

9.45 **Apertura dei lavori: Salvatore Amato, Claudio Giustozzi**

10.15 **Strategie future per un problema attuale**

Presiede: **Silvio Gherardi**

Moderano: **Salvatore Amato, Claudio Giustozzi**

10.15 – 10.35 Antibiotico-resistenza: cosa cambia per la sanità, i rimedi e le industrie
Vittorio A. Sironi

10.35 – 10.55 Piano nazionale di contrasto all'AMR: diagnostica e innovazione
Daniela Delledonne

10.55 – 11.15 Lotta alla diffusione dell'antibiotico- resistenza: ruolo delle Istituzioni e delle Società Scientifiche
Anna Teresa Palamara

11.15 – 11.35 MDR: ruolo, epidemiologia, diagnostica
Stefania Stefani

11.35 – 11.55 L'approccio ONE HEALTH per un'efficace azione di contrasto alla diffusione della resistenza agli antimicrobici
Maria Vitale

11.55 – 12.15 Infezioni da microorganismi multi-resistenti: dove abbiamo sbagliato, come possiamo Rimediare
Antonio Cascio

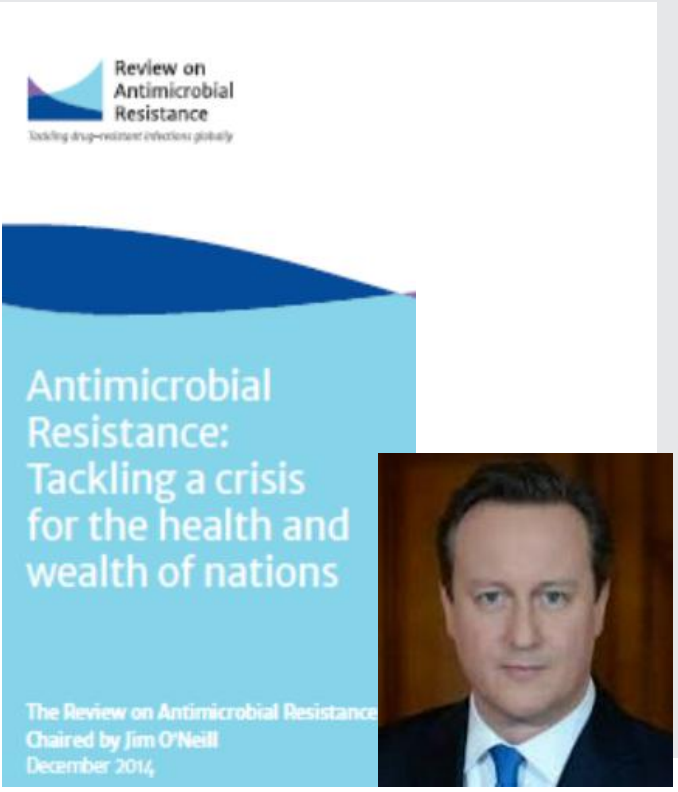
12.15 – 12.35 Controllare il microbiota resistente in ambiente ospedaliero: il sistema PCHS
Elisabetta Caselli

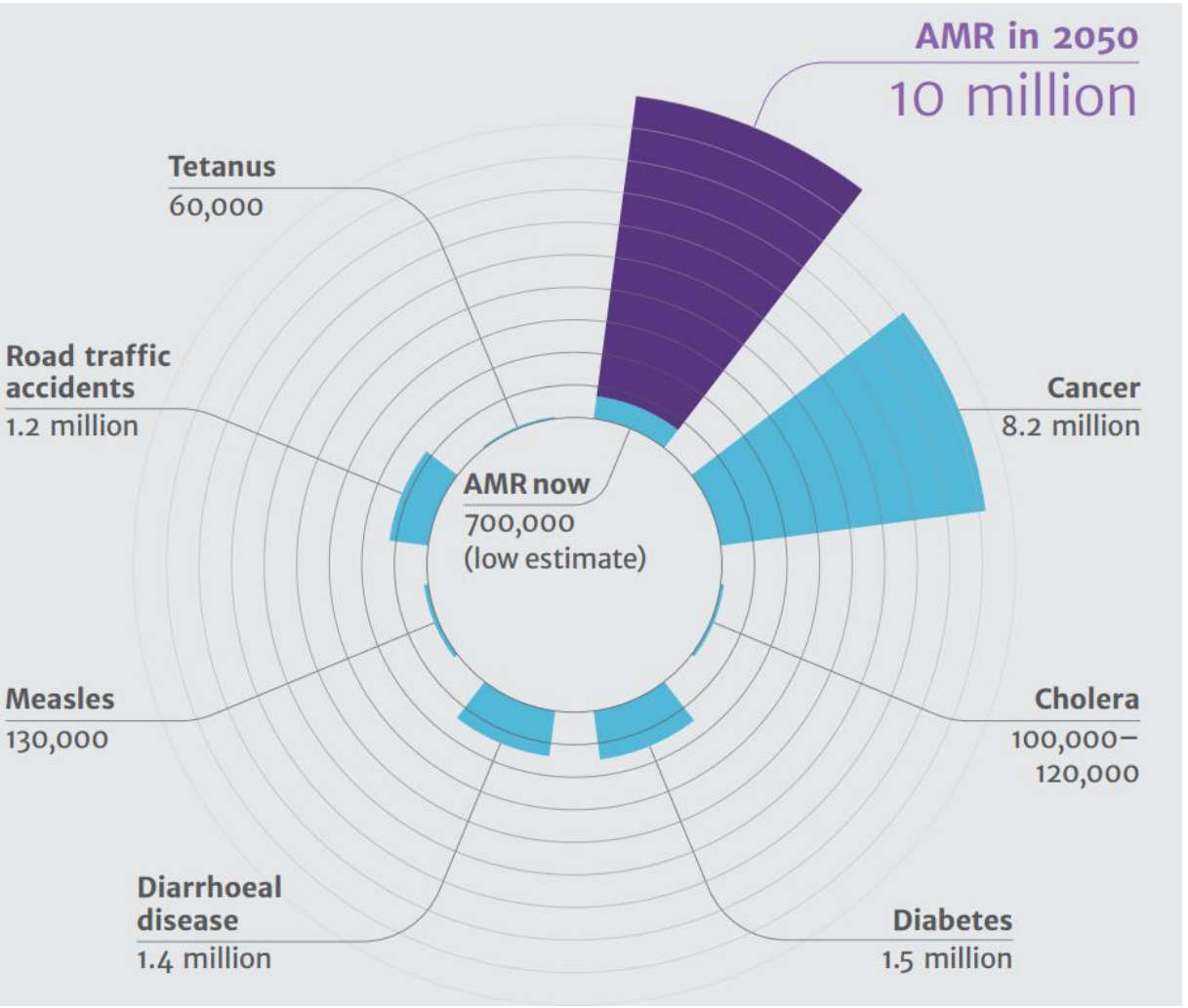
Infezioni da microorganismi multi-resistenti: dove abbiamo sbagliato, come possiamo rimediare

Antonio Cascio

Università di Palermo

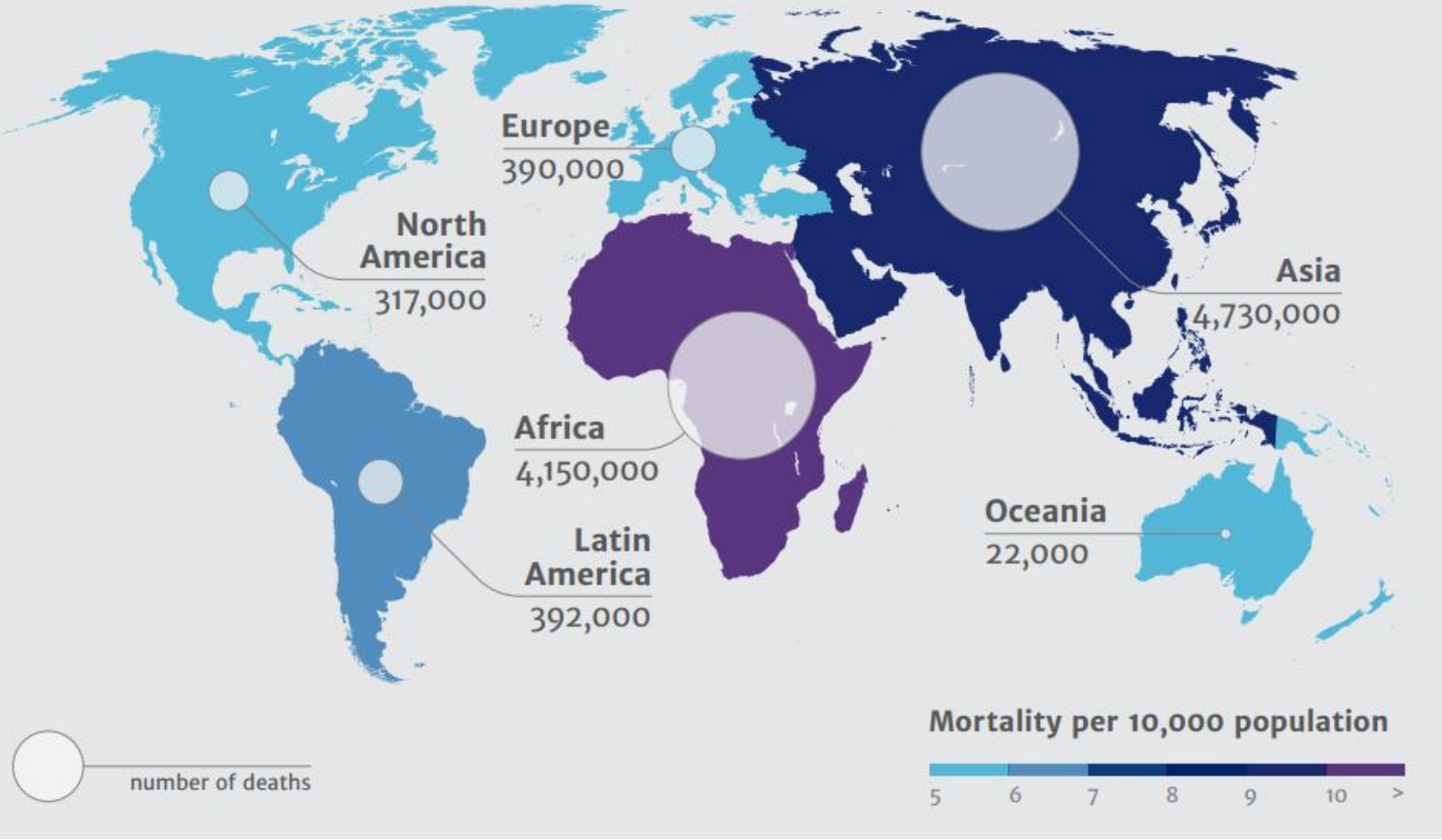
Deaths attributable to AMR every year compared to other major causes of death



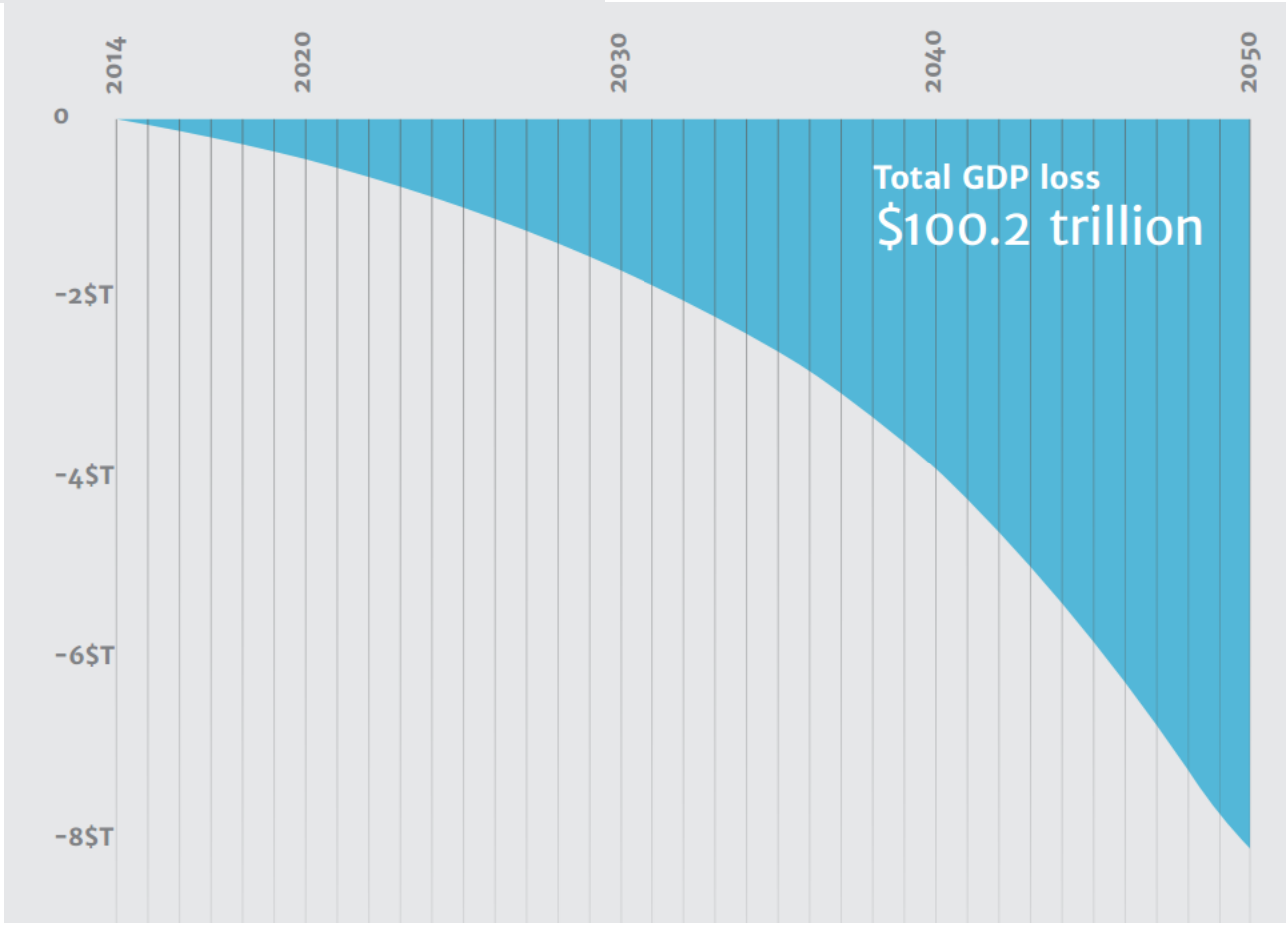


The UK Prime Minister commissioned the Review on Antimicrobial Resistance to address the growing global problem of drug-resistant infections. It is Chaired by Jim O'Neill and supported by the Wellcome Trust and the UK Government, but operates and speaks with full independence from both.

Deaths attributable to AMR every year by 2050



AMR's impact on World GDP
in trillions of USD



PLOS ONE

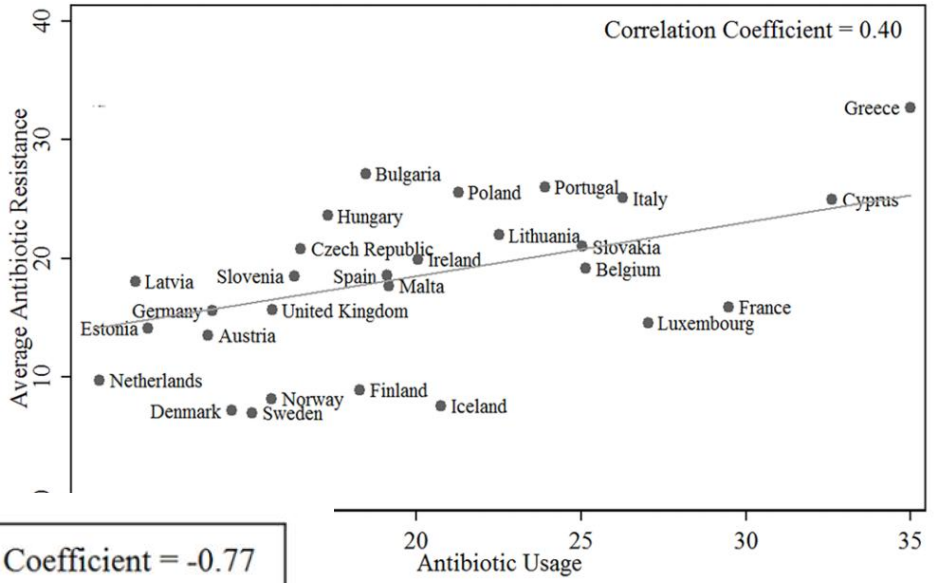
RESEARCH ARTICLE

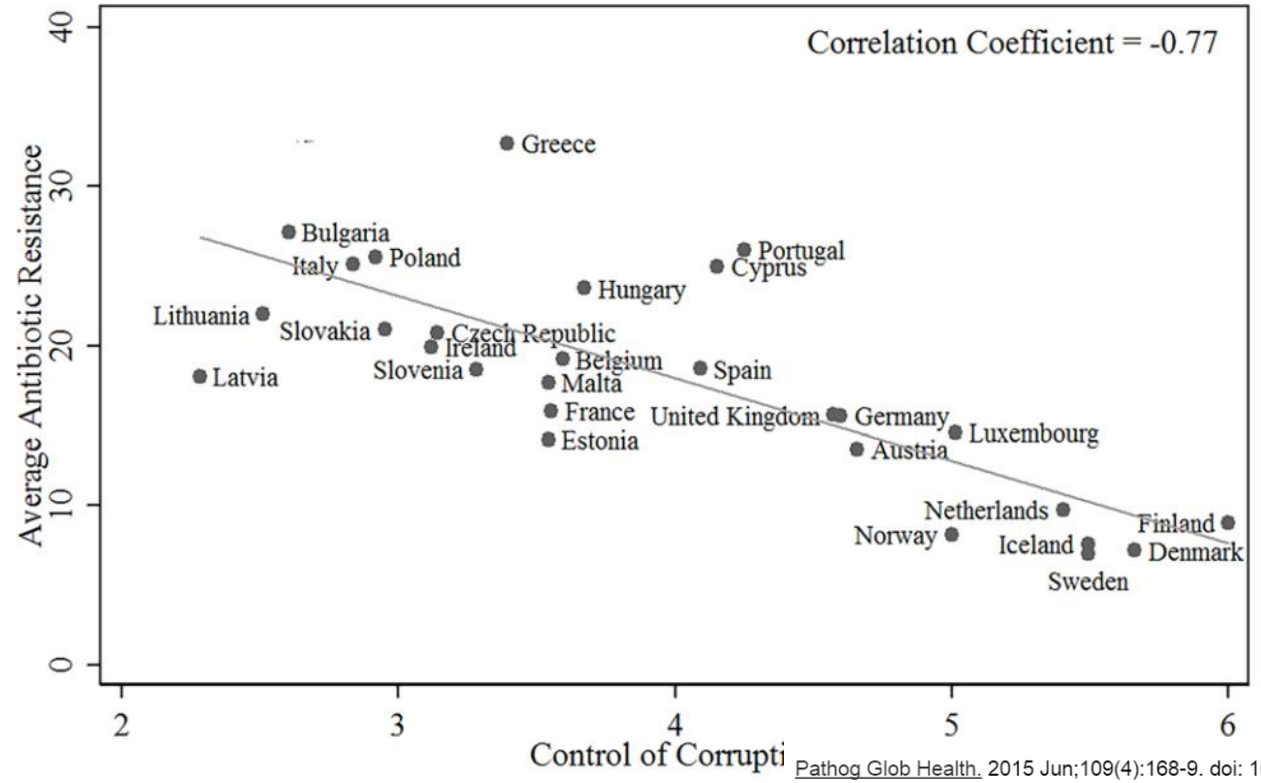
Antimicrobial Resistance: The Major Contribution of Poor Governance and Corruption to This Growing Problem

Peter Collignon[1,2]*, Prema-chandra Athukorala[3,4], Sanjaya Senanayake[5,6], Fahad Khan

1 ACT Pathology, Canberra Hospital, Australian National University, Garran, Australia, **2** Canberra Clinic School, Australian National University, Garran, Australia, **3** Arndt-Corden Department of Economics, Australian National University, Acton, Australia, **4** School of Environment and Development, University of Manchester, Manchester, England, **5** Australian National University, Garran, Australia, **6** Canberra Hosp Garran, Australia

* peter.collignon@act.gov.au





Pathog Glob Health. 2015 Jun;109(4):168-9. doi: 10.1179/2047772415Z.000000000267.

Want a better way to control antibiotic resistance? Fight the corruption.

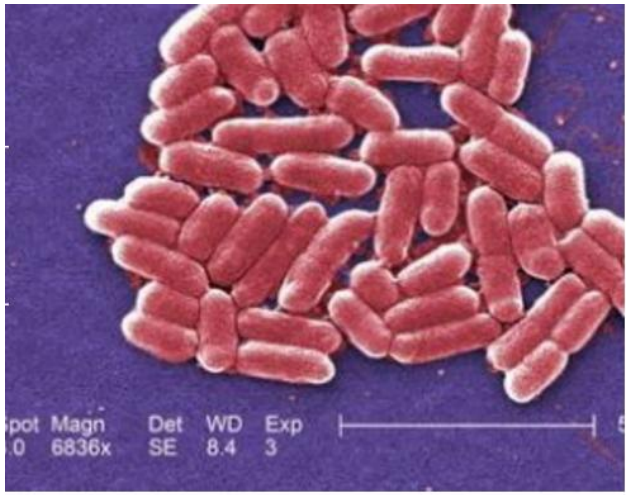
Cauda R, Cassone A.

Allarme negli Usa, donna colpita da batterio resistente a tutti gli antibiotici

Per la prima volta, alcuni ricercatori hanno trovato una persona portatrice di un batterio con un gene che lo rende resistente persino ai trattamenti più potenti

il batterio è stato individuato lo scorso mese nelle urine di una donna della Pennsylvania di 49 anni

27 maggio 2016



Il gene mcr-1 resistente alla colistina è stato

AAC Accepted Manuscript Posted Online 26 May 2016
Antimicrob. Agents Chemother. doi:10.1128/AAC.01103-16
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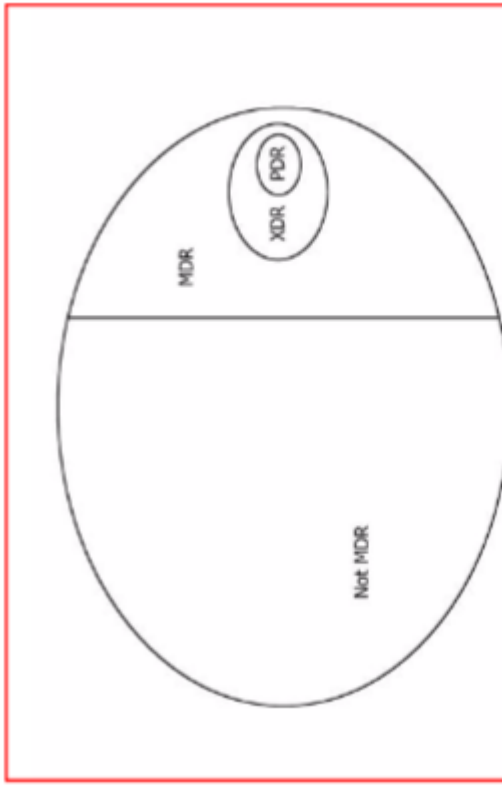
1 ***Escherichia coli*** **Harboring** ***mcr-1*** **and** ***bla*$_{CTX-M}$** **on a Novel IncF Plasmid: First report of**

2 ***mcr-1*** **in the USA**

- **MDR**: non -susceptibility to at least one agent in three or more antimicrobial categories.
- **XDR**: non-susceptibility to at least one agent in all but two or fewer antimicrobial categories (i.e. bacterial isolates remain susceptible to only one or two categories).
- **PDR**: non -susceptibility to all agents in all antimicrobial categories (i.e. no agents tested as susceptible for that organism).



Magiorakos et al,Clin Microbiol Infect 2012; 18: 268–281

Bad Bugs, No Drugs: No ESKAPE! An Update from the Infectious Diseases Society of America

Clinical Infectious Diseases 2009; 48:1–12

Helen W. Boucher,[1] George H. Talbot,[2] John S. Bradley,[3,4] John E. Edwards, Jr,[5,6,7] David Gilbert,[8] Louis B. Rice,[9,10] Michael Scheld,[11] Brad Spellberg,[5,6,7] and John Bartlett[12]

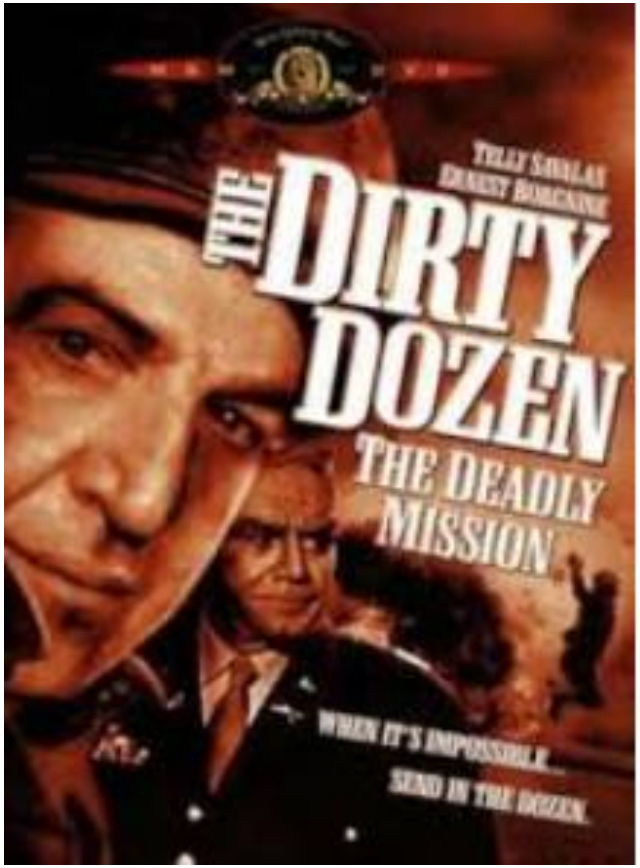
The ESKAPE pathogens are multi-drug resistant strains of:

***E**nterococcus faecium*
***S**taphylococcus aureus*
***K**lebsiella species*
***A**cinetobacter baumannii*
***P**seudomonas aeruginosa*
***E**nterobacter species*

According to the latest data from the Centers for Disease Control, the **six ESKAPE Bacteria are responsible for two-thirds of all healthcare associated infections.**

WHO names 12 bacteria that pose the greatest threat to human health

- **Critical priority**:
  - Pseudomonas aeruginosa, carbapenem-resistant
  - Enterobacteriaceae, carbapenem-resistant, ESBL-producing
  - Acinetobacter baumannii, carbapenem-resistant
- **High priority:**
  - Enterococcus faecium, vancomycin-resistant
  - Staphylococcus aureus, methicillin-resistant, vancomycin-intermediate and resistant
  - Helicobacter pylori, clarithromycin-resistant
  - several species of Campylobacter, fluoroquinolone-resistant
  - Salmonellae, fluoroquinolone-resistant
  - Neisseria gonorrhoeae, cephalosporin-resistant, fluoroquinolone-resistant
- **Medium priority:**
  - Streptococcus pneumoniae, penicillin-non-susceptible
  - Haemophilus influenzae, ampicillin-resistant
  - several species of Shigella, fluoroquinolone-resistant





Executive order. Combacting antibiotic resistant Bacteria

Ordine Esecutivo.
La lotta ai batteri resistenti agli antibiotici

Executive Order. Combating Antibiotic-Resistant Bacteria

Barack Obama
The White House
Office of the Press Secretary
For Immediate Release
September 18, 2014
http://wh.gov/ilTny

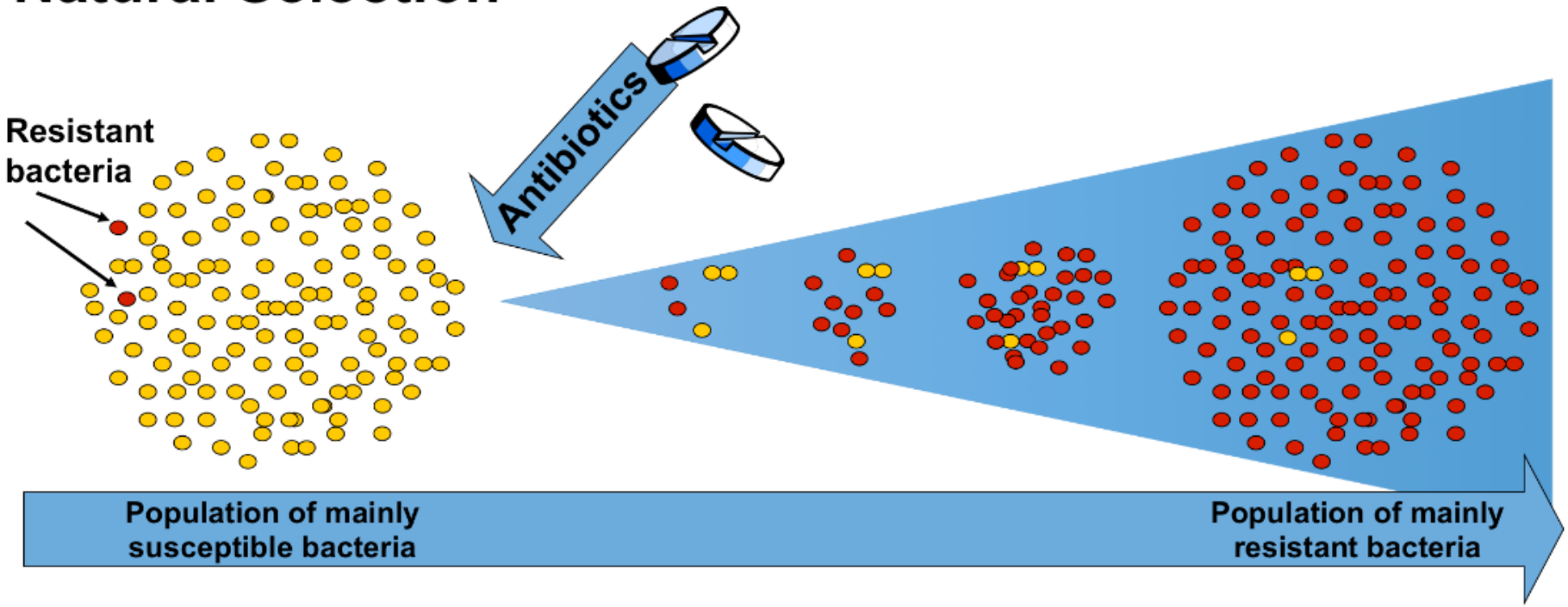
- Con l'autorità conferitami come Presidente dalla Costituzione e dalla legislazione degli Stati Uniti d'America, ordino quanto segue:
  - -------
- **<u>La lotta ai batteri resistenti agli antibiotici rappresenta una priorità di sicurezza nazionale.</u>** Lo staff del Consiglio di Sicurezza Nazionale, in collaborazione con l'Ufficio di Politica Scientifica e Tecnologica, con il Consiglio di Politica Interna, e con l'Ufficio di Gestione e Bilancio, dovrà coordinare lo sviluppo e l'attuazione delle politiche del Governo Federale per la lotta ai batteri resistenti agli antibiotici tra cui le attività, le relazioni e le raccomandazioni della *Task Force* per la lotta alla resistenza agli antibiotici prevista nella sezione 3 della presente ordinanza.
- **Migliorare l'*Antibiotic Stewardship***
- **Potenziamento degli sforzi nazionali di sorveglianza per i batteri resistenti**
- **Prevenzione e risposta alle infezioni e ai focolai epidemici da organismi antibiotico-resistenti**
- **Promuovere lo sviluppo di antibiotici e di tecniche diagnostiche di nuova generazione**

Antimicrobial resistance concern clinicians



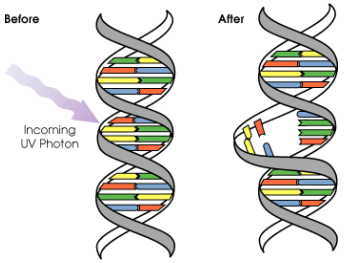
- Treatment options are limited and sometimes nonexistent;
- Resistance has spread widely on several fronts;
- Dissemination and acquisition may be silent and pose significant challenges for infection control;
- Infections are associated with increased mortality and economic costs.

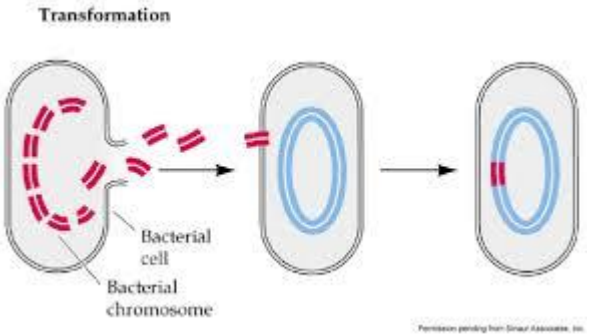
Natural Selection

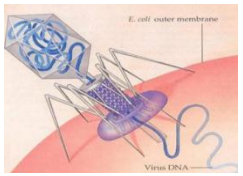


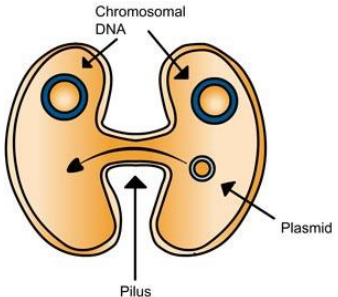
Antibiotic resistance

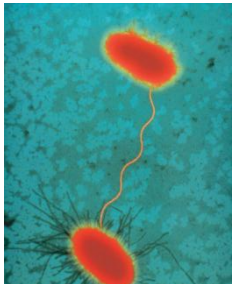
- Mutation of existing DNA;
- Uptake of foreign DNA by means of:
  - transformation
  - phage-mediated transduction
  - Conjugation (DNA exchange directly from other bacteria).











THE LANCET Infectious Diseases Vol 1 September 2001

Effect of antimicrobial agents on the ecological balance of human microflora

Åsa Sullivan, Charlotta Edlund, and Carl Erik Nord

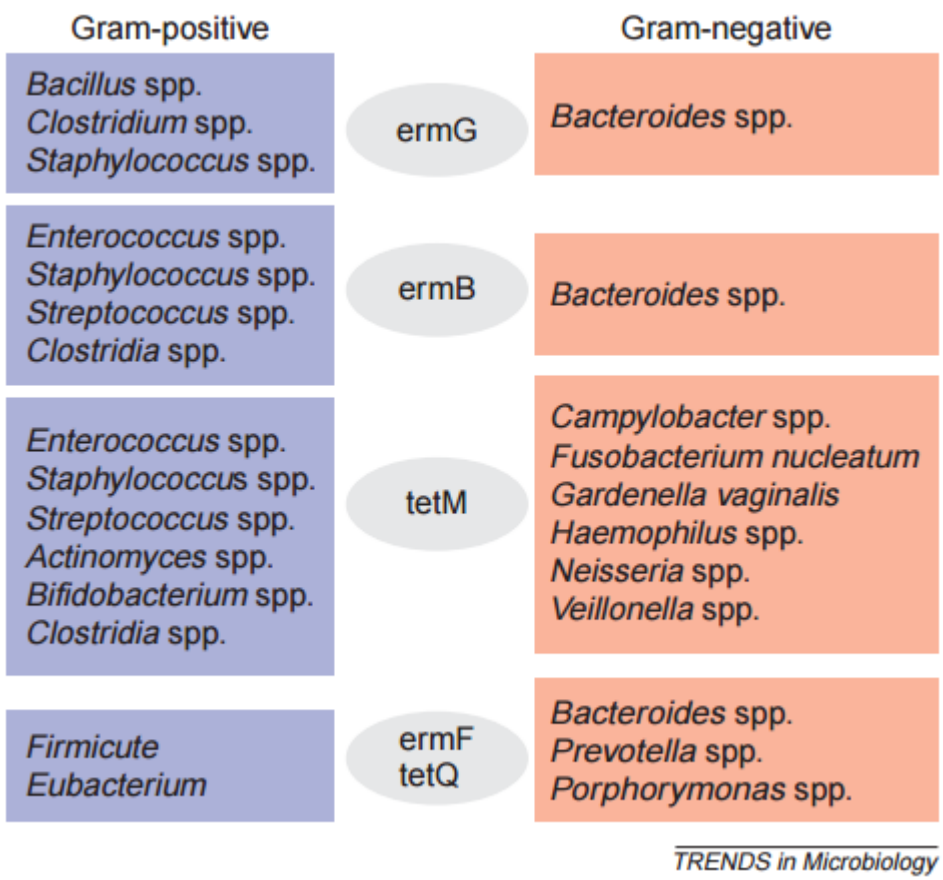
- Old and new antibiotics vary in their impact on the emergence and spread of resistant bacteria

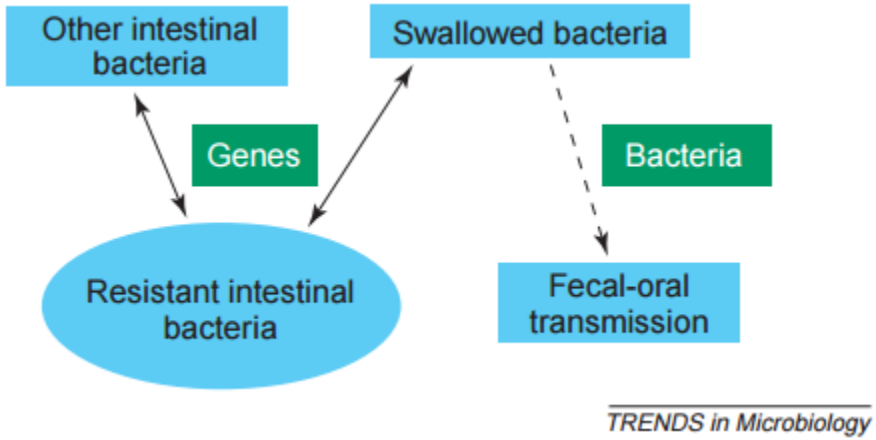
Review TRENDS in Microbiology Vol.12 No.9 September 2004
Full text provided by www.sciencedirect.com SCIENCE DIRECT

Human intestinal bacteria as reservoirs for antibiotic resistance genes

Abigail A. Salyers, Anamika Gupta and Yanping Wang

Department of Microbiology, University of Illinois, Urbana, IL 61801, USA





Antimicrob Agents Chemother. 2015 Aug 10. pii: AAC.00933-15. [Epub ahead of print]

The human gut microbiome as a transporter of antibiotic resistance genes between continents.

Bengtsson-Palme J[1], Angelin M[2], Huss M[3], Kjellqvist S[3], Kristiansson E[4], Palmgren H[2], Larsson DG[1], Johansson A[5].

Author information

Abstract

Previous studies of antibiotic resistance dissemination by travel have, by targeting only a select number of cultivable bacterial species, omitted most of the human microbiome. Here, we used explorative shotgun metagenomic sequencing to address the abundance of >300 antibiotic resistance genes in fecal specimens from 35 Swedish students taken before and after exchange programs on the Indian peninsula or in central Africa. All specimens were additionally cultured for extended-spectrum beta-lactamase (ESBL) producing enterobacteria and the isolates obtained genome sequenced. The overall taxonomic diversity and composition of the gut microbiome remained stable comparing before and after travel, but with increasing abundance of Proteobacteria in 25/35 students. The relative abundance of antibiotic resistance genes increased, most prominently for genes encoding resistance to sulfonamide (2.6-fold increase), trimethoprim (7.7-fold) and beta-lactams (2.6-fold). Importantly, the increase observed occurred without any antibiotic intake. Of 18 students visiting the Indian peninsula, 12 acquired ESBL-producing Escherichia coli, while none returning from Africa was positive. Despite deep sequencing efforts, sensitivity of metagenomics was not sufficient to detect acquisition of the low-abundant genes responsible for the observed ESBL phenotype. In conclusion, metagenomic sequencing of the intestinal microbiome of Swedish students returning from exchange programs in Central Africa or the Indian peninsula showed increased abundance of genes encoding resistance to widely used antibiotics.

nature International weekly journal of science

NATURE | NEWS FEATURE

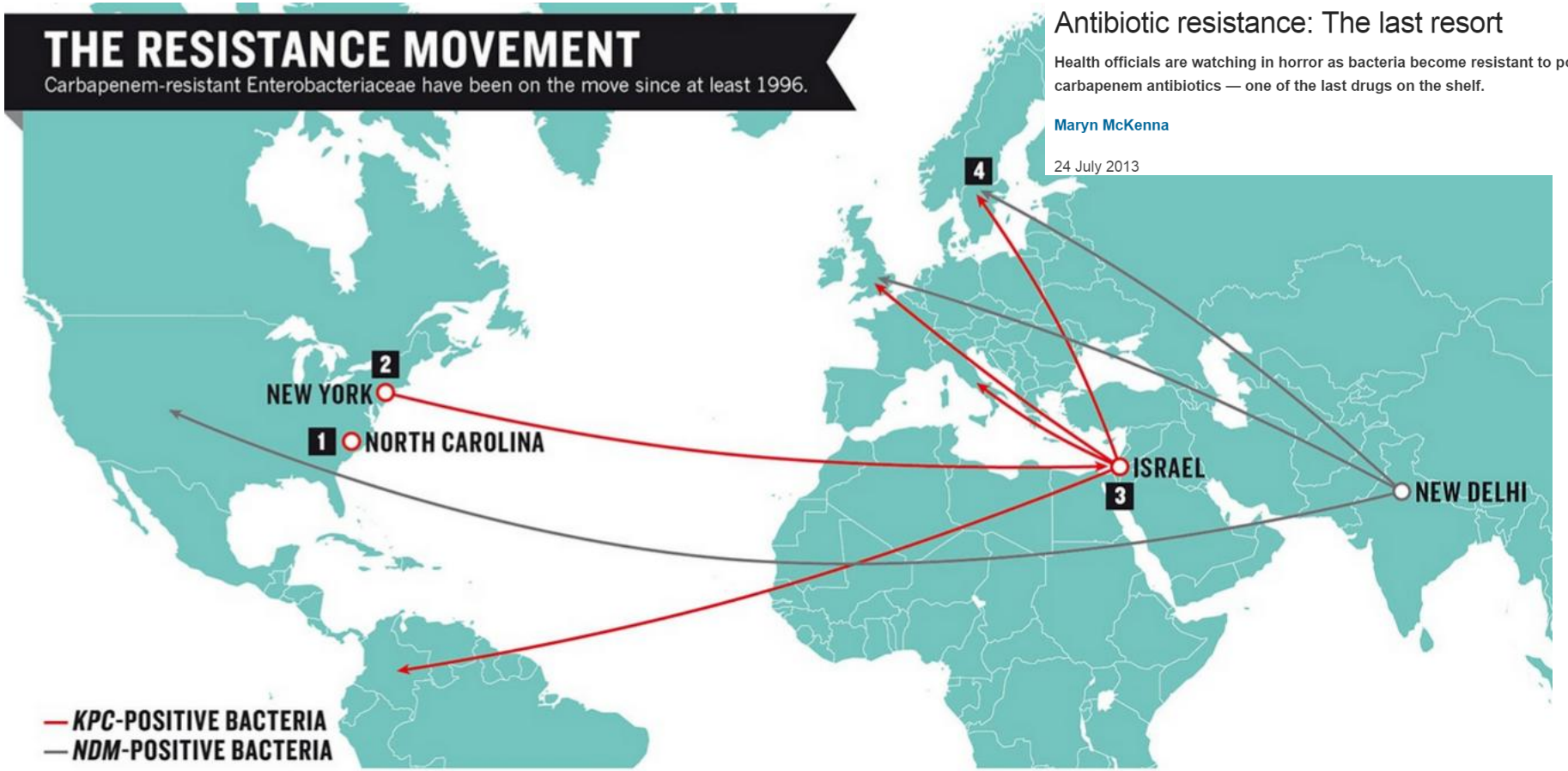
عربي

Antibiotic resistance: The last resort

Health officials are watching in horror as bacteria become resistant to powerful carbapenem antibiotics — one of the last drugs on the shelf.

Maryn McKenna

24 July 2013



Available online at www.sciencedirect.com

ScienceDirect

Current Opinion in Microbiology

The antibiotic resistome: what's new?

Julie Ann Perry[1], Erin Louise Westman[1] and Gerard D Wright

Moore *et al. Microbiome* (2015) 3:27
DOI 10.1186/s40168-015-0090-9

Microbiome

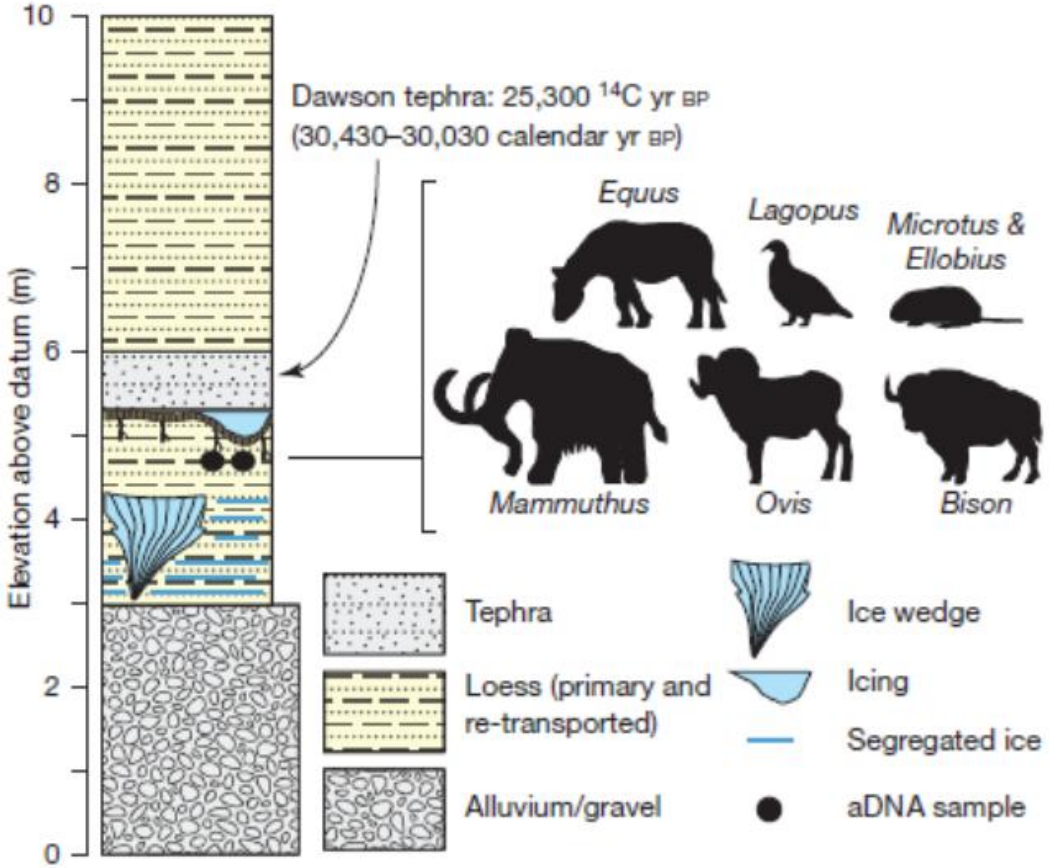
RESEARCH Open Access

Gut resistome development in healthy twin pairs in the first year of life

Aimee M. Moore[1,3], Sara Ahmadi[2,3], Sanket Patel[2,3], Molly K. Gibson[3], Bin Wang[2,3], I. Malick Ndao[1], Elena Deych[4], William Shannon[4], Phillip I. Tarr[1,5], Barbara B. Warner[1] and Gautam Dantas[2,3,6*]


Dove abbiamo sbagliato?





Elevation above datum (m)
10
8
6
4
2
0
Dawson tephra: 25,300 ^{14}C yr BP
(30,430–30,030 calendar yr BP)
Equus
Lagopus
Microtus & Ellobius
Mammuthus
Ovis
Bison
Tephra
Loess (primary and re-transported)
Alluvium/gravel
Ice wedge
Icing
Segregated ice
aDNA sample



ARCTIC OCEAN
Perennial sea ice
Berelekh 13,000
Present-day shoreline
ARCTIC CIRCLE
SIBERIA
BERINGIA
18,000 years ago
ALASKA
Bluefish Cave 13,000
Dry Creek 11,000
Tangle Lakes 12,000
Malorych 18,000
Land migration route
Seasonal sea ice
Ushki Lake 15,000
BERING SEA
Aleutian Islands
Alaska Peninsula
700 km
700 mi
AZIMUTHAL EQUIDISTANT PROJECTION CENTERED ON THE NORTH POLE
Migrations may have occurred along coasts and across seasonal sea ice.

NATURE Received 28 March; accepted 22 July 2011.
Published online 31 August 2011.

Antibiotic resistance is ancient

Vanessa M. D'Costa[1,2]*, Christine E. King[3,4]*, Lindsay Kalan[1,2], Mariya Morar[1,2], Wilson W. L. Sung[4], Carsten Schwarz[3], Duane Froese[5], Grant Zazula[6], Fabrice Calmels[5], Regis Debruyne[7], G. Brian Golding[4], Hendrik N. Poinar[1,3,4] & Gerard D. Wrigh

- Targeted metagenomic analyses of rigorously authenticated ancient **DNA from 30,000-year-old** Beringian **permafrost** sediments and the identification of a highly diverse collection of genes encoding resistance to b-lactam, tetracycline and glycopeptide antibiotics.
- Structure and function studies on the complete vancomycin resistance element VanA confirmed its similarity to modern variants.
- These results show conclusively that antibiotic resistance is a natural phenomenon that predates the modern selective pressure of clinical antibiotic use.

OPEN ACCESS Freely available online

PLoS one

Antibiotic Resistance Is Prevalent in an Isolated Cave Microbiome

Kirandeep Bhullar[1], Nicholas Waglechner[1], Andrew Pawlowski[1], Kalinka Koteva[1], Eric D. Banks[2], Michael D. Johnston[2], Hazel A. Barton[2], Gerard D. Wright[1]*

1 M.G. DeGroote Institute for Infectious Disease Research, Department of Biochemistry and Biomedical Sciences, McMaster University, Hamilton, Ontario, Canada, **2** Department of Biology, University of Akron, Akron, Ohio, United States of America



- Viable multidrug-resistant bacteria were cultured from the Lechuguilla Cave in NewMexico even though it has been totally isolated for >4 million years.
- These bacteria were resistant to at least 1 antibiotic and often 7–8 antibiotics, including β-lactams, aminoglycosides, and macrolides, as well as newer drugs such as daptomycin, linezolid, telithromycin, and tigecycline



OPEN ACCESS Freely available online

PLoS one

Tracking Acquired Antibiotic Resistance in Commensal Bacteria of Galápagos Land Iguanas: No Man, No Resistance

Maria Cristina Thaller[1]*, Luciana Migliore[1], Cruz Marquez[2], Washington Tapia[2], Virna Cedeño[3,4], Gian Maria Rossolini[5], Gabriele Gentile[1]

1 Dipartimento di Biologia, University Tor Vergata, Roma, Italy, **2** Galápagos National Park Service, Puerto Ayora, Galápagos Islands, Ecuador, **3** Galápagos Genetics, Epidemiology and Pathology Laboratory "F. Valverde", Galápagos National Park, Puerto Ayora, Galápagos Islands, Ecuador, **4** Concepto Azul, Guayaquil, Ecuador, **5** Dipartimento di Biologia molecolare, University of Sienna, Sienna, Italy





Published in final edited form as:
Sci Adv. 2015 April 3; 1(3): . doi:10.1126/sciadv.1500183.

The microbiome of uncontacted Amerindians

Jose C. Clemente[1,2,*], Erica C. Pehrsson[3,*], Martin J. Blaser[4,5], Kuldip Sandhu[5,†], Zhan Gao[5], Bin Wang[3], Magda Magris[6], Glida Hidalgo[6], Monica Contreras[7], Óscar Noya-Alarcón[6], Orlana Lander[8], Jeremy McDonald[9], Mike Cox[9], Jens Walter[10,‡], Phaik Lyn Oh[10], Jean F. Ruiz[11], Selena Rodriguez[11], Nan Shen[1], Se Jin Song[12], Jessica Metcalf[12], Rob Knight[12,13,§], Gautam Dantas[3,14], and **M. Gloria Dominguez-Bello[5,7,11,¶]**

- Despite their isolation, presumably for >11,000 years since their ancestors arrived in South America, and no known exposure to antibiotics, they harbor bacteria that carry functional antibiotic resistance (AR) genes, including those that confer resistance to synthetic antibiotics and are syntenic with mobilization elements.



Agriculture and food animals as a source of antimicrobial-resistant bacteria

This article was published in the following Dove Press journal:
Infection and Drug Resistance
1 April 2015
Number of times this article has been viewed

Vangelis Economou[1]
Panagiota Gousia[2]

[1]Department of Hygiene and Technology of Food of Animal Origin, School of Veterinary Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki, Thessaloniki, Greece; [2]Food-Water Microbiology Unit, Department of Microbiology, Faculty of Medicine, School of Health Sciences, University of Ioannina, Ioannina, Greece

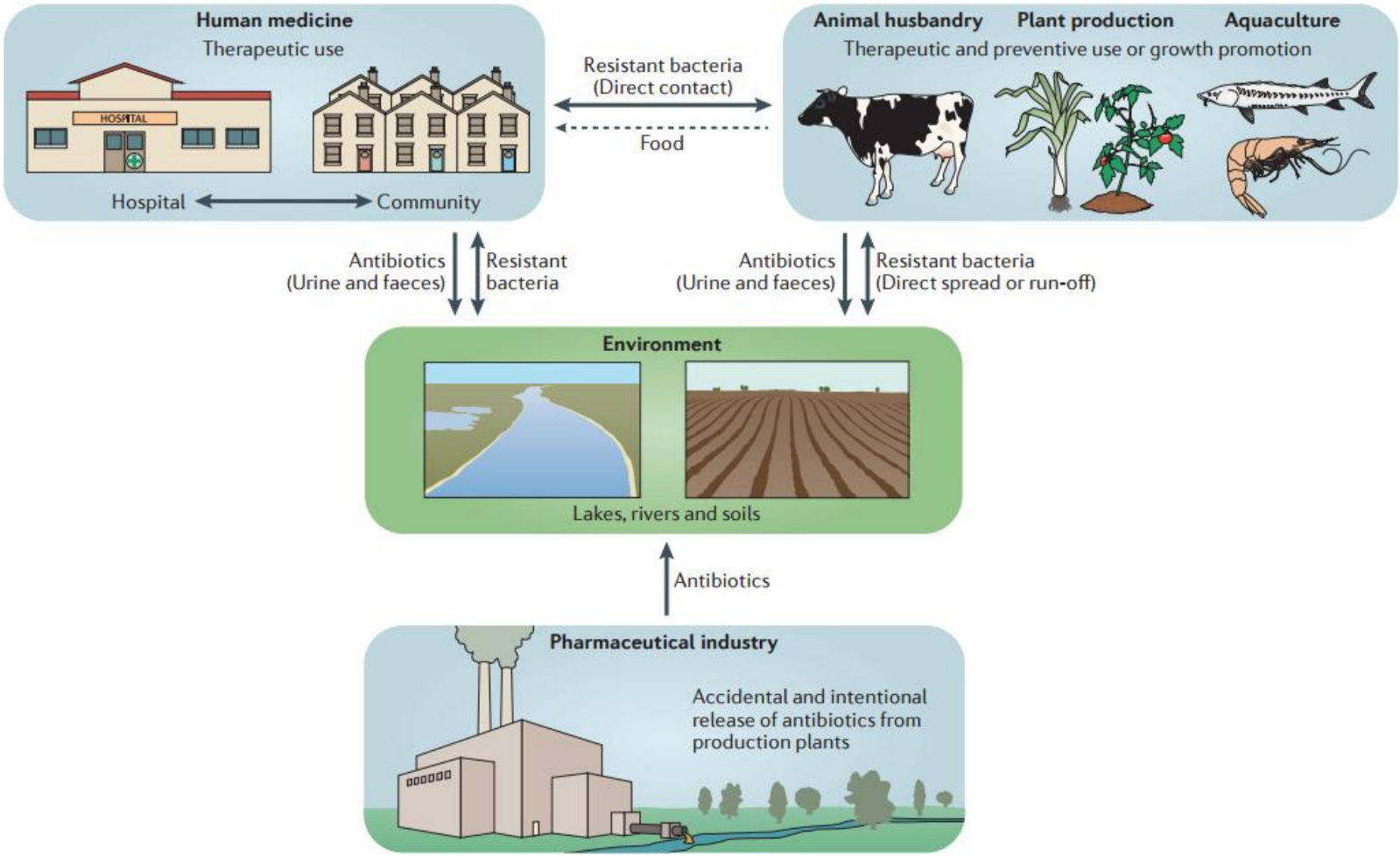
Abstract: One of the major breakthroughs in the history of medicine is undoubtedly the discovery of antibiotics. Their use in animal husbandry and veterinary medicine has resulted in healthier and more productive farm animals, ensuring the welfare and health of both animals and humans. Unfortunately, from the first use of penicillin, the resistance countdown started to tick. Nowadays, the infections caused by antibiotic-resistant bacteria are increasing, and resistance to antibiotics is probably the major public health problem. Antibiotic use in farm animals has been criticized for contributing to the emergence of resistance. The use and misuse of antibiotics in farm animal settings as growth promoters or as nonspecific means of infection prevention and treatment has boosted antibiotic consumption and resistance among bacteria in the animal habitat. This reservoir of resistance can be transmitted directly or indirectly to humans through food consumption and direct or indirect contact. Resistant bacteria can cause serious health effects directly or via the transmission of the antibiotic resistance traits to pathogens, causing illnesses that are difficult to treat and that therefore have higher morbidity and mortality rates. In addition, the selection and proliferation of antibiotic-resistant strains can be disseminated to the environment via animal waste, enhancing the resistance reservoir that exists in the environmental microbiome. In this review, an effort is made to highlight the various factor that contribute to the emergence of antibiotic resistance in farm animals and to provide som insights into possible solutions to this major health issue.

Microbiological effects of sublethal levels of antibiotics

Nature Reviews Microbiology | AOP, published online 27 May 2014; doi:10.

Dan I. Andersson and Diarmaid Hughes

Abstract | The widespread use of antibiotics results in the generation of antibiotic concentration gradients in humans, livestock and the environment. Thus, bacteria are frequently exposed to non-lethal (that is, subinhibitory) concentrations of drugs, and recent evidence suggests that this is likely to have an important role in the evolution of antibiotic resistance. In this Review, we discuss the ecology of antibiotics and the ability of subinhibitory concentrations to select for bacterial resistance. We also consider the effects of low-level drug exposure on bacterial physiology, including the generation of genetic and phenotypic variability, as well as the ability of antibiotics to function as signalling molecules. Together, these effects accelerate the emergence and spread of antibiotic-resistant bacteria among humans and animals.



Int. J. Environ. Res. Public Health **2015**, *12*, 4231-4246; doi:10.3390/ijerph120404231

OPEN ACCESS

International Journal of
Environmental Research and Public Health
ISSN 1660-4601
www.mdpi.com/journal/ijerph

Article

Antibiotic Susceptibilities of *Enterococcus* Species Isolated from Hospital and Domestic Wastewater Effluents in Alice, Eastern Cape Province of South Africa

Benson Chuks Iweriebor [1,2,*], Sisipho Gaqavu [1,2], Larry Chikwelu Obi [3], Uchechukwu U. Nwodo [1,2] and Anthony I. Okoh [1,2]

The ISME Journal (2014) 8, 1381–1390
© 2014 International Society for Microbial Ecology All rights reserved 1751-7362/14
www.nature.com/ismej

ORIGINAL ARTICLE

Wastewater as a point source of antibiotic-resistance genes in the sediment of a freshwater lake

Nadine Czekalski[1], Elena Gascón Díez[2] and Helmut Bürgmann[1]
[1]*Department of Surface Waters—Research and Management, Eawag: Swiss Federal Institute of Aquatic Science and Technology, Kastanienbaum, Switzerland and* [2]*Group of Limnology and Environmental Geology, Institut F.-A. Forel, University of Geneva, Versoix, Switzerland*

- Eighty percent of antibiotics sold in the US are for use in animals, primarily for growth promotion and infection prophylaxis, without adequate data supporting efficacy

US Food and Drug Administration. 2010 summary report on antimicrobials sold or distributed for use in food producing animals, **2011**. Available at: http://www.fda.gov/downloads/ForIndustry/UserFees/AnimalDrugUserFeeActADUFA/M277657.pdf. Accessed 17 February 2012.

Collignon and Voss *Antimicrobial Resistance and Infection Control* (2015) 4:16
DOI 10.1186/s13756-015-0056-5

ANTIMICROBIAL RESISTANCE & INFECTION CONTROL

EDITORIAL Open Access

China, what antibiotics and what volumes are used in food production animals?

Peter Collignon[1*] and Andreas Voss[2]

- It is suggested that nearly half of the **210,000 tonnes of antibiotics** produced in China are deployed in **food animals**.
- Some studies give data on what antibiotics are found in waterways and manure in China, which gives an indirect idea of both that the amounts used and types of antibiotics are used. However this is still all only based on relatively limited sample sizes.
- From the information available, it suggests high volumes of sulphonamides, tetracyclines and fluoroquinolones (enrofloxacin, fleroxacin and norfloxacin) are widely used in the **agriculture** sector there.

Multidrug resistance genes in staphylococci from animals that confer resistance to critically and highly important antimicrobial agents in human medicine

Trends in Microbiology, January 2015, Vol. 23, No. 1

Sarah Wendlandt[1], Jianzhong Shen[2], Kristina Kadlec[1], Yang Wang[2], Beibei Li[3], Wan-Jiang Zhang[4], Andrea T. Feßler[1], Congming Wu[2], and Stefan Schwarz[1]

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[4] State Key Laboratory of Veterinary Biotechno
Harbin 150001, P.R. China

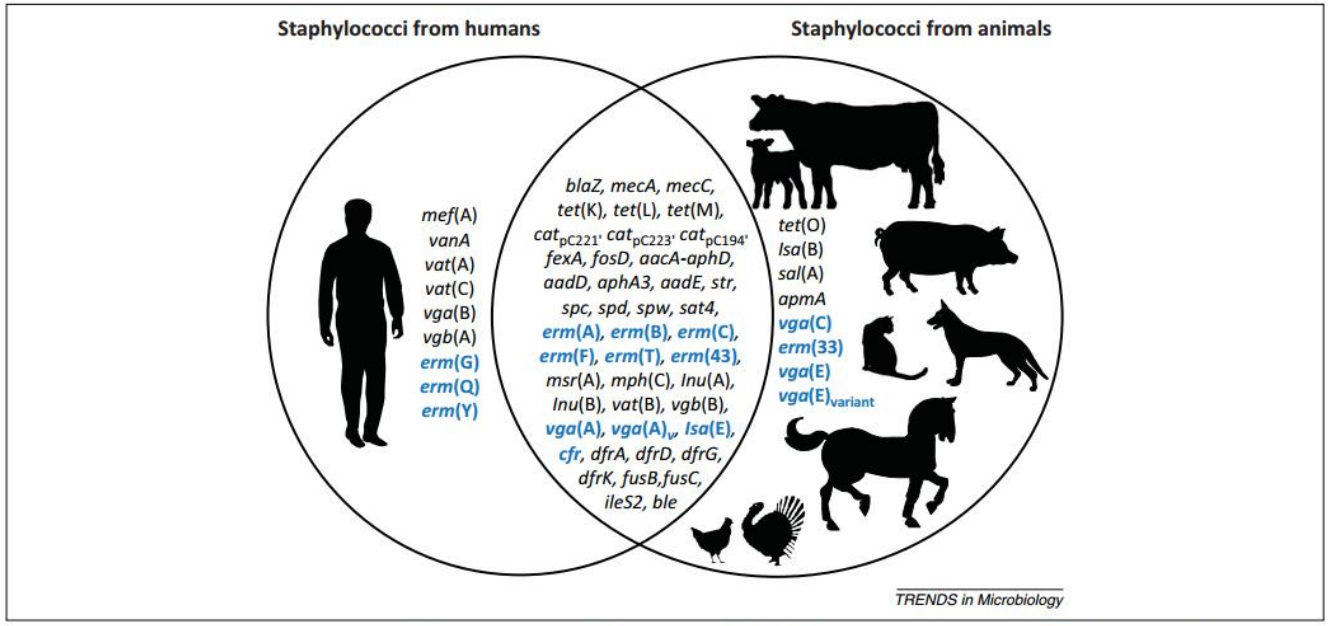

Figure 1. Antimicrobial resistance genes so far identified in staphylococci of human and animal origin (modified and expanded from [11]). Multidrug resistance genes are shown in bold and blue color.

PLOS ONE | DOI:10.1371/journal.pone.0137143 August 31, 2015

RESEARCH ARTICLE

Livestock-Associated Methicillin Resistant and Methicillin Susceptible *Staphylococcus aureus* Sequence Type (CC)1 in European Farmed Animals: High Genetic Relatedness of Isolates from Italian Cattle Herds and Humans

Patricia Alba[1], Fabiola Feltrin[1], Gessica Cordaro[1], María Concepción Porrero[2], Britta Kraushaar[3], María Angeles Argudín[4,11], Suvi Nykäsenoja[5], Monica Monaco[6], Marc Stegger[7], Frank M. Aarestrup[8], Patrick Butaye[4,9,10], Alessia Franco[1], Antonio Battisti[1]*

1 Istituto Zooprofilattico Sperimentale del Lazio e della Toscana "M. Aleandri", Diagnostic Department, Rome, Italy, **2** VISAVET Health Surveillance Centre, Universidad Complutense Madrid, Madrid, Spain, **3** Federal Institute for Risk Assessment (BfR), Berlin, G Centre (VAR-CODA-CERVA), Groeselenberg, Belgium Finland, **6** Istituto Superiore di Sanità, Department of In Rome, Italy, **7** Statens Serum Institut, Department of Mi Denmark, **8** National Food Institute, Technical Universit University, School of Veterinary Medicine, Department Indies, **10** Ghent University, Faculty of Veterinary Medi poultry diseases, Merelbeke, Belgium, **11** Université Lit Erasme Laboratoire de Référence MRSA—Staphyloco

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Human Deaths and Third-Generation Cephalosporin use in Poultry, Europe

MAJOR ARTICLE

Swine Farming Is a Risk Factor for Infection With and High Prevalence of Carriage of Multidrug-Resistant *Staphylococcus aureus*

Shylo E. Wardyn,[1,2] Brett M. Forshey,[1,2] Sarah A. Farina,[1] Ashley E. Kates,[1,2] Rajeshwari Nair,[1,2] Megan K. Quick,[1] James Y. Wu,[1,2] Blake M. Hanson,[1,2] Sean M. O'Malley,[1] Hannah W. Shows,[1] Ellen M. Heywood,[4] Laura E. Beane–Freeman,[5] Charles F. Lynch,[2] Margaret Carrel,[3] and Tara C. Smith[6]

[1]Center for Emerging Infectious Diseases, [2]Department of Epidemiology, College of Public Health, [3]Department of Geographical and Sustainability Sciences, College of Liberal Arts and Sciences, and [4]Department of Occupational and Environmental Health, College of Public Health, University of Iowa, Iowa City; [5]Occupational and Environmental Epidemiology Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute, Rockville, Maryland; and [6]Department of Biostatistics, Environmental Health Sciences and Epidemiology, College of Public Health, Kent State University, Ohio

Expert Rev Anti Infect Ther. 2014 Dec;12(12):1441-61. doi: 10.1586/14787210.2014.976611. Epub 2014 Oct 28.

Antibacterial resistance: an emerging 'zoonosis'?

Labro MT[1], Bryskier JM.

Author information

Abstract

Antibacterial resistance is a worldwide threat, and concerns have arisen about the involvement of animal commensal and pathogenic bacteria in the maintenance and spread of resistance genes. However, beyond the facts related to the occurrence of resistant microorganisms in food, food-producing animals and companion animals and their transmission to humans, it is important to consider the vast environmental 'resistome', the selective pathways underlying the emergence of antibacterial resistance and how we can prepare answers for tomorrow.

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MINIREVIEW

Insects Represent a Link between Food Animal Farms and the Urban Environment for Antibiotic Resistance Traits

Ludek Zurek,[a,b] Anuradha Ghosh[a]

Department of Diagnostic Medicine and Pathobiology, College of Veterinary Medicine,[a] and Department of Entomol
Manhattan, Kansas, USA



Ecologia delle malattie

» Corriere della Sera › Salute › *La nuova scienza per prevedere le epidemie*

ECOLOGIA DELLE MALATTIE

La nuova scienza per prevedere le epidemie

Qualsiasi attività, anche la più banale, in teoria, può essere all'origine di inedite emergenze sanitarie



Tutte le patologie emergenti degli ultimi 30-40 anni sono da ritenere il risultato delle modifiche nella demografia mondiale e degli sconfinamenti dell'uomo in terre non abitate in precedenza.

The Scourge of Antibiotic Resistance: The Important Role of the Environment

Rita L. Finley,[1] Peter Collignon,[2] D. G. Joakim Larsson,[3] Scott A. McEwen,[4] Xian-Zhi Li,[5] William H. Gaze,[6] Richard Reid-Smith,[7] Mohammed Timinouni,[8] David W. Graham,[9] and Edward Topp[10]

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Antibiotic resistance and associated genes are ubiquitous and ancient, with most genes that encode resistance in human pathogens having originated in bacteria from the natural environment (eg, β-lactamases and fluoroquinolones resistance genes, such as *qnr*). The rapid evolution and spread of "new" antibiotic resistance genes has been enhanced by modern human activity and its influence on the environmental resistome. This highlights the importance of including the role of the environmental vectors, such as bacterial genetic diversity within soil and water, in resistance risk management. We need to take more steps to decrease the spread of resistance genes in environmental bacteria into human pathogens, to decrease the spread of resistant bacteria to people and animals via foodstuffs, wastes and water, and to minimize the levels of antibiotics and antibiotic-resistant bacteria introduced into the environment. Reducing this risk must include improved management of waste containing antibiotic residues and antibiotic-resistant microorganisms.



BJCP British Journal of Clinical Pharmacology

DOI:10.1111/bcp.12298

Substandard drugs: a potential crisis for public health

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Keywords
drug quality, falsification, inspection, regulation, substandard

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- **Poor-quality medicines** present a serious public health problem, particularly in emerging economies and developing countries, and may have a significant impact on the national clinical and economic burden.
- Attention has largely focused on the increasing availability of **deliberately falsified drugs**, but substandard medicines are also reaching patients because of poor manufacturing and quality-control practices in the production of genuine drugs (either branded or generic).
- **Substandard medicines are widespread and represent a threat to health because they can inadvertently lead to healthcare failures, such as antibiotic resistance** and the spread of disease within a community, as well as death or additional illness in individuals.

OPEN ACCESS Freely available online PLoS PATHOGENS

Selection of Resistant Bacteria at Very Low Antibiotic Concentrations

Erik Gullberg[1¶], Sha Cao[1¶], Otto G. Berg[2], Carolina Ilbäck[1], Linus Sandegren[1], Diarmaid Hughes[1], Dan I. Andersson[1*]

1 Department of Medical Biochemistry and Microbiology, Uppsala University, Uppsala, Sweden, **2** Department of Molecular Evolution, Uppsala University, Uppsala, Sweden

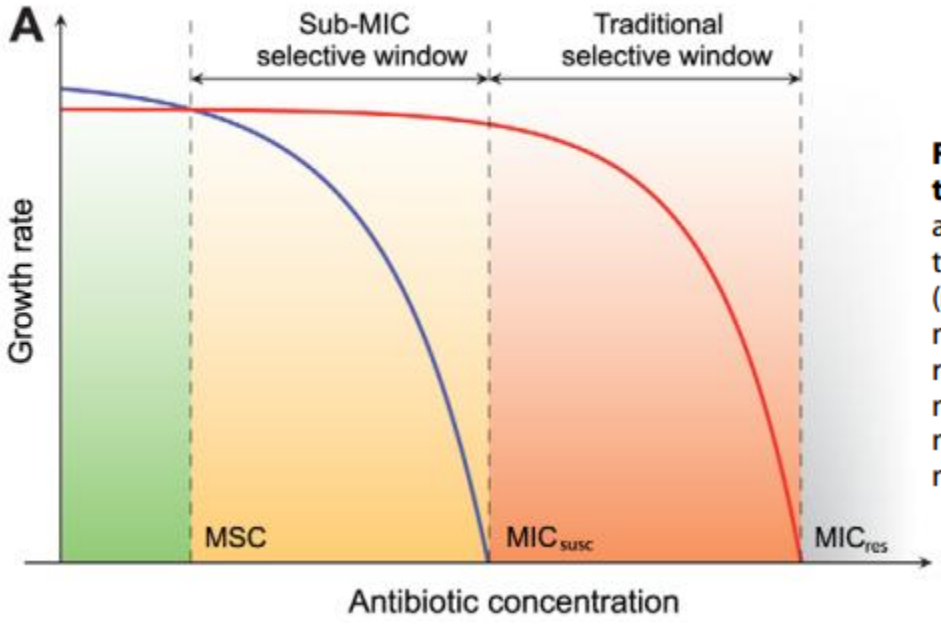

Figure 1. Growth rates as a function of antibiotic concentration. (**A**) Schematic representation of growth rates as a function of antibiotic concentration. Green indicates a concentration interval where the susceptible strain (blue line) will outcompete the resistant strain (red line). Orange (sub-MIC selective window) and red (traditional mutant selective window) indicate concentration intervals where the resistant strain will outcompete the susceptible strain. MIC_{susc} = minimal inhibitory concentration of the susceptible strain, MIC_{res} = minimal inhibitory concentration of the resistant strain and MSC = minimal selective concentration. (**B**). Relative exponential growth rates

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Current Opinion in Microbiology

Antimicrobials as promoters of genetic variation

Jesús Blázquez, Alejandro Couce, Jerónimo Rodríguez-Beltrán and Alexandro Rodríguez-Rojas

- Antibiotics at sublethal concentrations can promote genetic exchanges through multiple pathways involving various stress responses.

J Antimicrob Chemother. 1986 Apr;17(4):409-13.

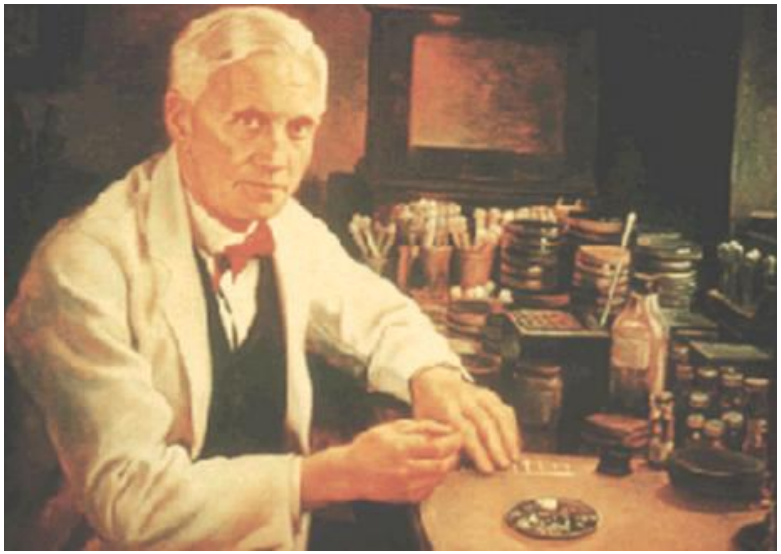
Beta-lactam antibiotics increase the frequency of plasmid transfer in Staphylococcus aureus.

Barr V, Barr K, Millar MR, Lacey RW.

Abstract

The transfer of a plasmid specifying tetracycline resistance between different derivatives of Staphylococcus aureus by phage mediated conjugation was enhanced 100- to 1000-fold by exposure of the culture to subinhibitory concentrations of beta-lactam agents. A variety of other antibiotics, including vancomycin and teicoplanin, had no such effect. The enhanced frequency of transfer was probably due to the formation of large bacterial aggregates.

Fleming in reference to Penicillin



- The public will demand [the drug and]…then will begin an era… of abuses. The microbes are educated to resist penicillin and a host of penicillin-fast organisms is bred out which can be passed to other individuals…In such a case the thoughtless person playing with penicillin treatment is morally responsible for the death of the man who finally succumbs to infection with penicillin-resistant organism. I hope the evil can be averted.

Fleming A. Penicillin's finder assays its future. New York Times. 1945; 21

Global antibiotic consumption 2000 to 2010: an analysis of national pharmaceutical sales data

Thomas P Van Boeckel, Sumanth Gandra, Ashvin Ashok, Quentin Caudron, Bryan T Grenfell, Simon A Levin, Ramanan Laxminarayan

Summary

Background Antibiotic drug consumption is a major driver of antibiotic resistance. Variations in antibiotic resistance across countries are attributable, in part, to different volumes and patterns for antibiotic consumption. We aimed to assess variations in consumption to assist monitoring of the rise of resistance and development of rational-use policies and to provide a baseline for future assessment.

Methods With use of sales data for retail and hospital pharmacies from the IMS Health MIDAS database, we reviewed trends for consumption of standard units of antibiotics between 2000 and 2010 for 71 countries. We used compound annual growth rates to assess temporal differences in consumption for each country and Fourier series and regression methods to assess seasonal differences in consumption in 63 of the countries.

Findings Between 2000 and 2010, consumption of antibiotic drugs increased by 36% (from 54 083 964 813 standard units to 73 620 748 816 standard units). Brazil, Russia, India, China, and South Africa accounted for 76% of this increase. In most countries, antibiotic consumption varied significantly with season. There was increased consumption of carbapenems (45%) and polymixins (13%), two last-resort classes of antibiotic drugs.

Interpretation The rise of antibiotic consumption and the increase in use of last-resort antibiotic drugs raises serious concerns for public health. Appropriate use of antibiotics in developing countries should be encouraged. However, to prevent a striking rise in resistance in low-income and middle-income countries with large populations and to preserve antibiotic efficacy worldwide, programmes that promote rational use through coordinated efforts by the international community should be a priority.

Funding US Department of Homeland Security, Bill & Melinda Gates Foundation, US National Institutes of Health, Princeton Grand Challenges Program.

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Figure 6. Distribution of consumption of antibacterials for systemic use (community (outside of hospitals) at ATC group level 3, expressed as DDI per day, EU/EEA, 2012

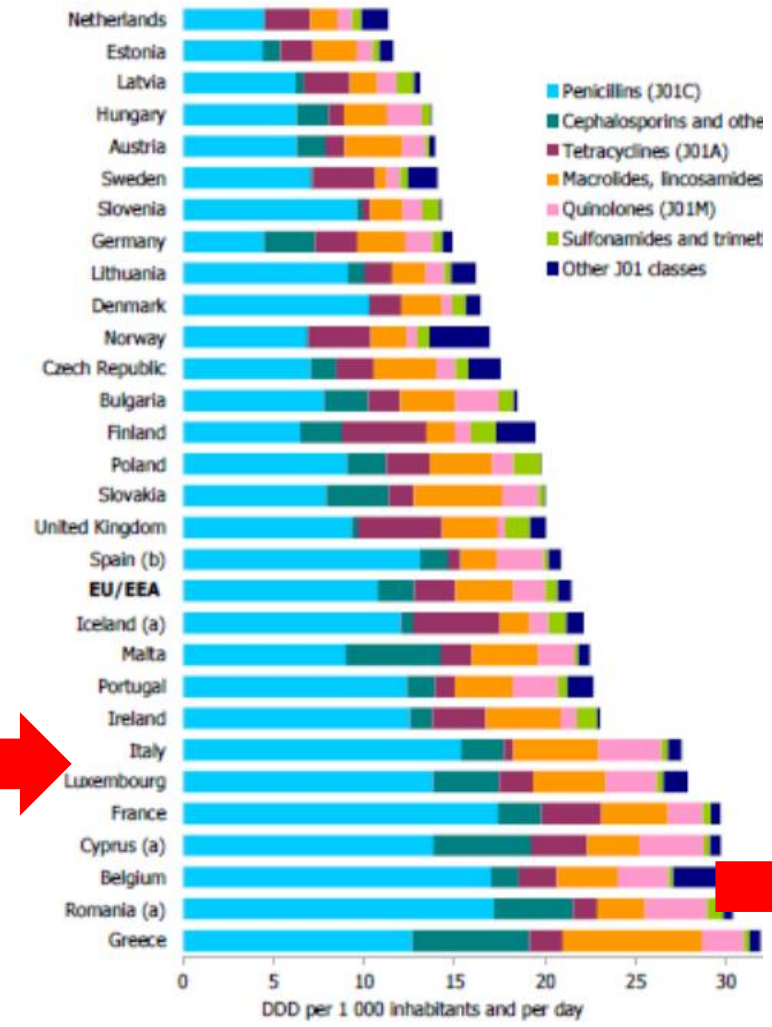
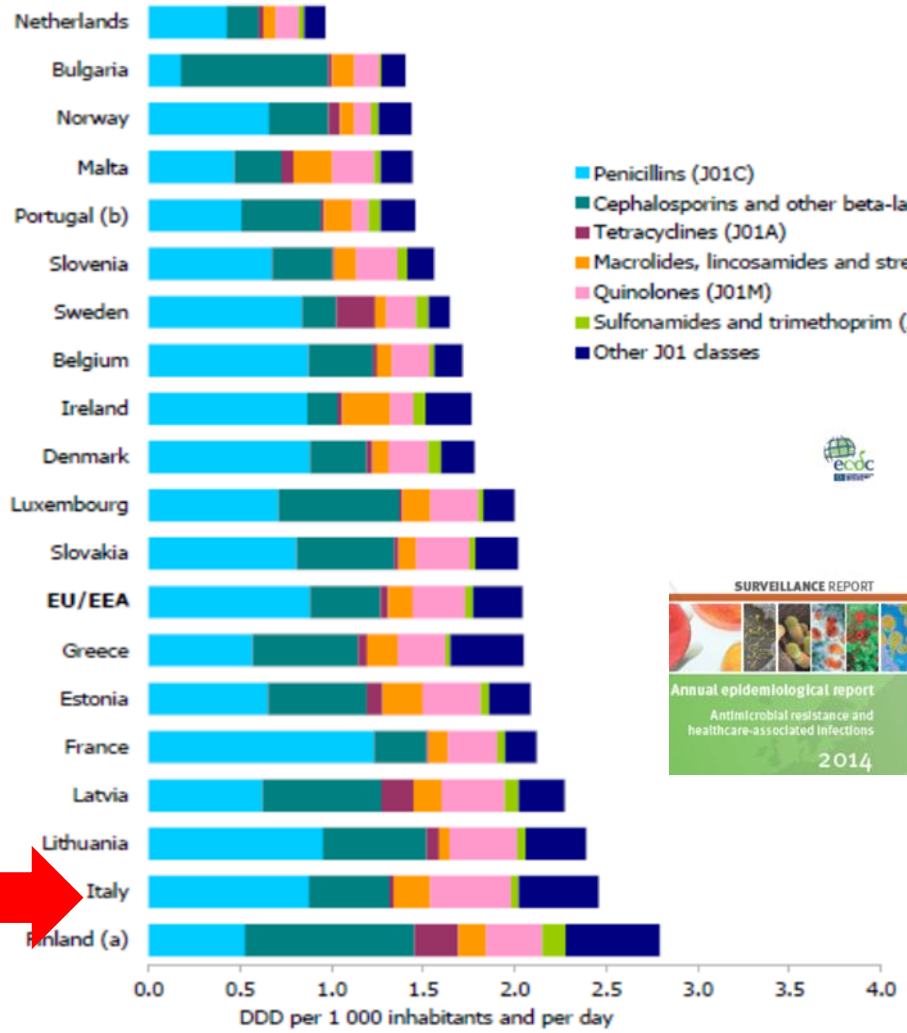


Figure 7. Distribution of consumption of antibacterials for systemic use (ATC group J01) at A level 3 in the hospital sector, expressed as DDD per 1 000 inhabitants and per day, EU/EEA, 2



VOLUME 337 AUGUST 14, 1997 NUMBER 7

THE EFFECT OF CHANGES IN THE CONSUMPTION OF MACROLIDE ANTIBIOTICS ON ERYTHROMYCIN RESISTANCE IN GROUP A STREPTOCOCCI IN FINLAND

HELENA SEPPÄLÄ, M.D., TIMO KLAUKKA, M.D., JAANA VUOPIO-
HANS HELENIUS, M.Sc., KATRINA LAGER, M.Sc.,
AND THE FINNISH STUDY GROUP FOR ANTIMI

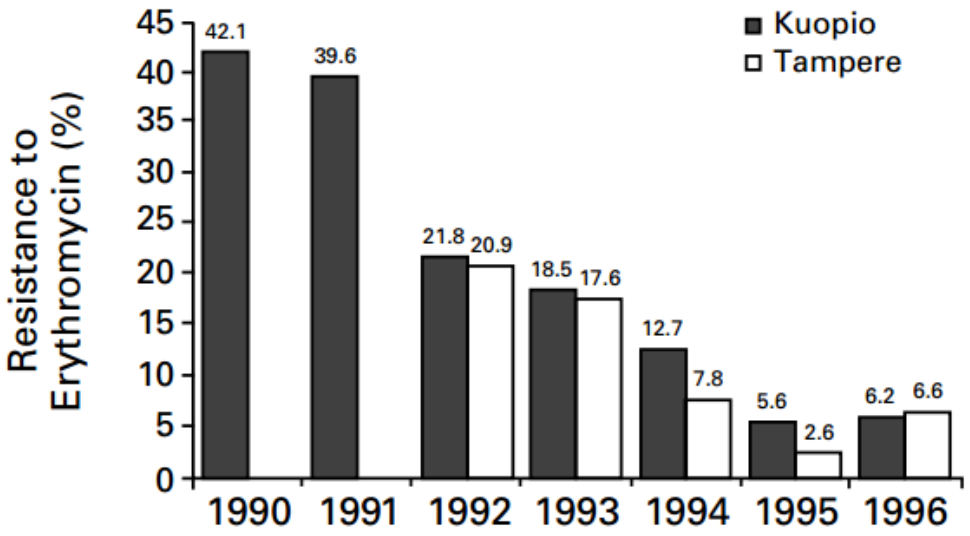


Figure 4. Frequency of Resistance to Erythromycin among 3022 Group A Streptococcal Isolates from Throat-Swab and Pus Samples (230 to 537 Isolates per Year) from the Kuopio Laboratory in 1990 through 1996 and among 2155 Isolates (153 to 814 per Year) from the Tampere Laboratory in 1992 through 1996.

The frequency of resistance decreased significantly ($P<0.001$) during the study period in both Kuopio (odds ratio for 1996 as compared with 1990, 0.09; 95 percent confidence interval, 0.06 to 0.14) and Tampere (odds ratio for 1996 as compared with 1992, 0.3; 95 percent confidence interval, 0.2 to 0.4).



Come possiamo rimediare

The World Alliance Against Antibiotic Resistance: Consensus for a Declaration

Jean Carlet

World Alliance Against Antibiotic Resistance

CID 2015:60 (15 June) • HEALTHCARE EPIDEMIOLOGY

Antibiotic resistance is increasing worldwide and has become a very important threat to public health. The overconsumption of antibiotics is the most important cause of this problem. We created a World Alliance Against Antibiotic Resistance (WAAAR), which now includes 720 people from 55 different countries and is supported by 145 medical societies or various groups. In June 2014, WAAAR launched a declaration against antibiotic resistance. This article describes the process and the content of this declaration.

Table 1. Consensus Process for the 10 Actions of the Declaration

Actions	Achieving Consensus	Contentious Issues	Concerns of Countries	Concerns of Professionals	Solving the Problem
1. Awareness of all stakeholders on the threat represented by AMR	Easy	None	None	None	
2. Financed national plan in each country	Some difficulties	Resources needed	LMIC	LMIC	Help those countries
3. Permanent access of AB of assured quality	Some difficulties	Difficult to implement	LMIC	LMIC	Help those countries
4. Antibiotic stewardship					
a. ABS in animals	Some difficulties	Antibiotic prophylaxis in animals	Europe	Veterinarians	Consensus efforts
b. AB as growth factors	Easy	None	None	None	
c. AB over the counter	Some difficulties	Slow process Patience needed	LMIC	LMIC	Determination and patience
d. ABS in the hospitals	Some difficulties	Resources needed	LMIC	LMIC	Help those countries
5. Infection prevention	Some difficulties	Cultural and financial issues	LMIC	LMIC	Apply the WHO recommendations
6. Use of diagnostic tests	Some difficulties	Resources issues	LMIC Small hospitals	LMIC	Resources
7. Education information	Easy	None	None	None	
8. Surveillance	Some difficulties	Technical issues for laboratories	None	Microbiologists, pharmacists	Resources
9. Basic and applied research: R&D for new drugs	Some difficulties	Difficult for R&D	None	Pharmaceutical companies	New business models
10. AB in UNESCO list	Easy	None	None	None	

Abbreviations: AB, antibiotic; ABS, antibiotic stewardship; AMR, antimicrobial resistance; LMIC, low- and middle-income countries; R&D, research and

Seven Ways to Preserve the Miracle of Antibiotics

John G. Bartlett,[1] David N. Gilbert,[2] and Brad Spellberg[3]

[1]Johns Hopkins University School of Medicine, Baltimore, Maryland; [2]Department of Medical Education, Providence Portland Medical Center, Portland, Oregon; and [3]Liu Vaccine Center, Torrance, California

Antibiotic resistance is a well-acknowledged crisis with no clearly defined comprehensive, national corrective plan. We propose a number of interventions that, collectively, could make a large difference. These include collection of data to inform decisions, efforts to reduce antibiotic abuse in people and animals, great emphasis on antibiotic stewardship, performance incentives, optimal use of newer diagnostics, better support for clinical and basic resistance-related research, and novel methods to foster new antibiotic development.

- Addressing antibiotic abuse in farm animals;
- Methods to implement prevention of nosocomial infections;
- Stewardship to improve hospital-based antibiotic use;
  - ….
  - Avoid inappropriate antibacterial use for viral infections;
  - Resisting the urge to treat colonization rather than true infection;
  - Discontinuing use of antimicrobials when infection is cured or unlikely ;
- Diagnostic methods that can transform the management of infectious diseases;
- Methods to promote antibiotic development

MAYO CLINIC
CONCISE REVIEW FOR CLINICIANS

Shawn Vasoo, MBBS, MRCP; Jason N. Barreto, PharmD; and Pritish K. Tosh, MD

Decrease in Nonhuman Use of Antimicrobials.

- Currently, only the European Union has banned (since 2006) the use of antibiotics for nontherapeutic uses in farm animals.
- It has been estimated that 80% of antimicrobial use in the United States is for nontherapeutic uses in livestock.
- Further inroads globally should be made into regulating such use because this has been linked to antimicrobial resistant human infections.

MAYO CLINIC
CONCISE REVIEW FOR CLINICIANS

Shawn Vasoo, MBBS, MRCP; Jason N. Barreto, PharmD; and Pritish K. Tosh, MD

Infection Control and Antimicrobial Stewardship.

- Multidisciplinary teams (involving physicians, pharmacists, microbiologists, and nurses).
- Antimicrobial stewardship should extend beyond inpatients to the outpatient setting (including emergency departments), where most patients are seen.

Prevention of nosocomial infections

- Awareness
- Hand hygiene
- Contact Isolation – Gloves + Gowns – Equipment dedicated to room – Disinfect personal equipment used in room
- Limit HCW exposure

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Journal of Hospital Infection

journal homepage: www.elsevierhealth.com/journals/jhin



Controlling multidrug-resistant Gram-negative bacilli in your hospital: a transformational journey

L.S. Munoz-Price*

Institute for Health and Society and Department of Medicine, Medical College of Wisconsin, Milwaukee, WI, USA

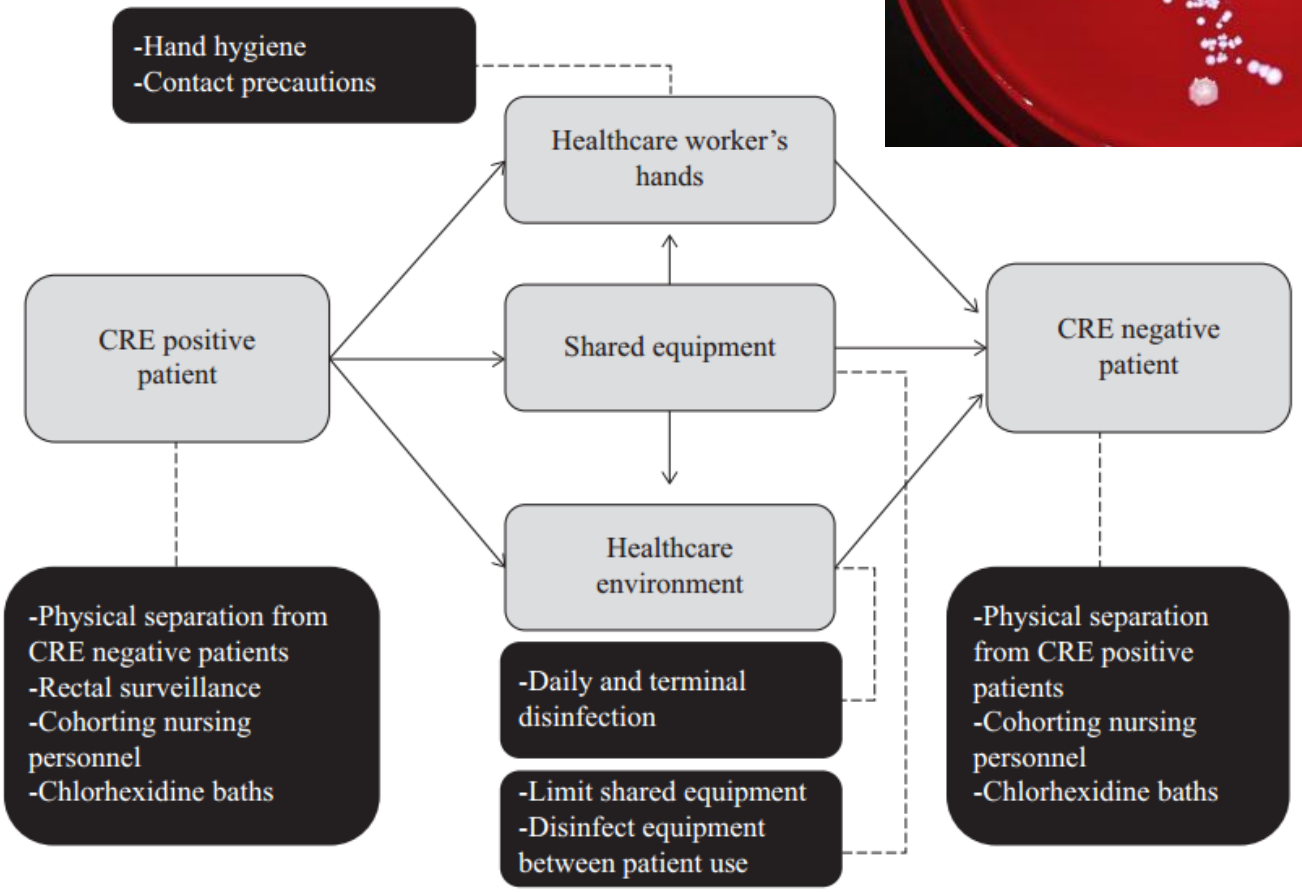

Figure 1. Horizontal transmission pathways for carbapenem-resistant Enterobacteriaceae (CRE). Reproduced from Munoz-Price and Quinn with permission from Wolters Kluwer Health.[1]

Journal of Infection and Public Health (2015) xxx, xxx–xxx





http://www.elsevier.com/locate/jiph

An evaluation of hand hygiene in an intensive care unit: Are visitors a potential vector for pathogens?

David J. Birnbach[a,b,*], Lisa F[illegible][a], [illegible][a]
Kristopher L. Arheart[b], L. Si

MAJOR ARTICLE

Surveillance Cultures Growing Carbapenem-Resistant *Acinetobacter baumannii* Predict the Development of Clinical Infections: A Retrospective Cohort Study

Rachel Latibeaudiere,[1] Rossana Rosa,[1] Panthipa Laowansiri,[1] Kristopher Arheart,[2,3] Nicholas Namias,[4] and L. Silvia Munoz-Price[5,6]

[1]Department of Medicine, [2]Department of Public Health Sciences, [3]Division of Statistics, and [4]Department of Surgery, University of Miami Miller School of Medicine, Florida; and [5]Institute for Health and Society, and [6]Department of Medicine, Medical College of Wisconsin, Milwaukee

Use of UV Powder for Surveillance to Improve Environmental Cleaning

L. Silvia Munoz-Price, MD;[1,2] Ella Ariza-Heredia, MD;[1,2]
Stephen Adams, RN;[2] Micheline Olivier, RN;[2]
Lisa Francois, RN;[2] Maria Socarras, RN;[2]
Gabriel Coro, RN;[2] Amos Adedokun, RN;[2]
Theodora Pappas, RN;[2] Madelaine Tamayo, RN;[2]
Regina McDade, RN;[2] Cameron Dezfulian, MD[1]

Commercially available UV powder was applied weekly to high-risk objects within patient rooms and inspected after 48 hours. We found a baseline cleaning rate of 41.8% that increased up to 80% ($P <$ .001) after the institution of weekly electronic feedback (unit rates and rankings) to environmental services, hospital leadership, and unit administrators.

Infect Control Hosp Epidemiol 2011;32(3):000-000





Journal of Hospital Infection (2007) **67**, 182–188

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Assessing the biological efficacy and rate of recontamination following hydrogen peroxide vapour decontamination☆

J.A. Otter [a], M. Cummins [b], F. Ahmad [c], C. van Tonder [c], Y.J. Drabu [d,*]

[a] *BIOQUELL (UK) Ltd, Andover, Hampshire, UK*
[b] *Infection Control Department, Barts and the London NHS Trust, The Royal London Hospital, London, UK*
[c] *Infection Control Department, North Middlesex University Hospital NHS Trust, London, UK*
[d] *Infection Prevention and Control Department, Barking, Havering and Redbridge Hospitals NHS Trust, Romford, Essex, UK*

Emerging Issues in Gram-Negative Bacterial Resistance: An Update for the Practicing Clinician

Shawn Vasoo, MBBS, MRCP; Jason N. Barreto, PharmD; and Pritish K. Tosh, MD

Active Surveillance and Interrupting the Chain of Transmission

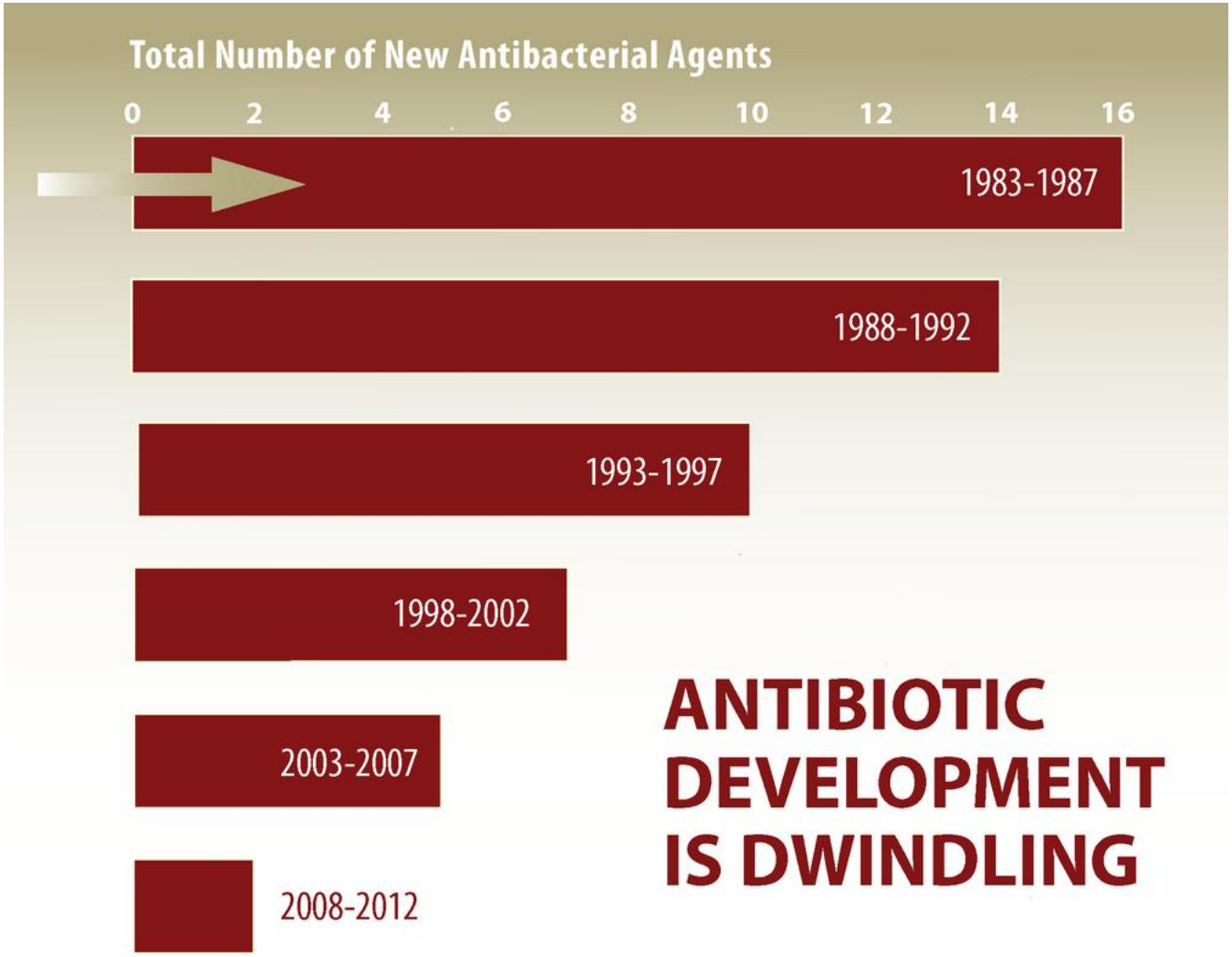
- Early detection, isolation and cohorting, and skin decontamination in select patient groups (eg, daily chlorhexidine bathing) can help interrupt the chain of transmission.
- Novel approaches may help in decreasing environmental contamination (eg, adenosine triphosphate bioluminescence or UV monitoring for effectiveness of environmental cleaning, hydrogen peroxide vapor decontamination, and use of coppercoated surfaces);
- Laboratories, depending on local hospital epidemiology, should determine the **optimal method for CPGNB screening** and be aware that **no one method is perfect** (molecular methods only detect resistance targets identified in the assay, whereas phenotypic methods may be less sensitive overall and are generally more labor intensive).

MAYO CLINIC
CONCISE REVIEW FOR CLINICIANS

Shawn Vasoo, MBBS, MRCP; Jason N. Barreto, PharmD; and Pritish K. Tosh, MD

Regional or National and International Level Information Sharing.

- Given the potential for rapid regional dissemination of resistant GNB with increased interfacility transfers for medical care, novel methods to accurately identify patients who are at risk of or who are known CPGNB carriers during transfer of care will help ensure that appropriate infection control measures will be continued.
- Regional antimicrobial surveillance networks, such as the Healthcare-Associated Infections-Community Interface, **European Antimicrobial Resistance Surveillance Network**, and Asian Network for Surveillance of Resistant Pathogens, play an important role in providing necessary data for policy making and resource allocation.



Source: *The Epidemic of Antibiotic-Resistant Infections*, CID 2008:46 (15 January)
Clin Infect Dis. (2011) May 52 (suppl 5): S397-S428. doi: 10.1093/cid/cir153

frontiers in MICROBIOLOGY

REVIEW ARTICLE
published: 20 October 2014
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A new strategy to fight antimicrobial resistance: the revival of old antibiotics

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The increasing prevalence of hospital and community-acquired infections caused by multidrug-resistant (MDR) bacterial pathogens is limiting the options for effective antibiotic therapy. Moreover, this alarming spread of antimicrobial resistance has not been paralleled by the development of novel antimicrobials. Resistance to the scarce new antibiotics is also emerging. In this context, the rational use of older antibiotics could represent an alternative to the treatment of MDR bacterial pathogens. It would help to optimize the armamentarium of antibiotics in the way to preserve new antibiotics and avoid the prescription of molecules known to favor the spread of resistance (i.e., quinolones). Furthermore, in a global economical perspective, this could represent a useful public health orientation knowing that several of these cheapest "forgotten" antibiotics are not available in many countries. We will review here the successful treatment of MDR bacterial infections with the use of old antibiotics and discuss their place in current practice.

Keywords: multi-drug-resistant pathogens, MRSA and VRE, ESBLs, colistin, fosfomycin, trimethoprim-sulfamethoxazole combination, tetracycline, MDR-tuberculosis

Clin Microbiol Infect 2005; 11 (Suppl. 1): 9–11

Infectious disease emergencies: role of the infectious disease specialist

S. Ragnar Norrby

Swedish Institute for Infectious Disease Control, Solna, Sweden

- The ID specialty should be seen as an **essential component in modern healthcare**.
- **The money used to create an effective ID service is well-invested, since ID specialists will decrease the risk of dissemination of infections within hospitals and within society**.
- Also, by **optimising antibiotic treatment**, in terms of choice of drugs, dosages and treatment times, these specialists can contribute to a reduction in the incidence of antimicrobial resistance, the consumption of such medicines and the risk of nosocomial infections caused by resistant bacteria.

- To be optimally efficient, the ID specialist must work **in close cooperation** with **clinical microbiologists and hospital hygiene specialists**.
- When outbreaks occur, cooperation with public health organisations is also necessary, as well as with national infection control agencies and with international organisations such as the European Centre for Disease Prevention and Control and the WHO



The impact of infectious diseases consultation on oncology practice

Granwehra BP & Kontoyiannis DP Curr Opin Oncol 2013, 25:353-359

KEY POINTS

- Infectious diseases consultation results in improved outcomes in inpatient and outpatient settings.
- Mortality of *S. aureus* bacteremia and candidemia is reduced with infectious diseases consultation.
- Adherence with infectious diseases recommendations is associated with improved outcomes.
- Routine infectious diseases consultation for outpatient parenteral antibiotic therapy is associated with more appropriate utilization of antibiotics, including discontinuation.
- Telephone, curbside, or other informal consultation is inferior to bedside consultation, resulting in increased mortality.



Impact of Infectious Diseases Specialists and Microbiological Data on the Appropriateness of Antimicrobial Therapy for Bacteremia

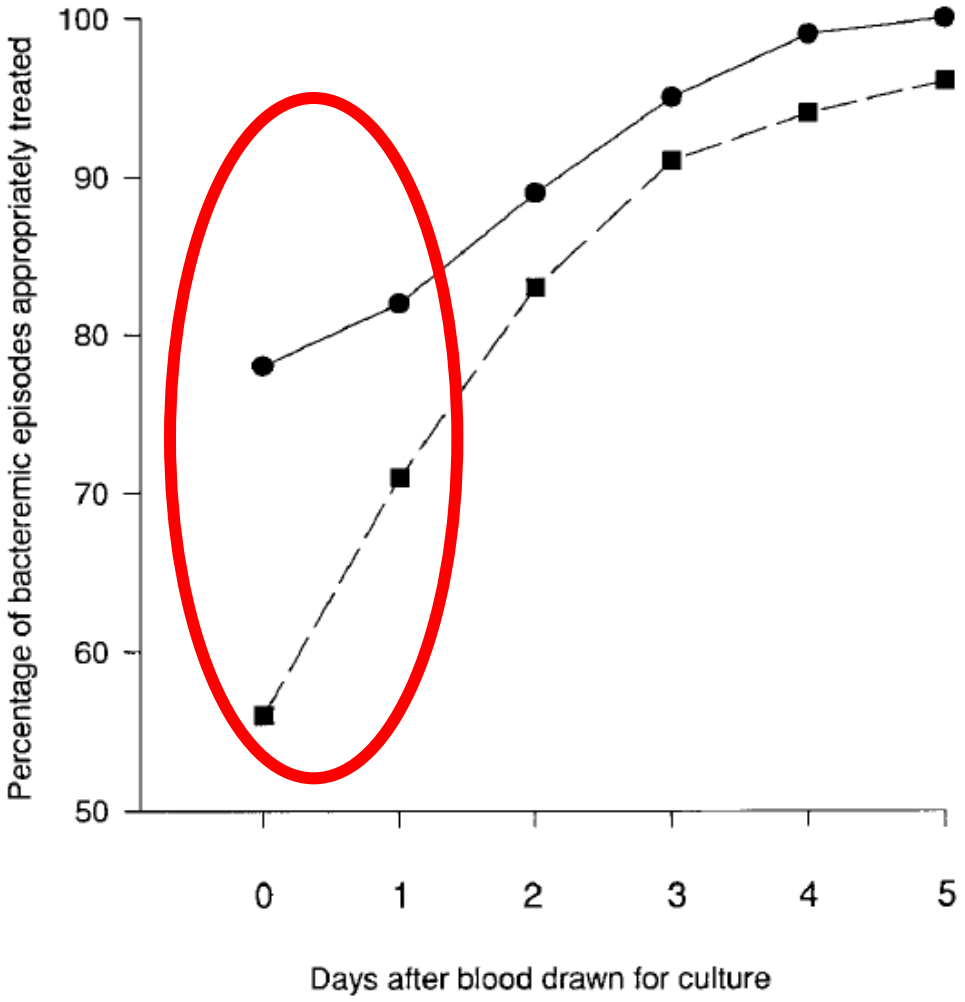

Figure 1. Proportion of bacteremic episodes appropriately treated by infectious disease specialists (*circles*) and other physicians (*squares*) over time. The difference between the two curves is statistically significant during the first 2 days ($P < .05$ [χ^2]).

- 428 batteriemie, 850 letti
- Terapia antibiotica indirizzata su blood colture o su IDS
- Empirica appropriata nel 63% sale al 78% con IDS
- IDS più rapido shift a orale e meno largo spettro

CID 1999;

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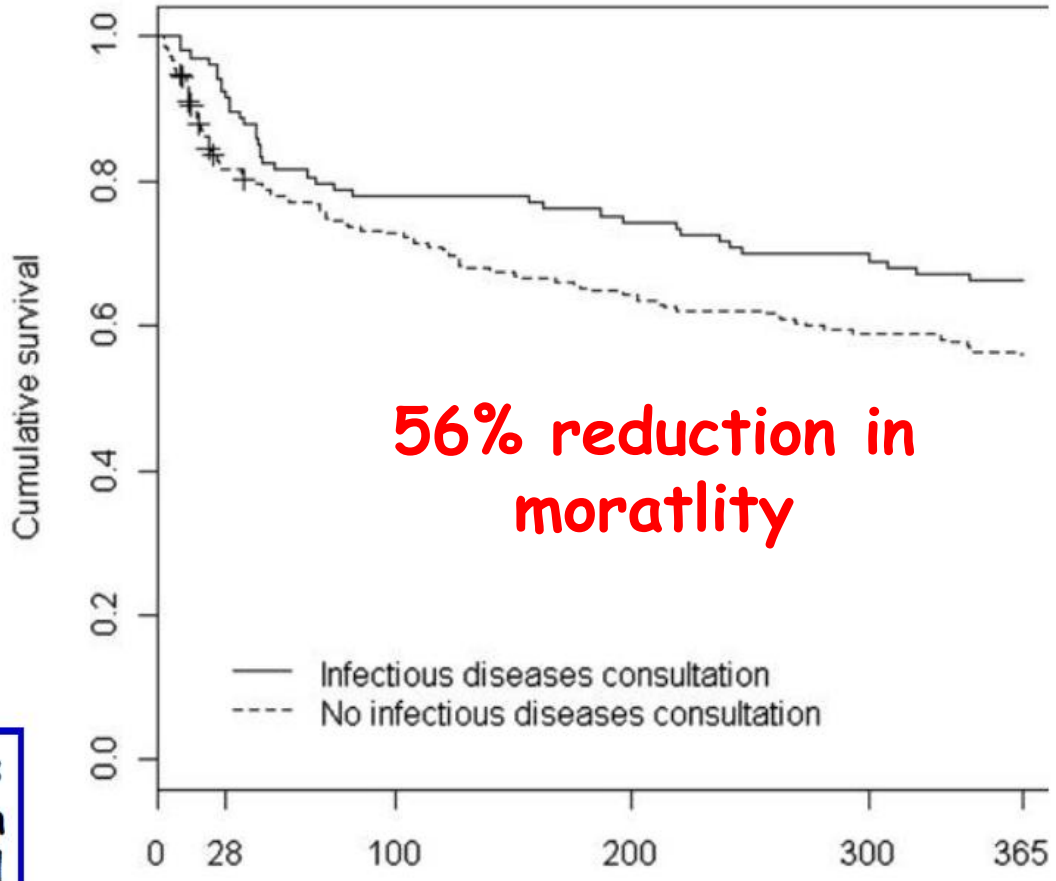
The Value of Infectious Diseases Consultation in Staphylococcus aureus Bacteremia

A 2-year prospective cohort study of patients with *S. aureus* BSI was performed at a tertiary care hospital. Independent risk factors for 28-day mortality were determined.



56% reduction in moratlity

Infectious diseases consultation was associated with a 56% reduction in 28-day mortality (adjusted hazard ratio, 0.44; 95% CI, 0.22-0.89).

Honda H et al, Am J Med 2010; 123: 631-637

Proposte

- Assumere infettivologi
- Presenza di almeno un infettivologo per ospedale
- Possibilmente istituire un servizio di infettivologia in ogni ospedale (tale servizio dovrebbe essere in rete con gli altri servizi di infettivologia e dipendere dalla UOC di malattie infettive più vicina)

Clinical Infectious Diseases 2008; 47:1051–63

The Value of Infectious Diseases Specialists: Non–Patient Care Activities

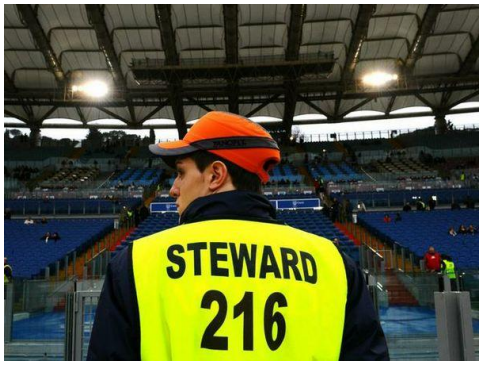
Daniel P. McQuillen,[1] Russell M. Petrak,[2] Ronald B. Wasserman,[3] Ronald G. Nahass,[4] Jason A. Scull,[5] and Lawrence P. Martinelli[6]

[1]Lahey Clinic Center for Infectious Diseases and Prevention, Tufts University School of Medicine, Burlington, Massachusetts; [2]Metro Infectious Diseases Consultants, Hinsdale, Illinois; [3]Infectious Diseases Medical Group, Walnut Creek, California; [4]ID CARE, Hillsborough, New Jersey; [5]Clinical Affairs, Infectious Diseases Society of America, Arlington, Virginia; and [6]Consultants in Infectious Diseases, Lubbock, Texas

- This article will detail the available data supporting the value of **infectious diseases specialists in their roles of directing antimicrobial-management and infection-control programs**, maintaining health care workers' well-being, and minimizing exposure

Steward: definition

a person and especially a man whose job is to serve meals and take care of passengers on a train, airplane, or ship





Stewardship

The careful and responsible management of something entrusted in one's care.

La gestione attenta e responsabile di qualcosa affidato alla propria cura

Antimicrobial Stewardship Programs

ASPs are designed

- To optimize antimicrobial therapy,
- To improve patients' outcomes,
- To ensure cost-effective therapy and
- To reduce adverse effects associated with antimicrobial use, including antimicrobial resistance

MacDougall C et al. *Clin Microbiol Rev 2005; 18; 638–656*
Lesprit P et al. *Curr Opin Infect Dis 2008:21; 344–349*

Impact of antimicrobial stewardship in critical care: a systematic review

IMPACT OF STEWARDSHIP ON SAFETY?

"The reductions in antimicrobial utilization associated with stewardship interventions **have not been associated** with any worsening in nosocomial infection rates, length of stay or mortality among intensive care patients."

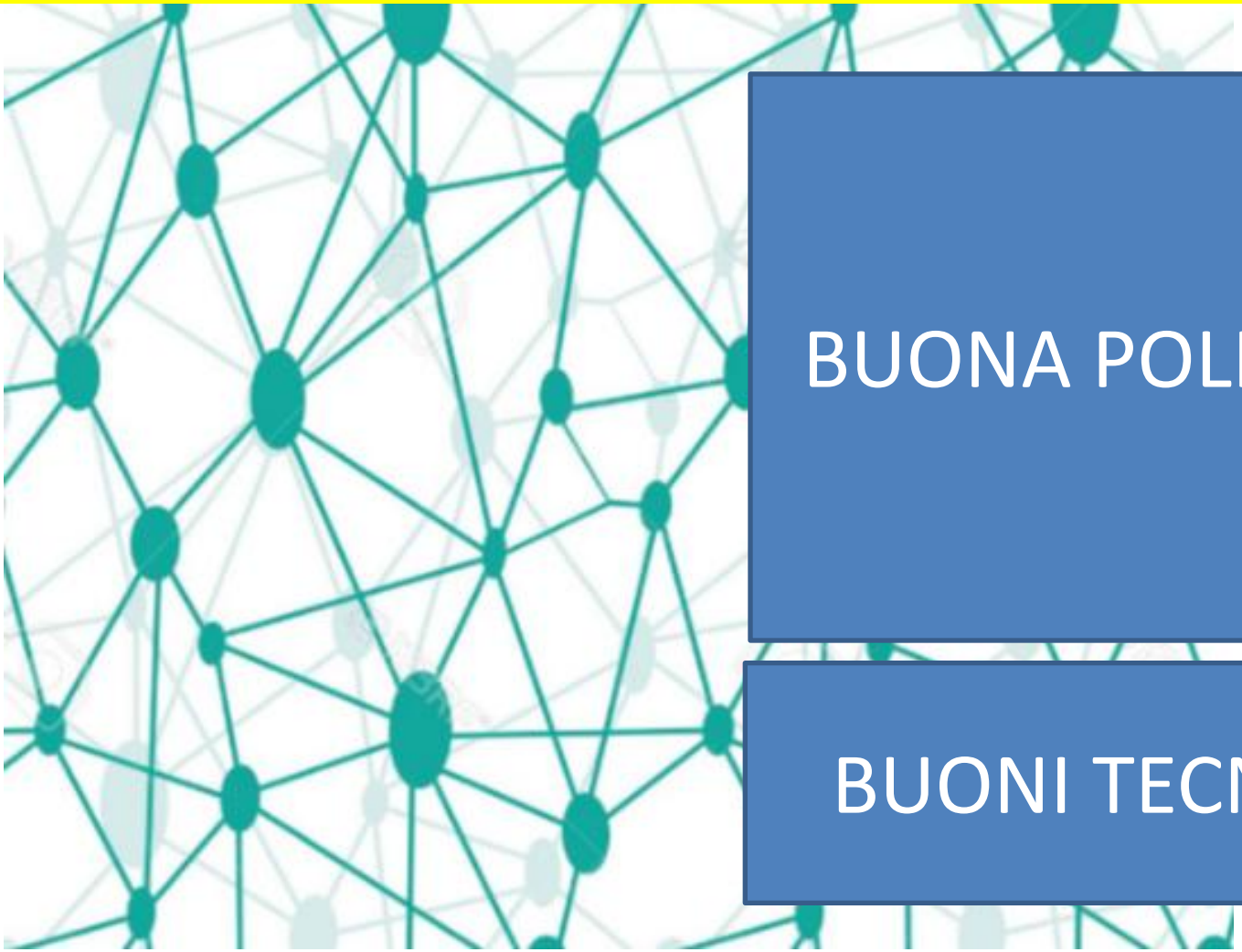
"Stewardship interventions were associated with … fewer antibiotic adverse events."

Kaki R et al. J Antimicrob Chemother 2011; 66: 1223–1230

Alla Regia Centrale Regionale (RCR) dovranno pervenire:

- i dati del **consumo degli antibiotici** (i farmacisti invieranno il consumo mensile degli antimicrobici separati per UOC sia al CIO che alla RCR)
- i dati relativi agli **isolamenti di germi MDR** (possibilmente in tempo reale). (I microbiologi invieranno i dati al sia CIO di competenza che alla RCR)
- I dati relativi agli **indici occupazionali e i DRG** delle UOC coinvolte (calcolo del numero di paz ricoverati/giorno). Le Direzioni Sanitarie invieranno i dati con cadenza mensile
- I **risultati delle indagini di prevalenza puntuale delle ICA** (eseguiti ogni 4 mesi)

Necessario fare rete

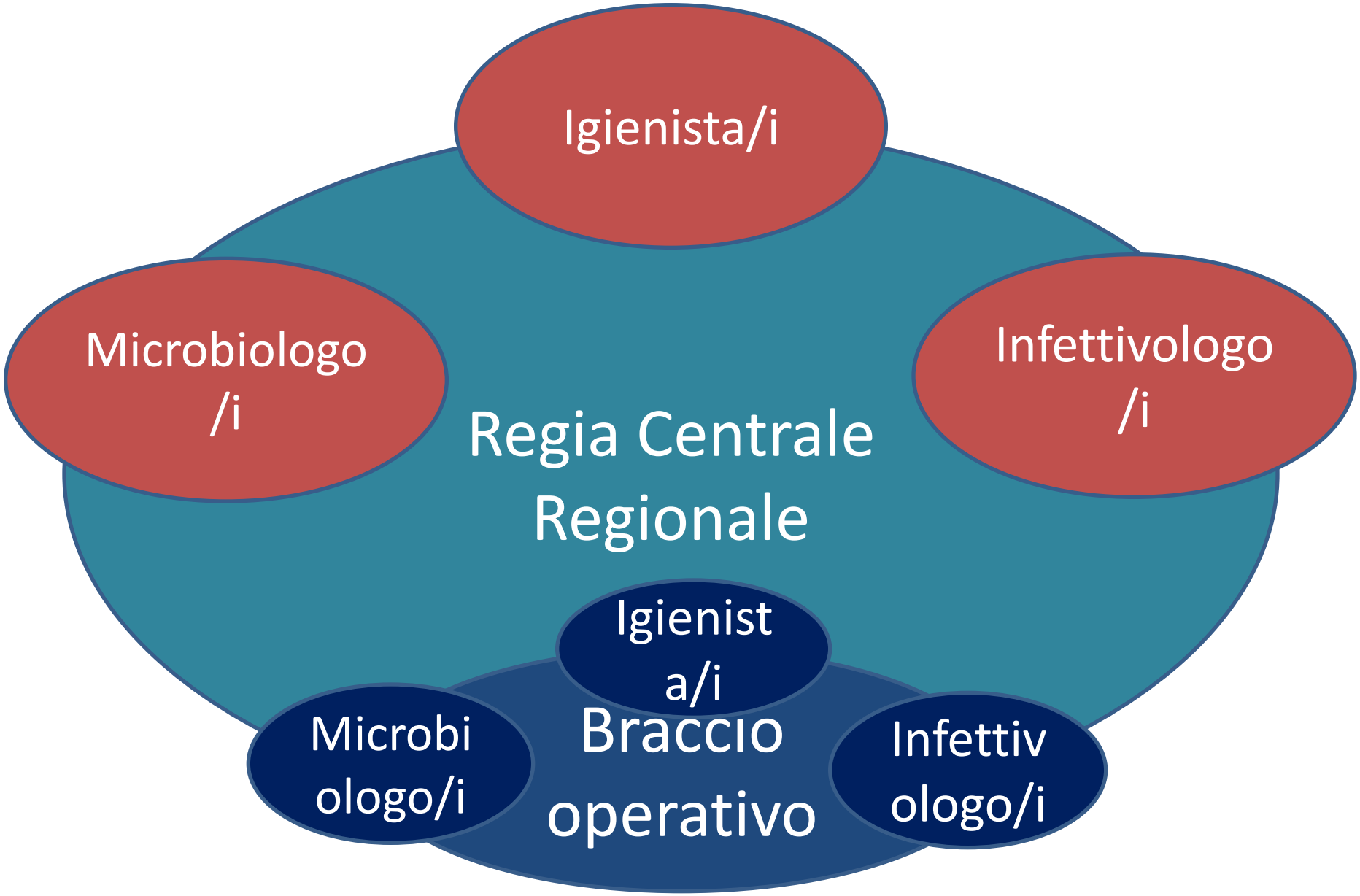


BUONA POLITICA

BUONI TECNICI

Regia Centrale Regionale

- Funzione di coordinamento dei CIO
- Coordina interventi omogenei nelle diverse aziende (metodologie che garantiscano l'ottenimento di risultati condivisibili) relativi a
  - Prevalenza/incidenza di infezioni nosocomiali
  - Consumo di singoli antimicrobici per UOC
  - Prevalenza/incidenza di microrganismi sentinella
- Raccoglie in tempo reale i dati forniti dai CIO e li analizza provando anche a correlare i dati del consumo degli antibiotici con quelli della prevalenza dei microrganismi MDR


Igienista/i
Microbiologo /i
Infettivologo /i
Regia Centrale Regionale
Igienist a/i
Microbi ologo/i
Braccio operativo
Infettiv ologo/i

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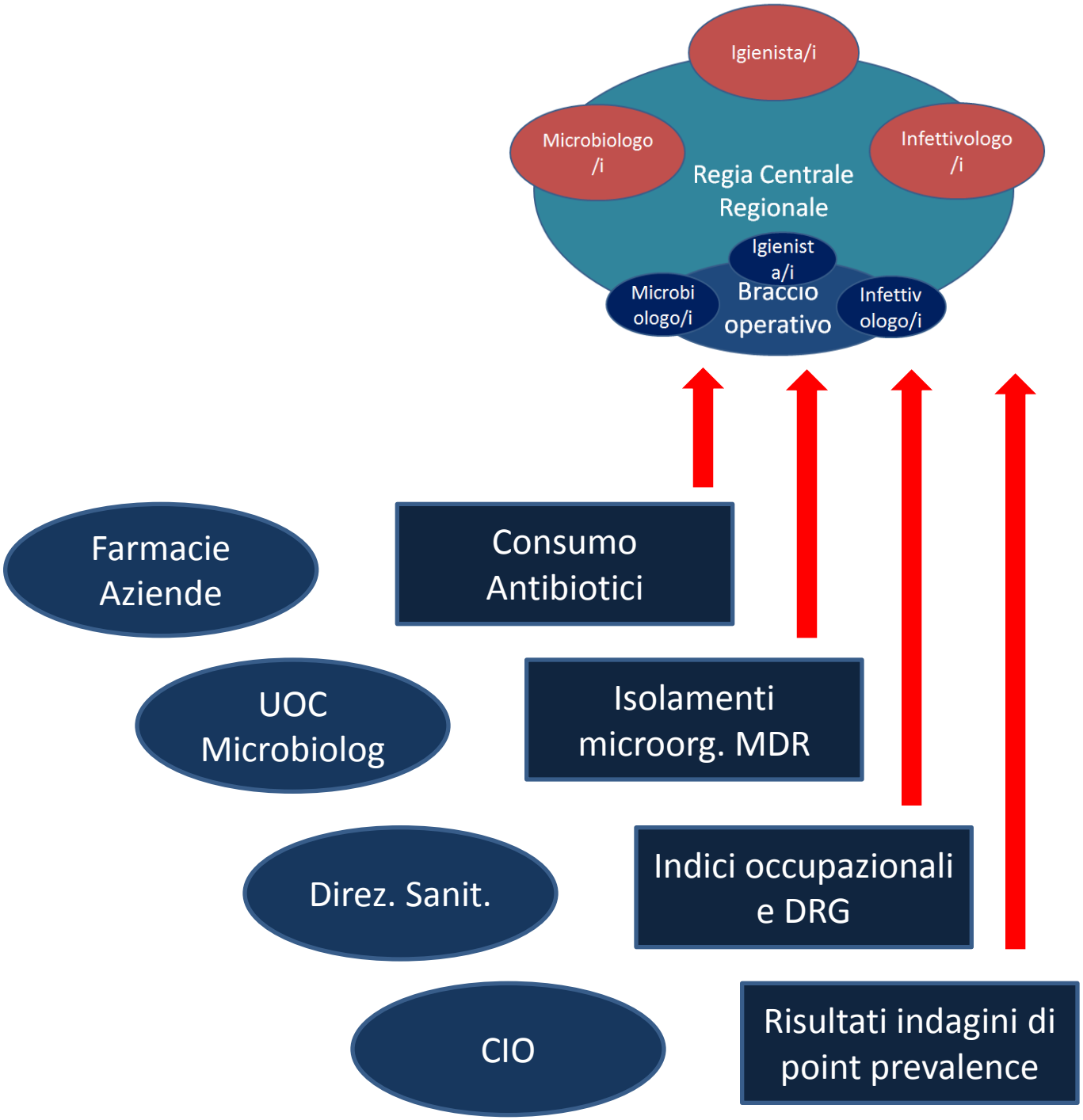
Igienista/i
Microbiologo /i
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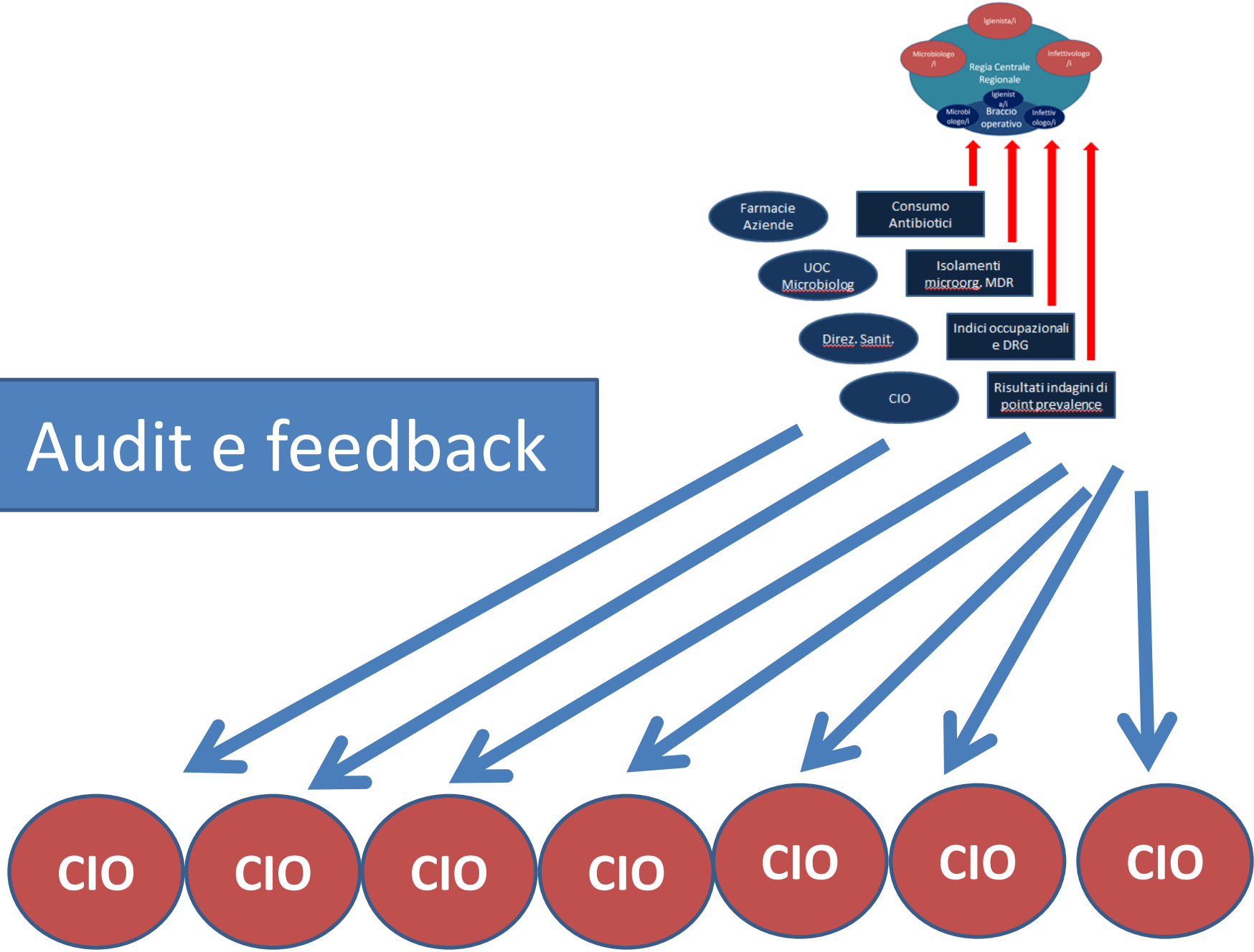
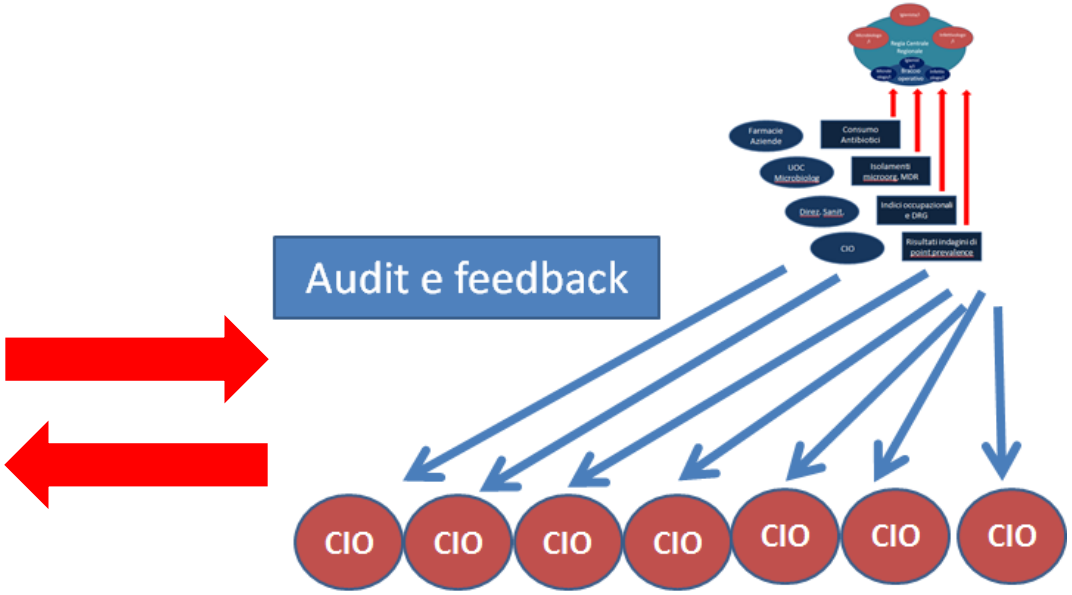
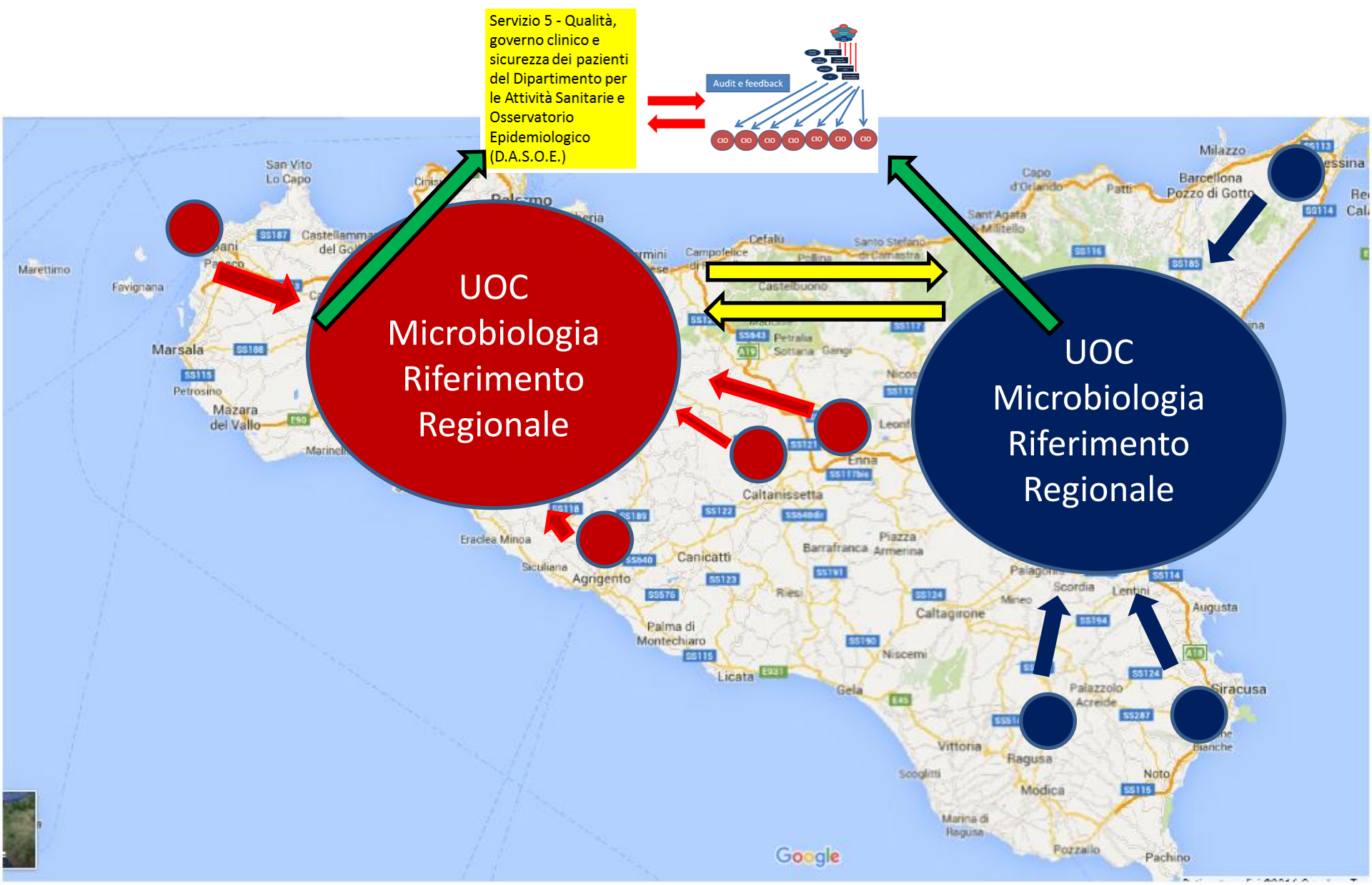
Regia Centrale Regionale
Igienist a/i
Microbi ologo/i
Braccio operativo
Infettiv ologo/i
Farmacie Aziende
Consumo Antibiotici
UOC Microbiolog
Isolamenti microorg. MDR
Direz. Sanit.
Indici occupazionali e DRG
CIO
Risultati indagini di point prevalence

Audit e feedback



Servizio 5 - Qualità, governo clinico e sicurezza dei pazienti del Dipartimento per le Attività Sanitarie e Osservatorio Epidemiologico (D.A.S.O.E.)




Servizio 5 - Qualità, governo clinico e sicurezza dei pazienti del Dipartimento per le Attività Sanitarie e Osservatorio Epidemiologico (D.A.S.O.E.)
Audit e feedback
CIO
UOC Microbiologia Riferimento Regionale
UOC Microbiologia Riferimento Regionale
San Vito Lo Capo
Marettimo
Favignana
Marsala
Petrosino
Mazara del Vallo
Castellammare del Golfo
Cefalù
Campofelice di Roccella
Castelbuono
Petralia Sottana
Gangi
Enna
Caltanissetta
Eraclea Minoa
Siculiana
Agrigento
Canicatti
Barrafranca
Piazza Armerina
Riesi
Palma di Montechiaro
Licata
Gela
Caltagirone
Niscemi
Vittoria
Scoglitti
Ragusa
Modica
Marina di Ragusa
Pozzallo
Pachino
Palazzolo Acreide
Noto
Siracusa
Augusta
Lentini
Scordia
Mineo
Milazzo
Barcellona Pozzo di Gotto
Capo d'Orlando
Patti
Sant'Agata di Militello
Santo Stefano di Camastra
Google

UOC Microbiologia di Riferimento

- Istituzione di n.2 UOC di Microbiologia di riferimento regionale
  - Sicilia occidentale - **Palermo** (Prof.ssa Anna Giammanco)
  - Sicilia Orientale - **Catania** (Prof.ssa Stefania Stefani)
- Funzione
  - Collettori dei microrganismi MDR provenienti dai laboratori dei relativi bacini
    - Tipizzazione microrganismi MDR
    - Antibiogramma con MIC
    - Saggio di antibiotici in combinazione in caso di infezioni difficili (su espressa richiesta del clinico)
    - archiviazione ed elaborazione dei dati
    - Invio dei dati alla Regia Centrale con cadenza semestrale


Comunicazione
E
Confronto
Crescita
e
Cultura
Ottimizzazio
ne dei
percorsi
Qualità
delle
prestazioni
Trasparenza
gestionale
Ricerca scientifica
E
Pubblicazioni
Salute
Risparmio
Finaziamenti italiani ed
europei per la riecrca
scientifica
Investimenti in
nuove tecnologie

Costi

- Implementazione UOC di Riferimento (strumentazione e personale tecnico specializzato)
- Laboratory Information System
- Database e manutenzione dello stesso
- Epidemiologo/microbiologo/infettivologo addetto alla gestione dei dati

Sicilia. Dallo Stato 167,5 milioni per l'innovazione tecnologica delle strutture sanitarie

Ad annunciarlo l'assessore alla Sanità sulla base della comunicazione inviata dal ministero della Salute. "A breve seguirà un ulteriore stralcio per un ammontare analogo". Un "importantissimo risultato che dà grande respiro al servizio sanitario regionale".



18 MAG - Il ministero della Salute ha comunicato all'assessorato regionale della Salute della Regione Siciliana la concessione del primo stralcio del finanziamento per l'innovazione tecnologica e delle strutture sanitarie, pari a 167 milioni e 500 mila euro a carico dello Stato. Ad annunciarlo una nota dell'assessore regionale della Salute, **Baldo Gucciardi,** che ha ricevuto ufficialmente la comunicazione della prima tranche del finanziamento del programma ex art. 20 della Legge n. 67 del 1988, finanziamento che ammonta complessivamente a 375 milioni di euro.

"Questo primo finanziamento – commenta Gucciardi - cui a breve seguirà un ulteriore stralcio per un ammontare analogo, consentirà di ammodernare le nostre strutture sanitarie e di dotare i nostri presidi di apparecchiature di tecnologie avanzate".

"Questo è un importantissimo risultato – conclude l'assessore - che dà grande respiro al servizio sanitario regionale per un ulteriore avanzamento qualitativo dell'offerta sanitaria in Sicilia".

18 maggio 2016