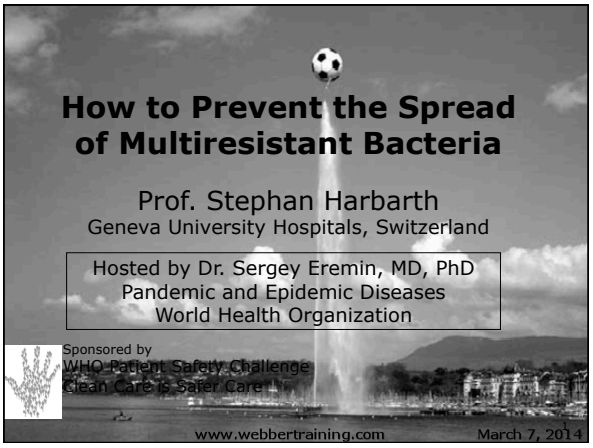
How to Prevent the Spread of Multiresistant Bacteria
Prof. Stephan Harbarth, Geneva University Hospitals
Sponsored by the WHO Clean Care is SAFER Care



Disclosures

- Advisory board: Destiny Pharma, DaVolterra, bioMérieux
- Financial support for MDRO research activities: B.Braun, Pfizer, UniGe/HUG, **European Commission**

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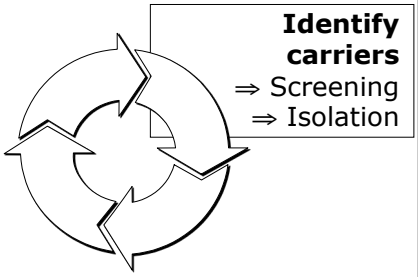
Objectives

- Describe different control measures to control the transmission of MDRO
- Discuss the role of hand hygiene compared to other preventive measures
- Present recent research findings of high-quality studies
- To highlight strengths and weaknesses of the current evidence base

3

-- Control of endemic MDRO --



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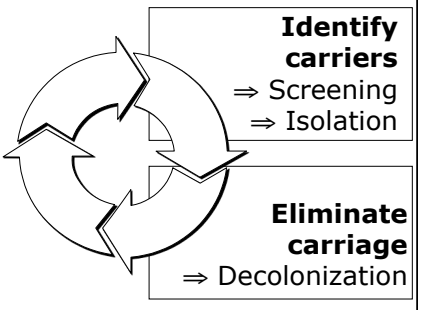
-- Control of endemic MDRO --



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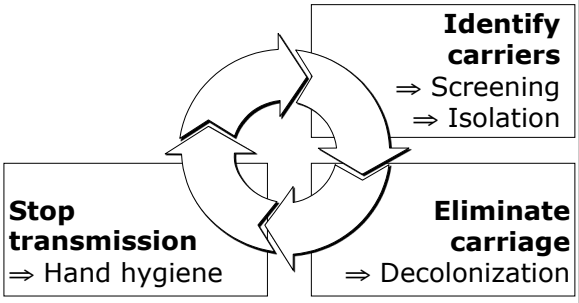
-- Control of endemic MDRO --



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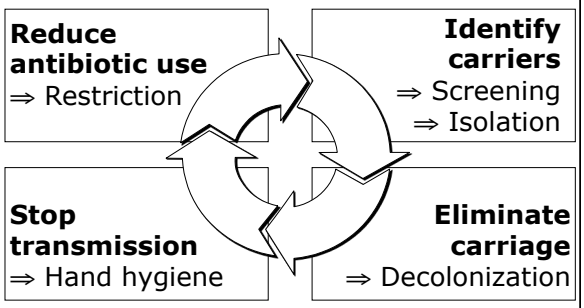
Hosted by Dr. Sergey Eremin, World Health Organization
A Webber Training Teleclass
www.webbertraining.com

-- Control of endemic MDRO --



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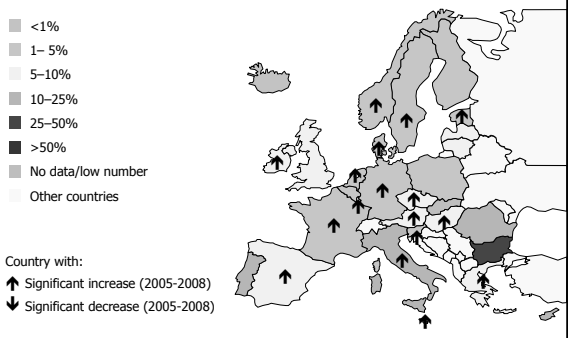
Improve infection control

- Surveillance of multi-R bacteria
  - Passive: Clinical cultures
  - Active: Surveillance swabs
  - Optional: Genotyping

8

Third-generation cephalosporin-resistant *Escherichia coli*, blood and CSF, 2008

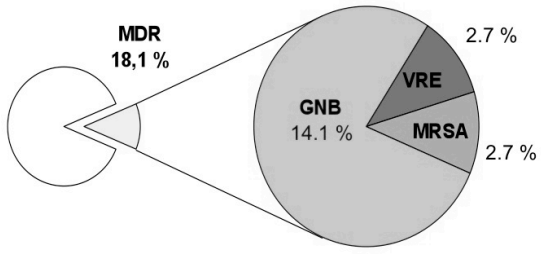


Source: European Antimicrobial Resistance Surveillance System (EARSS), 2009

9

Prevalence of multiresistant pathogens in repatriates to the Netherlands

211 (18.1%) carriers of MDR pathogens



Kaiser et al. Clin Micro Infect 2004; 10: 972-79

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Spread of KPC-containing *Klebsiella pneumoniae* from Greece

Country	Year	Total Number of patients	Cases direct Greek origin	Further transmission	Probability of the Greek Origin	References	Mechanisms of resistance
Belgium	2009	3	3 patients transferred from Greek hospital	0	Confirmed	Bogaerts et al. 2010 (144)	blaKPC-2
Denmark	06/2009	2	2 patients transferred from Greek hospitals	0	Confirmed	Hammerum et al. 2010 (145)	No data
Finland	06/2009	3	3 patients transferred from Crete	0	Confirmed	Osterlund et al. 2010 (146)	blaKPC-2
France	No data	8	1 patient transferred from Chania, Crete	7	Confirmed	Nass et al. 2010 (147)	blaKPC-2
France	10/2007	3	1 patient transferred from Heraklion	0	Confirmed	Cuzon et al. 2008 (137)	blaKPC-2
France	04/2009	8	1 patient transferred from Greek hospital	0	Confirmed	Bechet et al. 2010 (126)	blaKPC-2
France	07/2009	8	5 patient transferred from a Greek hospital	3	Confirmed	Kassis-Chikhani et al. 2010 (148)	blaKPC-2
Germany	2007-2008	9	1 patient treated in Greece	8	Hypothetical	Wendt et al. 2010 (149)	blaKPC-2
Hungary	09/2008	7	1 patient transferred from Greek hospital	6	Confirmed	Tóth et al. 2010 (150)	blaKPC-2
Norway	11/2007	6	4 patients transferred from Greek hospital	2	Confirmed	Samuelsen et al. 2009 (151)	blaKPC-2
Sweden	No data	3	1 patient transferred from Greek hospital	0	Confirmed	Tegmark Wisell et al. (152)	blaKPC-2
The Netherlands	No data	14	African immigrants travelling via Greece	No data	Hypothetical	Nijhuis et al. (153)	No data
The Netherlands	No data	3	1 patient transferred from Greek hospital	No data	Confirmed	Cohen Stuart et al. (154)	blaKPC-2

Gasink LB et al. PLoS Medicine 2011

HUG Hôpitaux Universitaires de Genève

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Extended-spectrum β-Lactamase-Producing *Enterobacteriaceae* Causing Nosocomial Infections in Mexico. A Retrospective and Multicenter Study

Jesus Silva-Sanchez,[a,e] Jesus Ulises Garza-Ramos,[a,e] Fernando Reyna-Flores,[a,e] Alejandro Sánchez-Perez,[a,e] Teresa Rojas-Moreno,[a,e] Veronica Andrade-Almaraz,[a,e] Josefina Pastrana,[a,e] Julieta Ivone Castro-Romero,[b,e] Pablo Vinuesa,[c,e] Humberto Barrios,[a,e] and Carlos Cervantes[d,e]

Archives of Medical Research 42 (2011) 156–162

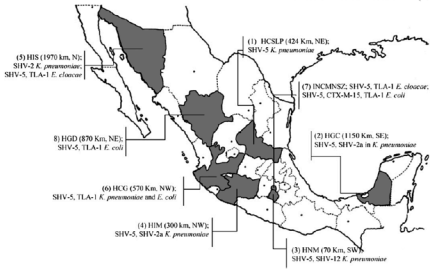

Figure 1. Distribution map of SHV-type, TLA-1 and CTX-M-15 genes among *Enterobacteriaceae* isolates from eight Mexican hospitals. The name and hospital number assigned is shown.

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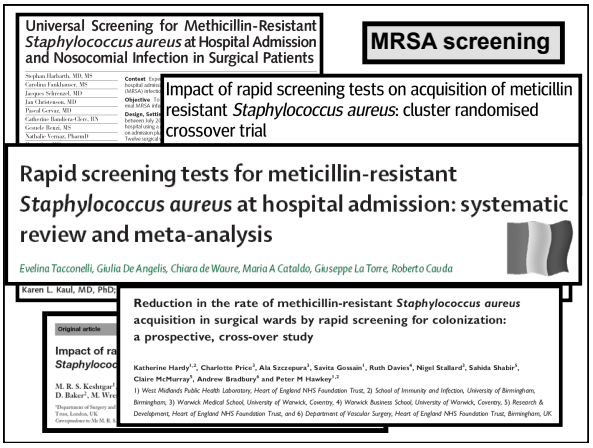
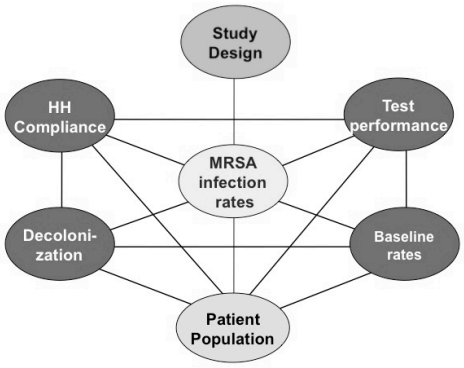


MRSA screening on admission

Authors	HUG, JAMA 2008	Robicsek, Annals 2008	Jeyaratnam, BMJ 2008	Keshtgar, Br J Surg 2008
Country	Switzerland	USA	UK	UK
Setting	Surgery	Hospital-wide	Geriatrics, oncology, surgery	Surgery
Design	Cross-over	Before-after	Cross-over	Before-after
Control group	Yes	No	Yes	No
Admission MRSA prevalence	5.1%	6.3%	6.7%	4.5%
CONCLUSION	Screening did not reduce MRSA infections	Admission screening reduced MRSA disease	Universal MRSA screening is not recommended	MRSA screening reduced MRSA BSI

Harbarth S et al. J Am Coll Surg 2008

Possible explanations



Results of the STAR*ICU Trial

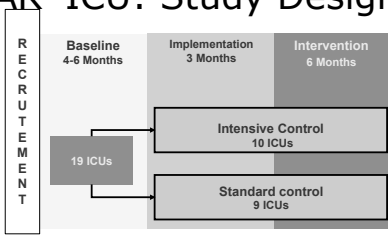
Strategies to Reduce Transmission of Antimicrobial Resistant Bacteria in Adult Intensive Care Units

W. Charles Huskins, MD, MSc
Mayo Clinic College of Medicine, Rochester, MN

conducted by the
Bacteriology and Mycology Study Group (BAMSG)
19 US academic medical centers

N Engl J Med 2011;364:1407-18.

STAR*ICU: Study Design



Standard control

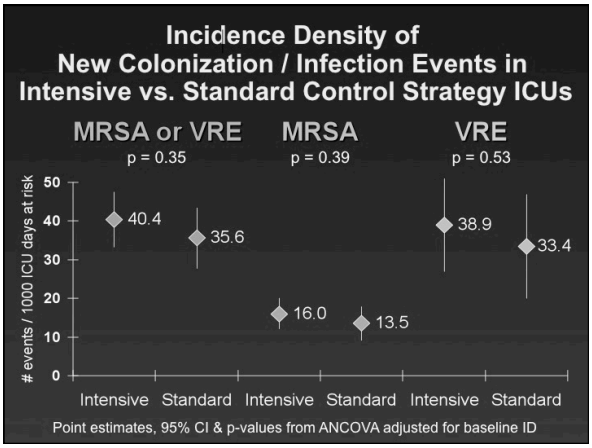
- Screening for MRSA & VRE, without result notification.
  Hand hygiene & education.

Intensive control

- Screening for MRSA & VRE, with result notification.
  Preemptive contact isolation until negative screening result.
  No rapid test available.

N Engl J Med 2011;364:1407-18.

Incidence Density of New Colonization / Infection Events in Intensive vs. Standard Control Strategy ICUs



Point estimates, 95% CI & p-values from ANCOVA adjusted for baseline ID

Possible reasons for failure

- Central laboratory facility
  - No rapid testing available
- No intensive search & destroy
  - No uniform decontamination approach
  - No environmental control
  - No HCW screening

N Engl J Med 2011;364:1407-18.

Possible reasons for failure (2)

- High rates of MRSA & VRE acquisition in both arms
  - Antibiotic misuse and overuse?
- Universal gloving policy:
  - In intervention ICUs, health care providers used clean gloves, gowns, and hand hygiene less frequently than required for contacts with patients assigned to barrier precautions

N Engl J Med 2011;364:1407-18.

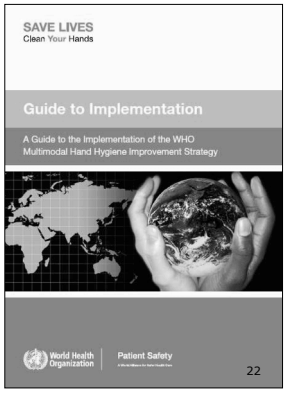
Improve infection control

- Surveillance
- Promote and improve hand hygiene

21

Implementation tools: Key tools

- Guide to Implementation of the WHO Multimodal Hand Hygiene Improvement Strategy
- Template Action Plan



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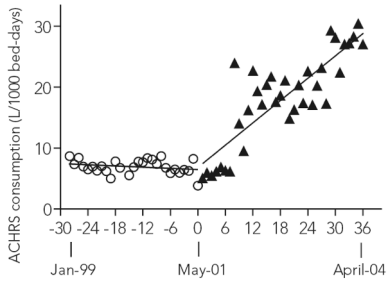
- The 5 core components of the WHO Multimodal Hand Hygiene Improvement Strategy

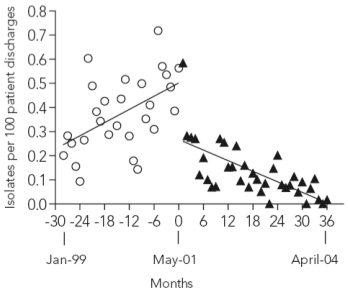
Use of alcohol hand rubs



Johnson et al. Med J Australia 2005

24

ESBL bacteremia



Johnson et al. Med J Australia 2005

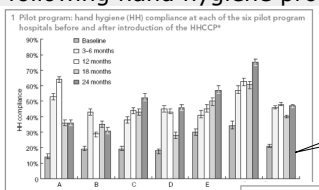
Hand Hygiene Culture Change Program (HHCCP)

Pilot Program
Oct 2002 – Sep 2004 (2 years)
6 sites (2379 beds)

Statewide roll-out
From Mar to July 2006 (1 year)
75 sites (6154 beds)

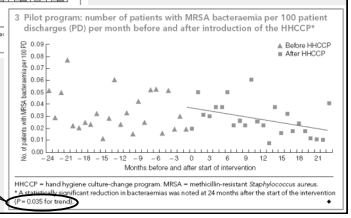
MJA 2008; 188: 633–640

Significant reduction of MRSA bacteremia following hand hygiene promotion



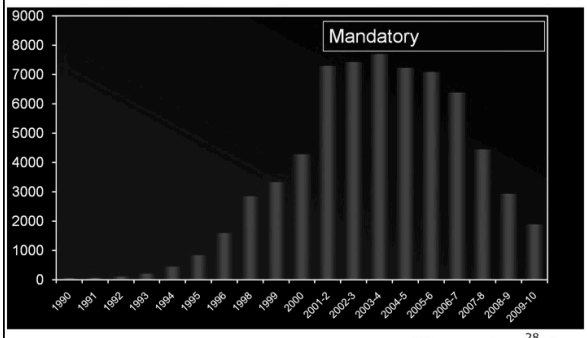
Grayson ML et al. Med J Austr 2008

Compliance increase from 21% to 47%



65 (95% CI: 5-126) fewer patients with MRSA bacteraemia in the 6 Pilot hospitals than expected prior to the intervention

MRSA Bacteraemia, England 1990-2010



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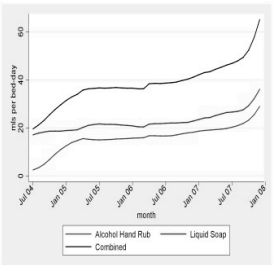
(Courtesy: G. French)

Estimated average procurement of Alcohol Hand Rub and Liquid Soap in mls per bed-day July 2004-December 2007 in 148 acute NHS Trusts

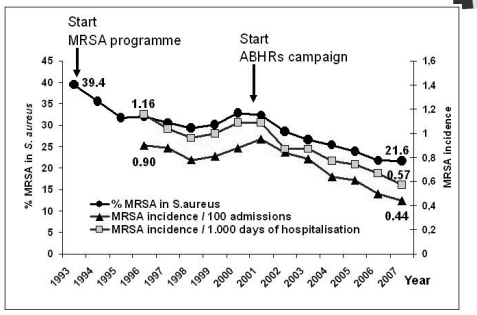


- 3-fold increase in combined use to 60 mls per pt-day
- Analysis shows highly significant association between each ml of AHR used and 1% drop fall in MRSA BSI

Stone S et al. BMJ 2012

29

% MRSA in *S.aureus* and MRSA incidence per 100 admissions or 1000 days of hospitalisation
Univ. hospitals of Paris area (n=39) 1993-2007



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Jarlier V et al. Arch Intern Med 2010; 170: 552-559

ARPAC Antibiotic Resistance Prevention And Control

Alcohol-Handrub Policy Predicts Low Hospital MRSA Rate

- Linear regression modelling of general infection control policies to predict local MRSA rate
- adjusted for antibiotic consumption, case-mix, hospital size and teaching status:
- Alcohol-based hand rubs (mean difference -10.3 % MRSA rate; p=0.005)

MacKenzie *Clin Microbiol Infect* 2007; 13: 269

Open Access Research

BMJ open

Comparison of strategies to reduce meticillin-resistant *Staphylococcus aureus* rates in surgical patients: a controlled multicentre intervention trial

Andie S Lee,[1,2] Ben S Cooper,[3,4] Surbhi Malhotra-Kumar,[5] Annie Chalfine,[6] George L Daikos,[7] Carolina Fankhauser,[1] Biljana Carevic,[8] Sebastian Lemmen,[9] José Antonio Martinez,[10] Cristina Masuet-Aumatell,[11] Angelo Pan,[12] Gabby Phillips,[13] Bina Rubinovitch,[14] Herman Goossens,[5] Christian Brun-Buisson,[15] Stephan Harbarth,[1] for the MOSAR WP4 Study Group

Lee AS et al. (2013). BMJ Open

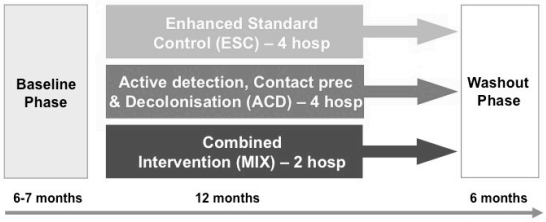
32 mosar

Study Design

MOSAR surgery study

Prospective, controlled, multicentre, intervention

March 2008 to July 2010



33 Collection of data regarding MRSA rates and secondary outcomes

mosar

Methods

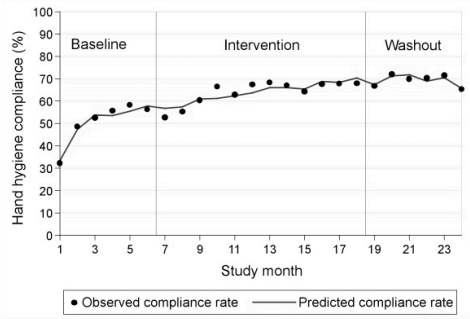
Setting and Participants

33 surgical wards
10 hospitals
9 countries
Serbia
France
Spain
Italy
Greece
Scotland
Israel
Germany
Switzerland

34 mosar

Results

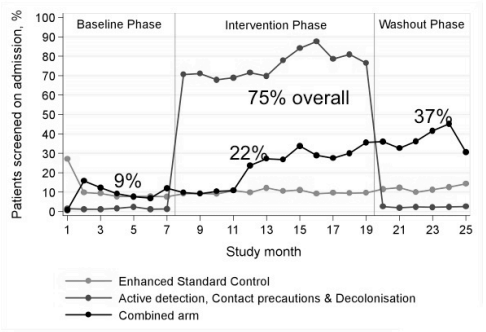
Overall Hand Hygiene Compliance



35 mosar

Results

MRSA Screening on Admission



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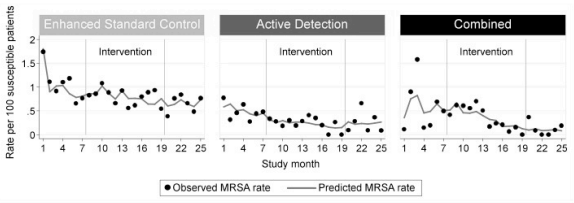
Results

Nosocomial MRSA
Clinical Culture Isolation Rate



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Lee AS et al. (2013). BMJ Open

Results

MRSA Clinical Culture Isolation Rate

Variable	aIRR*	95% CI	P Value
Baseline Phase			
Trend	0.97	0.89-1.06	0.55
Intervention Phase			
Change in level			
Enhanced Standard Control	1.44	0.96-2.15	0.076
Comparing study arms			
Enhanced Standard Control	1.00	-	-
MRSA screening	0.61	0.37-1.00	0.048
Combined	1.13	0.71-1.79	0.60
Change in trend			
Enhanced Standard Control	0.99	0.91-1.09	0.88
Comparing study arms			
Enhanced Standard Control	1.00	-	-
MRSA screening	0.95	0.90-1.01	0.076
Combined	0.88	0.82-0.95	0.001
Washout Phase			
Change in level	1.90	0.91-3.95	0.087
Change in trend	1.02	0.91-1.15	0.74

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*aIRR = Adjusted incidence rate ratio

MRSA Clinical Culture Isolation Rate
Clean Surgery Wards

- Change in trend in MRSA rates
  - Screening and decolonisation arm
    aIRR 0.85, 95% CI 0.74-0.97, p=0.02
  - Combined arm
    aIRR 0.82, 95% CI 0.71-0.95, p=0.01

39
Lee AS et al. (2013). BMJ Open

Discussion

Conclusions

1. Compared to enhanced standard control measures with hand hygiene promotion, MRSA screening was more effective at initially reducing MRSA clinical culture isolation rates in surgical units
2. Combining both strategies resulted in more marked reduction in MRSA rates over time
3. The effect of screening and decolonisation on MRSA rates was more pronounced in clean surgery wards
4. These findings are generalisable to a variety of healthcare settings

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Lee AS et al. (2013). BMJ Open

Improve infection control

- Surveillance
- Promote and improve hand hygiene
- Use cohorting and isolation precautions (gowns, gloves, signs)

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ISOLATION & COHORTING FOR MRSA
Systematic review with 6 high-quality studies

- **Isolation wards**
  - 1 effective, 1 ineffective, 1 transient
- **Single room isolation**
  - 1 transient hospital wide
- **Cohorting**
  - 1 effective hospital wide
- **Cohorting & Single Room**
  - 1 effective in paediatric ICU

Cooper BS, Stone SP, Kibbler CC, et al. Systematic review of isolation policies in the management of MRSA. Health Technol Assess 2003;7:1-194

Control of ESBL-*Klebsiella* spp

- Modes of patient-to-patient transmission include transmission via colonisation of the inanimate environment, the hands of healthcare personnel, and of medical equipment[1]
- **ALL THESE MODES CAN BE DECREASED BY ISOLATION**

1. Falagas ME, Journal of Hospital Infection 2009;73: 345

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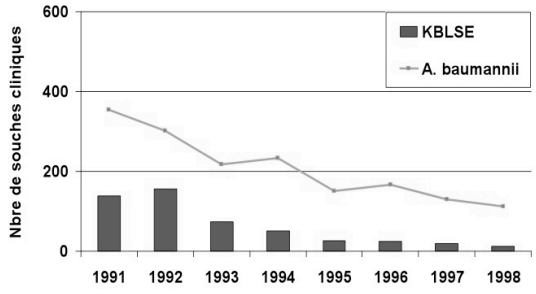
Effect of Contact Isolation

Paris, GH Bichat - Claude Bernard

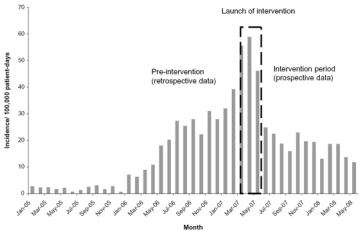


Courtesy: JC Lucet

Containment of a Country-wide Outbreak of Carbapenem-Resistant *Klebsiella pneumoniae* in Israeli Hospitals via a Nationally Implemented Intervention

Clinical Infectious Diseases 2011;52(7):1–8

Mitchell J. Schwaber,[1] Boaz Lev,[2] Avi Israeli,[2] Ester Solter,[1] Gill Smollan,[1] Bina Rubinovitch,[1] Itamar Shalit,[1] Yehuda Carmeli,[1] and the Israel Carbapenem-Resistant Enterobacteriaceae Working Group[a]



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CDC recommendation

- **In acute care settings, implement contact precautions for all patients known to be colonized/infected with MDROs including ESBL-producing bacteria**
- This was a grade 1B recommendation: Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale

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Gloves and gowns block 90% of resistant bacteria

Organism	HCW Room Entries	Hand + Before (%)	Gown and/or Glove + After %	Hands + After Removal	Effectiveness of PPE
A. baumannii[1]	202	1.5%	**38.7%**	4.5%	88%
P. aeruginosa[1]	133	0%	**8.2%**	0.7%	90%
VRE[2]	94	0%	**9%**	0%	100%
MRSA[2]	81	2%	**19%**	2.6%	85%

1. Morgan D, et al, Infect Control Hosp Epidemiol July 2010; 31: 716-21
2. Snyder G, et al, Infect Control Hosp Epidemiol July 2008; 29: 584-89

47

Improve infection control

- Surveillance
- Promote and improve hand hygiene
- Use cohorting and isolation precautions (gowns, gloves, signs)
- Environmental control

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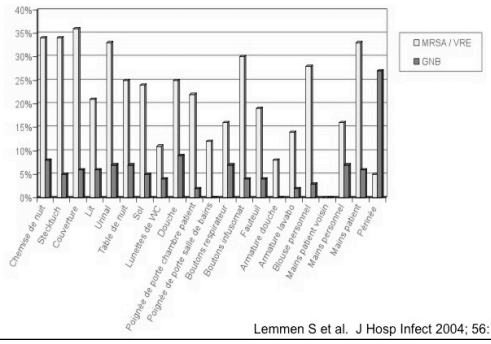
Environmental Contamination MRSA/VRE vs. GNB

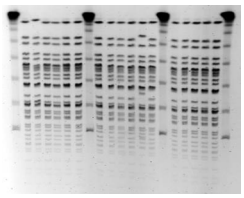


Lemmen S et al. J Hosp Infect 2004; 56: 191

Acinetobacter Outbreak

- **Index patient**
  - Severe burn injuries, transfer from Bali (Oct 2002)
  - Multi-R *Acinetobacter* at admission
- **Outbreak**
  - Spread to 2 patients
  - 6 months later: 6 new cases
  - Closure of the burn unit
- **Environnement**
  - Widespread contamination: 16/161 (10%) positive swabs

Patients *Environnement*



► Environmental cleaning & disinfection
► Complete replacement of all disposable material

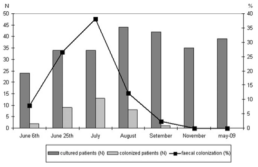
Zanetti G et al. Infect Control Hosp Epidemiol 2007; 28: 723-25

Foodborne Nosocomial Outbreak of SHV1 and CTX-M-15–producing *Klebsiella pneumoniae*: Epidemiology and Control

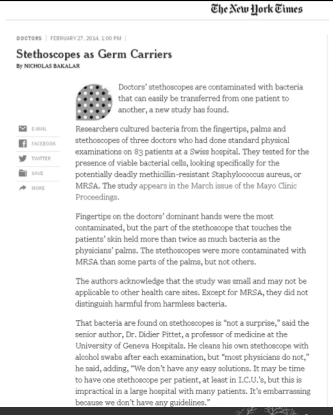
Esther Calbo,[1] Núria Freixas,[2] Mariona Xercavins,[3] Montserrat Riera,[2] Carmen Nicolás,[2] Olga Monistrol,[2] Maria del mar Solé,[4] M. Rosa Sala,[5] Jordi Vila,[6] and Javier Garau[1]

[1]Infectious Diseases Unit, Service of Internal Medicine, Hospital Universitari Mútua de Terrassa, [2]Infection Control Nurse, Hospital Universitari Mútua Terrassa, [3]Microbiology, Catlab, [4]Service of Microbiology, Hospital Clínic i Provincial, Barcelona, and [5]Unitat de Vigilància Epidemiològica Vallès Occidental i Vallès Oriental Health Department, Generalitat de Catalunya, Barcelona, Spain

- Outbreak of ESBL *K. pneumoniae* in 2008 (clonal)
- 156 patients colonised
  - 22% infected
- 35% of the hospital kitchen–screened surfaces or foodstuff were colonised
- 6 (14%) of 44 food handlers found to be fecal carriers
- HCWs negative



Calbo *et al.* (2011) *Clin Infect Dis* 52:743-749



The New York Times

DOCTORS | FEBRUARY 27, 2014, 1:00 PM

Stethoscopes as Germ Carriers

By NICHOLAS BAKALAR

Doctors' stethoscopes are contaminated with bacteria that can easily be transferred from one patient to another, a new study has found.

Researchers cultured bacteria from the fingertips, palms and stethoscopes of three doctors who had done standard physical examinations on 83 patients at a Swiss hospital. They tested for the presence of viable bacterial cells, looking specifically for the potentially deadly methicillin-resistant Staphylococcus aureus, or MRSA. The study appears in the March issue of the Mayo Clinic Proceedings.

Fingertips on the doctors' dominant hands were the most contaminated, but the part of the stethoscope that touches the patients' skin held more than twice as much bacteria as the physicians' palms. The stethoscopes were more contaminated with MRSA than some parts of the palms, but not others.

The authors acknowledge that the study was small and may not be applicable to other health care sites. Except for MRSA, they did not distinguish harmful from harmless bacteria.

That bacteria are found on stethoscopes is "not a surprise," said the senior author, Dr. Didier Pittet, a professor of medicine at the University of Geneva Hospitals. He cleans his own stethoscope with alcohol swabs after each examination, but "most physicians do not," he said, adding, "We don't have any easy solutions. It may be time to have one stethoscope per patient, at least in I.C.U.'s, but this is impractical in a large hospital with many patients. It's embarrassing because we don't have any guidelines."

Longtin Y et al (2014). Mayo Clin Proc

Improve infection control

- Surveillance
- Promote and improve hand hygiene
- Use cohorting and isolation precautions (gowns, gloves, signs)
- Environmental control
- Decolonization

J Antimicrob Chemother 2013; **68**: 2375–2382
doi:10.1093/jac/dkt174 Advance Access publication 29 May 2013

Journal of Antimicrobial Chemotherapy

Decolonization of intestinal carriage of extended-spectrum β-lactamase-producing Enterobacteriaceae with oral colistin and neomycin: a randomized, double-blind, placebo-controlled trial

Benedikt Huttner[1]*, Thomas Haustein[1], Ilker Uçkay[1], Gesuele Renzi[2], Andrew Stewardson[1], Danièle Schaerrer[3], Americo Agostinho[1], Antoine Andremont[4], Jacques Schrenzel[2], Didier Pittet[1] and Stephan Harbarth[1]

[1]*Infection Control Program, Geneva University Hospital and Faculty of Medicine, Rue Gabrielle-Perret-Gentil 4, 1211 Geneva 4, Switzerland;* [2]*Clinical Microbiology Laboratory, Service of Infectious Diseases, Geneva University Hospital, Rue Gabrielle-Perret-Gentil 4, 1211 Geneva 4, Switzerland;* [3]*Pharmacy, Geneva University Hospital, Rue Gabrielle-Perret-Gentil 4, 1211 Geneva 4, Switzerland;* [4]*Assistance publique—Hôpitaux de Paris (AP-HP) and University Paris-Diderot Medical School, Paris, France*

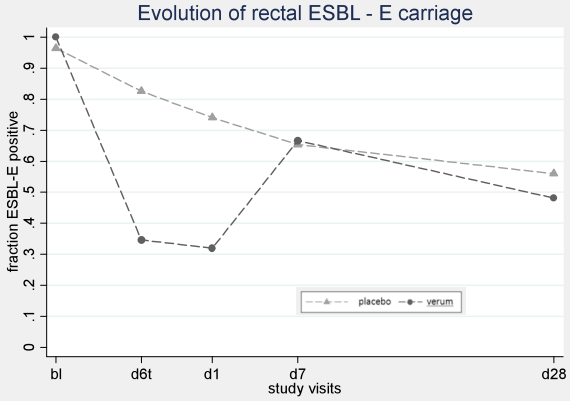
Huttner et al. (2013). *J Antimicrob Chemother*.

Need for a randomized, controlled study*

Colistin sulfate (50mg 4x/d) + Neomycine sulfate (250mg 4x/day)	10 days	PLACEBO
Nitrofurantoine (100mg 3x/d)	5 days	PLACEBO

Sample size: 27 patients in each group**

* investigator initiated, financed by HUG (PRD 08-II-6)
** 70% vs 30%, 1-beta 0.8, alpha 0.05 (two-sided)



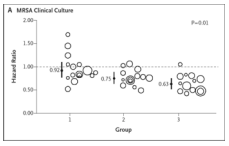
bl= baseline; d6t= 6th day of treatment
d1=1st day after end of treatment; d7=7th day after end of treatment
d28=28th day after end of treatment

The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 JUNE 13, 2013 VOL. 368 NO. 24

Targeted versus Universal Decolonization to Prevent ICU Infection

Susan S. Huang, M.D., M.P.H., Edward Septimus, M.D., Ken Kleinman, Sc.D., Julia Moody, M.S.,

Group 1: Screen/Isolate
Group 2: Screen/Decolonize (Mupi/CHX)
Group 3: Universal Decolonization (Mupi/CHX)



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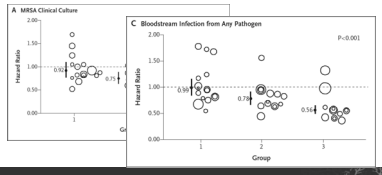

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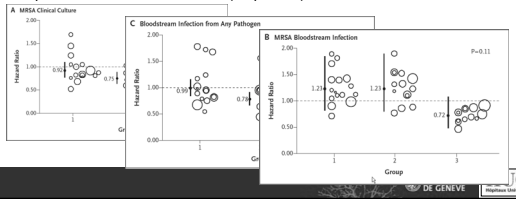

Table 3. Frequency and Rates of Outcomes during the Baseline and Intervention Periods, According to Study Group.*

Outcome	Group 1		Group 2		Group 3	
	Baseline	Intervention	Baseline	Intervention	Baseline	Intervention
	no. of events (crude rate per 1000 patient-days)					
MRSA clinical cultures	216 (3.4)	279 (3.2)	245 (4.3)	301 (3.2)	240 (3.4)	217 (2.1)
Bloodstream infection						
MRSA	37 (0.6)	63 (0.7)	31 (0.5)	61 (0.6)	46 (0.6)	48 (0.5)
Any pathogen†	265 (4.2)	360 (4.1)	273 (4.8)	341 (3.7)	412 (6.1)	356 (3.6)
Gram-positive organism	165 (2.6)	228 (2.6)	159 (2.8)	203 (2.2)	253 (3.7)	187 (1.9)
Skin commensal organism	50 (0.8)	55 (0.6)	49 (0.9)	46 (0.5)	120 (1.8)	38 (0.4)
Noncommensal organism	115 (1.8)	173 (2.0)	110 (1.9)	157 (1.7)	133 (2.0)	149 (1.5)
Gram-negative organism	62 (1.0)	83 (0.9)	58 (1.0)	75 (0.8)	100 (1.5)	107 (1.1)
Candida species	38 (0.6)	49 (0.6)	56 (1.0)	63 (0.7)	59 (0.9)	62 (0.6)

Table S3. Bloodstream Pathogens by Study Arm in Baseline and Intervention Periods per 1,000 Attributable ICU Days *

Pathogen (Ordered by Frequency)	Bloodstream Infections per 1,000 Attributable ICU Days					
	Arm1		Arm 2		Arm 3	
	Baseline	Intervention	Baseline	Intervention	Baseline	Intervention
Total Events (N)	**265**	**360**	**273**	**341**	**412**	**356**
***Staphylococcus aureus* (N)**	77	128	70	106	80	92
Methicillin-Resistant (MRSA)	0.46	0.49	0.47	0.56	0.58	0.38
Methicillin-Susceptible (MSSA)	0.77	0.97	0.75	0.59	0.61	0.54
Total	**1.23**	**1.46**	**1.23**	**1.15**	**1.19**	**0.92**
Coagulase-Negative *Staphylococcus*[§] (N)	48	54	43	42	116	94
Total	**0.77**	**0.62**	**0.75**	**0.46**	**1.72**	**0.36**

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Important issues to consider

- Very high MRSA on-admission prevalence
- High BSI rates in the universal decolonization arm (including 2 BMT units, by chance !)
- Surprisingly low rate of previously unknown MRSA carriers at admission
- Nasal screening only
- Slow screening method (no PCR tests)
- Chlorhex-R and HH issues: not addressed

61

Independent risk factors associated with persistent MRSA colonization

	Multivariate analysis	
Risk factor	**OR (95% CI)**	**p value**
Mupirocin/chlorhexidine resistance	3.4 (1.5-7.8)	0.004
Age (per 1 year increment)	1.04 (1.02-1.1)	0.001
Prior hospitalisation (2 years)	2.4 (1.1-5.7)	0.04
Wound/pressure sore	5.7 (1.8-17.6)	0.003
MRSA-inactive antibiotics	3.1 (1.3-7.2)	0.01
Central venous catheter	5.7 (1.4-23.9)	0.02

Lee & Harbarth. Clin Infect Dis 2011;52(12):1422–1430

60

Interventions to reduce colonisation and transmission of antimicrobial-resistant bacteria in intensive care units: an interrupted time series study and cluster randomised trial

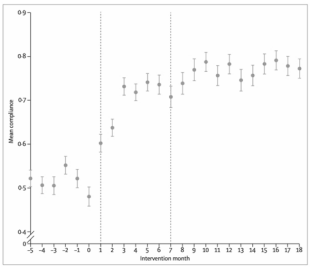
Lennie P G Derde, Ben S Cooper, Herman Goossens, Surbhi Malhotra-Kumar, Rob J L Willems, Marek Gniadkowski, Waleria Hyrniewicz, Joanna Empel, Mirjam J D Dautzenberg, Djillali Annane, Irene Aragão, Annie Chalfine, Uga Dumpis, Francisco Esteves, Helen Giamarellou, Igor Muzlovic, Giuseppe Nardi, George L Petrikkos, Viktorija Tomic, Antonio Torres Martí, Pascal Stammet, Christian Brun-Buisson, Marc J M Bonten*, on behalf of the MOSAR WP3 Study Team*

- Reduction in MDRO acquisition by CBW plus hand hygiene program
  - Mainly caused by reduction in MRSA acquisition
- Screening and isolation of identified carriers did not have an incremental effect

63

Interventions

- **Hand Hygiene compliance** improved from 52 % to 69% to 77% from phase 1 to 3



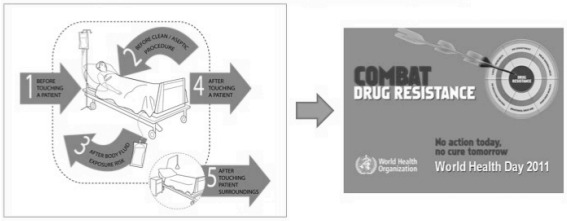
64

Infection Control

- Promote adherence to alcohol-based hand hygiene & basic infection control
- Improve systems to recognize and detect patients colonized with MDROs
- Implement barrier precautions in high-risk situations and during outbreaks
- Don't forget the environment
- Adapt preventive measures to your local setting and epidemiology

65

5 May 2014
Role of hand hygiene to combat antimicrobial resistance
http://www.who.int/gpsc/5may/en/



No action today; no cure tomorrow – make sure the WHO 5 Moments are part of protecting your patients from resistant germs

Participate in the WHO 5 May 2014 Global Surveys!

- **A Global Prevalence Survey on Multidrug- Resistant Organisms (MDROs)** – to assess and raise awareness of the burden of the five key health case-associated MDROs that have been identified at the global level
- **WHO Global Prevalence Survey on use of SURGICAL ANTIBIOTIC PROPHYLAXIS -** to assess surgical antibiotic prophylaxis prescribing in a wide range of acute health-care facilities

➢ **Find out how to participate at:**

- English http://www.who.int/gpsc/5may/global-surveys/en/
- French http://www.who.int/gpsc/5may/global-surveys/fr/
- Spanish http://www.who.int/gpsc/5may/global-surveys/es/

2014 WHO Teleclass Schedule

Clean Care is Safer Care

January 29
Innovation and implementation strategic approaches to reduce catheter-related bacteraemia: The results of a European multicentre study (PROHIBIT)
Dr. Walter Zingg, Switzerland

March 7
How to prevent the spread of multiresistant bacteria
Dr. Stephan Harbarth, Switzerland

April 9
Highlights on SSI prevention: The new CDC guidelines and more
Dr. Joseph Solomkin, USA

May 5
Special lecture for International Hand Hygiene Day
Prof. Didier Pittet, Switzerland

September 3
New WHO global campaign to eliminate unsafe therapeutic injections
Dr. Benedetta Allegranzi, Switzerland

October 8
Public reporting and disclosure of HAI rates: Positive impact or confusion?
Dr. Maryanne McGuckin, USA

November 5
Global application of behaviour change models and infection control strategies
Dr. Michael Borg, Malta

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