

# Ainda é possível reduzir as taxas de resistência antimicrobiana por meio da utilização de programas de racionalização de antimicrobianos?

## SIM

Cláudia Maio Carrilho

CCIH/UTI

UEL



# TEMOS UM GRAVE PROBLEMA

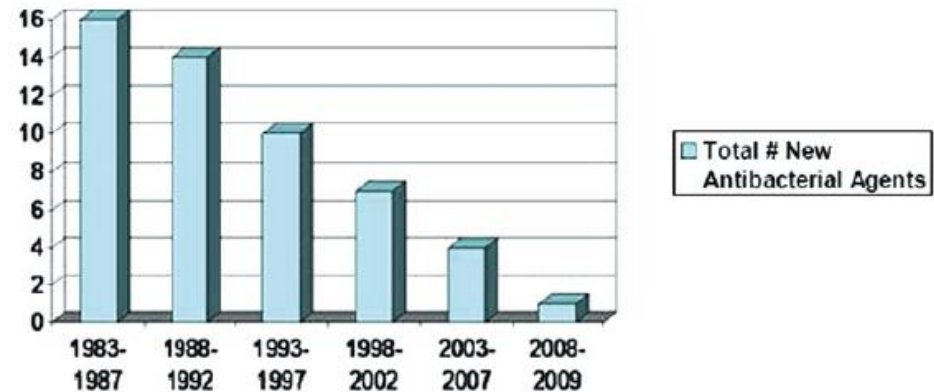
## ESKAPE Pathogens

-  *Enterococcus faecium*
-  *Staphylococcus aureus*  
• *Streptococcus pneumoniae*
-  *Klebsiella pneumoniae*
-  *Acinetobacter baumannii*
-  *Pseudomonas aeruginosa*
-  *Enterobacteriaceae*

We Need Them, but They Have Become Part of the Problem

31

DECLINING ANTIBACTERIAL APPROVALS (PAST 25 YEARS)

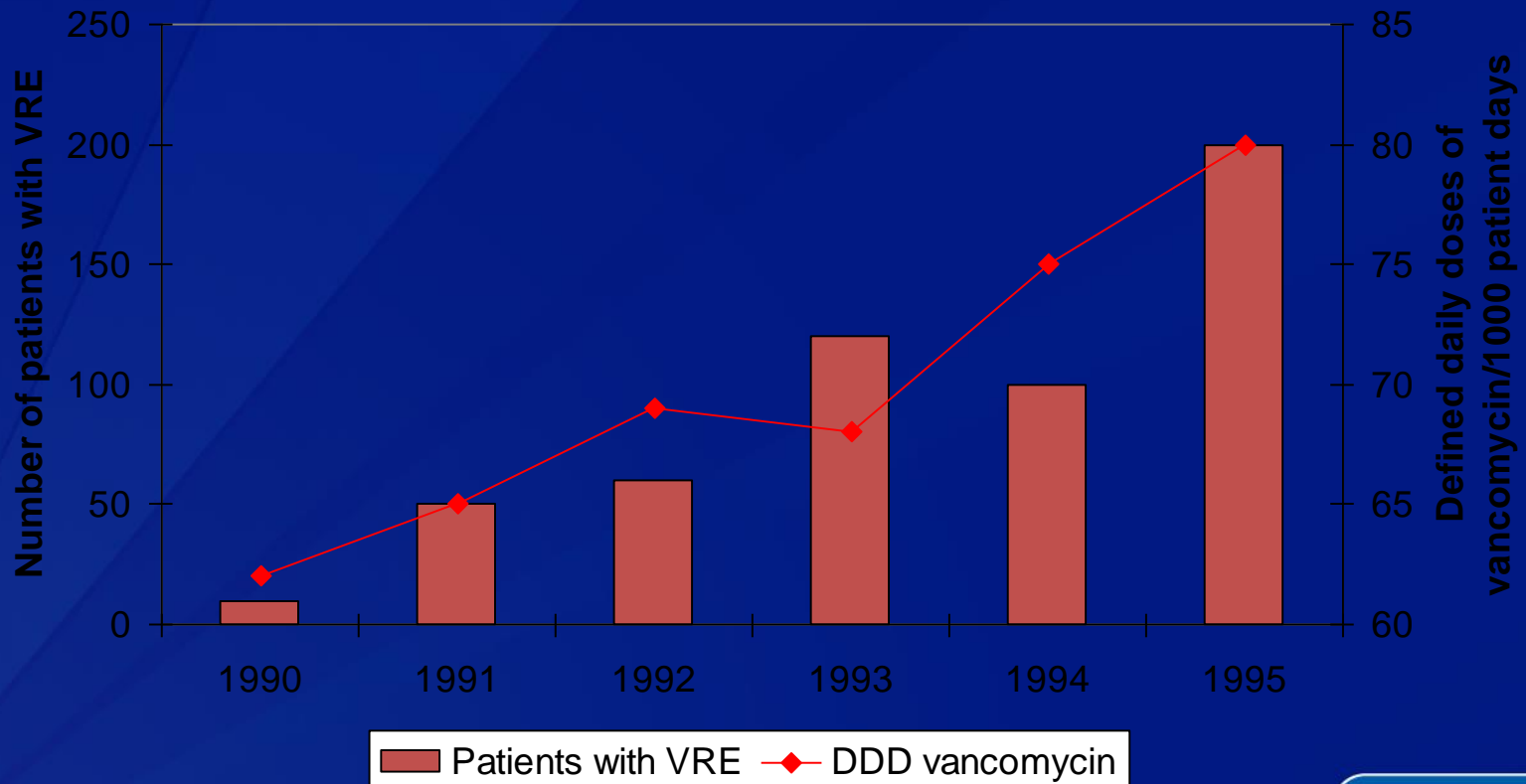


Spellberg, CID 2004, Modified

Fig. 4.2 Approval of antibiotics at the FDA over time. From the Infectious Diseases Society of America with permission

# Associação do uso de vancomicina com resistência

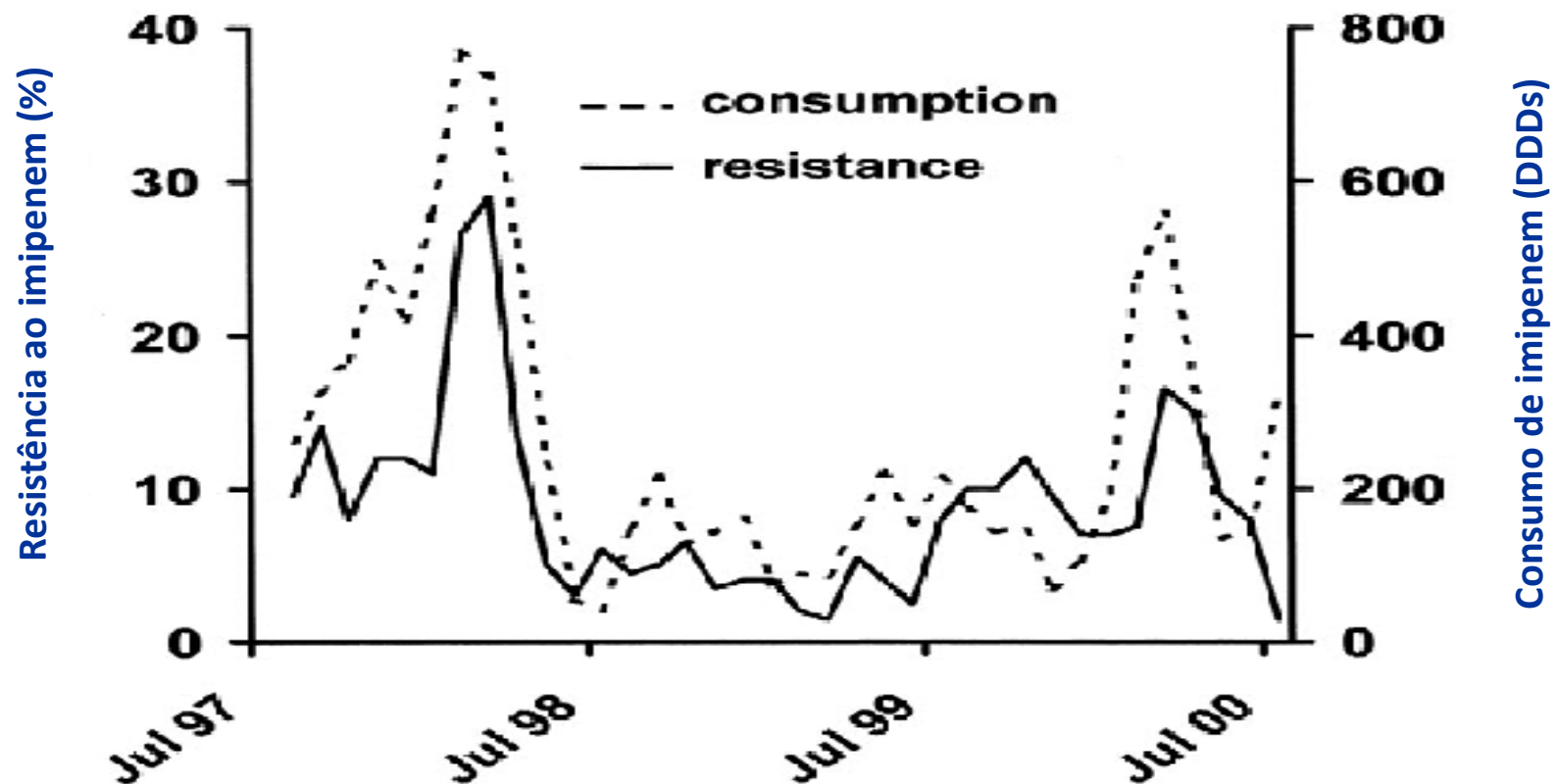
(JID 1999;179:163)



# Consumption of Imipenem Correlates with $\beta$ -Lactam Resistance in *Pseudomonas aeruginosa*

Philipp M. Lepper,<sup>1</sup> Eberhard Grusa,<sup>2</sup> Helga Reichl,<sup>3</sup> Josef Högel,<sup>4</sup> and Matthias Trautmann<sup>1\*</sup>

Section of Hospital Hygiene, Department of Medical Microbiology and Hygiene, Ulm University Hospital,<sup>1</sup> and Institute of Biometry and Medical Documentation, University of Ulm,<sup>4</sup> Ulm, and Clinical Pharmacy<sup>2</sup> and Microbiological Laboratory,<sup>3</sup> Klinikum Memmingen, Memmingen, Germany



# CONSENSO

- **CONTROLE DE ANTIMICROBIANOS**
- **VÁRIAS OPÇÕES FORAM SUGERIDAS**
  - Formulários de restrição
  - Pré-autorização
  - Uso cíclico
  - Etc
- **Antimicrobial Stewardship Program**

# SIMPLES

- **BÁSICO**

—“4 Ds”

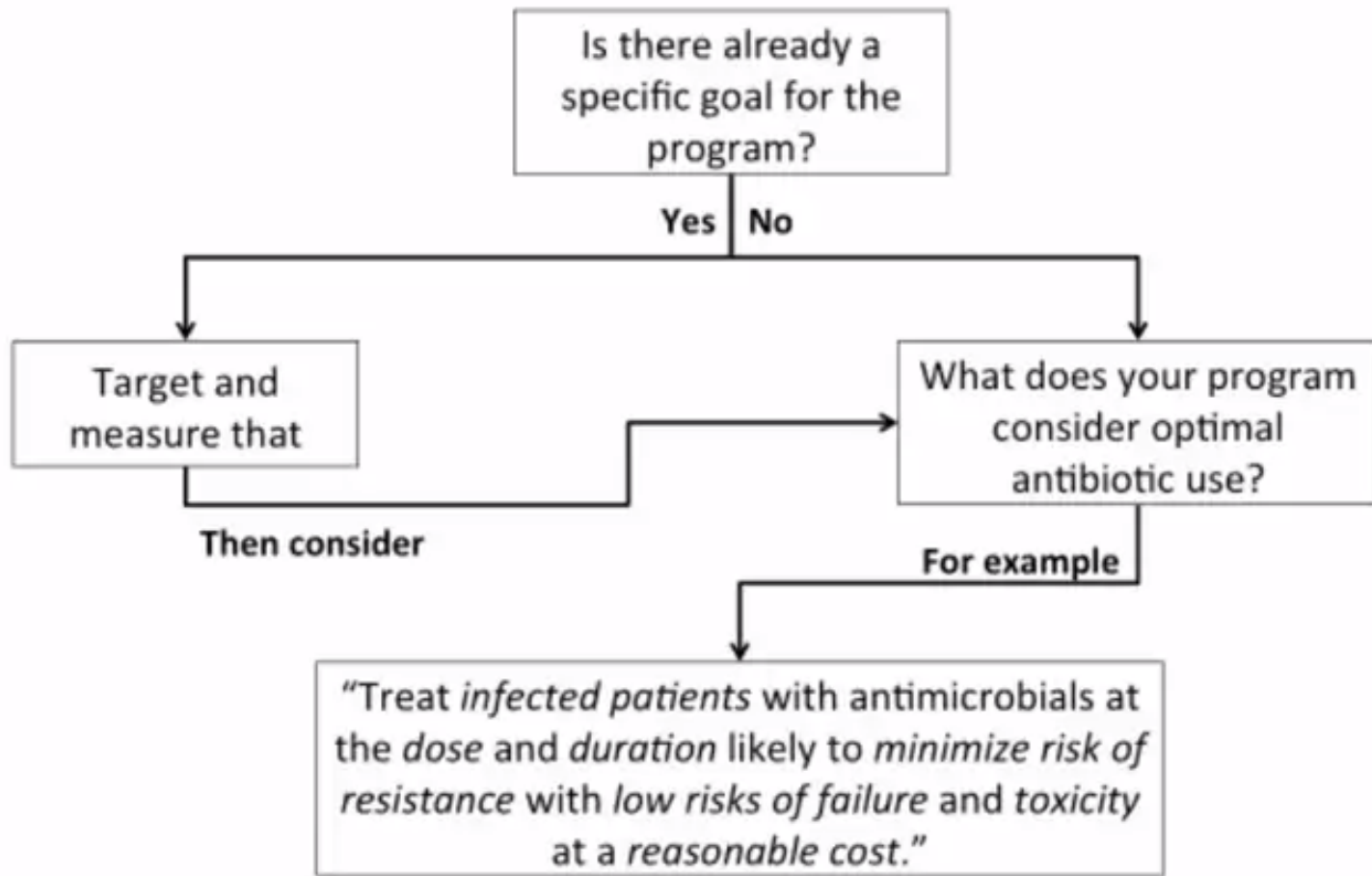
- **D**ose - correta
- “ **D**elivery” - melhor
- **D**uração - menor
- **D**e-escalonamento - possível

**BOAS PRÁTICAS NO USO ...**

**Não é novidade!**



# What should I measure?



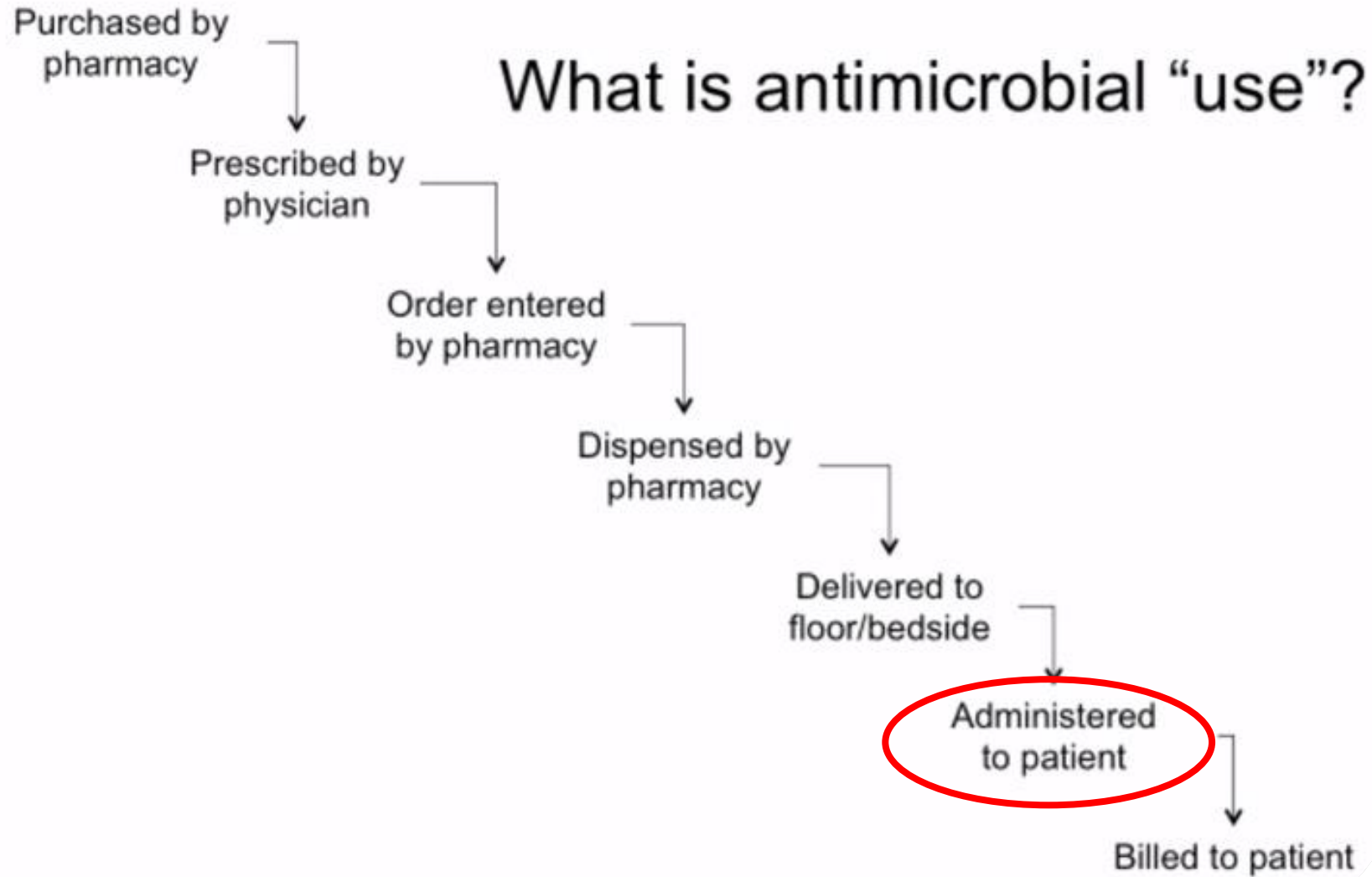


Goal	Example Process Metric	Example Outcome Metric
Treat <i>infected</i> patients...	% of blood cultures ordered as pairs	% of blood cultures with contamination
...with antimicrobials at the <i>dose</i> ...	% of regimens meeting institutional dosing guidelines	% of vancomycin levels in therapeutic range
...and <i>duration</i> ...	% of orders with duration	Mean duration of therapy
...likely to <i>minimize risk of resistance</i> ...	Total antimicrobial utilization of cephalosporins	ESBL-producing isolates/1000 patient days
...with <i>low risks of failure</i> ...	% of VAP regimens meeting guidelines	Infection-related mortality for VAP
...and <i>toxicity</i> ...	% of regimens with monitoring	Antimicrobial-related adverse event reports
...at a <i>reasonable cost</i> .	% of IV to PO conversions	Total antimicrobial expenditures

# What is antimicrobial “use”?

Administered  
to patient

# What is antimicrobial “use”?



18/11

# Dia da consciência do antibiótico

*Clin Microbiol Infect.* 2014 Oct 1. doi: 10.1111/1469-0691.12791. [Epub ahead of print]

## Editorial - CMI Themed section October 2014 'Antimicrobial stewardship: an international emergency'

Pulcini C<sup>1</sup>, Mainardi JL.

### Author information

### Abstract

The 'European Antibiotic Awareness Day' will take place on the 18th November, and is now a well-known event, six years after its first launch by the European Centre for Disease Prevention and Control (ECDC) [1]. Bacterial resistance is increasing worldwide, and has been identified as one of the most serious public health issues of our time by the WHO, and was qualified as a 'problem so serious that it threatens the achievements of modern medicine. A post-antibiotic era-in which common infections and minor injuries can kill-far from being an apocalyptic fantasy, is instead a very real possibility for the 21st century' [2]. This article is protected by copyright. All rights reserved.

## Resistência bacteriana:

- ↑ global
- sério problema de saúde pública
- ameaça muitas realizações da medicina moderna



# NATIONAL STRATEGY FOR COMBATING ANTIBIOTIC- RESISTANT BACTERIA

*Vision: The United States will work domestically and internationally to prevent, detect, and control illness and death related to infections caused by antibiotic-resistant bacteria by implementing measures to mitigate the emergence and spread of antibiotic resistance and ensuring the continued availability of therapeutics for the treatment of bacterial infections.*

September 2014



# Detect and Protect Against Antibiotic Resistance

*CDC's Initiative to outsmart this threat*

## The problem

It's been called public health's ticking time bomb. Antibiotic resistance—when bacteria don't respond to the drugs designed to kill them—threatens to return us to the time when simple infections were often fatal. Today, antibiotic resistance annually causes more than 2 million illnesses and 23,000 deaths in the United States. Tomorrow, if it continues on its current course, could be even worse:

- A simple cut of the finger could lead to a life-threatening infection.
- Common surgical procedures, such as hip and knee replacements, would be far riskier because of the danger of infection.
- Dialysis patients could develop untreatable bloodstream infections.
- Life-saving treatments that suppress immune systems, such as chemotherapy and organ transplants, could potentially cause more harm than good.

## The solution

We need to outsmart antibiotic resistance—now. CDC identified four core actions to be addressed by all partners in AR:

- **Detect** and track patterns of antibiotic resistance.
- **Respond** to outbreaks involving antibiotic-resistant bacteria.
- **Prevent** infections from occurring and resistant bacteria from spreading.
- **Discover** new antibiotics and new diagnostic tests for resistant bacteria.

CDC's **Detect and Protect Against Antibiotic Resistance Initiative** (known as the **AR Initiative**) is a part of the broader CDC strategy to target investment aimed at AR. The 2015 President's Budget requests \$30 million annual funding for 5 years for the **AR Initiative** to achieve measurable results in the first three core actions and support the National Institutes of Health (NIH) and private industry in their discovery efforts.

# FIGHTING BACK AGAINST ANTIBIOTIC RESISTANCE

## Four Core Actions to Prevent Antibiotic Resistance

### 1 PREVENTING INFECTIONS, PREVENTING THE SPREAD OF RESISTANCE



Avoiding infections in the first place reduces the amount of antibiotics that have to be used and reduces the likelihood that resistance will develop during therapy. There are many ways that drug-resistant infections can be prevented: immunization, safe food preparation, handwashing, and using antibiotics as directed and only when necessary. In addition, preventing infections also prevents the spread of resistant bacteria.

### 2 TRACKING



CDC gathers data on antibiotic-resistant infections, causes of infections and whether there are particular reasons (risk factors) that caused some people to get a resistant infection. With that information, experts can develop specific strategies to prevent those infections and prevent the resistant bacteria from spreading.

### 3 IMPROVING ANTIBIOTIC PRESCRIBING/STEWARDSHIP



Perhaps the single most important action needed to greatly slow down the development and spread of antibiotic-resistant infections is to change the way antibiotics are used. Up to half of antibiotic use in humans and much of antibiotic use in animals is unnecessary and inappropriate and makes everyone less safe. Stopping even some of the inappropriate and unnecessary use of antibiotics in people and animals would help greatly in slowing down the spread of resistant bacteria. This commitment to always use antibiotics appropriately and safely—only when they are needed to treat disease, and to choose the right antibiotics and to administer them in the right way in every case—is known as antibiotic stewardship.

### 4 DEVELOPING NEW DRUGS AND DIAGNOSTIC TESTS



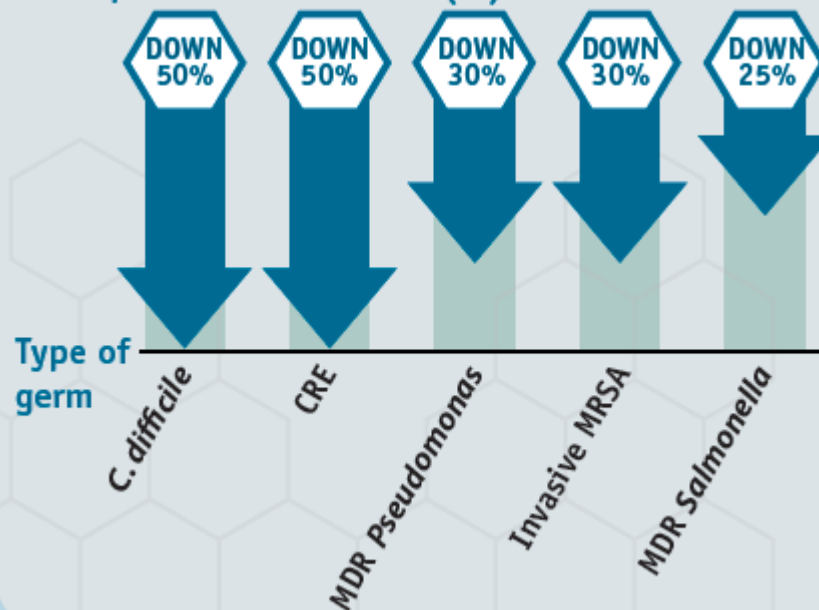
Because antibiotic resistance occurs as part of a natural process in which bacteria evolve, it can be slowed but not stopped. Therefore, we will always need new antibiotics to keep up with resistant bacteria as well as new diagnostic tests to track the development of resistance.

## The results

With a \$30 million annual funding level over 5 years, CDC's **AR Initiative** could achieve a:

- 50% reduction in healthcare-associated *C. difficile*, which saves 20,000 lives, prevents 150,000 hospitalizations, and cuts more than \$2 billion in healthcare costs
- 50% reduction in healthcare-associated CRE infections
- 30% reduction in healthcare-associated multidrug-resistant (MDR) *Pseudomonas*, a common cause of healthcare-associated infections
- 30% reduction in invasive MRSA
- 25% reduction in MDR *Salmonella* infections

### Anticipated reduction rate (%)





# AR : 2 frentes



## Improve detection through regional labs

*A new regional lab network and resistant-bacteria bank will speed up outbreak detection and provide a tool to aid development of new antibiotics and diagnostics.*

- ▶ A new 5-region **AR Regional Lab Network** improves our response to outbreaks of infectious disease by **speeding up** the identification of the most concerning resistant threats. The Network helps in other ways—in **increasing susceptibility testing** (to see which antibiotics stop bacteria from growing) for high-priority bacteria like CRE and in **keeping pace with rapidly mutating bacteria** so labs are ready to respond to new threats. The Lab Network will identify drug-resistant threats that are candidates for **new diagnostics and antibiotics**. And because of innovations made possible by Advanced Molecular Detection (AMD), the Lab Network provides a **cutting-edge testing platform** that not only increases the amount of testing but also ensures that all labs in the network can easily share new discoveries.
- ▶ A new **Resistant-Bacteria Bank** (called AR Isolate Library), a unique centralized collection of samples of resistant bacteria that are made available to:
  - **Pharmaceutical companies** testing new antibiotic agents.
  - **Biotech and diagnostic companies** designing next-generation clinical tests.
  - **Researchers** evaluating the effectiveness of interventions to reduce antibiotic resistance.
- ▶ A new **public data portal** will show national trends as well as variations in antibiotic prescribing and resistance among states and regions.

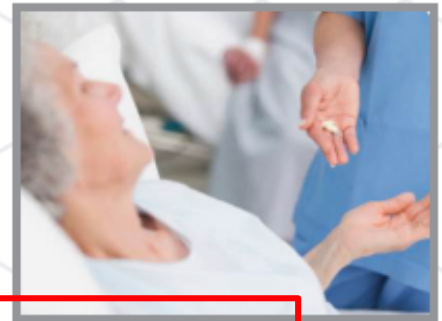




## Prevent infections and improve antibiotic prescribing practices—in healthcare facilities and in the community

*Closer collaboration with healthcare facilities and large health systems will strengthen stewardship programs and reduce antibiotic resistance.*

- ▶ **Establish the AR Prevention Collaboratives**—Groups of healthcare facilities in communities around the country that work together to implement best practices for **inpatient antibiotic prescribing and preventing infections**. The Collaboratives will **scale up, or extend the reach of interventions** that have been reducing or stopping antibiotic-resistant threats. The AR Prevention Collaboratives will also encourage **involvement of large health systems**, which will help bridge interventions between hospitals and long-term care facilities.
- ▶ **Target concerning community threats**, like MDR *Salmonella* and MDR *N. gonorrhoeae* infections.
- ▶ **Improve antibiotic stewardship** (meaning good antibiotic prescribing practices) by evaluating state-to-state variations in antibiotic use to improve outpatient prescribing nationwide.
- ▶ **Launch Antibiotic Adverse Event Study**, to see what effect antibiotics given to infants and young children have on future health problems, such as obesity, asthma, eczema, allergies, and *C. difficile* infections.



# HAI Prevention Stories from the States

## Improving Inpatient

- Convened an Antibiotic Stewardship Committee of key stakeholders that established the strategic framework for statewide activities and provided support for implementation.
- Initiated an antibiotic stewardship assessment to determine baseline hospital prescribing practices and to track practices over time.
- Created training programs to help pharmacists and physicians lead antibiotic stewardship programs in their hospitals. This activity multiplied the number of Georgia physician and pharmacist champions for the improvement of antibiotic prescribing.

### Measure

Georgia assessed activities statewide. In their efforts, they of Georgia hospitals to improve prescribing implementing specific actions.

### Focus on Pharmacists

After focus groups identified a statewide need for training and education related to running antibiotic stewardship programs, Georgia is providing modest funding to hospitals for additional pharmacists to attend such training.

### Convene

To develop a statewide network of hospital champions for antibiotic

resistance and putting patients at risk for *Clostridium difficile* infection (deadly diarrhea), and future infections that are harder to treat.

The Georgia Department of Public Health provides leadership to healthcare facilities across the state to improve antibiotic prescribing practices. Long-term goals are to decrease *Clostridium difficile* and drug-resistant infections across the state.

## What We Did

The Georgia Department of Public Health:

- Conducted a focus group with hospital pharmacists. Identified additional training and stipends to cover educational events as their most important needs.
- Expanded professional partnerships for antibiotic stewardship across the state to include the Atlanta Chapter of the Society for Hospital Medicine, the Atlanta Infectious Disease Society, and the Medical Association of Georgia.

## What We Accomplished

Through this work, the Georgia Department of Public Health has solidified its role as the statewide leader in stewardship. The agency established the overall direction by convening an antibiotic stewardship subcommittee that developed a strategic plan-building new partnerships to extend the reach of the program; creating and disseminating tools and education to stimulate stewardship activity; and identifying and implementing an approach to assess stewardship activities

Georgia is currently launching its hospital Honor Roll program to encourage further improvement in antibiotic prescribing. This program, which will publicly recognize hospitals working to improve prescribing practices, will be a vehicle to both initiate as well as advance hospital programs across Georgia.

antibiotic stewardship programs.

National Center for Emerging and Zoonotic Infectious Diseases  
Division of Healthcare Quality Promotion



### For information about this story, contact:

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Publication date: 03/04/2014



# HAI Prevention Stories from the States

## South Dakota

SD

### State Secretary of Health

South Dakota Secretary of Health called on health leadership to improve antibiotic prescribing across the state.

### Top-down Approach

Health system leaders were involved from the beginning, providing authority to affect changes throughout health systems and facilities.

### Flagship Facilities

South Dakota's three largest health systems have inpatient antibiotic stewardship programs at flagship facilities. Once they implemented this program, 47% of acute care inpatient state will be covered.

### Collaborative

South Dakota's program was developed from the Indian Health Service medical association, a quality improvement organization, the hospital association, pharmacy association, state infection control council, hospitals, long-term care facilities, medical schools, and clinics.

In addition, the state provided training on drug resistance and stewardship for infection prevention nurses, physicians and administrators from various healthcare facilities across the state. These included:

- "Bugs and Drugs" symposium featuring CDC subject matter experts. More than 300 health care providers attended. This session was taped and is being used as a training resource for facilities.
- Regular training sessions for providers.

help ensure antibiotics remain effective and are used only when needed for the state's 833,354 residents.

This effort grew out of the state's aggressive response to a cluster of serious infections caused by carbapenem-resistant Enterobacteriaceae (CRE). As the South Dakota Department of Health worked with health care facilities to reduce CRE, it became clear that the state needed to tackle the underlying problem of drug-resistant organisms in general.

The health department surveyed hospitals and nursing homes and found only 21% had programs in place to assure good antibiotic stewardship. As a result, the Department of Health created a comprehensive statewide program to improve antibiotic prescribing practices. The program included training on drug

- **Regional Health – expanded longstanding stewardship efforts in hospitals to include long-term care facilities. Continues intense, real time oversight to assure appropriateness of prescribing and prevention of unnecessary prescribing of high-risk antibiotics by requiring physician or pharmacist approval before they can be given (preauthorization).**

## What We Did

South Dakota involved clinical and administrative leadership from hospitals across the state from the beginning, forming multidisciplinary teams.

## What We Accomplished

South Dakota's three largest health systems have since put antibiotic prescribing improvement programs in place. All three systems have multidisciplinary teams, all have at least one measure in place to assure correct prescribing of antibiotics, and all have put process measures in place to measure improvements. In addition, the state sponsors educational opportunities for providers and the general public.

- Avera Health – achieved 50% decrease of prescriptions for antibiotics linked to *C. difficile* infections. Created clinical guidelines for treatment of pneumonia.
- Sanford Health – created clinical guidelines and patient handouts for pneumonia, urinary tract infections, upper respiratory infections, *C. difficile* and MRSA for system-wide use. This facility is working to assure timely communication of lab results between physicians and labs.
- IHS – created system-wide multidisciplinary team to provide antibiotic guidelines and general microbiology information to individual service units.

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Web: <http://www.cdc.gov/HAI/>  
Publication date: 03/04/2014



## Improvement Efforts in Antibiotic Therapy for the Christian Hospital

### **Bhumi Pathak, Pharm.D.**

Clinical Pharmacist  
Christian Hospital  
BJC Healthcare  
St. Louis, MO

We are an 485 bed non-teaching hospital. We do not have an ID pharmacist on staff. Our stewardship program is run primarily by clinical pharmacists with support from pathology and a consulting ID physician."

We began our stewardship efforts by examining how antibiotics were being prescribed at our hospital. We found that a lot of our use was directed at infections caused by MRSA, *Pseudomonas* and *Enterococcus*. Thus, we felt that efforts to improve the appropriate selection of empiric antibiotic therapy and de-escalating therapy based on culture results for these pathogens would result in decreased antimicrobial resistance and substantial cost savings.

### **To accomplish our goals we:**

Ensured the appropriate empiric antibiotic selection was made for at risk patients, by collaborating with pathology to create an antibiogram specifically for MRSA, *Pseudomonas*, and *Enterococcus* in the ICU units, and consulting with the ID physician to establish empiric therapy guidelines. In addition, the clinical pharmacists conducted risk factor assessments on all patients initiated on any anti-MRSA, anti-pseudomonal, and anti-enterococcal antibiotics within 24 hours of therapy start date.

Required cultures to be drawn prior to initiating any IV antibiotic therapy. This was done with collaboration between Pharmacy and the Emergency Department to create a system to notify nursing of the need for cultures prior to initiating antibiotic.

Ensured appropriate de-escalation of antibiotic therapy based on culture results. The clinical pharmacist documented whether appropriate de-escalation occurred and intervened on cases where needed.

We believe that careful monitoring of our outcomes is critical and so we measured an outcome for each of our interventions. Our efforts have been very successful to date. At the end of the pilot period:

80% of patients got appropriate empiric antibiotics

92% of patients got baseline cultures prior to antibiotic start

56% of our recommendations to de-escalate therapy were accepted

64% of patients had therapy modified based on culture results

## Stewardship Activities for the NYU Langone Medical Center

### Sapna Mehta, MD

Medical Director of Antimicrobial Stewardship Program  
NYU Langone Medical Center  
New York, NY

NYU Langone Medical Center is a 970-bed tertiary care teaching hospital serving the metropolitan New York City area. Our antimicrobial stewardship program is staffed by an infectious diseases physician (part-time) and two infectious diseases clinical pharmacists (full-time). The program is funded by the hospital, and has three major goals:

Ensuring antimicrobials are optimized – the right drug with the narrowest spectrum for the appropriate duration of therapy;

Reduce *C. difficile* illness and carbapenem-resistant Enterobacteriaceae ;

Conduct research to measure the impact of antibiotic stewardship on patient safety.

Over the past year, we've initiated new stewardship activities that have been quite successful.

We implemented a tiered system of antimicrobial pre-authorization and ordering which enables providers to order timely initial broad-spectrum therapy (in the setting of high rates of MDROs) yet incorporates guidance and review by our antimicrobial stewardship team. This system places all antimicrobials into 3 tiers:

Tier 1 antimicrobials are most restricted and require pre-approval. The initial course of therapy lasts only 4 days, after which the clinician is required to contact the program and review microbiology and clinical results to decide on type and duration of therapy. Antimicrobials in this group include carbapenems, most fluoroquinolones, tigecycline, polymixin B, linezolid and daptomycin.

Tier 2 antimicrobials may be ordered by all providers for 4 days only – then the clinician must call the program to review the patient data and decide on type and duration of therapy. Antimicrobials in this class include 3rd and 4th generation cephalosporins, piperacillin-tazobactam, and aztreonam.

Tier 3 antimicrobials are unrestricted.



**Key components** of this program include early audit and feedback from our stewardship team for continued therapy of all restricted antimicrobials, 4-day automatic-stop on initial orders, electronic reminders to clinicians if an antimicrobial is about to expire and all clinicians, including infectious disease physicians, are included in the review process . In addition to ensuring appropriate use of antimicrobials, a major goal of the program is to reduce C. difficile illness and carbapenem-resistant Enterobacteriaceae by targeting the use of fluoroquinolones and carbapenems, plus ensuring appropriate duration of therapy for all antimicrobials.

We measure utilization both by DDD and days of therapy. Prior to implementation of the program, our baseline monthly utilization (in DDD) for oral ciprofloxacin ranged from 24.6 to 34.3 (per 1000 patient days) and for meropenem 10.1 to 13.3 (per 1000 patient days). Six months after implementation, we have seen a reduction in utilization for these targeted agents with oral ciprofloxacin use ranging from 18.3 to 21.4 and meropenem use 4.4 to 6.1 in the last 2 months.

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In addition, we developed an institution-specific antibiotic info pocket card with 3 main features:

Key info on our stewardship program (pre-authorization procedures, pager numbers, pharmacy numbers)

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Detailed dosing protocols for weight-based vancomycin therapy and for aminoglycosides

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A table of formulary antimicrobials with helpful info (e.g. loading dose, dosing for different syndromes, medication interactions/contraindications) and renal adjustment doses

## The impact of an antimicrobial stewardship programme on the use of antimicrobials and the evolution of drug resistance.

Del Arco A<sup>1</sup>, Tortajada B, de la Torre J, Olalla J, Prada JL, Fernández F, Rivas F, García-Alegría J, Faus V, Montiel N.

### ⊕ Author information

#### Abstract

Misuse of antibiotics can provoke increased bacterial resistance. There are no immediate prospects of any new broad-spectrum antibiotics, especially any with activity against enterobacteria, coming onto the market. Therefore, programmes should be implemented to optimise antimicrobial therapy. In a quasi-experimental study, the results for the pre-intervention year were compared with those for the 3 years following the application of an antimicrobial stewardship programme. We describe 862 interventions carried out as part of the stewardship programme at the Hospital Costa del Sol from 2009 to 2011. We examined the compliance of the empirical antimicrobial treatment with the programme recommendations and the treatment optimisation achieved by reducing the antibiotic spectrum and adjusting the dose, dosing interval and duration of treatment. In addition, we analysed the evolution of the sensitivity profile of the principal microorganisms and the financial savings achieved. 93 % of the treatment recommendations were accepted. The treatment actions taken were to corroborate the empirical treatment (46 % in 2009 and 31 % in 2011) and to reduce the antimicrobial spectrum taking into account the antibiogram results (37 % in 2009 and 58 % in 2011). The main drugs assessed were imipenem/meropenem, used in 38.6 % of the cases, and cefepime (20.1 %). The sensitivity profile of imipenem against *Pseudomonas aeruginosa* increased by 10 % in 2011. Savings in annual drug spending (direct costs) of 30,000 Euros were obtained. Stewardship programmes are useful tools for optimising antimicrobial therapy. They may contribute to preventing increased bacterial resistance and to reducing the long-term financial cost of antibiotic treatment.

**Pré-intervenção (1 ano) – ASP – Pós-intervenção (3 anos), 862 intervenções**

**Compliance tto empírico X ASP (otimização, de-escalamento, dose, intervalo e duração)**

**Perfil de sensibilidade MO prevalentes**

**Economia**

**Pós:**

**93% recomendações eram aceitas;**

**Tto empírico: 46% (2009) x 31% ↓ (2011)**

**Redução espectro: 37% (2009) x 58% (2011) ↑**

**ATB avaliados: imipenem/meropenem (38,6%) e cefepime (20,1%)**


**Sensibilidade *P. aeruginosa* ao imipenem ↑ em 10% em 2011**

**Economia (custos diretos): 30.000 € ↓**



# Optimizing antimicrobial therapy in critically ill patients

Virginie Vitrat<sup>1</sup>  
Serge Hautefeuille<sup>2</sup>  
Cécile Janssen<sup>1</sup>  
David Bougon<sup>2</sup>  
Michel Sirodot<sup>2</sup>  
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**Table I** Summary of main studies on ASPs in ICUs

Authors	Study design	Strategy/procedure	Study results
Slain et al <sup>92</sup>	Pre-/post-intervention Observational study ICU		– Transitory decrease in <i>Pseudomonas aeruginosa</i> resistance
Carling et al <sup>88</sup>	Pre-/post-intervention (7 yrs) Observational study All units		– Significant decrease of parenteral broad-spectrum antibiotics
Katsios et al <sup>93</sup>	Pre-/post-intervention Observational study ICU		– Decrease in nosocomial infections by <i>Clostridium difficile</i> or resistant <i>Enterobacteriaceae</i>
Rimawi et al <sup>102</sup>	269 patients Pre-/post-intervention Observational study ICU 246 patients		– Significant reduction in extended-spectrum antibiotics, carbapenem, vancomycin, metronidazole – Better adherence to guidelines – Reduction in mechanical ventilation days, length of stay, and costs – <b>Reduction in mortality</b> – Multivariate analysis: emergence of MRSA was significantly
Kim et al <sup>96</sup>	Open-label randomized Monocentric ICU 109 patients		– <b>Reduction in hospital mortality and 90-day mortality</b>
Garnacho-Montero et al <sup>97</sup>	Prospective study in ICU 628 patients		
Ng et al <sup>91</sup>	Pre-/post-intervention Observational study All units	Antibiotic restriction	– Decrease in restricted and non-restricted antibiotic consumption
Gentry et al <sup>94</sup>	Pre-/post-intervention Observational study ICU	Antibiotic restriction	– Reduced length of stay
Rahal et al <sup>95</sup>	Pre-/post-intervention Observational study ICU		– Significant decrease in resistant <i>Klebsiella</i> spp. – Increase in imipenem use and incidence of imipenem-resistant <i>P. aeruginosa</i>
Jain et al <sup>103</sup>	All units sub-study Pre-/post-intervention 196 ICUs		– Decrease in infections caused by MRSA and other pathogens
Huskins et al <sup>104</sup>	2 million patients 18 ICUs		– Improved time to effective and optimal antibiotic therapy – <b>Decreased mortality</b> , length of stay in ICU, and recurrent bacteremia
Huang et al <sup>105</sup>	9,000 patients All units 501 patients		

# 1997, Londrina – *P. aeruginosa*

- Sensibilidade à ceftazidima – 13%
- 1 ano sem uso
- 40% sensibilidade
- Minimo uso
- 2014 - 60%

# Aguardando....

*Clin Microbiol Infect.* 2014 Oct 8. doi: 10.1111/1469-0691.12803. [Epub ahead of print]

## **Success stories of implementation of antimicrobial stewardship: a narrative review.**

Huttner B<sup>1</sup>, Harbarth S, Nathwani D; the ESCMID Study Group for Antibiotic Policies (ESGAP).

### Author information

#### **Abstract**

It has been increasingly recognized that antimicrobial stewardship (AMS) has to be a key component of any efforts that aim to mitigate the current global antimicrobial resistance (AMR) crisis. It has also become evident that AMR is a problem that cannot be tackled by single institutions or physicians, but needs concerted actions at regional, national and supra-national levels. However, it is easy to become discouraged, given the problems that are often encountered when implementing AMS. The aim of this review is to highlight some of the success stories of AMS strategies, and to describe the actions that have been taken, the outcomes that have been obtained, and the obstacles that have been met. Although the best approach to effective AMS remains elusive and may vary significantly among settings, these diverse examples from a range of healthcare contexts demonstrate that effective AMS is possible. Such examples will inform others and encourage them to formally evaluate and share their results with the global stewardship community.

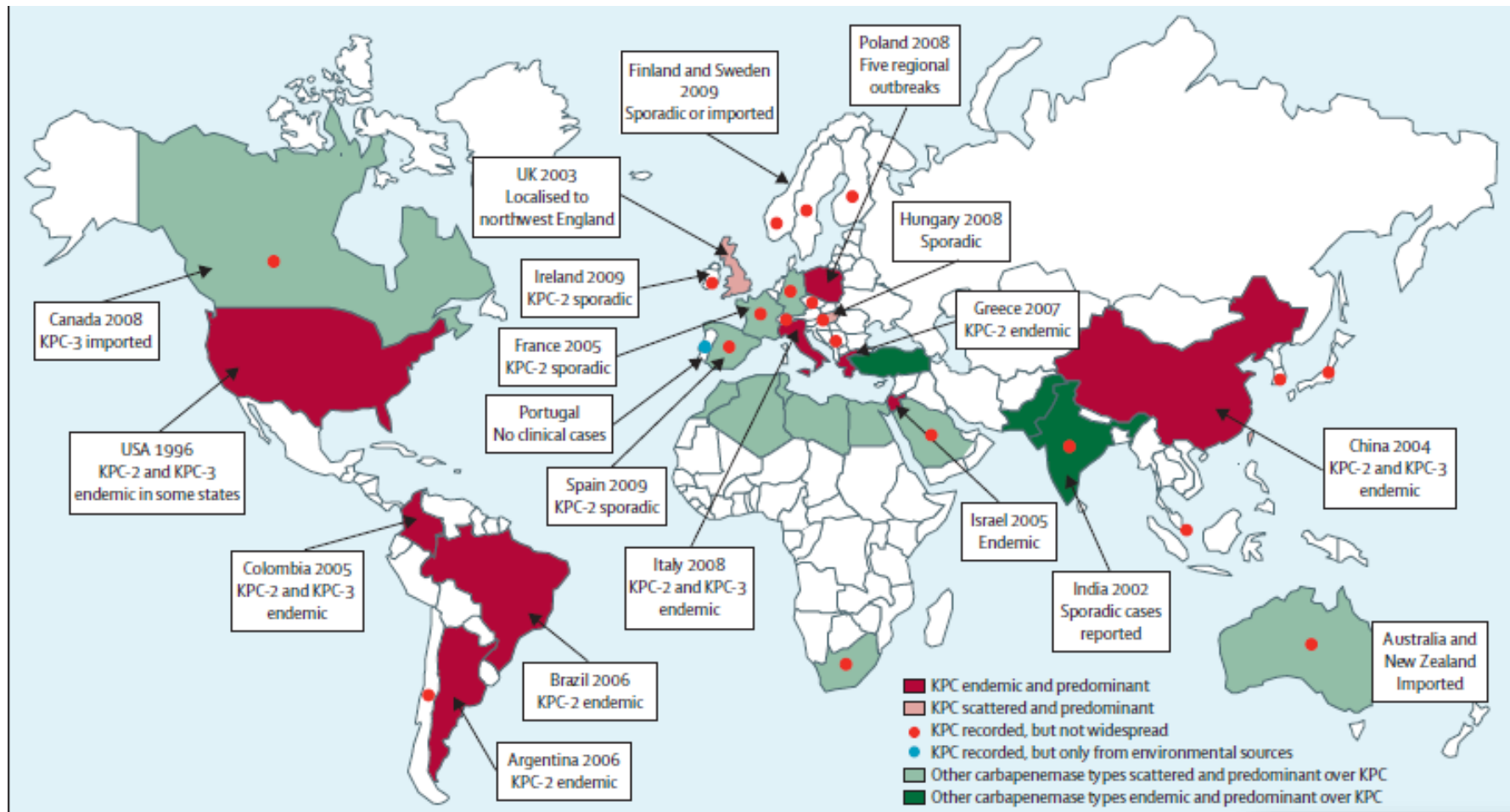
© 2014 The Authors Clinical Microbiology and Infection © 2014 European Society of Clinical Microbiology and Infectious Diseases.

**KEYWORDS:** antibiotic policy; antibiotic stewardship; antibiotic use; antimicrobial resistance; unintended consequences

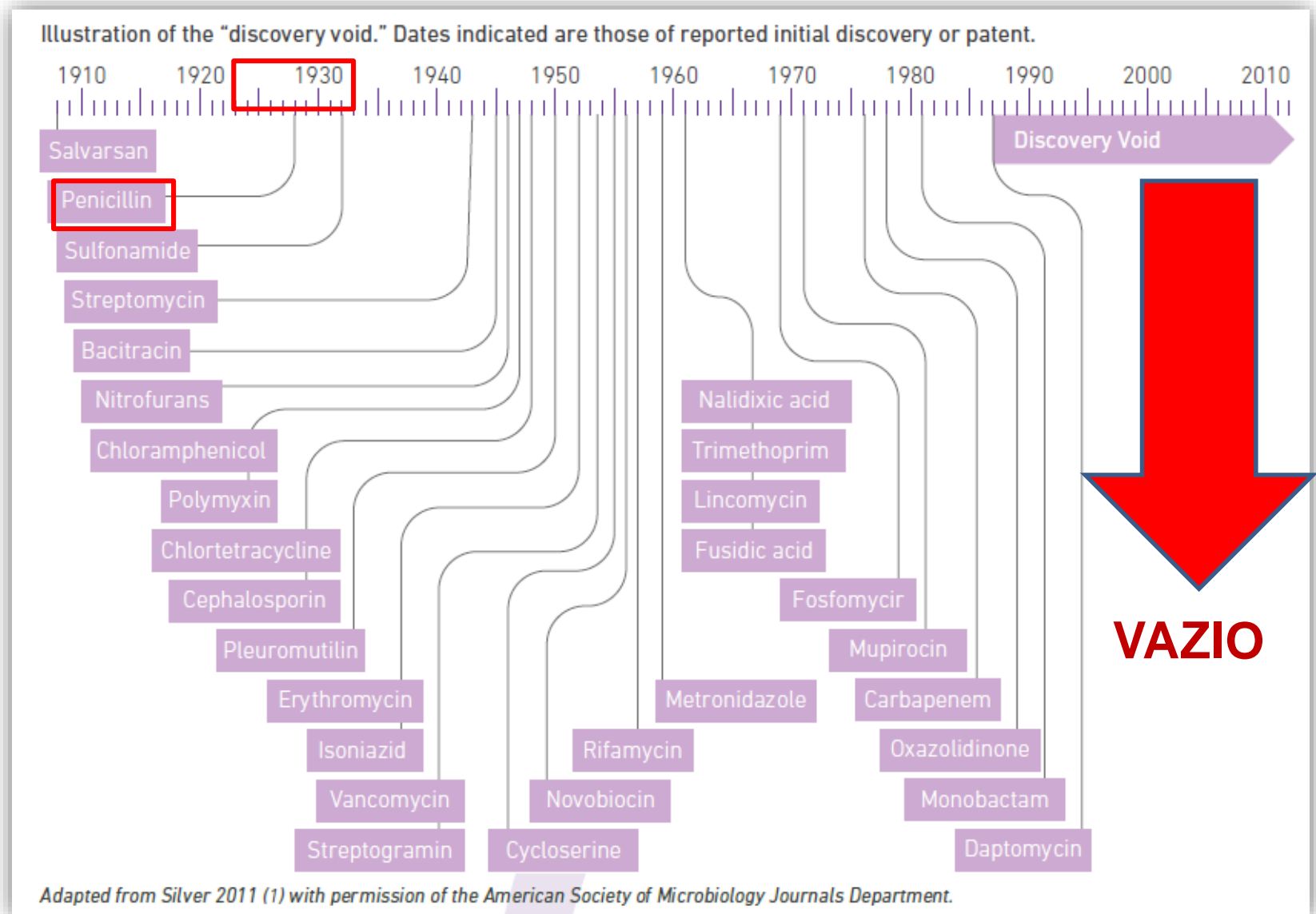
# Concluindo

# Clinical epidemiology of the global expansion of *Klebsiella pneumoniae* carbapenemases

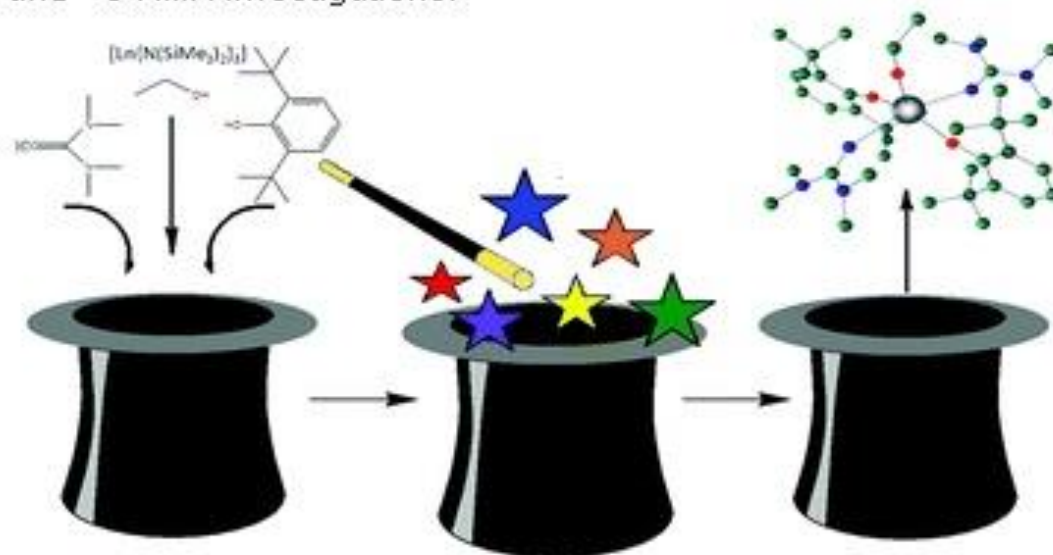
L Silvia Munoz-Price, Laurent Poirel, Robert A Bonomo, Mitchell J Schwaber, George L Daikos, Martin Cormican, Giuseppe Cornaglia, Javier Garau, Marek Gniadkowski, Mary K Hayden, Karthikeyan Kumarasamy, David M Livermore, Juan J Maya, Patrice Nordmann, Jean B Patel, David L Paterson, Johann Pitout, Maria Virginia Villegas, Hui Wang, Neil Woodford, John P Quinn



# Há apenas 86 anos....

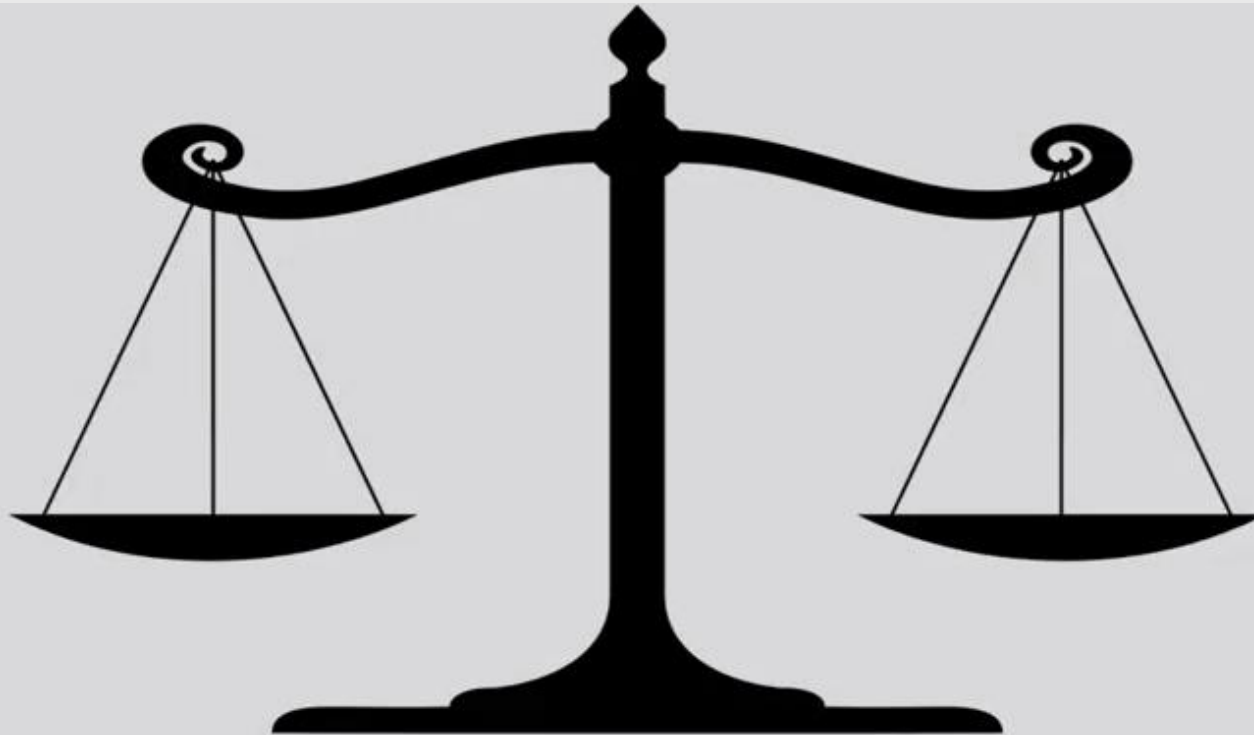


2.11.1912 - O primeiro exemplo.



**NÃO EXISTE MÁGICA....**





FAVORABLE CLINICAL  
OUTCOME

ADVERSE CLINICAL OUTCOME  
ANTIBIOTIC RESISTANCE

**NEM SEGREDO, APENAS BOM SENSO E JUÍZO**

# The Future of Antibiotics and Resistance: A Tribute to a Career of Leadership by John Bartlett

Brad Spellberg<sup>1</sup> and David N. Gilbert<sup>2</sup>

The Future of Antibiotics and Resistance • CID 2014:59 (Suppl 2)

- **7 tarefas**
  - Coletar dados e mapear resistencia
  - parar o abuso na agricultura
  - **Parar abuso em humanos - ASP**
  - Prevenção infecção
  - Novos antimicrobianos
  - Novos tratamentos que não ATM
  - desenvolver plano nacional

# SIM!

- **TEM QUE RACIONALIZAR**
- **PROTEGER OS ANTIBIÓTICOS**
- **Apoio**
  - **prevencionistas**
  - **prescritores**
  - **gestores**
  - **governo**

# ANTIMICROBIAL STEWARDSHIP

- **Disponível**
- **Básico**
- **Sem custo**

**TEM QUE DAR  
CERTO!**

# NOVA CAMPANHA 2014

## Antimicrobial Stewardship

### PRATICANDO O MELHOR USO DOS ANTIBIÓTICOS

Antimicrobial Stewardship Program

O programa de Gerenciamento de Uso de Antibióticos, adotado pela Unimed Londrina, se baseia em intervenções coordenadas para melhorar e medir o uso apropriado de antimicrobianos.



Ao prescrever qualquer antibiótico, lembre-se:



Após identificar a infecção, solicitar cultura e iniciar imediatamente o antibiótico mais indicado.



Certificar-se da indicação, dose, tempo necessário para tratamento (ex: D1/7), anotar TUDO no prontuário. Não tratar colonizações e infecções virais.



**48**  
Horas

Reavaliar o paciente em 48 horas e checar culturas. É preciso confirmar a necessidade de alterar o antibiótico, passar para via oral, de-escalonar ou, até mesmo, suspender o uso.

A única forma de melhorar a resistência bacteriana é otimizar o uso dos antibióticos na prática diária, seja hospitalar ou comunitária. A antibioticoterapia mudou. Atualize-se e procure a CCIH de seu

CUIDAR DE VOCÊ. ESSE É O PLANO

**Unimed**  
Londrina



# Resistência a antibióticos pode levar medicina 'de volta à Idade Média', diz premiê britânico

Fergus Walsh

Correspondente de Saúde, BBC News

Atualizado em 2 de julho, 2014 - 21:53 (Brasília) 00:53 GMT



O mundo poderá ser "lançado de volta à Idade Média da medicina" caso não sejam tomadas medidas para enfrentar a crescente resistência aos antibióticos, disse o primeiro-ministro britânico David Cameron.

Ele anunciou a criação de um grupo para analisar por que tão poucos medicamentos do tipo têm sido criados nos últimos anos.

O renomado economista Jim O'Neill, criador das siglas Bric, vai liderar uma comissão sobre o assunto com especialistas das áreas de ciência, finanças, indústria e saúde global.

Esse grupo vai definir planos para incentivar o desenvolvimento de novos antibióticos.

## Liderança

"Se não agirmos, a perspectiva é de um cenário quase impensável em que antibióticos não funcionam mais. Voltaremos à Idade Média da medicina, em que infecções e lesões tratáveis vão matar de novo", afirmou Cameron.

Cameron disse que discutiu a questão no início deste mês em uma reunião de líderes do G7, em Bruxelas, e tem apoio específico do presidente dos Estados Unidos, Barack Obama, e da chanceler alemã, Angela Merkel.

A expectativa é que as propostas desse grupo de análise sejam discutidas no encontro do G7 do próximo ano, na Alemanha.

"A penicilina foi uma grande invenção britânica de Alexander Fleming em 1928", disse Cameron à BBC. "É bom que a Grã-Bretanha esteja



David Cameron: 'Se não agirmos, a perspectiva é de cenário impensável em que antibióticos não funcionam mais'

## Notícias relacionadas

[Para OMS, resistência de bactérias a antibióticos é 'ameaça global'](#)

[Novo antibiótico que ataca superbactéria é encontrado no mar](#)

[Alerta médico ressalta perda de eficiência dos antibióticos](#)

## Tópicos relacionados

Saúde





## **Santo Agostinho, idade média**

- **O mal e o bem sempre coexistiram, mas o bem deve imperar sobre o mal**



# Obrigada

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