal
Improper preoperative skin preparation/use of non–alcohol-based skin preparation
Improper antimicrobial prophylaxis (wrong drug, wrong dose, wrong time of administration)
Failure to timely redose antibiotics in prolonged procedures
Inadequate OR ventilation
Increased OR traffic
Perioperative hypothermia
Perioperative hypoxia

318 **Surgical Site Infections and Antimicrobial Prophylaxis**

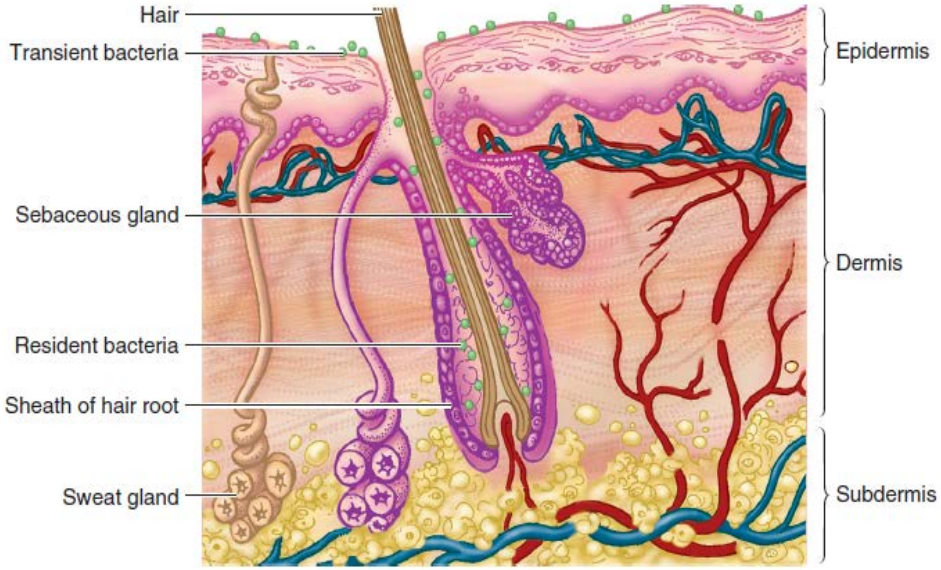
Thomas R. Talbot

PATOGENESI: GOING DEEP



Modern methods of **antisepsis can reduce but not eliminate the skin-associated bacteria** of surgical patients. This **limitation derives**, in part, from the localization of up to **20% of skin-associated bacteria in skin appendages**, such as hair follicles and sebaceous glands.

Because these sites are **beneath the skin's surface, bacteria residing there are not eliminated by topical antisepsis**. **Transection** of these skin structures by surgical incision **may carry the patient's resident bacteria deep into the wound** and set the stage for subsequent infection.



318 Surgical Site Infections and Antimicrobial Prophylaxis
Thomas R. Talbot

MICROBIOLOGIA: REAL LIFE

Surgical Site Infections

Infect Dis Clin N Am 25 (2011) 135–153

Deverick J. Anderson, MD, MPH

The 10 most common pathogens causing SSIs in hospitals that report to the CDC

Pathogen	Percentage of Infections (%)
S aureus	20
Coagulase-negative staphylococci	14
Enterococci	12
Pseudomonas aeruginosa	8
Escherichia coli	8
Enterobacter species	7
Proteus mirabilis	3
Streptococci	3
Klebsiella pneumoniae	3
Candida albicans	2

MICROBIOLOGIA: ATTENZIONE ALLA SEDE

Surgical site infections

Nel DC

South African Family Practice 2014; 56(5):33-37

Procedure	Organisms
Grafts/prosthesis/implants	Staph Aureus, Coagulase negative Staphs
Cardiac	Staph Aureus/CNS
Neuro surgery	Staph Aureus/CNS
Breast surgery	Staph Aureus/CNS
Ophthalmology	Staph Aureus/CNS/Streptococci/Gram negative Bacilli
Orthopaedics	Staph Aureus/CNS/GNB
Non-cardiac thoracics	Staph Aureus/CNS/Strep pneumonia/ GNB
Vascular	Staph Aureus/CNS
Appendix	Staph Aureus/Anaerobes
Biliary tract	GNB/Anaerobes
Colorectal	GNB/Anaerobes. Diverse group of aerobic and anaerobic organisms with up to 15 different species detectable
Gastroduodenal	GNB/Streptococci/Oropharyngeal anaerobes
Head and neck	Staph Aureus/Streptococci
Obstetrics and gynaecology	GNB/Enterococci/Group B Streptococci/ Anaerobes
Urology	GNB

SSI: UN PROBLEMA GLOBALE

Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis

Benedetta Allegranzi, Sepideh Bagheri Nejad, Christophe Combescure, Wilco Graafmans, Homa Attar, Liam Donaldson, Didier Pittet

Lancet 2011; 377: 228–41

Results: *"Surgical-site infection was the leading infection in hospitals ... , strikingly higher than proportions recorded in developed countries."*

PREVENZIONE SSI: PILASTRI

Clinics in Colon and Rectal Surgery

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Clin Colon Rectal Surg. 2013 Sep; 26(3): 168–173.
doi: 10.1055/s-0033-1351133

Perioperative Strategies to Prevent Surgical-Site Infection

Juan Lucas Poggio, MD, FACS, FASCRS[1]

Wound Protectors

Hair Removal

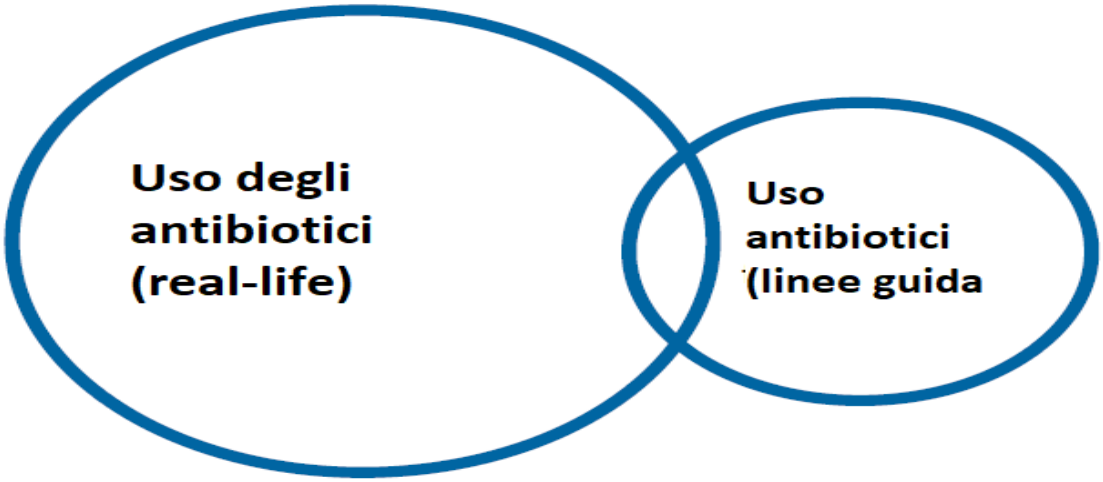
Surgical Hand Hygiene and Technique

Increased Oxygen Delivery

Skin Antisepsis

Prophylactic Antibiotics

IL MISMATCH NELLA PROFILASSI ANTIBIOTICA DELLE SSI



Soluzione: allineare l'utilizzo degli antibiotici in profilassi alle raccomandazioni evidence-based

ITALY, WE HAVE A PROBLEM

Sorveglianza delle infezioni del sito chirurgico in Italia

Interventi ortopedici anno 2015

Interventi non ortopedici anno 2016

Sistema nazionale di sorveglianza delle infezioni del sito chirurgico

Qualità delle informazioni raccolte

La qualità dei dati raccolti nel corso dell'anno 2016 è sostanzialmente invariata rispetto ai livelli raggiunti nell'anno precedente. Una proporzione consistente di valori mancanti è presente solo per le informazioni indicate come non obbligatorie dal Protocollo nazionale.

Tabella 9. Qualità e completezza delle informazioni. Percentuali di record con dati mancanti (o con informazioni non note) sul totale dei record inviati (interventi non ortopedici 2016)

Informazione	Percentuale di informazioni mancanti o non note
Profilassi antibiotica perioperatoria	84

Antibioticoprofilassi

Il Protocollo nazionale prevede la registrazione facoltativa di informazioni sull'antibiotico-profilassi.

Per il 2016 sono state riportate informazioni su 11.853 interventi pari al 16% del totale (vedi *Tabella 10*), in netta riduzione rispetto all'anno precedente (quando il dato era presente nel 29% dei casi); la profilassi antibiotica è stata eseguita nell'80% degli 11.853 interventi effettuati.

ITALY, WE HAVE A PROBLEM

Sorveglianza delle infezioni del sito chirurgico in Italia

Interventi ortopedici anno 2015

Interventi non ortopedici anno 2016

Sistema nazionale di sorveglianza delle infezioni del sito chirurgico

Tabella 14. Molecole utilizzate per la profilassi antibiotica (interventi non ortopedici 2016)

Principio attivo	Interventi	Percentuale su interventi con molecola indicata (n. 8.634) *
Cefazolina	4.527	52%
Amoxicillina e inibitori enzimatici	1.093	13%
Metronidazolo	1.022	12%
Ampicillina e inibitori enzimatici	784	9%
Ceftriaxone	746	9%
Cefoxitina	364	4%
Piperacillina e inibitori enzimatici	295	3%
Vancomicina	163	2%
Clindamicina	147	2%
Ciprofloxacina	126	1%
Ampicillina	115	1%
Altro	789	9%

* La somma dei valori percentuali è superiore a 100 in quanto in alcuni casi è stata indicato l'utilizzo di più molecole.

CAMPANIA: MOLTO LAVORO DA FARE (SELF-CRITICISM)

Ulteriori informazioni sull'uso ospedaliero degli antibiotici sono state ottenute con la partecipazione al *Sistema Nazionale di sorveglianza delle infezioni del Sito Chirurgico (SNICH)*, attraverso il quale la maggior parte delle Aziende del SSR, nel periodo 2009-2015, ha svolto rilevazioni sulle modalità di somministrazione della *profilassi antibiotica* perioperatoria.

- indipendentemente dall'indicazione d'uso, in Campania è stato rilevato nella profilassi chirurgica e medica un uso particolarmente elevato di Cefalosporine di III generazione e di Fluorochinolonici, mentre in Europa la Classe di antibiotici più utilizzata è l'associazione di Penicilline con inibitori delle beta-lattamasi;
- in Campania la molecola più frequentemente somministrata in profilassi antibiotica perioperatoria è stato il Ceftriaxone (nel 18,9% dei casi), mentre in Italia ed in Europa il principio attivo più frequentemente utilizzato è stato quello raccomandato dalle Linee Guida, ovvero la Cefazolina, rispettivamente nel 26,0% e nel 18,9% dei casi;
- in Campania, il timing previsto dalle Linee Guida di riferimento nell'antibioticoprofilassi per la maggior parte degli interventi chirurgici, ovvero la somministrazione in singola dose, è stato applicato solo nel 12,5% dei trattamenti (rispetto al 25,9% delle profilassi chirurgiche praticate in Italia ed il 26,1% in Europa), mentre l'antibioticoprofilassi chirurgica è stata protratta per più di un giorno nel 75,8% dei casi.

LINEE D'INDIRIZZO E COORDINAMENTO PER LE AZIENDE SANITARIE ED OSPEDALIERE DELLA CAMPANIA SULL'USO APPROPRIATO DEGLI ANTIBIOTICI E SUL CONTROLLO DELLE INFEZIONI DA ORGANISMI MULTIRESISTENTI

PER L'ATTUAZIONE DELLE AZIONI SPECIFICHE PREVISTE DAL PIANO REGIONALE DELLA PREVENZIONE 2014-2018

Aprile 2017

PROFILASSI ANTIBIOTICA: LA VIA SEMPLICE

JAMA Surgery | Special Communication

Published online May 3, 2017.

Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017

Sandra I. Berríos-Torres, MD; Craig A. Umscheid, MD, MSCE; Dale W. Bratzler, DO, MPH; Brian Leas, MA, MS; Erin C. Stone, MA; Rachel R. Kelz, MD, MSCE; Caroline E. Reinke, MD, MSHP; Sherry Morgan, RN, MLS, PhD; Joseph S. Solomkin, MD; John E. Mazuski, MD, PhD; E. Patchen Dellinger, MD; Kamal M. F. Itani, MD; Elie F. Berbari, MD; John Segreti, MD; Javad Parvizi, MD; Joan Blanchard, MSS, BSN, RN, CNOR, CIC; George Allen, PhD, CIC, CNOR; Jan A. J. W. Kluytmans, MD; Rodney Donlan, PhD; William P. Schecter, MD; for the Healthcare Infection Control Practices Advisory Committee

CDC

CENTERS FOR DISEASE CONTROL AND PREVENTION

Parenteral Antimicrobial Prophylaxis

1A.1. Administer preoperative antimicrobial agents only when indicated based on published clinical practice guidelines and timed such that a bactericidal concentration of the agents is established in the serum and tissues when the incision is made. (Category IB–strong recommendation; accepted practice.)

PROFILASSI ANTIBIOTICA: PRINCIPI GENERALI

Surgical antimicrobial prophylaxis

Courtney Ierano
PhD Fellow[1]
Jo-Anne Manski-Nankervis
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Lecturer in primary care[2]
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Trisha Peel
Chief investigator[1]
Infectious diseases and antimicrobial stewardship physician[3]
Karin Thursky
Director[1]
Deputy head[4]

Australian Prescriber
VOLUME 40 : NUMBER 6 : DECEMBER 2017

Right indication

Right antimicrobial

Right dose

Right route of administration

Right timing of administration

Right duration

FATTORI DA CONSIDERARE

- pre-existing infection
- recent antimicrobial use
- known colonisation with a resistant organism
- prolonged hospitalisation
- prostheses
- weight
- renal function
- allergy status
- comorbidities
- immunosuppression.

PROFILASSI ANTIBIOTICA: PANORAMICA

Clinical practice guidelines for antimicrobial prophylaxis in surgery

DALE W. BRATZLER, E. PATCHEN DELLINGER, KEITH M. OLSEN, TRISH M. PERL, PAUL G. AUWAERTER, MAUREEN K. BOLON, DOUGLAS N. FISH, LENA M. NAPOLITANO, ROBERT G. SAWYER, DOUGLAS SLAIN, JAMES P. STEINBERG, AND ROBERT A. WEINSTEIN

Am J Health-Syst Pharm—Vol 70 Feb 1, 2013

PROCEDURE	TYPICAL MICROBIOLOGIC FLORA*	RECOMMENDED ANTIMICROBIALS
Cardiac	*Staphylococcus aureus*, CoNS, (GNR less common)	
Coronary artery bypass		Cefazolin, cefuroxime
Cardiac device insertion (e.g., pacemaker)		Cefazolin, cefuroxime
Ventricular assist device placement		Cefazolin, cefuroxime
Thoracic	*S. aureus*, CoNS	Cefazolin, ampicillin-sulbactam
Gastroduodenal (involving entry into lumen of gastrointestinal tract or without entry into lumen in high-risk patients)	Coliform GNR, streptococci, staphylococci	Cefazolin
Biliary	GNR (less commonly, anaerobes and enterococci)	
Open		Cefazolin, cefoxitin, cefotetan, ceftriaxone, ampicillin-sulbactam
Laparoscopic, high risk		Cefazolin, cefoxitin, cefotetan, ceftriaxone, ampicillin-sulbactam
›pendectomy	GNR, anaerobes	Cefoxitin, cefotetan, cefazolin + metronidazole
_›lorectal	GNR, anaerobes (especially *Bacteroides fragilis* and *Escherichia coli*)	Cefazolin + metronidazole, cefoxitin, cefotetan, ampicillin-sulbactam, ceftriaxone + metronidazole, ertapenem; IV agent used along with mechanical bowel preparation and oral antimicrobial (neomycin sulfate + erythromycin base or neomycin sulfate + metronidazole)
Neurosurgery (craniotomy, CSF shunting, intrathecal pump implantation)	*S. aureus*, CoNS	Cefazolin
Cesarean section	*S. aureus*, streptococci, enterococci, vaginal anaerobes	Cefazolin
Hysterectomy (vaginal or abdominal)	*S. aureus*, streptococci, enterococci, vaginal anaerobes	Cefazolin, cefoxitin, cefotetan, ampicillin-sulbactam
Orthopedic	*S. aureus*, CoNS, streptococci, GNR (*Propionibacterium* spp. in shoulder procedures)	
Clean procedure of hand, knee, foot without implantation of foreign materials		None
Spinal procedures, hip fracture repair, internal fixation procedure, total joint arthroplasty		Cefazolin
Urologic	GNR (*E. coli*), rarely enterococci	
Lower tract instrumentation (includes transrectal prostate biopsy)		Fluoroquinolone, trimethoprim-sulfamethoxazole, cefazolin
Clean procedure (with or without entry into urinary tract		Cefazolin (single-dose aminoglycoside may be added for placement of prosthetic material)
Clean contaminated		Cefazolin + metronidazole, cefoxitin
Vascular	*S. aureus*, CoNS	Cefazolin

*Staphylococci will be associated with surgical site infections after all types of operations.
CSF, cerebrospinal fluid; CoNS, coagulase-negative staphylococci; GNR, gram-negative rods/bacilli; IV, intravenous.

PROFILASSI ANTIBIOTICA: RISCHI

Risk of *Clostridium difficile* Infection after Perioperative Antibacterial Prophylaxis before and during an Outbreak of Infection due to a Hypervirulent Strain

Clinical Infectious Diseases 2008; 46:1838–43

Alex Carignan,[1] Catherine Allard,[1] Jacques Pépin,[1] Benoit Cossette,[2] Vincent Nault,[1] and Louis Valiquette[1]

Characteristic	No. of patients with CDI/ total no. of patients	Risk of CDI, no. of cases per 1000 surgical procedures	Crude OR (95% CI)	*P*	Adjusted OR (95% CI)	*P*
Prophylactic antibacterial						
Cefazolin	20/4351	4.6	1.0		1.0	
Cefoxitin	9/632	14.2	3.2 (1.4–6.9)	.005	2.7 (1.2–6.0)	.02
Cefoxitin plus any other antibacterial	10/138	72.4	16.9 (7.8–36.9)	<.001	10.7 (4.8–23.8)	<.001
Vancomycin	0/150	0	0			

Results. A total of 8373 surgical procedures were performed, and PAP was used in 7600 of these interventions. Of 98 CDI episodes identified, 40 occurred after patients received PAP only. The risk of CDI was 14.9 cases per 1000 surgical procedures among patients who received PAP only during the period 2003–2005, compared with 0.7 cases per 1000 surgical procedures during the period 1999–2002 ($P < .001$). The independent risk factors associated with CDI in patients given PAP only were older age, administration of cefoxitin (rather than cefazolin) alone or in combination with another drug, and year of surgery.

Conclusions. In the context of a large epidemic of CDI associated with the emergence of a novel strain, 1.5% of patients who received PAP as their sole antibiotic treatment developed CDI. In situations in which the only purpose of PAP is to prevent infrequent and relatively benign infections, the risks may outweigh the benefits in some elderly patients.

PROFILASSI ANTIBIOTICA: RISCHI

Prolonged Antibiotic Prophylaxis After Cardiovascular Surgery and Its Effect on Surgical Site Infections and Antimicrobial Resistance

Stephan Harbarth, MD, MS; Matthew H. Samore, MD; Debi Lichtenberg, RN; Yehuda Carmeli, MD, MPH

(*Circulation*. 2000;101:2916-2921.)

Methods:
To compare the effect of short (<48 hours) versus prolonged (>48 hours) ABP on surgical site infections (SSIs) and acquired antimicrobial resistance, we conducted an observational 4-year cohort study at a tertiary-care center

Study Population
From September 1993 through August 1997, 2641 adult patients underwent CABG, including 186 patients who received combined CABG and valve replacement procedures.

TABLE 2. Multivariable Model for Isolation of Acquired Resistant Enterobacteriaceae and Enterococci After CABG, Matched by Calendar Time and the Prophylactic Antibiotic Agents Used

	Patients With Positive Cultures (n=426)		
Variable	OR	*P*	95% CI
Prolonged prophylaxis (>48 h)	1.6	0.027	1.1–2.6
Age >65 y	1.3	0.022	1.0–1.6
Combined CABG/valve surgery	2.7	0.002	1.4–5.1
Antibiotic therapy after CABG	1.8	0.054	1.0–3.3

PROFILASSI ANTIBIOTICA: NON IN AUTOMATICO

SNLG - Antibioticoprofilassi perioperatoria nell'adulto

Raccomandazione

✔ **La decisione finale riguardante i benefici e i rischi della profilassi antibiotica per ogni singolo paziente dipenderà da:**

- **il suo rischio di infezione del sito chirurgico, che terrà conto dei rischi legati all'intervento e dei rischi legati al paziente;**
- **la potenziale gravità dell'eventuale infezione del sito chirurgico;**
- **l'efficacia della profilassi per quel determinato intervento;**
- **le conseguenze della profilassi per quel determinato paziente (per esempio un aumentato rischio di colite o diarrea associata a *Clostridium difficile*).**

PROFILASSI ANTIBIOTICA: QUANDO NO (ESEMPIO)

SNLG - Antibioticoprofilassi perioperatoria nell'adulto

No!

Colecistectomia laparoscopica	D	NON raccomandata**	I dati derivano da due revisioni sistematiche entrambe su 6 RCT (rispettivamente 974 e 1.031 pazienti) in cui non si evidenzia alcuna differenza statisticamente significativa nell'incidenza di infezione di ferita, infezioni in altri siti, infezioni totali nei pazienti con profilassi antibiotica. Gli studi escludevano pazienti con colecistite, pancreatite, ittero, immunodeficienza, presenza di protesi biliari	I [102-103]

Cochrane Database of Systematic Reviews

Antibiotic prophylaxis for patients undergoing elective laparoscopic cholecystectomy

Cochrane Systematic Review - Intervention | Version published: 08 December 2010

Surgical site infection

The number of surgical site infections was similar in the two groups: 24 of 900 (2.7%) patients in the prophylaxis group had a surgical site infection against 25 of 764 (3.3%) in the no-prophylaxis group. The OR was 0.87, 95% CI (0.49 to 1.54). No statistically significant differences or heterogeneity were observed

PROFILASSI PRE-OPERATORIA: TIMING

Surgical site infections 1

Lancet Infect Dis 2016;

New WHO recommendations on preoperative measures for surgical site infection prevention: an evidence-based global perspective

*Benedetta Allegranzi, Peter Bischoff, Stijn de Jonge, N Zeynep Kubilay, Bassim Zayed, Stacey M Gomes, Mohamed Abbas, Jasper J Atema, Sarah Gans, Miranda van Rijen, Marja A Boermeester, Matthias Egger, Jan Kluytmans, Didier Pittet, Joseph S Solomkin, and the WHO Guidelines Development Group**

Recommendations 9 and 10: optimal timing for administration of surgical antibiotic prophylaxis (SAP)

The panel recommends the administration of SAP before surgical incision when indicated, depending on the type of operation (strong recommendation, low quality of evidence); it should be done within the 120 min before the incision, while considering the half-life of the antibiotic (strong recommendation, moderate quality of evidence).

MAI OLTRE LE 2 ORE PRIMA DELL'INCISIONE

PROFILASSI PRE-OPERATORIA: TIMING

The NEW ENGLAND JOURNAL of MEDICINE

Volume 326 JANUARY 30, 1992 Number 5

THE TIMING OF PROPHYLACTIC ADMINISTRATION OF ANTIBIOTICS AND THE RISK OF SURGICAL-WOUND INFECTION

DAVID C. CLASSEN, M.D., R. SCOTT EVANS, PH.D., STANLEY L. PESTOTNIK, R.PH., SUSAN D. HORN, PH.D., RONALD L. MENLOVE, PH.D., AND JOHN P. BURKE, M.D.

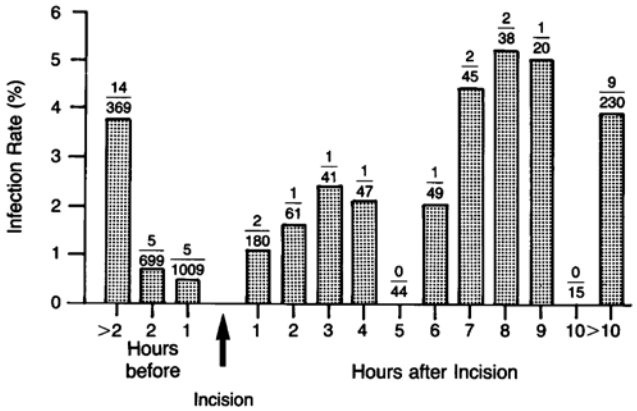


Figure 1. Rates of Surgical-Wound Infection Corresponding to the Temporal Relation between Antibiotic Administration and the Start of Surgery.

Table 1. Temporal Relation between the Administration of Prophylactic Antibiotics and Rates of Surgical-Wound Infection.

TIME OF ADMINISTRATION*	NO. OF PATIENTS	NO. (%) OF INFECTIONS	RELATIVE RISK (95% CI)	ODDS RATIO† (95% CI)
Early	369	14 (3.8)‡	6.7 (2.9–14.7)	4.3§ (1.8–10.4)
Preoperative	1708	10 (0.59)	1.0	
Perioperative	282	4 (1.4)¶	2.4 (0.9–7.9)	2.1‖ (0.6–7.4)
Postoperative	488	16 (3.3)‡	5.8‡ (2.6–12.3)	5.8** (2.4–13.8)
All	2847	44 (1.5)	—	—

*For the administration of antibiotics, "early" denotes 2 to 24 hours before the incision, "preoperative" 0 to 2 hours before the incision, "perioperative" within 3 hours after the incision, and "postoperative" more than 3 hours after the incision.

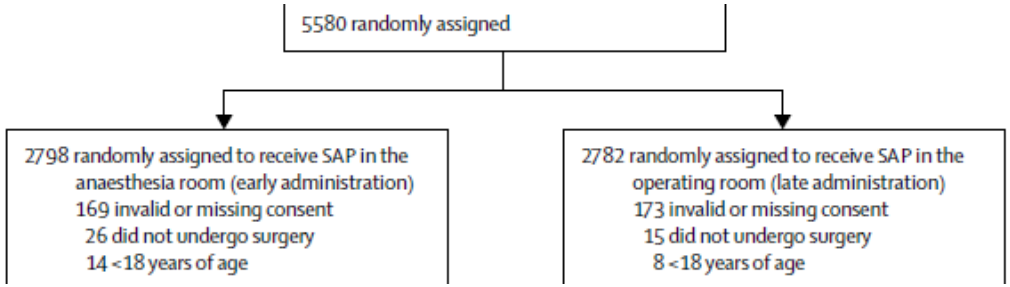
PROFILASSI PRE-OPERATORIA: TIMING

Timing of surgical antimicrobial prophylaxis: a phase 3 randomised controlled trial

Lancet Infect Dis 2017

Published Online
April 3, 2017

Walter P Weber, Edin Mujagic*, Marcel Zwahlen, Marcel Bundi, Henry Hoffmann, Savas D Soysal, Marko Kraljević, Tarik Delko, Marco von Strauss, Lukas Iselin, Richard X Sousa Da Silva, Jasmin Zeindler, Rachel Rosenthal, Heidi Misteli, Christoph Kindler, Peter Müller, Ramon Saccilotto, Andrea Kopp Lugli, Mark Kaufmann, Lorenz Gürke, Daniel Oertli, Evelin Bucheli-Laffer, Julia Landin, Andreas F Widmer, Christoph A Fux, Walter R Marti*



NO BENEFIT FROM NARROWING THE 60-MIN WINDOW

	SAP in anaesthesia room, early administration (n=2296)*	SAP in operating room, late administration (n=2300)*	Odds ratio (95% CI)	p value†
Primary outcome				
Surgical site infection	113 (5%)	121 (5%)	0·93 (0·72–1·21)	0·601
Superficial incisional infection	48 (2%)	55 (2%)	0·87 (0·59–1·29)	0·491
Deep incisional infection	23 (1%)	20 (1%)	1·15 (0·63–2·11)	0·642
Organ space infection	42 (2%)	46 (2%)	0·91 (0·60–1·39)	0·673
Secondary outcomes				
All-cause 30-day mortality	29 (1%)	24 (1%)	1·21 (0·70–2·09)	0·485
Median length of hospital stay, days	5·1 (3–9)	5·0 (3–10)	NA	0·375

Data are n (%) or median (IQR). For the secondary outcome all-cause 30 day mortality, the complete case set numbers were 2301 in the early and 2306 in the late group. For the secondary outcome median length of hospital stay, the complete case set numbers are equal to the total study population (ie, 2589 for the early group and 2586 for the late group). SAP=surgical antimicrobial prophylaxis. NA=not applicable. *These numbers represent the complete case set (ie, the numbers of cases with complete 30-day follow-up). †p values for binary outcomes are Wald p values from logistic regression and for length of stay from a Wilcoxon (Mann-Whitney) rank-sum test.

PROFILASSI: ULTERIORI CONSIDERAZIONI

Surgical site infections 1

New WHO recommendations on preoperative measures for surgical site infection prevention: an evidence-based global perspective

Lancet Infect Dis 2016;

Benedetta Allegranzi, Peter Bischoff, Stijn de Jonge, N Zeynep Kubilay, Bassim Zayed, Stacey M Gomes, Mohamed Abbas, Jasper J Atema, Sarah Gans, Miranda van Rijen, Marja A Boermeester, Matthias Egger, Jan Kluytmans, Didier Pittet, Joseph S Solomkin, and the WHO Guidelines Development Group*

The half-life of the agent used, the underlying condition(s) of the individual patient (eg, bodymass index, or renal or liver function), the time needed to complete the procedure, and the protein binding of the antibiotic should be taken into account to achieve adequate serum and tissue concentrations at the surgical site at the time of incision and up to wound closure—in particular to prevent incisional SSI. For instance, administration should be closer to the incision time (<60 min before) for antibiotics with a short half-life, such as cefazolin and cefoxitin, and penicillins in general.

Intra-operative redosing is indicated if the duration of the procedure exceeds two half-lives of the drug, or if there is excessive blood loss during the procedure. However, these concepts are not based on clinical outcome data.

PROFILASSI: ULTERIORI CONSIDERAZIONI

Raccomandazione SNLG - Antibioticoprofilassi perioperatoria nell'adulto

II/A	**Nella maggior parte dei casi la profilassi antibiotica deve essere iniziata immediatamente prima delle manovre anestesiologiche e comunque nei 30-60 minuti che precedono l'incisione della cute.**

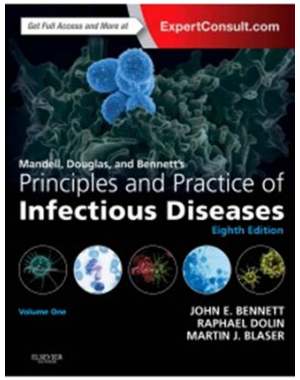
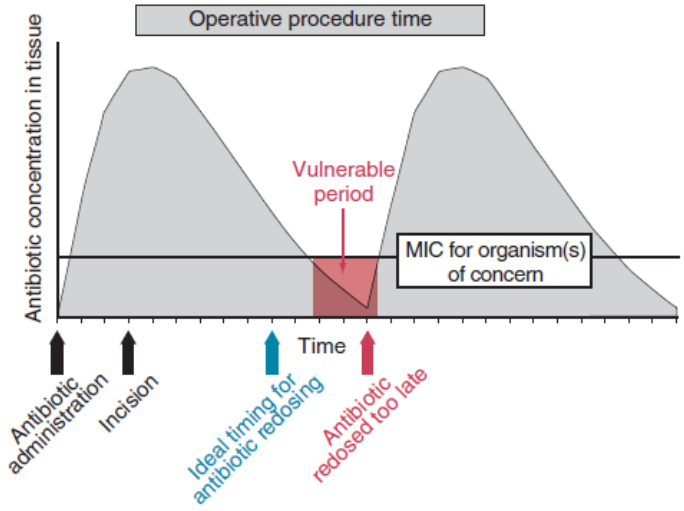


FIGURE 318-4 Tissue antibiotic concentration over time. Dynamics of tissue antibiotic concentration during the course of a surgical procedure. After an initial dose of antibiotic (noted on the far left of the *x* axis), tissue concentrations reach their peak rapidly, with a subsequent decline over time. As illustrated, the goal of antibiotic prophylaxis is to have tissue concentrations above the minimal inhibitory concentration (MIC) for the specific pathogens of concern at the time of the incision and throughout the procedure. Antibiotics should be redosed in prolonged procedures to prevent a period with tissue levels below the MIC *(blue arrow)*. Failure to redose antibiotics appropriately *(red arrow)* may result in a period during which the wound is vulnerable.

318 Surgical Site Infections and Antimicrobial Prophylaxis
Thomas R. Talbot



PROFILASSI INTRA-OP: REDOSING

REDOSING: ESEMPI

Clinical practice guidelines for antimicrobial prophylaxis in surgery

Am J Health-Syst Pharm. 2013; 70:195-283

DALE W. BRATZLER, E. PATCHEN DELLINGER, KEITH M. OLSEN, TRISH M. PERL, PAUL G. AUWAERTER, MAUREEN K. BOLON, DOUGLAS N. FISH, LENA M. NAPOLITANO, ROBERT G. SAWYER, DOUGLAS SLAIN, JAMES P. STEINBERG, AND ROBERT A. WEINSTEIN

Recommended Doses and Redosing Intervals for Commonly Used Antimicrobials for Surgical Prophylaxis

Antimicrobial	Recommended Dose		Half-life in Adults With Normal Renal Function, hr[19]	Recommended Redosing Interval (From Initiation of Preoperative Dose), hr[c]
	Adults[a]	Pediatrics[b]		
Ampicillin–sulbactam	3 g (ampicillin 2 g/sulbactam 1 g)	50 mg/kg of the ampicillin component	0.8–1.3	2
Ampicillin	2 g	50 mg/kg	1–1.9	2
Aztreonam	2 g	30 mg/kg	1.3–2.4	4
Cefazolin	2 g, 3 g for pts weighing ≥120 kg	30 mg/kg	1.2–2.2	4
Cefuroxime	1.5 g	50 mg/kg	1–2	4
Cefotaxime	1 g[d]	50 mg/kg	0.9–1.7	3
Cefoxitin	2 g	40 mg/kg	0.7–1.1	2
Cefotetan	2 g	40 mg/kg	2.8–4.6	6

PROFILASSI INTRA- E POST-OP: PIÙ NO CHE SÌ

Surgical site infections 2

Lancet Infect Dis 2016;

New WHO recommendations on intraoperative and postoperative measures for surgical site infection prevention: an evidence-based global perspective

Benedetta Allegranzi, Bassim Zayed, Peter Bischoff, N Zeynep Kubilay, Stijn de Jonge, Fleur de Vries, Stacey M Gomes, Sarah Gans, Elon D Wallert, Xiuwen Wu, Mohamed Abbas, Marja A Boermeester, E Patchen Dellinger, Matthias Egger, Petra Gastmeier, Xavier Guirao, Jianan Ren, Didier Pittet, Joseph S Solomkin, and the WHO Guidelines Development Group

(13) Antimicrobial prophylaxis in the presence of a drain	In the presence of drains, does prolonged antibiotic prophylaxis prevent SSI?	Perioperative surgical antibiotic prophylaxis should not be continued because of the presence of a wound drain for the purpose of preventing SSI	Conditional recommendation (low)	This recommendation leads to a cost reduction because of reduced antibiotic use; it also contributes to preventing antimicrobial resistance
(16) Surgical antibiotic prophylaxis prolongation	Does continued postoperative surgical antibiotic prophylaxis reduce the risk of SSI compared with preoperative and (if necessary) intraoperative prophylaxis only?	Surgical antibiotic prophylaxis administration should not be prolonged after completion of the operation	Strong recommendation (moderate)	This recommendation leads to a cost reduction because of reduced antibiotic use; it also contributes to preventing antimicrobial resistance

PROFILASSI ANTIBIOTICA: SIZE MATTERS

Perioperative antibiotic prophylaxis in the gastric bypass patient: Do we achieve therapeutic levels?

Charles E. Edmiston, Jr, PhD, Candace Krepel, MS, Holly Kelly, BSN, Jeffery Larson, BA, Deborah Andris, MSN, Cindy Hennen, RPh, Atilla Nakeeb, MD, *and* **James R. Wallace, MD, PhD,**
Milwaukee, Wis

doi:10.1016/j.surg.2004.06.022

Methods. *Patients undergoing Roux-en-Y gastric bypass for morbid obesity were given 2 g cefazolin preoperatively, followed by a second dose at 3 hours. Thirty-eight patients were each assigned to 1 of 3 body mass index (BMI) groups: (A) BMI = 40-49 (N = 17); (B) BMI = 50-59 (N = 11); (C) BMI ≥ 60 (N = 10). Multiple timed serum (baseline; incision, 15, 30, 60 minutes; prior to second prophylactic dose; and closure) and tissue (skin, subcutaneous fat, and omentum) specimens were collected and cefazolin concentration analyzed by microbiological assay.*

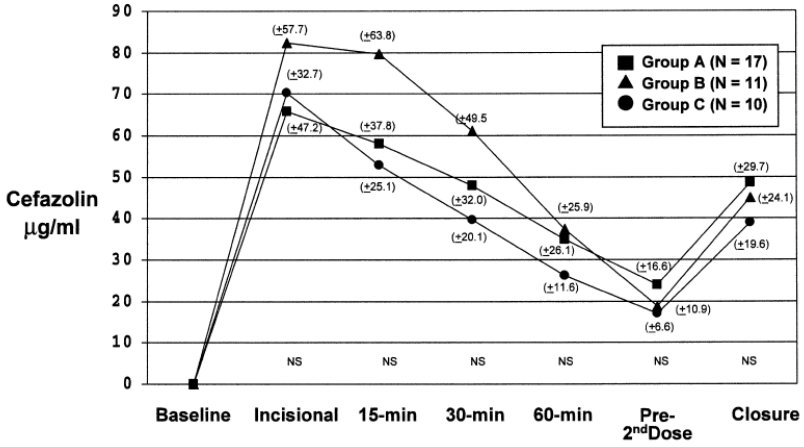


Fig 1. Mean serum concentration (µg/mL) of cefazolin in gastric bypass patients at baseline, at incision; 15 minutes, 30 minutes, and 60 minutes postincision; before second dose; and at wound closure.

"…therapeutic tissue levels were achieved in only 48.1%, 28.6%, and 10.2% of groups A, B, and C, respectively"

PROFILASSI ANTIBIOTICA: MRSA ISSUE

Nasal decontamination for the prevention of surgical site infection in Staphylococcus aureus carriers (Review)

Liu Z, Norman G, Iheozor-Ejiofor Z, Wong JKF, Crosbie EJ, Wilson P

Cochrane Database of Systematic Reviews 2017, Issue 5. Art. No.: CD012462.

Cochrane Library

Cochrane Database of Systematic Reviews

Authors' conclusions

There is currently limited rigorous RCT evidence available regarding the clinical effectiveness of nasal decontamination in the prevention of SSI. This limitation is specific to the focused question our review addresses, looking at nasal decontamination as a single intervention in participants undergoing surgery who are known *S aureus* carriers. We were only able to identify two studies that met the inclusion criteria for this review and one of these was very small and poorly reported. The potential benefits and harms of using decontamination for the prevention of SSI in this group of people remain uncertain.

PROFILASSI ANTIBIOTICA: MRSA BUNDLE

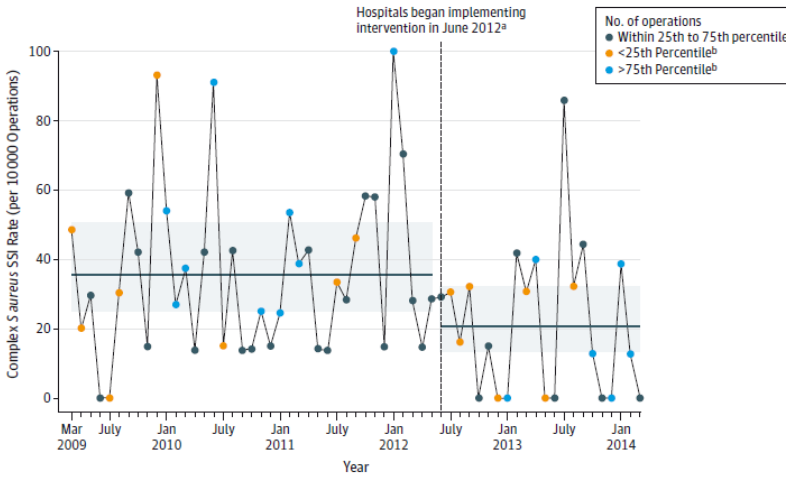
Association of a Bundled Intervention With Surgical Site Infections Among Patients Undergoing Cardiac, Hip, or Knee Surgery

JAMA. 2015;313(21):2162-2171. doi:10.1001/jama.2015.5387

Marin L. Schweizer, PhD; Hsiu-Yin Chiang, MS, PhD; Edward Septimus, MD; Julia Moody, MS; Barbara Braun, PhD; Joanne Hafner, RN, MS; Melissa A. Ward, MS; Jason Hickok, MBA, RN; Eli N. Perencevich, MD, MS; Daniel J. Diekema, MD; Cheryl L. Richards, MJ, LPN, LMT; Joseph E. Cavanaugh, PhD; Jonathan B. Perlin, MD, PhD; Loreen A. Herwaldt, MD

INTERVENTIONS Patients whose preoperative nares screens were positive for methicillin-resistant *S aureus* (MRSA) or methicillin-susceptible *S aureus* (MSSA) were asked to apply mupirocin intranasally twice daily for up to 5 days and to bathe daily with chlorhexidine-gluconate (CHG) for up to 5 days before their operations. MRSA carriers received vancomycin and cefazolin or cefuroxime for perioperative prophylaxis; all others received cefazolin or cefuroxime. Patients who were MRSA-negative and MSSA-negative bathed with CHG the night before and morning of their operations. Patients were treated as MRSA-positive if screening results were unknown.

Pooled Rate of Complex *Staphylococcus aureus* Surgical Site Infections (SSIs) by Admission Month



CONCLUSIONS AND RELEVANCE In this multicenter study, a bundle comprising *S aureus* screening, decolonization, and targeted prophylaxis was associated with a modest, statistically significant decrease in complex *S aureus* SSIs.

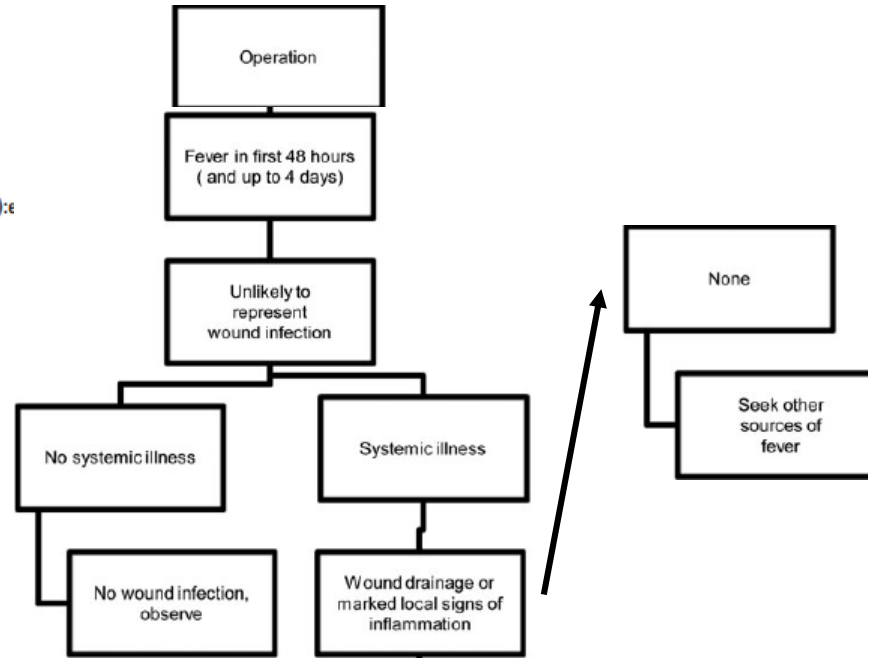
TERAPIA
(infezioni superficiali di ferita chirurgica)

Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America

Clinical Infectious Diseases 2014;59(2):e

Dennis L. Stevens,[1] Alan L. Bisno,[2] Henry F. Chambers,[3] E. Patchen Dellinger,[4] Ellie J. C. Goldstein,[5] Sherwood L. Gorbach,[6] Jan V. Hirschmann,[7] Sheldon L. Kaplan,[8] Jose G. Montoya,[9] and James C. Wade[10]

Wound Infection Algorithm



Algorithm for the management and treatment of surgical site infections (SSIs)

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(infezioni superficiali di ferita chirurgica)

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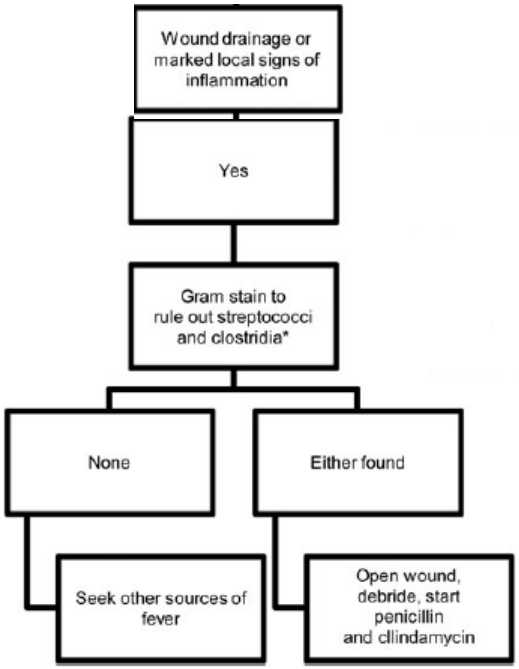

Algorithm for the management and treatment of surgical site infections (SSIs)

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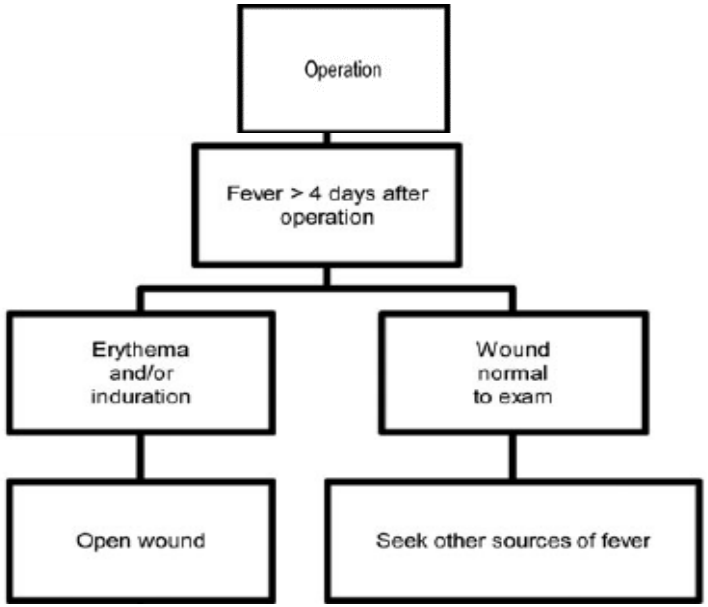

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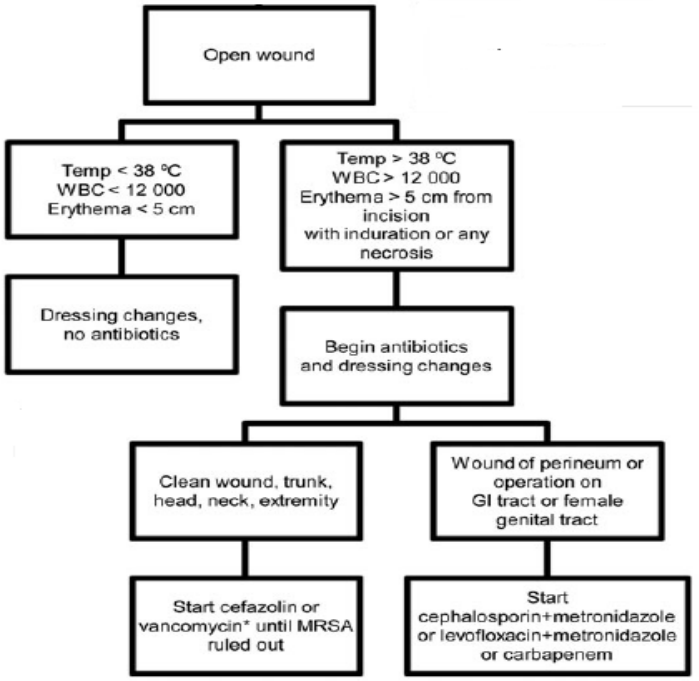

Algorithm for the management and treatment of surgical site infections (SSIs)

CARATTERISTICHE PK/PD

Diagnosis and management of skin and soft-tissue infections (SSTI). A literature review and consensus statement: an update

S. Esposito, M. Bassetti, E. Concia, G. De Simone, F. G. De Rosa, P. Grossi, A. Novelli, F. Menichetti, N. Petrosillo, M. Tinelli, M. Tumbarello, M. Sanguinetti, P. Viale, M. Venditti & C. Viscoli

Journal of Chemotherapy 2017

Tissue penetration (skin and skin structures) of antimicrobial drugs (alphabetical order)

Antibiotic	Administration route	Penetration (T/P)%
Amoxicillin/clavulanic acid	IV	40
Amoxicillin/clavulanic acid	PO	76
Ampicillin/sulbactam	IV	42
Cefazolin	IV	11
Cephalexin	PO	59
Cefepime	IV	134
Ceftaroline		No data
Ceftriaxone	IV	53
Ceftriaxone	IV	92
Ciprofloxacin	PO	57–80
Ciprofloxacin	PO	118–121
Clindamycin	PO	9
Clindamycin	PO	24–82
Dalbavancin	IV	59.6
Daptomycin	IV	19–68
Doxicicline	PO	47
Ertapenem	IV	61
Gentamicin	IM	31
Imipenem/cilastatin	IV	30–47
Imipenem/cilastatin	IV	51–54
Levofloxacin	IV	103
Linezolid	IV/OS	104
Meropenem	IV	87
Oritavancin		No data
Oxacillin*	IV	19
Oxacillin*	IV	11–16
Oxacillin**	IV	56
Penicillin G	IM	17
Piperacillin	IV	100
Piperacillin/tazobactam	IV	35
Rifampin	PO	20
Tedizolid	PO	110–120
Teicoplanin	IV	49
Teicoplanin	IV	63–77
Teicoplanin	IV	24
Telavancin	IV	40
Tigecycline	IV	74
TMP/SMX	PO	37/55
Vancomycin	IV	10–30

TERAPIA
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VII. What Is the Preferred Management of Surgical Site Infections?

Recommendations

22. Suture removal plus incision and drainage should be performed for surgical site infections (strong, low).

23. Adjunctive systemic antimicrobial therapy is not routinely indicated, but in conjunction with incision and drainage may be beneficial for surgical site infections associated with a significant systemic response (Figure 2) such as erythema and induration extending >5 cm from the wound edge, temperature >38.5° C, heart rate >110 beats/minute, or white blood cell (WBC) count >12 000/μL (weak, low).

24. A brief course of systemic antimicrobial therapy is indicated in patients with surgical site infections following clean operations on the trunk, head and neck, or extremities that also have systemic signs of infection (strong, low).

25. A first-generation cephalosporin or an antistaphylococcal penicillin for methicillin-susceptible *Staphylococcus aureus* (MSSA) or vancomycin, linezolid, daptomycin, telavancin, or ceftaroline where risk factors for MRSA are high (nasal colonization, prior MRSA infection, recent hospitalization, recent antibiotics) is recommended (strong, low).

26. Agents active against gram-negative bacteria and anaerobes, such as a cephalosporin or fluoroquinolone in combination with metronidazole are recommended for infections following operations on the axilla, gastrointestinal (GI) tract, perineum, or female genital tract (Table 2) (strong, low).

TERAPIA : QUANDO PENSARE ALL'MRSA

Focus on the prophylaxis, epidemiology and therapy of methicillin-resistant *Staphylococcus aureus* surgical site infections and a position paper on associated risk factors: the perspective of an Italian group of surgeons

G. Sganga[1*], C. Tascini[2], E. Sozio[3], M. Carlini[4], P. Chirletti[5], F. Cortese[6], R. Gattuso[7], P. Granone[8], C. Pempinello[9], M. Sartelli[10] and S. Colizza[11]

World Journal of Emergency Surgery (2016) 11:26

Methods: The authors conducted a systematic review of the literature on SSIs, especially MRSA infections, and used the Delphi method to identify risk factors for these resistant infections.

Results: RF were patients from long-term care facilities, recent hospitalization (within the preceding 30 days), Charlson score > 5 points, COPD and thoracic surgery, antibiotic therapy with beta-lactams (especially cephalosporins and carbapenem) and/or quinolones in the preceding 30 days, age 75 years or older, current duration of hospitalization >16 days, and surgery with prothesis implantation.

TERAPIA
(infezioni superficiali di ferita chirurgica)

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Table 3. Antibiotics for Treatment of Incisional Surgical Site Infections

Surgery of Intestinal or Genitourinary Tract
Single-drug regimens
Ticarcillin-clavulanate 3.1 g every 6 h IV
Piperacillin-tazobactam 3.375 g every 6 h or 4.5 g every 8 h IV
Imipenem-cilastatin 500 mg every 6 h IV
Meropenem 1 g every 8 h IV
Ertapenem 1 g every 24 h IV
Combination regimens
Ceftriaxone 1 g every 24 h + metronidazole 500 mg every 8 h IV
Ciprofloxacin 400 mg IV every 12 h or 750 mg po every 12 h + metronidazole 500 mg every 8 h IV
Levofloxacin 750 mg IV every 24 h + metronidazole 500 mg every 8 h IV
Ampicillin-sulbactam 3 g every 6 h + gentamicin or tobramycin 5 mg/kg every 24 h IV
Surgery of trunk or extremity away from axilla or perineum
Oxacillin or nafcillin 2 g every 6 h IV
Cefazolin 0.5–1 g every 8 h IV
Cephalexin 500 mg every 6 h po
SMX-TMP 160–800 mg po every 6 h
Vancomycin 15 mg/kg every 12 h IV
Surgery of axilla or perineum[a]
Metronidazole 500 mg every 8 h IV
plus
Ciprofloxacin 400 mg IV every 12 h or 750 mg po every 12 h IV po
Levofloxacin 750 mg every 24 h IV po
Ceftriaxone 1 g every 24 h

TERAPIA: NON SOLO OSPEDALIERA

When to switch to an oral treatment and/or to discharge a patient with skin and soft tissue infections

Curr Opin Infect Dis 2018, 30:000–000

Matteo Bassetti[a,b], *Christian Eckmann*[c], *Maddalena Peghin*[a], *Alessia Carnelutti*[a], *and Elda Righi*[a]

- Early (<72 h from diagnosis) assessment of clinical response to treatment can help clinician decisions to switch to oral treatment and discharge the patient.
- Early switch to oral treatment and early patient discharge should always be considered in the management of cSSTIs in order to reduce hospital-associated costs and risks.

Table 1. Main criteria for early switch to oral therapy and early patients' discharge in skin and soft tissue infections

Early switch eligibility criteria for intravenous discontinuation
Intravenous antibiotics for more than 24 h
Stable clinical infection or clinical improvement
Afebrile/temperature of less than 38 °C for more than 24 h
WBC count not less than 4×10^9/l or more than 12×10^9/l
Absence of unexplained tachycardia
SBP of at least 100 mmHg
Patient tolerates p.o. fluids/diet and is able to take p.o. medications with no gastrointestinal absorption problems
Bacteria susceptible to p.o. treatment (if microbiological cultures available)
Early discharge (early discharge) eligibility criteria
All key early switch eligibility criteria listed above
No other reason to stay in hospital except for infection management
Stable mental status
Stable comorbid illness
Stable social situation

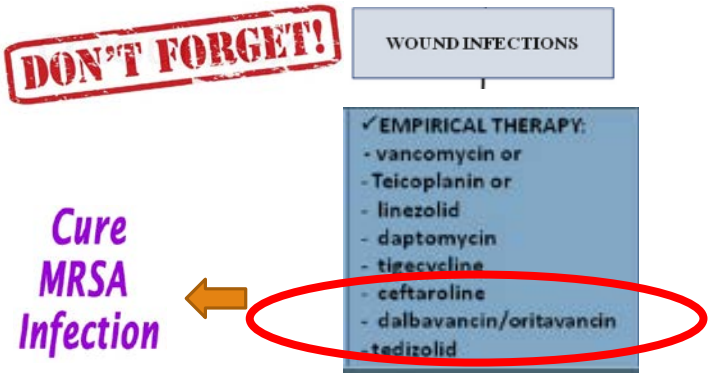
TERAPIA
(infezioni superficiali di ferita chirurgica)

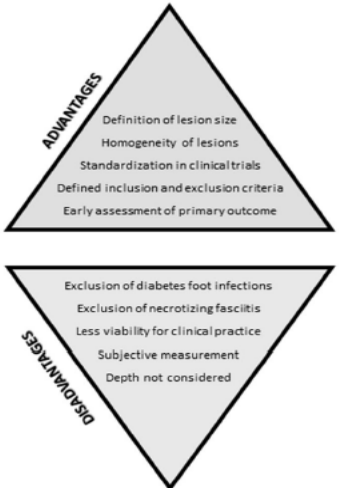
Do not forget new definitions and new drugs
(whose development was based on novel defining criteria)

Intern Emerg Med (2016) 11:637–648

Acute bacterial skin and skin structure infections in internal medicine wards: old and new drugs

Marco Falcone[1] · Ercole Concia[2] · Massimo Giusti[3] · Antonino Mazzone[4]
Claudio Santini[5] · Stefania Stefani[6] · Francesco Violi[7]





FDA 1998	FDA 2013
SSTI or SSSI complicated if: • Involve deep soft tissue • Require surgical intervention • In presence of underlying disease complicating treatment response	**ABSSSI** Revised nomenclature and improve of previous 2010 FDA definition
• **uSSTI:** Cellulitis, impetigous lesions, furuncles, simple abcesses • **cSSTI:** infected ulcers, infected burns, major abscesses	**ABSSSI** •Cellulitis/erysipelas •Wound infection •Major cutaneous abscess
No minimal size required	**ABSSSI=** bacterial infection of the skin with a lesion size area of at least 75 cm^2
Major abscesses not defined	**Minor abscess: <75 cm^2** **Major abscess: ≥75 cm^2**
Systemic signs of infection not required	**Not required fever (as 2010 FDA)** in order to not understimate elderly, diabetics, immunocompromised
Primary endpoint Clinical cure at test of cure visit (7-14 days after end of therapy)	**Primary endopoint** % reduction in the lesion size greater than or equal to 20% at 48 to 72 hours compared to baseline

TERAPIA : UNA PIPELINE AFFOLLATA (1)

Healio Infectious Disease News

Taksta noninferior to Zyvox in treating ABSSSIs, including MRSA

June 4, 2017

NEW ORLEANS — Taksta was noninferior to Zyvox as an oral treatment for acute bacterial skin and skin structure infections, or ABSSSIs, including MRSA, according to phase 3 data presented here.

Amanda Sheets, PhD, associate director of drug development at Cempra Pharmaceuticals, which conducted the study, characterized the results as “pivotal” to finally getting Taksta (fusidic acid, Cempra) approved in the United States.

FDA NEWS

FDA approves Baxdela for treatment of ABSSSIs

June 20, 2017

The FDA recently approved an IV and oral formulation of Baxdela, an anionic fluoroquinolone, for the treatment of acute bacterial skin and skin structure infections, or ABSSSIs, including MRSA.

The approval of both formulations is supported by data from two phase 3 trials that showed Baxdela (delafloxacin, Melinta Therapeutics) had similar safety and efficacy profiles against ABSSSIs compared with a combination regimen of vancomycin and aztreonam, according to a press release from the manufacturer.

TERAPIA : UNA PIPELINE AFFOLLATA (2)

Healio Infectious Disease News

MEETING NEWS

European Congress of Clinical Microbiology and Infectious Diseases

Omadacycline noninferior to Zyvox in treating ABSSSIs, including MRSA

April 28, 2017

Treatment of skin infections with the antibiotic omadacycline was noninferior to Zyvox in a phase 3 study, researchers said at the European Congress of Clinical Microbiology and Infectious Diseases in Vienna.

MEETING NEWS

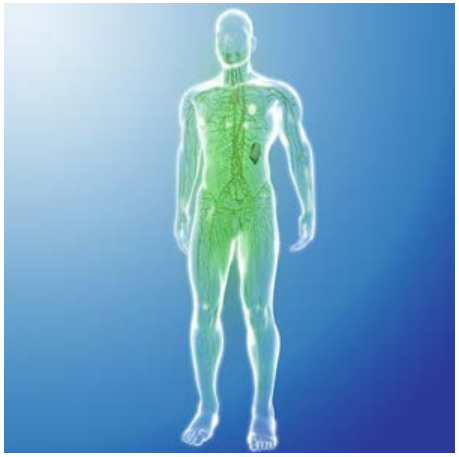
European Congress of Clinical Microbiology and Infectious Diseases

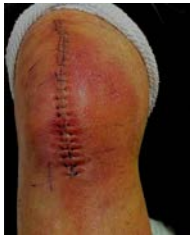
Iclaprim safe, potentially cost-effective for ABSSSIs

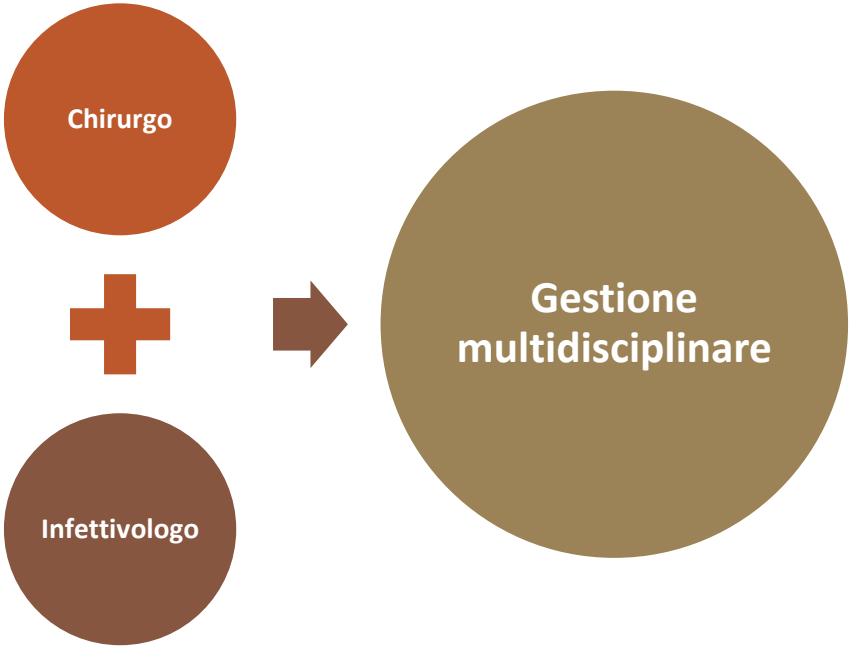
April 30, 2018

Motif Bio announced additional safety data from its REVIVE-2 trial of the investigational antibiotic iclaprim, showing that the treatment was well-tolerated in patients with acute bacterial skin and skin structure infections, or ABSSSIs. Other findings, presented at the European Congress of Clinical Microbiology and Infectious Diseases, showed that the drug could reduce the cost burden of acute kidney injury normally associated with vancomycin, which is currently the standard

TERAPIA : INFEZIONI PROFONDE

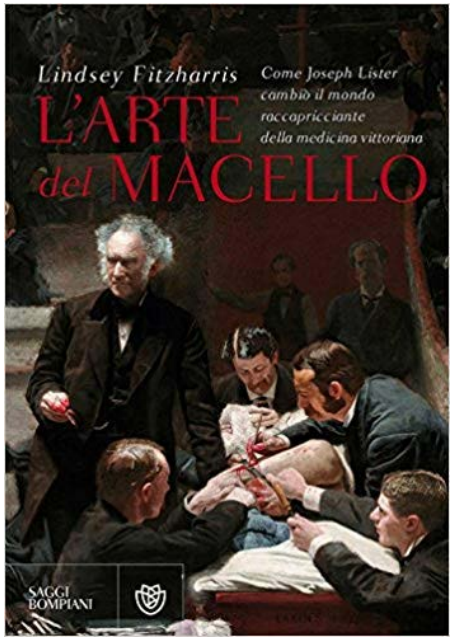


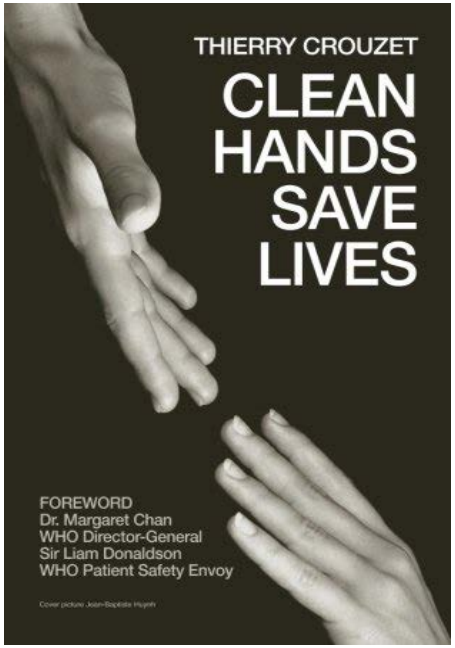




In questi casi la terapia dipende dalla sede di infezione.
Particolare attenzione va posta alle Prosthetic Joint Infection nel setting ortopedico (fino a un anno dall'impianto).

CONSIGLI DI LETTURA





GRAZIE PER L'ATTENZIONE