

**Controlling the spread of multidrug-resistant organisms in healthcare settings: Is it really possible?**  
Prof. Pierre Parneix, Center de Coordination de Lutte Contre les Infection Nosocomiales, Bordeaux, France  
A Webber Training Teleclass

**CClin AR**  
French healthcare-associated infection control network



**Controlling the spread of multidrug-resistant organisms in healthcare settings: Is it really possible?**

Hosted by Martin Kiernan  
martin@webbertraining.com

**Pierre Parneix**  
pierre.parneix@chu-bordeaux.fr  
@peyo3319

www.cclin-arlin.fr      www.webbertraining.com      July 8, 2014

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**Conflict of interest**



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**Be confident and protected**




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**Be confident and protected**

What's your nationality?



I'm a surgeon!

Johann Anton von Mikulicz-Radecki 1850-1905

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**Facing the epidemiological and microbiological reality!**

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**Facing the reality**



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**Facing the reality**

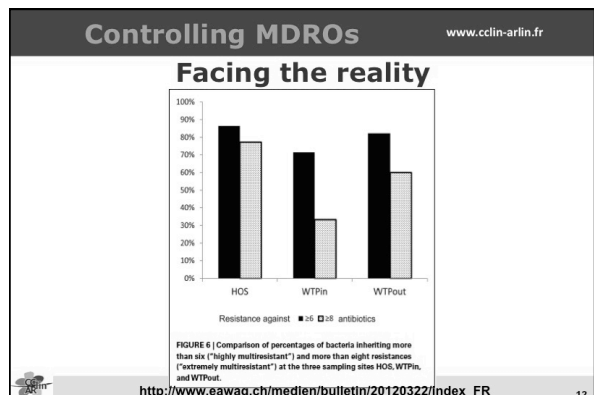
**frontiers in MICROBIOLOGY** ORIGINAL RESEARCH ARTICLE  
 published: 22 March 2012  
 doi: 10.3389/fmicb.2012.00006

**Increased levels of multiresistant bacteria and resistance genes after wastewater treatment and their dissemination into Lake Geneva, Switzerland**

*Nadine Czekalski<sup>1\*</sup>, Tom Berthold<sup>2</sup>, Serena Caucci<sup>2</sup>, Andrea Egli<sup>1</sup> and Helmut Bürgmann<sup>1</sup>*

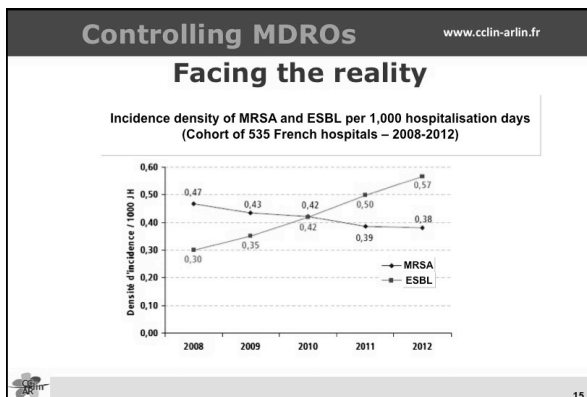
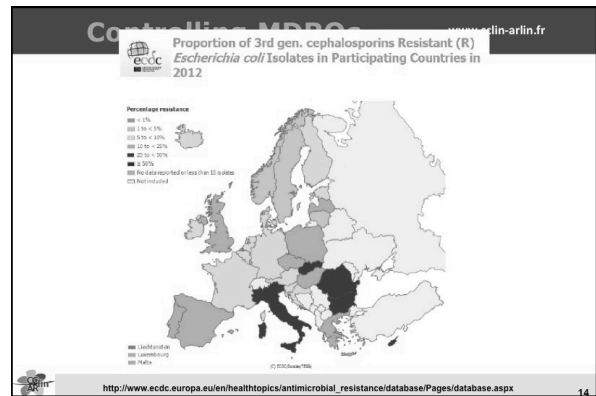
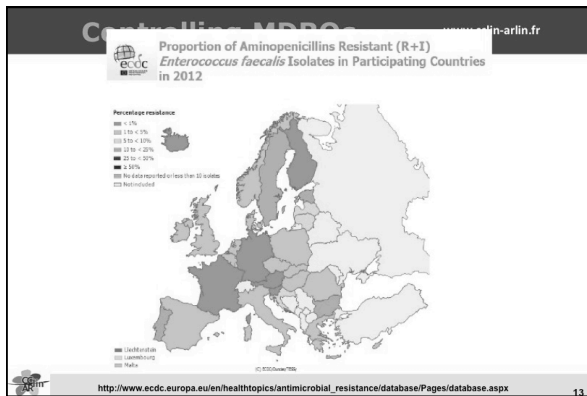
<sup>1</sup> Department of Surface Waters – Research and Management, Eawag, Swiss Federal Institute of Aquatic Science and Technology, Kastanienbaum, Switzerland  
<sup>2</sup> Department of Environmental Microbiology, UFZ, Helmholtz Centre for Environmental Research, Leipzig, Germany

[http://www.eawag.ch/medien/bulletin/20120322/index\\_FR](http://www.eawag.ch/medien/bulletin/20120322/index_FR)



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## Controlling MDROs

### Facing the reality

Phenotypic and genotypic comparison of ESBL production by Vaginal *Escherichia coli* isolates from pregnant and non-pregnant women

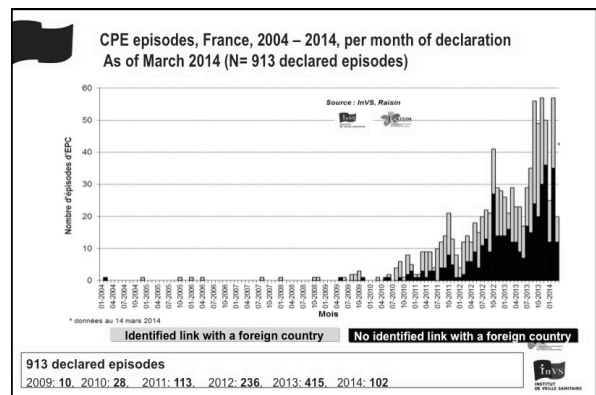
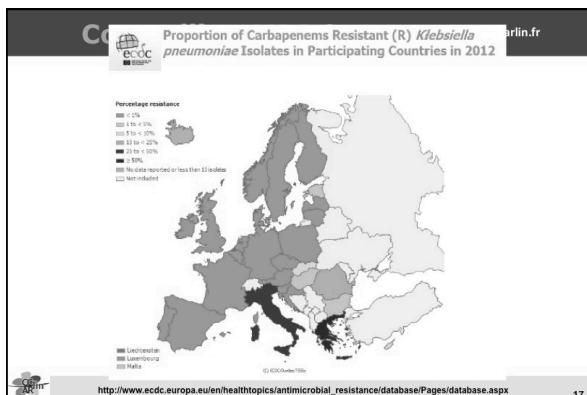
Sareaa MG Al-Mayahie<sup>1,2</sup>

Correspondence: sareeamaseen@yahoo.com  
<sup>1</sup>Medical Microbiology, Department of Biology, College of Science, University of Wasit, Al-Kut City, Wasit Province, Iraq

Al-Mayahie *Annals of Clinical Microbiology and Antimicrobiols* 2013, 12:7  
<http://www.ann-clinmicrob.com/content/12/1/7>

**61 patients**  
**50% ESBL *E. coli***  
**Among pregnant women**  
**61% among the others**

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**Controlling outbreaks**

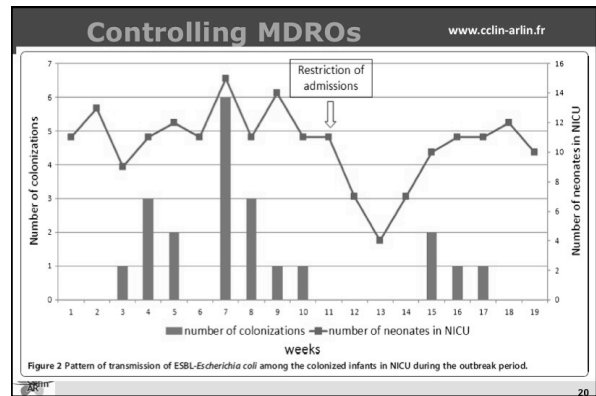
Giuffrè et al. *Antimicrobial Resistance and Infection Control* 2013, 2:8  
 http://www.aricjournal.com/content/2/1/8

RESEARCH Open Access

**Outbreak of colonizations by extended-spectrum  $\beta$ -lactamase-producing *Escherichia coli* sequence type 131 in a neonatal intensive care unit, Italy**

Mario Giuffrè<sup>1</sup>, Domenico Cipolla<sup>1</sup>, Celestino Bonura<sup>1</sup>, Daniela Maria Geraci<sup>1,2</sup>, Aurora Aleo<sup>1</sup>, Stefania Di Noto<sup>1,3</sup>, Federica Nociforo<sup>1,3</sup>, Giovanni Corsetto<sup>1</sup> and Caterina Mammìna<sup>1\*</sup>

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**Plan**

**Antibiotic stewardship:  
from guidelines to results!**

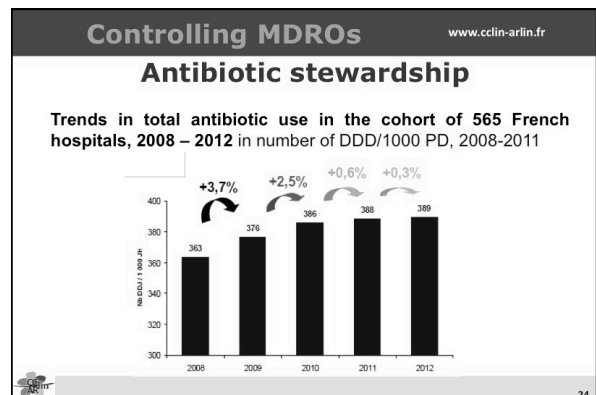
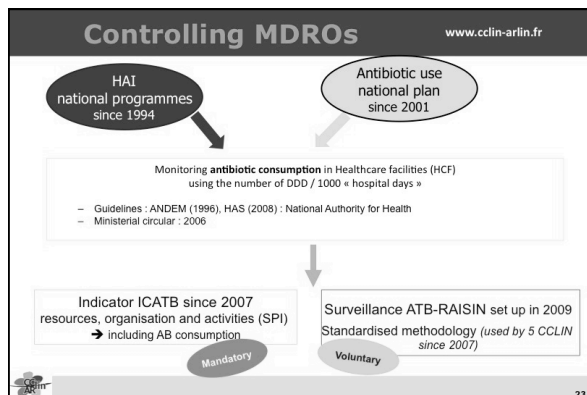
21

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**Antibiotic stewardship**

- Regional centre for healthcare associated infection prevention and control (CCLIN)
  - Including antimicrobial resistance prevention
- Management of surveillance networks in hospitals
  - National methodology
    - antimicrobial resistance (BMR-RAISIN 2002), antibiotic use (ATB-RAISIN 2009)
  - Regional survey
    - practical implementation of antibiotic policies at hospital level (yearly basis in South Western France since 2005)

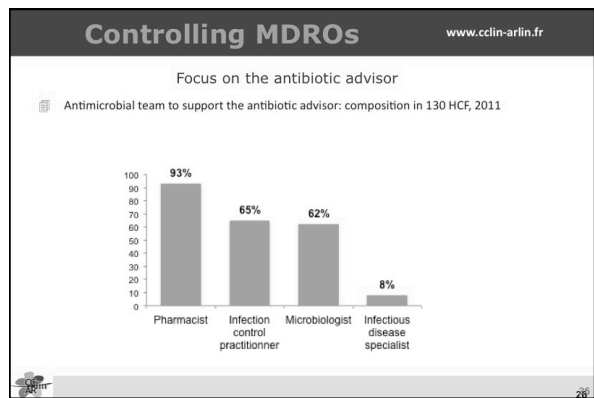
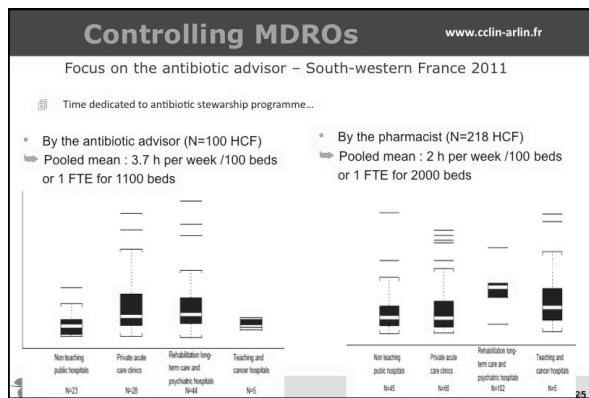
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### Controlling MDROs

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– Human resources

- Multidisciplinary teams to support AB advisor
  - Diamantis 2010, Bevilacqua 2011, Lesprit 2012

– USA, UK, Belgium, Spain...

ANTIMICROBIAL STEWARDSHIP: "START SMART - THEN FOCUS" ARAA Antimicrobial Stewardship Subgroup November 2011

Programa de optimización de uso de antimicrobianos (PROA) en hospitales españoles: documento de consenso GEM-SEM, SEM y SEMSPH 11. Farm Hosp. 2012;34(1):33.e1-33.e30

### Controlling MDROs

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- Changing behaviour
  - New prescribing tools and training tools for prescribers
    - Nursing homes 2012 "meilleur usage = moindre usage"
- Access to antibiotic counselling and education for all
  - Infectious diseases physicians
    - with dedicated time
    - supported by multidisciplinary teams
  - Inter-hospital collaboration
- Restrictive dispensation and de-escalation
  - Reassessment after 2-3 days and 7-10 days

Future structure and process indicator on ABS "ICATB2" for mandatory public reporting as of 2013

### Controlling MDROs

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## Behavior Change Strategies to Influence Antimicrobial Prescribing in Acute Care: A Systematic Review

Esmita Charani,<sup>1</sup> Rachel Edwards,<sup>1</sup> Nick Sevdalis,<sup>2</sup> Banos Alexandrou,<sup>2</sup> Eleanor Sibley,<sup>4</sup> David Mullet,<sup>4</sup> Bryony Dean Franklin,<sup>5,6</sup> and Alison Holmes<sup>1</sup>

<sup>1</sup>The National Centre for Infection Prevention and Management, <sup>2</sup>Department of Surgery and Cancer and Centre for Patient Safety and Service Quality, Imperial College London, <sup>3</sup>Independent Consultant, <sup>4</sup>Dr Foster Intelligence, <sup>5</sup>Centre for Medication Safety and Service Quality, Imperial College Healthcare National Health Service Trust, and <sup>6</sup>The School of Pharmacy, University of London, Pharmacy Department, Charing Cross Hospital, London, United Kingdom

Clinical Infectious Diseases 2011;53(7):651-662

### Controlling MDROs

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Table 1. Main Principles of Social Marketing

Customer orientation	Developing a robust understanding of the audience
Behavioral focus	Analyzing current and formulating desired behaviors
Theoretical basis	Drawing on and informed by behavioral theory
Insight driven	Appreciating what truly moves and motivates people
Acknowledges exchange	Understanding what people have to give up to get the benefits proposed
Competition aware	Considering what competes for people's time and attention
Appropriate segmentation	Developing a targeted approach specific to the audience
Mixes methods	Avoiding reliance on a single method or approach

Clinical Infectious Diseases 2011;53(7):651-662

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Journal of Antimicrobial Chemotherapy Advance Access published December 19, 2012  
**Journal of Antimicrobial Chemotherapy**  
 J Antimicrob Chemother doi:10.1093/jac/dks492

**An analysis of the development and implementation of a smartphone application for the delivery of antimicrobial prescribing policy: lessons learnt**

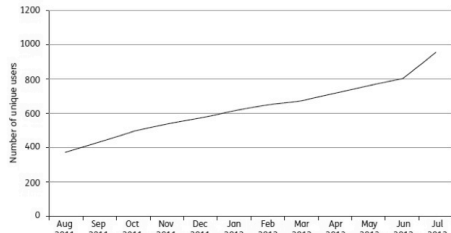
E. Charani<sup>1</sup>\*, Y. Kyrtatis<sup>1</sup>, W. Lawson<sup>2</sup>, H. Wickens<sup>2</sup>, E. T. Brannigan<sup>2</sup>, L. S. P. Moore<sup>2</sup> and A. H. Holmes<sup>1</sup>

<sup>1</sup>The National Centre for Infection Prevention and Management, Imperial College London, London, UK; <sup>2</sup>Imperial College Healthcare NHS Trust, London W12 0HS, UK



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**Figure 2.** Monthly adoption rate of the application by staff over a 12 month period.

J Antimicrob Chemother doi:10.1093/jac/dks492

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**Antimicrobial stewardship programmes: the need for wider engagement**

Esmita Charani, Alison H Holmes

Charani E, et al. *BMJ Qual Saf* 2013;22:885-887. doi:10.1136/bmjqp-2013-002444

Developing targeted quality improvement intervention for a common and recurring problem related to the overuse of antimicrobials.

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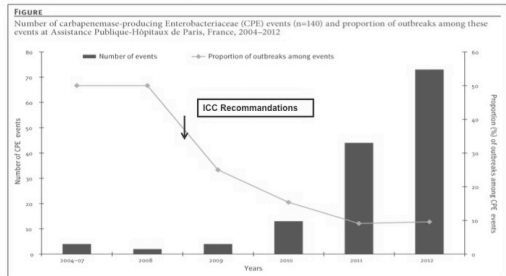
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**Reducing cross contamination: standard precautions or more?**

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**Which precautions**



**FIGURE**  
 Number of carbapenemase-producing Enterobacteriaceae (CPE) events (n=140) and proportion of outbreaks among these events at Assistance Publique-Hôpitaux de Paris, France, 2004-2012

A CPE event was defined as one index case (respectively defined as infected or colonised with CPE), followed or not by secondary case(s).

<http://www.eurosurveillance.org/images/dynamic/EEA/19N19/art20802.pdf>

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**Which precautions**

**Be aware and pragmatic  
 Avoid dogmatism!**

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**Which precautions**

The highest compliance to standard precautions will be the most peaceful you will live

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**Which precautions**

Do not hesitate to use wisely additional precautions

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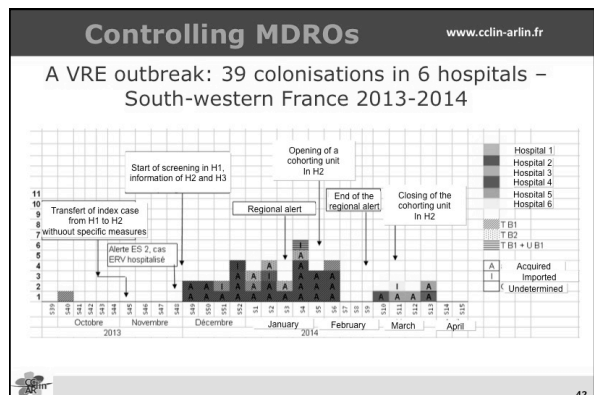
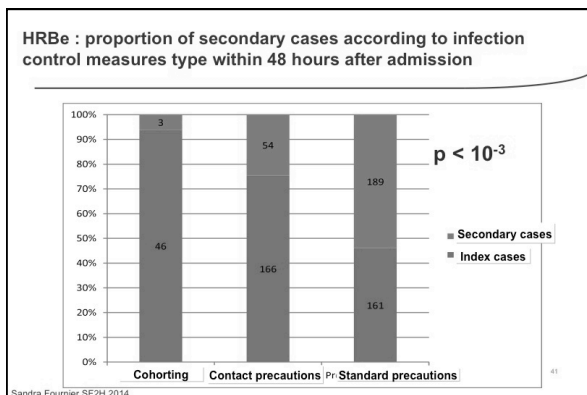
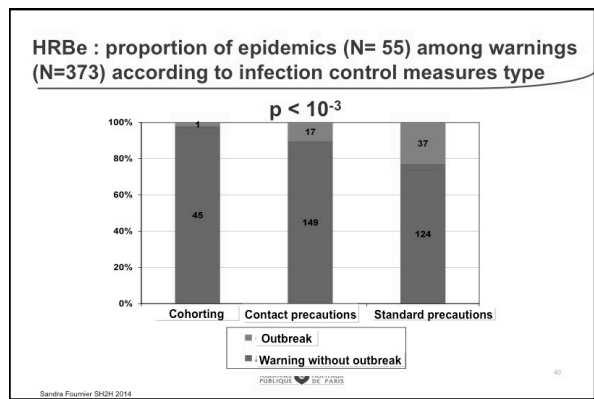
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**Which precautions**



<http://www.youtube.com/user/LaSF2H>

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## Which precautions

Living with extended-spectrum  $\beta$ -lactamase: A qualitative study of patient experiences

Susanne Wiklund RN, MPH<sup>a,\*</sup>, Ulrika Hallberg PhD<sup>b</sup>, Gunnar Kahlmeter MD, PhD<sup>c</sup>, Ann Tammelin PhD, MD<sup>d</sup>

<sup>a</sup> Department of Infection Control and Hospital Hygiene, Stockholm County Council and Infectious Disease Unit, Department of Medicine, Karolinska Institutet, Stockholm, Sweden  
<sup>b</sup> Nordic School of Public Health, Göteborg, Sweden  
<sup>c</sup> Department of Infection Control and Clinical Microbiology, Väsjä, Sweden

American Journal of Infection Control 41 (2013) 723-7

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## Which precautions

### Results

Fig 1. Model of the results.

American Journal of Infection Control 41 (2013) 723-7

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**Don't miss the power of root cause analysis!**



29 Novembre 1857

Theodor Escherich 1857-1911

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## Root cause analysis

Model of organisational causes of accidents (adapted from Reason<sup>9</sup>)

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC111773/pdf/777.pdf>


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### Root Cause Analysis Designed to be efficient



From audit



To root cause analysis..

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### Root Cause Analysis

Patient factors: Clinical condition Physical factors Social factors Psychological/mental factors Interpersonal relationships	Task factors: Guidelines/procedures/protocols Decision aids Task design	Working condition factors: Administrative Design of physical environment Environment Staffing Workload and hours Time
Team factors: Role congruence Leadership Support + cultural factors	Organisational + strategic factors: Organisational structure Priorities Externally imported risks Safety culture	


<http://www.nrls.npsa.nhs.uk/resources/collections/root-cause-analysis/>

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### Philosophy


■ A single and simple answer to a complex situation is most often not appropriate



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### Root Cause Analysis



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### Root Cause Analysis







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### Root Cause Analysis





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**Root Cause Analysis**

Outbreak of Esbl *K. pneumoniae* in an ICU – France 2013

Direct causes:

- Lack of compliance to precautions
- Poor alcoholic hand rub products use
- Lack of carriage screening
- High antibiotics consumption

[http://www.cclin-arlin.fr/GDR/Rex/Rex\\_KBise\\_CCIInSO.pdf](http://www.cclin-arlin.fr/GDR/Rex/Rex_KBise_CCIInSO.pdf)

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**Root Cause Analysis**

Outbreak of Esbl *K. pneumoniae* in an ICU – France 2013

<p>Direct causes:</p> <ul style="list-style-type: none"> <li>Lack of compliance to precautions</li> <li>Poor alcoholic hand rub products use</li> <li>Lack of carriage screening</li> <li>High antibiotics consumption</li> </ul>	<p>Latent factors:</p> <ul style="list-style-type: none"> <li>Understaffing and burn out</li> <li>No medical head and poor team spirit</li> <li>Inappropriate patient software</li> <li>Environment in poor shape</li> <li>No IC link nurses</li> </ul>
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[http://www.cclin-arlin.fr/GDR/Rex/Rex\\_KBise\\_CCIInSO.pdf](http://www.cclin-arlin.fr/GDR/Rex/Rex_KBise_CCIInSO.pdf)

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 Frank Debouck <http://www.afm42.fr>

Article original

Méthode Orion® : analyse systémique simple et efficace des événements cliniques et des précurseurs survenant en pratique médicale hospitalière

ORION®: A simple and effective method for systemic analysis of clinical events and precursors occurring in hospital practice

F. Debouck<sup>b</sup>, É. Rieger<sup>a</sup>, H. Petit<sup>b</sup>, G. Noël<sup>a</sup>, L. Ravinet<sup>b,\*</sup>

\*Département de radiothérapie, centre régional de lutte contre le cancer Paul-Strauss, 3, rue de la Porte-de-Tilly/Hôpital, BP 65, 67065 Strasbourg cedex, France  
<sup>a</sup>AIRMC2 Comminges, 21, allée de la Montagne, 79240 Chambourg, France

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**A need for an international cooperation at operational level**

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**International cooperation**



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**International cooperation**

**World Alliance Against Antibiotic Resistance**  
**Alliance Contre le développement des Bactéries Multi-Résistantes**  
**The WAAAR declaration against antibiotic resistance**  
 Jean Carlet, on behalf of the members of the WAAAR  
 June 2014 [jeancarlet@gmail.com](mailto:jeancarlet@gmail.com)



World Alliance Against Antibiotic  
Resistance

<http://www.ac2bmr.fr/index.php/en/>

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**International cooperation**

**World Alliance Against Antibiotic Resistance**  
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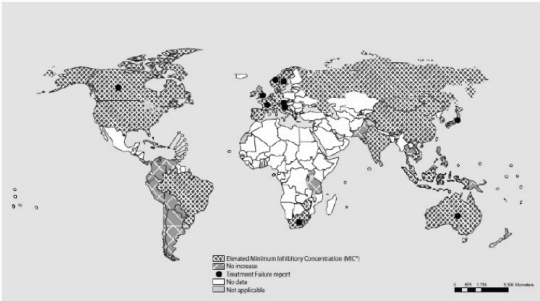
World Alliance Against Antibiotic  
Resistance

10. Request for UNESCO to include the "concept of antibiotic" in the list of the intangible cultural heritage.

<http://www.ac2bmr.fr/index.php/en/>

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Detection of decreased susceptibility to 3<sup>rd</sup> generation cephalosporin and treatment failures up to 2010



<http://www.who.int/drugresistance/documents/surveillance/en/>

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**Plan**

**What could I do in my position on a daily basis?**

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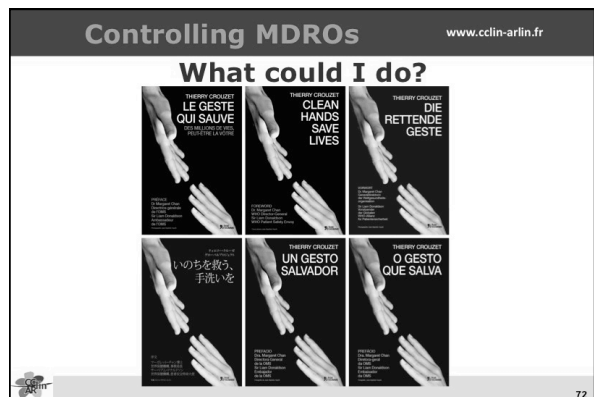
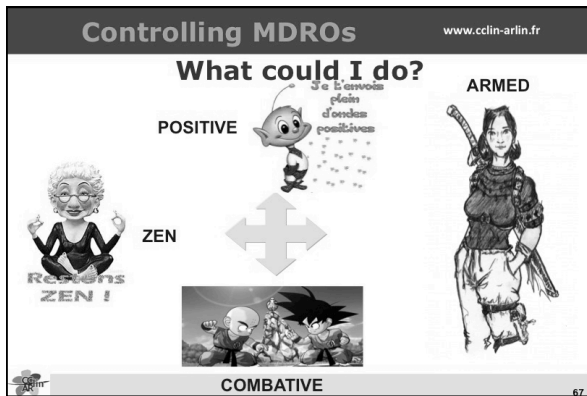
**What could I do?**



**Don't stay on the starting line!**

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International Federation of Infection Control  
**IFIC SURVEY 2012-2013**  
 on global practices related to disposal of faeces and urine

**If bedpans are cleaned manually, it is done**

- in dirty utility room 61 %
- in patient's bathroom 44 %
- other rooms 10 %

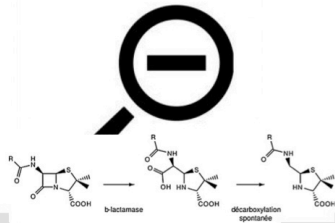


From presentation IFIC 2014 conference Malta  
 Prof Dr. Walter Pop, Germany

[http://www.sf2h.net/sf2h\\_in-english-as-well.html](http://www.sf2h.net/sf2h_in-english-as-well.html)


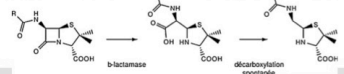
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**What could I do?**



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**What could I do?**  
 Close the door between colonization and infection!





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**What could I do?**

**World Alliance Against Antibiotic Resistance**  
**Alliance Contre le développement des Bactéries Multi-Résistantes**  
**The WAAAR declaration against antibiotic resistance**

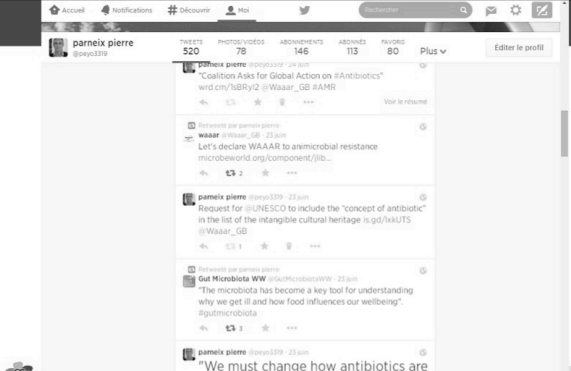
Jean Carlet, on behalf of the members of the WAAAR  
 June 2014 [jeancarlet@gmail.com](mailto:jeancarlet@gmail.com)



World Alliance Against Antibiotic Resistance

We urge all of you to participate in this crusade, in your own field of interest. The medical miracle of antibiotic therapy must be protected – this is a global priority and our duty. Please, help us to act

<http://www.ac2bmr.fr/index.php/en/>



parneix pierre @parneixpierre  
 "Coalition Asks for Global Action on Antibiotics" wrd.cym/sBRy2 @Waaar\_GB #AMR

WAAAR @Waaar\_GB  
 Let's declare WAAAR to antimicrobial resistance microbeworld.org/component/job...

parneix pierre @parneixpierre  
 Request for UNESCO to include the "concept of antibiotic" in the list of the intangible cultural heritage is gd/NAUTS @Waaar\_GB

parneix pierre @parneixpierre  
 "The microbiota has become a key tool for understanding why we get ill and how food influences our wellbeing." #gutmicrobiota

parneix pierre @parneixpierre  
 "We must change how antibiotics are used" bit.ly/V4uG9G #AMP



**NEWS SCIENCE & ENVIRONMENT**

25 June 2014 Last updated at 10:25 GMT

**Antibiotics to be focus of £10m Longitude prize**

By Paul Rincon  
 Science editor, BBC News website

<http://www.bbc.com/news/science-environment-28027376>

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**Conclusion**

Think patient safety:

- Control outbreaks early,
- Dream widely but act in a focused manner,
- Always promote the basics,
- Develop new strategies to tackle remaining problems:
  - Focus on organizational and human factors,
  - Mind the microbiome,
- But stay strong for ongoing and future challenges!



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Good fights make good ICPs

ROs **pure™**  
 Good music makes good people



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**Coming Soon**

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