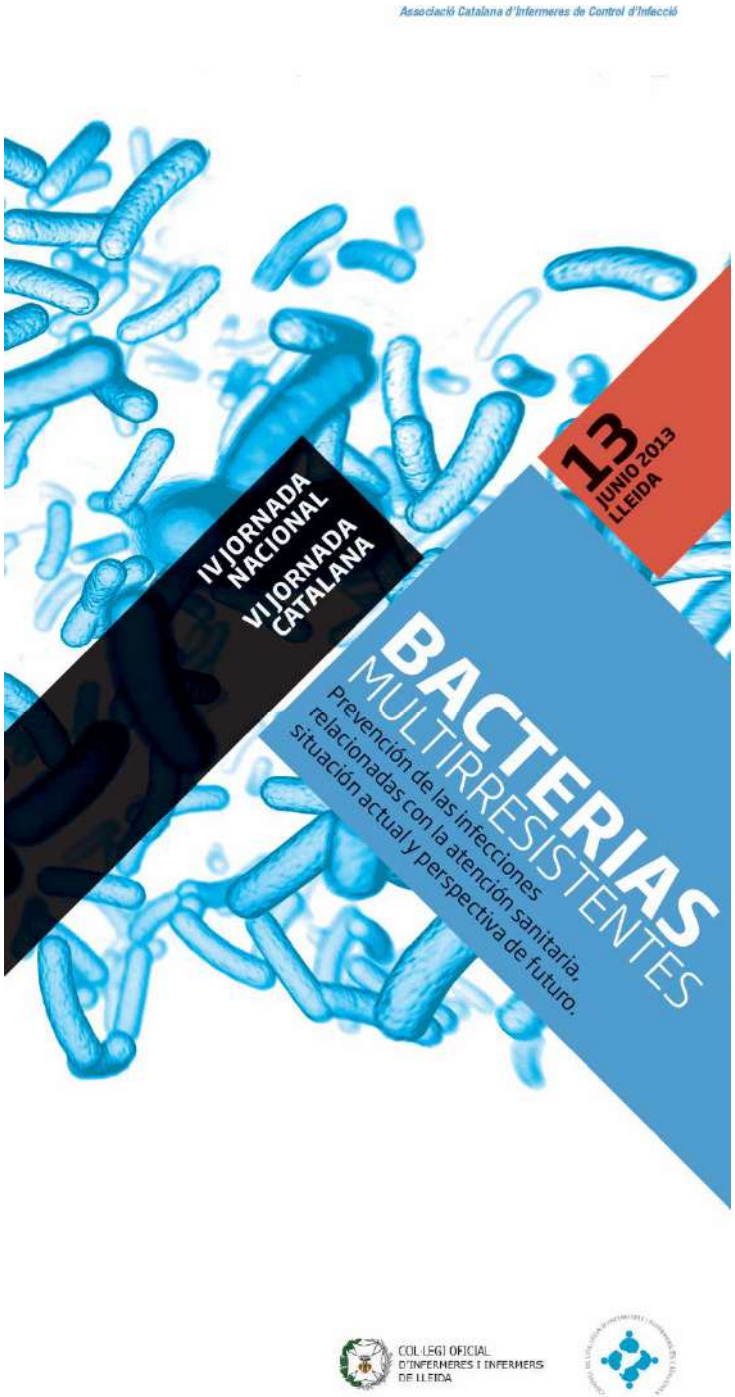
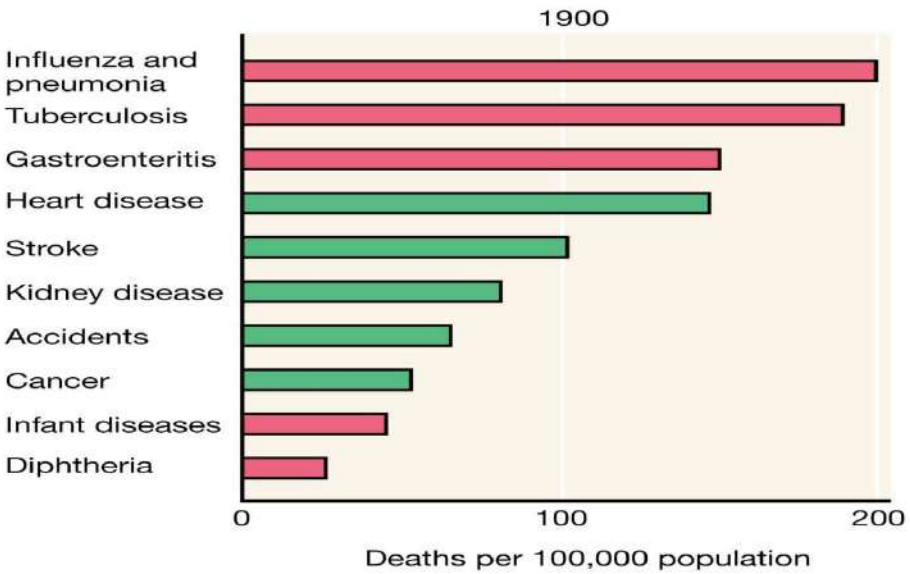


INFECCIÓN NOSOCOMIAL: DE DÓNDE VENIMOS, A DÓNDE VAMOS Y QUÉ HEMOS HECHO DURANTE EL CAMINO

Dr. Fernando Barcenilla.
Coordinador Unidad Funcional Infección Nosocomial. Hospital Universitari Arnau de Vilanova. Lleida

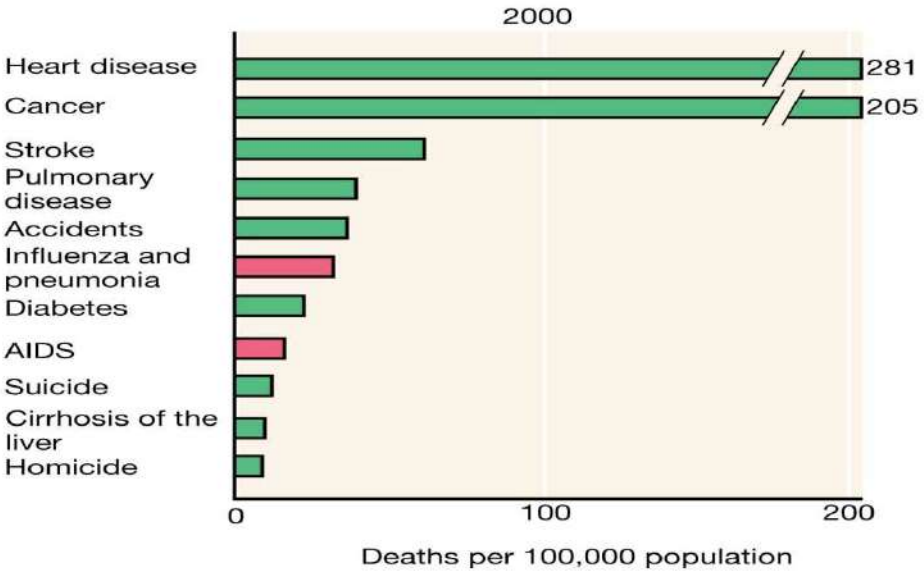
¿De donde venimos?

10 principales causas de muerte en USA: 1900 & 2000



Siglo XX

- Enfermedades infecciosas mayor causa de enfermedades/muertes

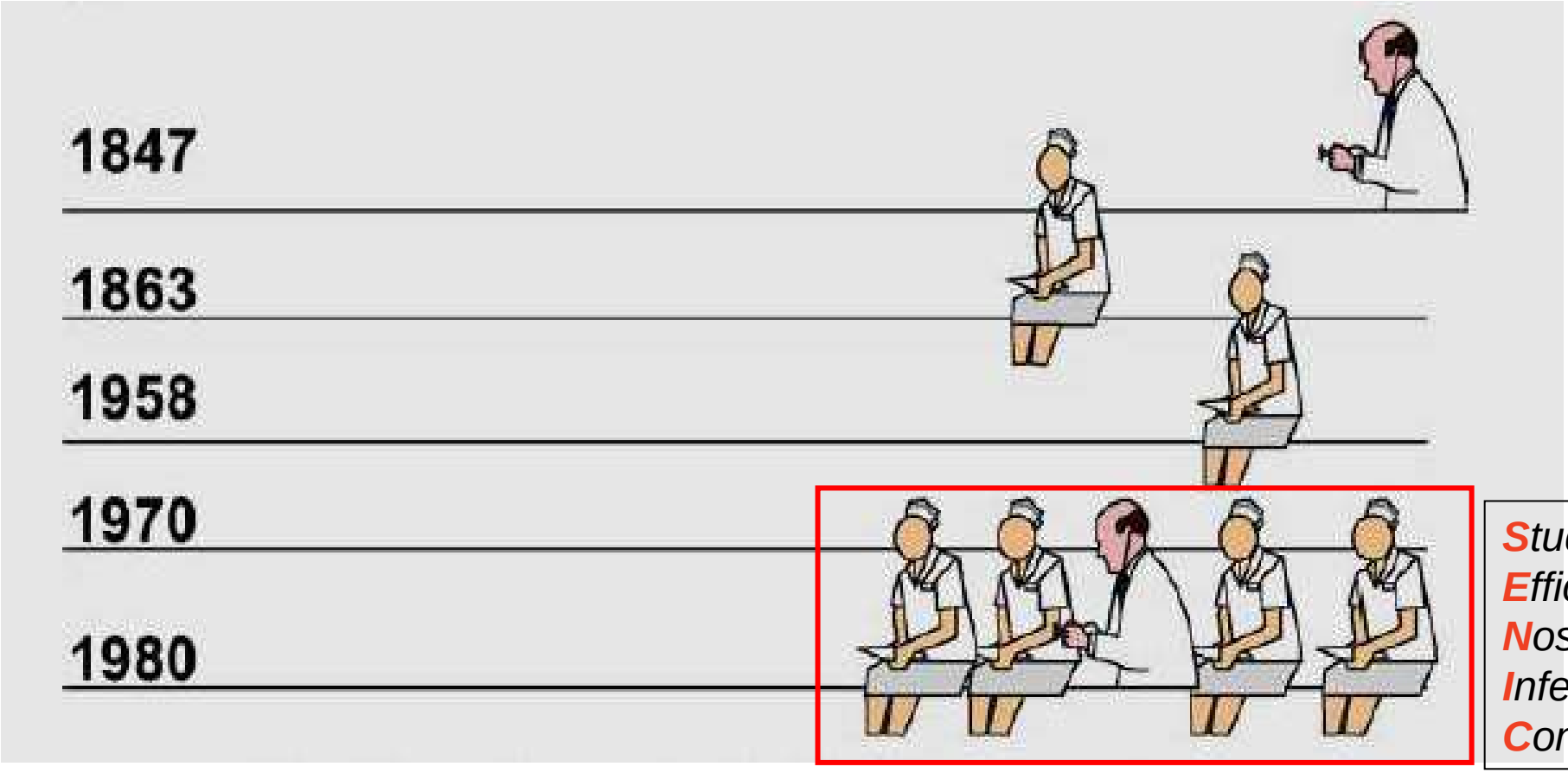


Siglo XX

- Infección menor importancia
- Mejora practicas sanitarias y descubrimiento/uso antibióticos
- Microorganismos son aun la mayor amenaza (SIDA, inmunocomprometidos, MMR) en países en desarrollo

Infection control and quality health care in the new millenium

Didier Pittet, MD, MS



Study on the Efficacy of Nosocomial Infection Control

1974

Am J Infect Control 2005;33:258-67

INFECCIÓN NOSOCOMIAL
"Concepto clásico"

"Infección adquirida en el hospital"

- 5-10% de los pacientes sufren una IN
- Mortalidad (atribuible 1%, contribuye 3%)
- Prolongación de estancia media en 2-15 d
- Incremento en los costes (1.800-3.000 €)
- Contribuye a la aparición resistencias ATBs

1950	Pandemia infecciones estafilococicas UK/ EEUU (Registro)
1963	The Lancet: 1ª experiencia control infección (enfermera dedicación exclusiva)
1970	· CDC inicia el NNIS. · CDC: "Isolation Techniques for use in Hospitals" · España: Creación Medicina Preventiva y Salud Pública
1974	CDC: Proyecto SENIC
1977	CDC: 1 enfermera/250 camas
1979	INSALUD: Supervisora Higiene Hospitalaria
1980	España: Creación Comisión de Infección Hospitalaria
1983	CDC: Guideline for Isolation Precautions in Hospitals

1984	Cataluña: Inicio ACICI (1994)
1985	CDC: Resultados proyecto SENIC
1988	EPINCAT(12,1%)
1990	EPINE (9,9%)
1994	ENVIN-UCI
1997	ESAC
1998	· EARS · VINICS
1999	· IOM: To err is human · SEIMC (GEIH), SEMICYUC (GTEI) Y SEMPSPH: Recomendaciones vigilancia y control de la IN

Documentos G.E.I.H.

* DOCUMENTO DE CONSENSO SOBRE RECOMENDACIONES Y RECURSOS NECESARIOS PARA UN PROGRAMA DE CONTROL DE LA INFECCION NOSOCOMIAL EN LOS HOSPITALES ESPAÑOLES

* Grupo de Estudio de Infección Hospitalaria de la Sociedad Española de Enfermedades Infecciosas y Microbiología Clínica
* Sociedad Española de Medicina Preventiva, Salud Pública e Higiene
* Grupo de Trabajo de Enfermedades Infecciosas de la Sociedad Española de Medicina Intensiva, Críticos y Unidades Coronarias

1 de Junio de 1999

Comision de infecciones

E.C.I.H.

1 Médico preferente
1 Enfemera/250 camas

Infecciosas
Microbiologia
M. Preventiva
UCI
Farmacia

Vigilancia, prevención y control
Diagnostico y tratamiento

Sabemos que tenemos IN

Cuantificamos la IN

Intentamos la prevención

Tratamos con antibióticos

Problemas

Desafio 1

Infección asociada a atención sanitaria

2009

ecdc

EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

REVISIÓN BIBLIOGRÁFICA SOBRE TRABAJOS DE COSTES DE LA "NO SEGURIDAD DEL PACIENTE"

GOBIERNO DE ESPAÑA

MINISTERIO DE SANIDAD Y CONSUMO

Plan de Calidad para el Sistema Nacional de Salud

Anualmente (27 países CE)

- 4,1 millones pacientes afectados
- 37.000 muertes directas
- Contribuye a 110.000 muertes
- 16 millones de estancias hospitalarias
- 5.500 millones de € (334€/día)

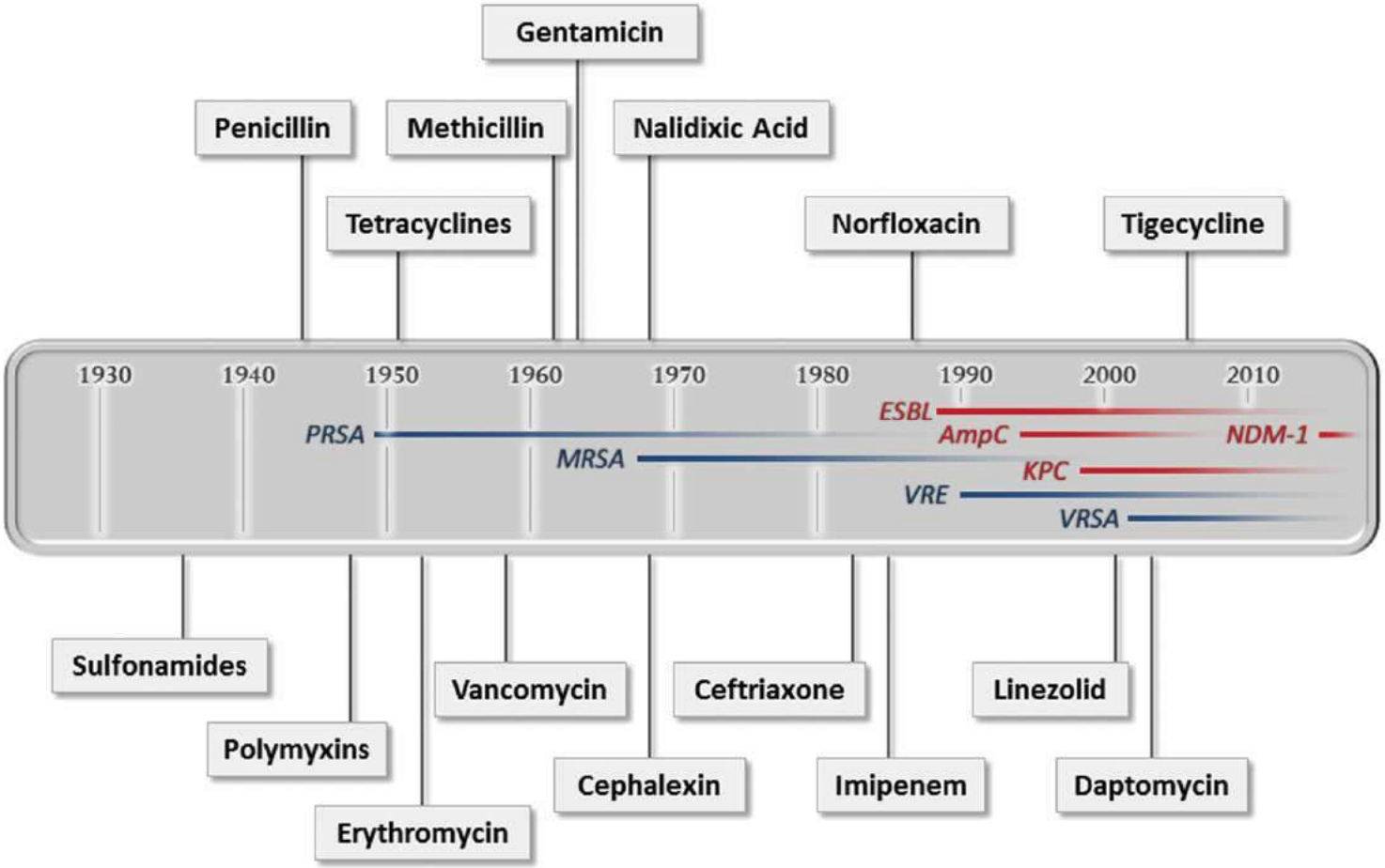
Tabla 12. Coste global asociado a las infecciones nosocomiales.

Tipo de infección nosocomial	% de pacientes (infecciones evitables)	Coste global para el sistema de salud español: euros en 2005
Bacteriemia	0,181%	240.225.449 euros
Infección nosocomial del sitio quirúrgico	0,477%	417.261.735 euros
Neumonía nosocomial	0,289%	91.759.891 - 177.945.865 euros
Bacteriemia asociada a dispositivo[11]	0,124%	36.794.04[illegible] - 59.713.475 euros
Infección nosocomial del tracto urinario	0,429%	14.148.190 - 14.787.140 euros

800 - 910 millones €

Desafío 2

Resistencia antibiótica



Clinical Infectious Diseases 2013;56(9):1310–8

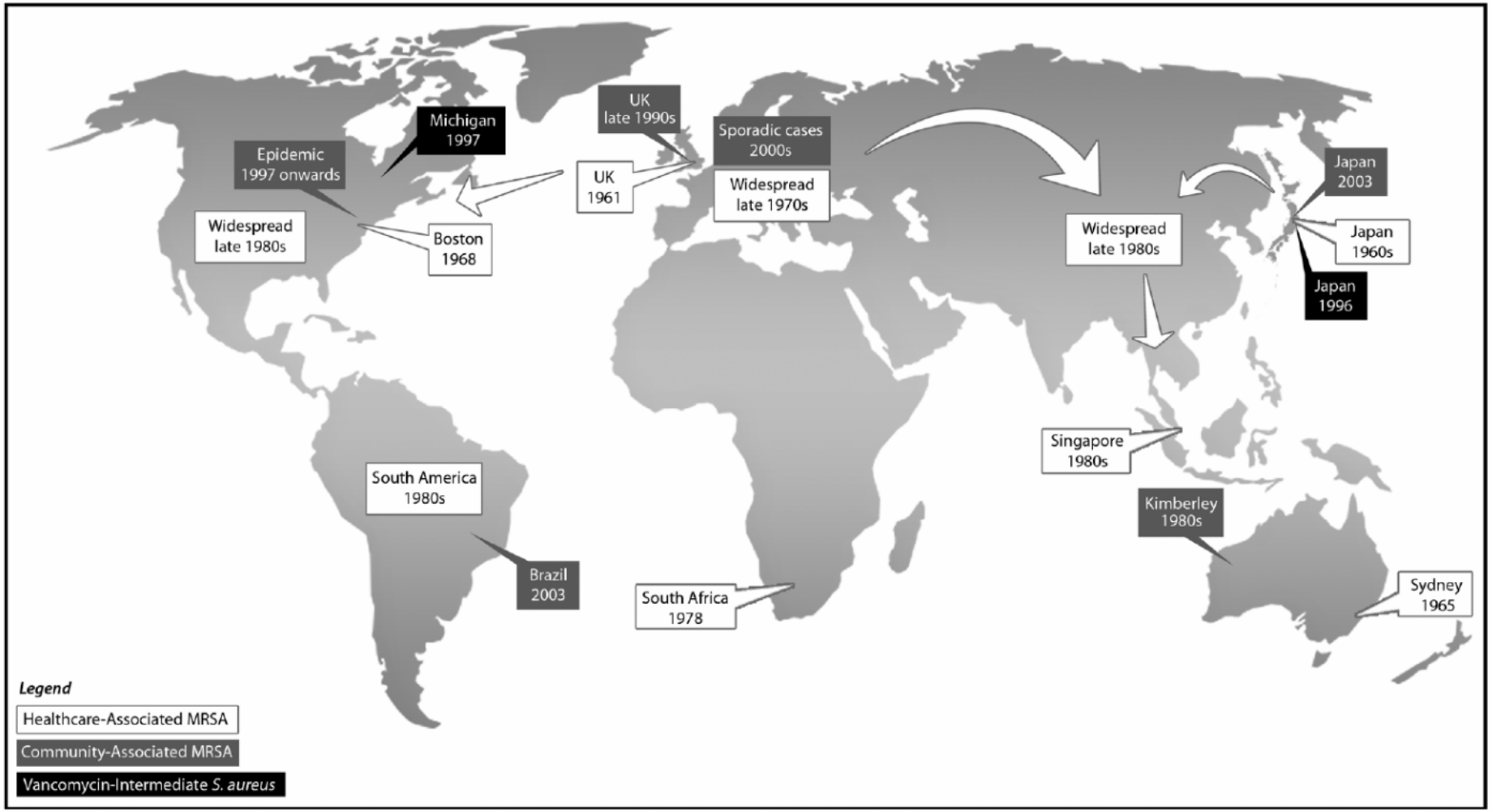

Michigan
1997
Epidemic
1997 onwards
Widespread
late 1980s
Boston
1968
UK
late 1990s
UK
1961
Sporadic cases
2000s
Widespread
late 1970s
Widespread
late 1980s
Japan
2003
Japan
1960s
Japan
1996
Singapore
1980s
Kimberley
1980s
Sydney
1965
South America
1980s
Brazil
2003
South Africa
1978
Legend
Healthcare-Associated MRSA
Community-Associated MRSA
Vancomycin-Intermediate S. aureus

Table 2. Estimated yearly human burden of infections due to the selected antibiotic-resistant bacteria and percentage of this burden due to bloodstream infections, EU Member States, Iceland and Norway, 2007.

Antibiotic-resistant bacteria[a]	No. cases of infection (four main types)[b] (% bloodstream infections)	No. extra deaths (% from bloodstream infections)	No. extra hospital days (% from bloodstream infections)
Antibiotic-resistant Gram-positive bacteria			
Methicillin-resistant *Staphylococcus aureus* (MRSA)	171 200 (12%)	5 400 (37%)	1 050 000 (16%)
Vancomycin-resistant *Enterococcus faecium*	18 100 (9%)	1 500 (28%)	111 000 (22%)
Penicillin-resistant *Streptococcus pneumoniae*[c]	3 500 (27%)	–[f]	–
Sub-total	*192 800 (12%)*	*6 900 (35%)*	*1 161 000 (16%)*
Antibiotic-resistant Gram-negative bacteria			
Third-generation cephalosporin-resistant *Escherichia coli*[d]	32 500 (27%)	5 100 (52%)	358 000 (27%)
Third-generation cephalosporin-resistant *Klebsiella pneumoniae*	18 900 (27%)	2 900 (52%)	208 000 (27%)
Carbapenem-resistant *Pseudomonas aeruginosa*[e]	141 900 (3%)	10 200 (7%)	809 000 (3%)
Sub-total	*193 300 (9%)*	*18 200 (27%)*	*1 375 000 (13%)*
Total	386 100 (11%)	25 100 (29%)	2 536 000 (14%)

Table 3. Estimated yearly economic burden of infections (four main types[a]) due to the selected antibiotic-resistant bacteria, EU Member States, Iceland and Norway, 2007.

Antibiotic-resistant bacteria[b]	Extra in-hospital costs (EUR)	Extra outpatient costs[c] (EUR)	Productivity losses due to absence from work (EUR)	Productivity losses due to patients who died from their infection (EUR)	Overall costs (EUR)
Antibiotic-resistant Gram-positive bacteria	*424 700 000*	*5 500 000*	*91 100 000*	*145 600 000*	*666 900 000*
Antibiotic-resistant Gram-negative bacteria	*503 100 000*	*4 500 000*	*59 300 000*	*300 300 000*	*867 200 000*
Total	927 800 000	10 000 000	150 400 000	445 900 000	1 534 100 000

386.000 casos

25.100 muertos

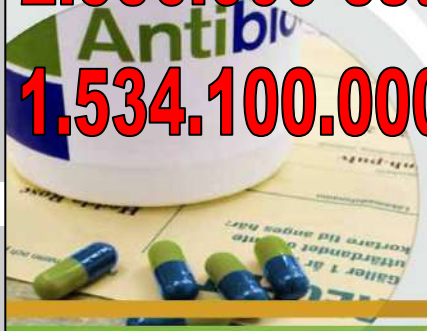
2.536.000 estancias extras

1.534.100.000€

ecdc EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

emea European Medicines Agency

September 2009



TECHNICAL REPORT

The bacterial challenge: time to react

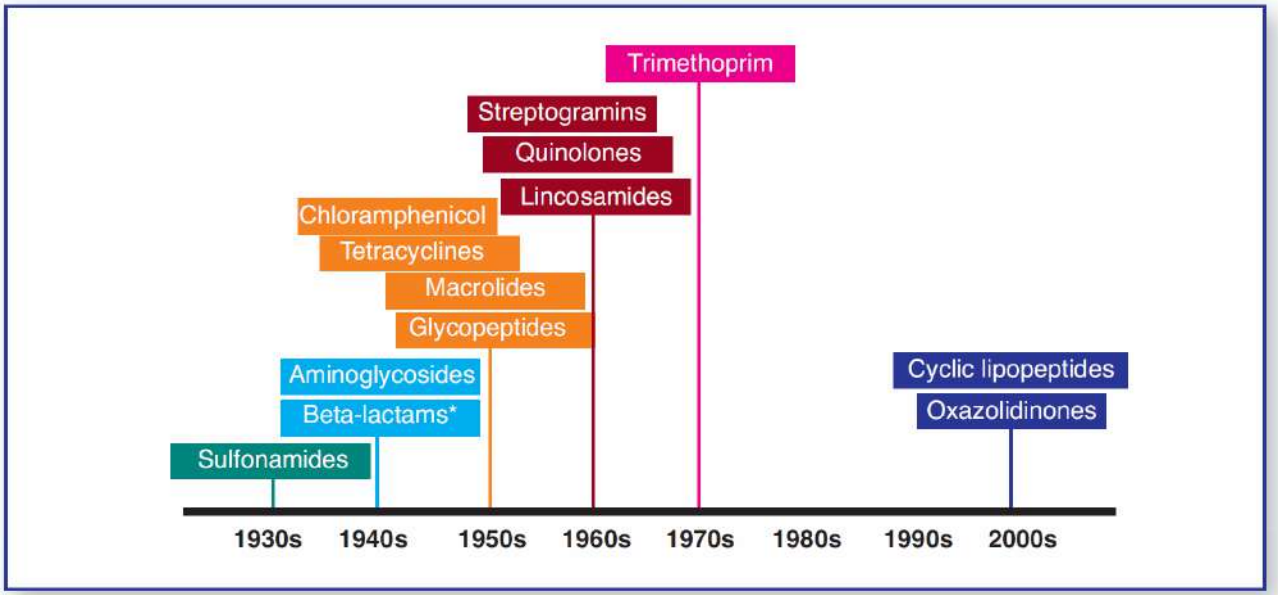
A call to narrow the gap between multidrug-resistant bacteria in the EU and the development of new antibacterial agents

www.ecdc.europa.eu
www.emea.europa.eu

Desafío 3

Escasez de antibióticos

Figure 6.1 Discovery of new classes of antibacterial drugs (1930s to 2000s)



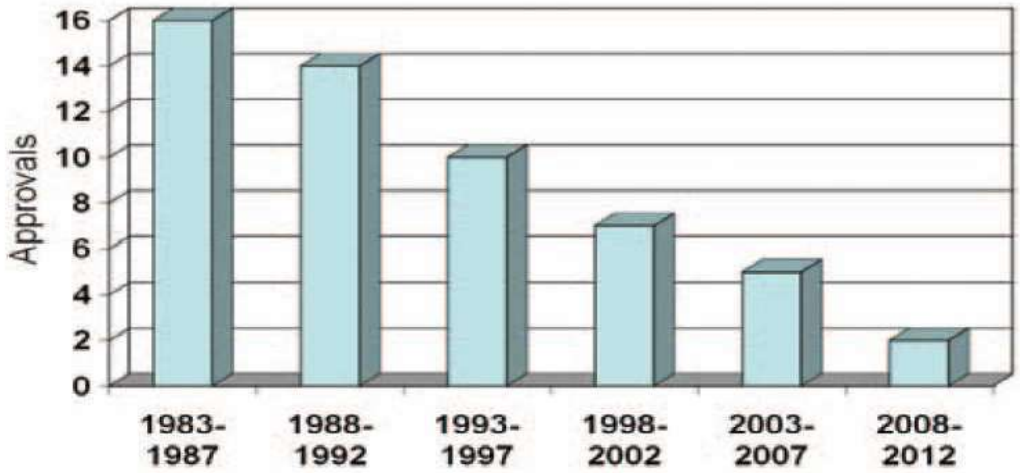


Figure 1. New systemic antibacterial agents approved by the US Food and Drug Administration per 5-year period, through 2012.

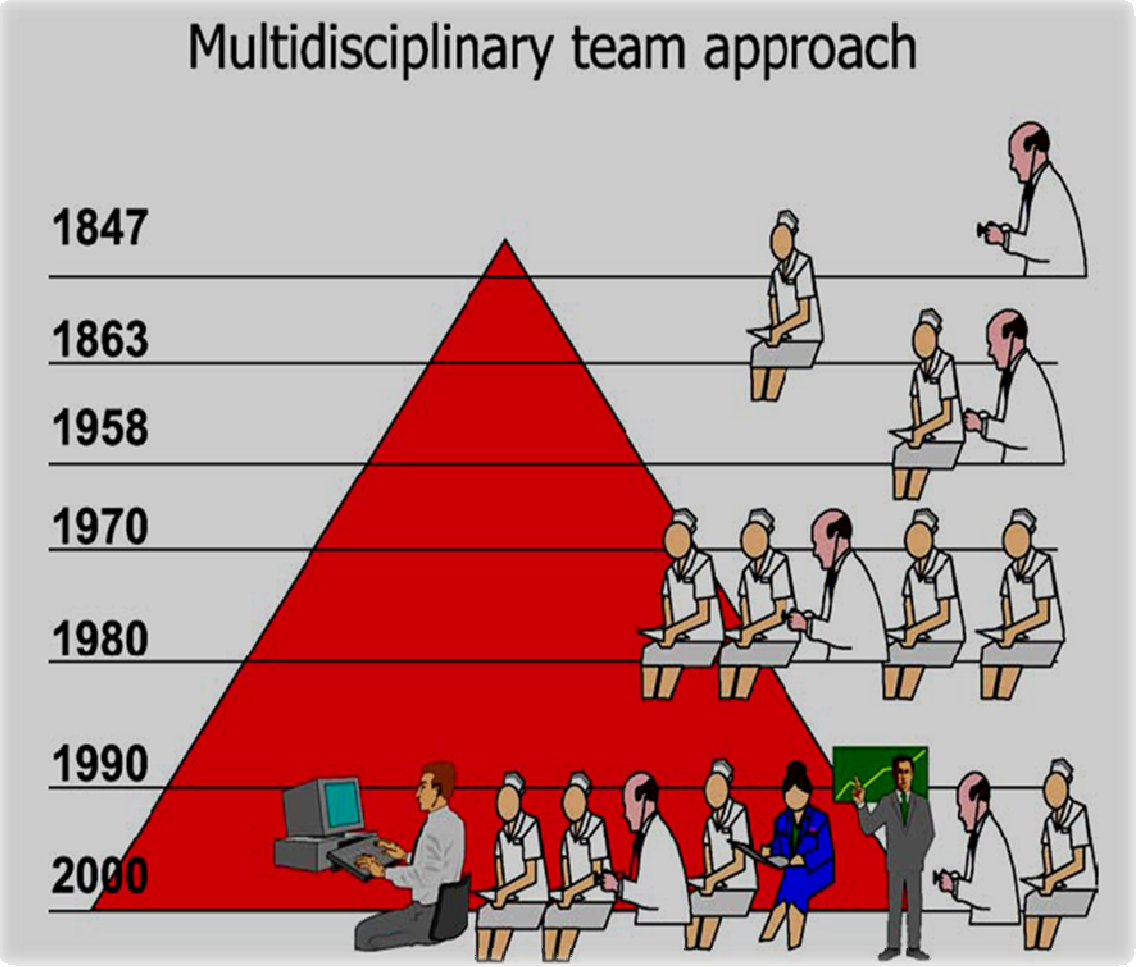
Clinical Infectious Diseases Advance Access published April 17, 2013

¿Qué hemos hecho durante el camino?

Infection control and quality health care in the new millenium

Didier Pittet, MD, MS

2000	ENVIN-HELICS
2004	• IHI: 100.000 lives compaing • OMS: Alianza Mundial Seguridad Paciente • ECDC
2006	• IHI: 5 million lives compaing • VINCat



Am J Infect Control 2005;33:258-67

INFECCION NOSOCOMIAL
"Concepto moderno"

"Infección Relacionada a Atención Sanitaria (IRAS)"

Vol. 20 No. 4 INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY 247

GUIDELINE FOR PREVENTION OF SURGICAL SITE INFECTION, 1999

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

CDC

MMWR

Morbidity and Mortality Weekly Report

Recommendations and Reports October 25, 2002 / Vol. 51 / No. RR-16

Guideline for Hand Hygiene in Health-Care Settings

Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force

CDC Home Search Health Topics A-Z

MMWR

Recommendations and Reports

March 26, 2004 / 53(RR03);1-36

Guidelines for Preventing Health-Care--Associated Pneumonia, 2003

Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee

2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

Jane D. Siegel, MD; Emily Rhinehart, RN MPH CIC; Marguerite Jackson, PhD; Linda Chiarello, RN MS; the Healthcare Infection Control Practices Advisory Committee

Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006

Jane D. Siegel, MD; Emily Rhinehart, RN MPH CIC; Marguerite Jackson, PhD; Linda Chiarello, RN MS; the Healthcare Infection Control Practices Advisory Committee

Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008

William A. Rutala, Ph.D., M.P.H.[1,2], David J. Weber, M.D., M.P.H.[1,2], and the Healthcare Infection Control Practices Advisory Committee (HICPAC)[3]

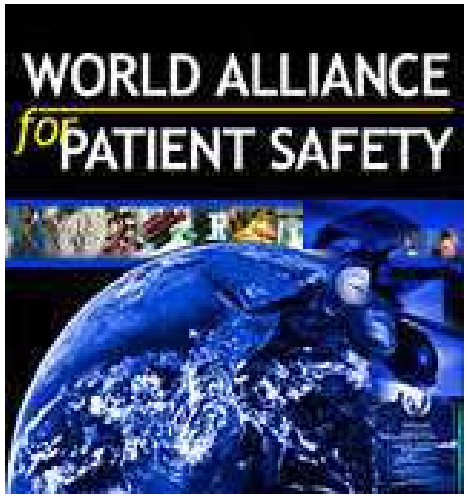
Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2011

GUIDELINE FOR PREVENTION OF CATHETER-ASSOCIATED URINARY TRACT INFECTIONS 2009

HICPAC

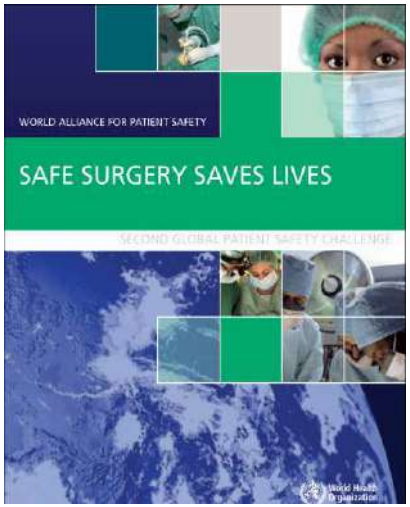
HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE

CDC



2004

2005



2007-2008

2007-2008

GOBIERNO DE ESPAÑA
MINISTERIO DE SANIDAD, POLÍTICA SOCIAL E IGUALDAD

SEEIUC
Sociedad Española de Enfermería Intensiva y Unidades Coronarias

SeMicyuc
LOS PROFESIONALES DEL ENFERMO CRÍTICO

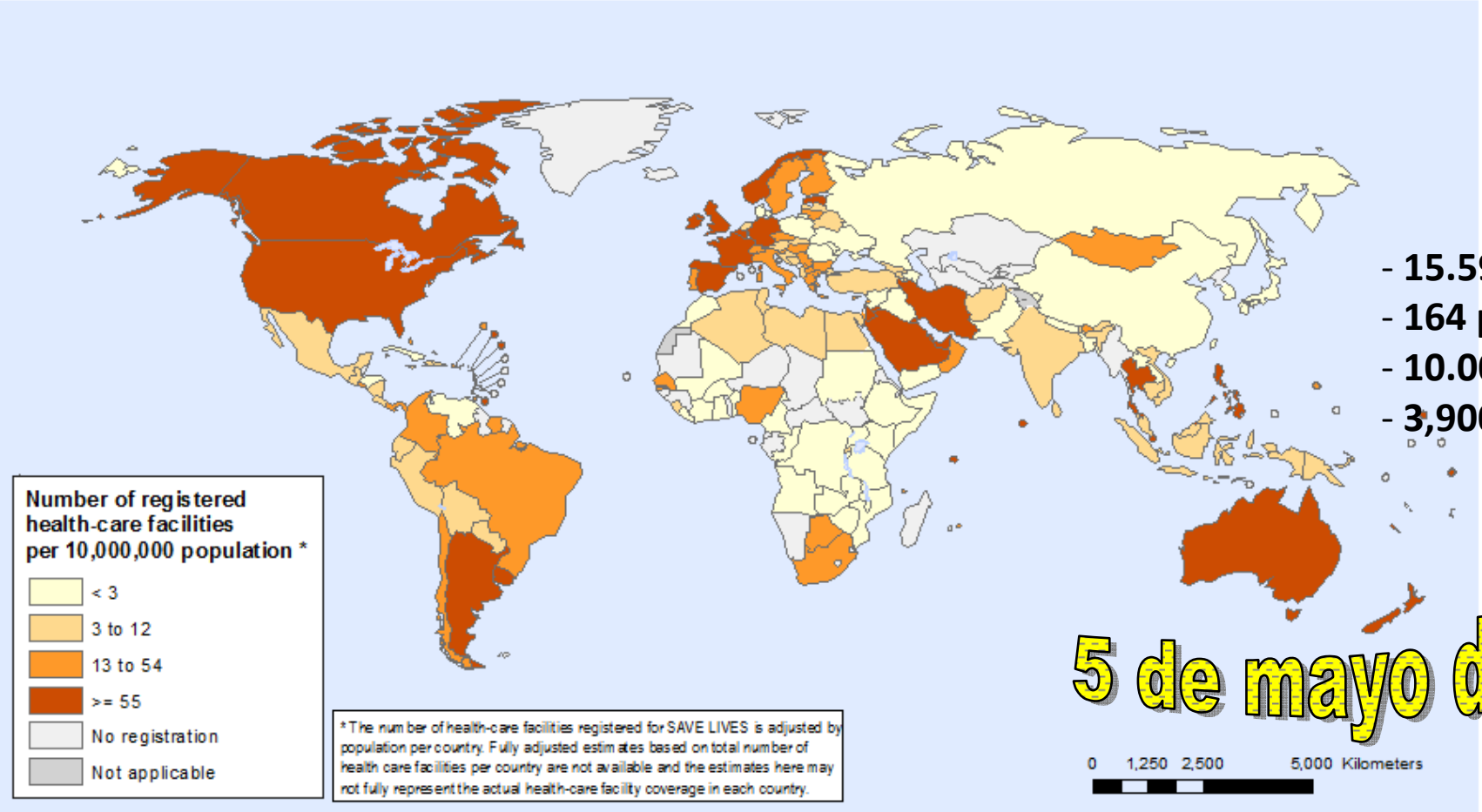
Neumonía Zero

2009

Bacteriemia Zero

2011

Countries with health-care facilities registered for SAVE LIVES: Clean Your Hands global campaign



- 15.596 centros
- 164 países
- 10.000.000 sanitarios
- 3,900.000 camas

5 de mayo de 2013

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

World Health Organization

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18 de noviembre de 2013

Día Europeo para el Uso Prudente de los Antibióticos

Una iniciativa europea para la salud

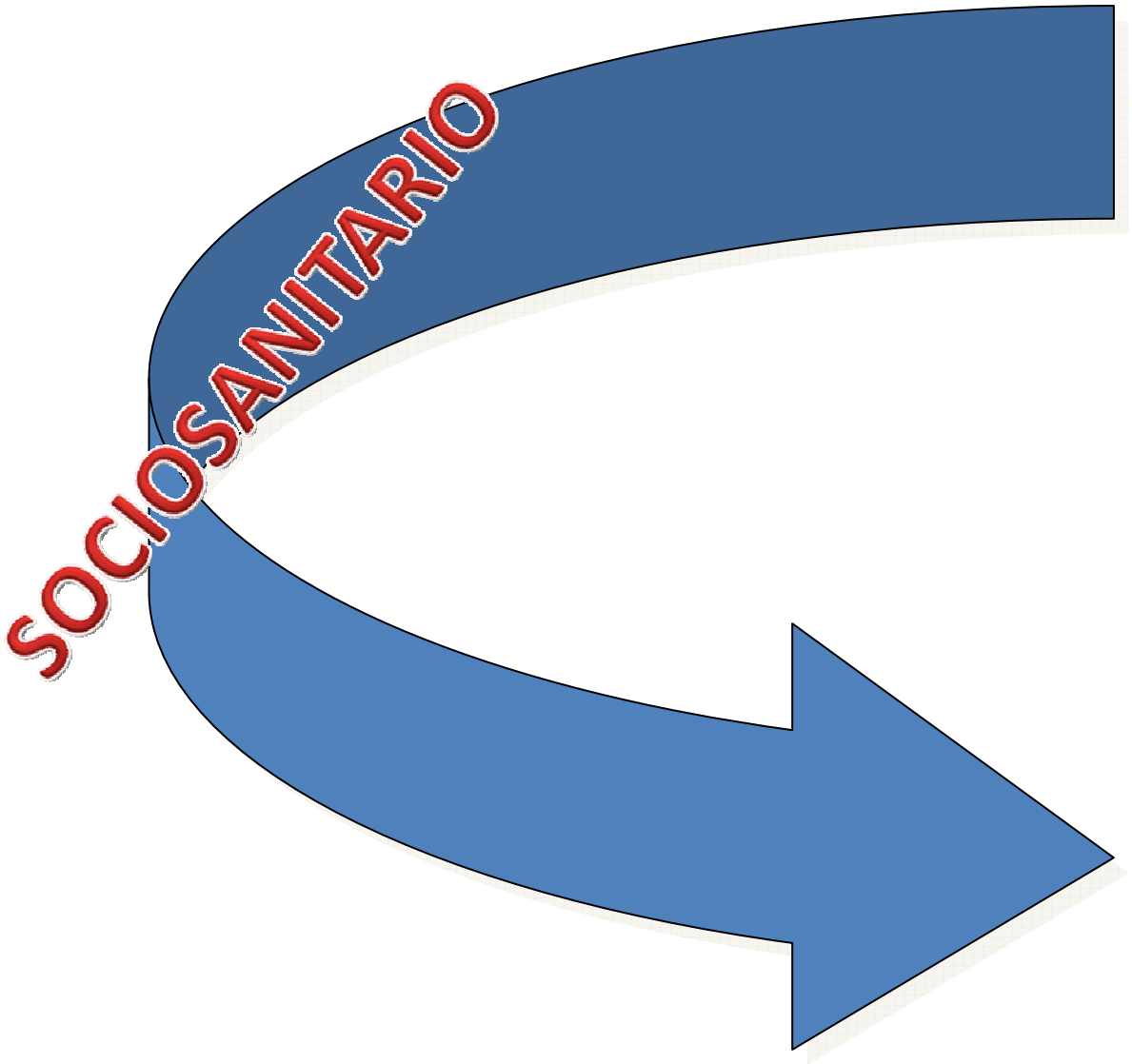
VINICS
1998

1. IN global
2. Indicadores de proceso
3. Infección bacteriémica
4. Infección quirúrgica
5. IN en UCI
6. MMR
7. Consumo de ATB

VINCat
2006

Creación: Febrero 2006
Inicio pruebas: 2007
Inicio real: 2008

- No existen programas específicos de vigilancia y control
- No existen programas de seguridad de los pacientes
- No existen indicadores
- No existen profesionales de referencias en el control de la IN



RISS
Registre infecció sociosanitària Lleida

Girona

VINCat
Vigilància de les infeccions nosocomials als hospitals de Catalunya

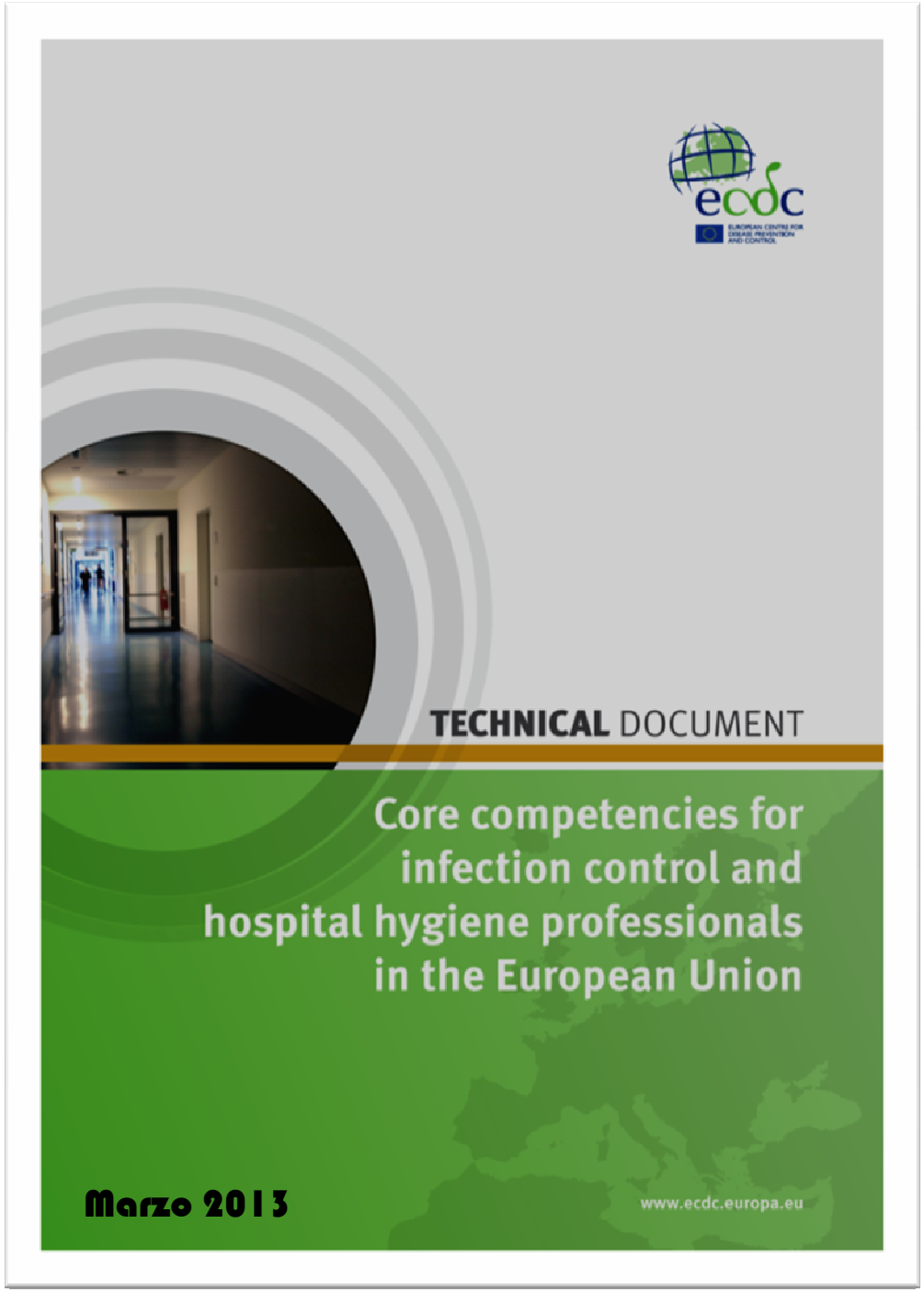
2011

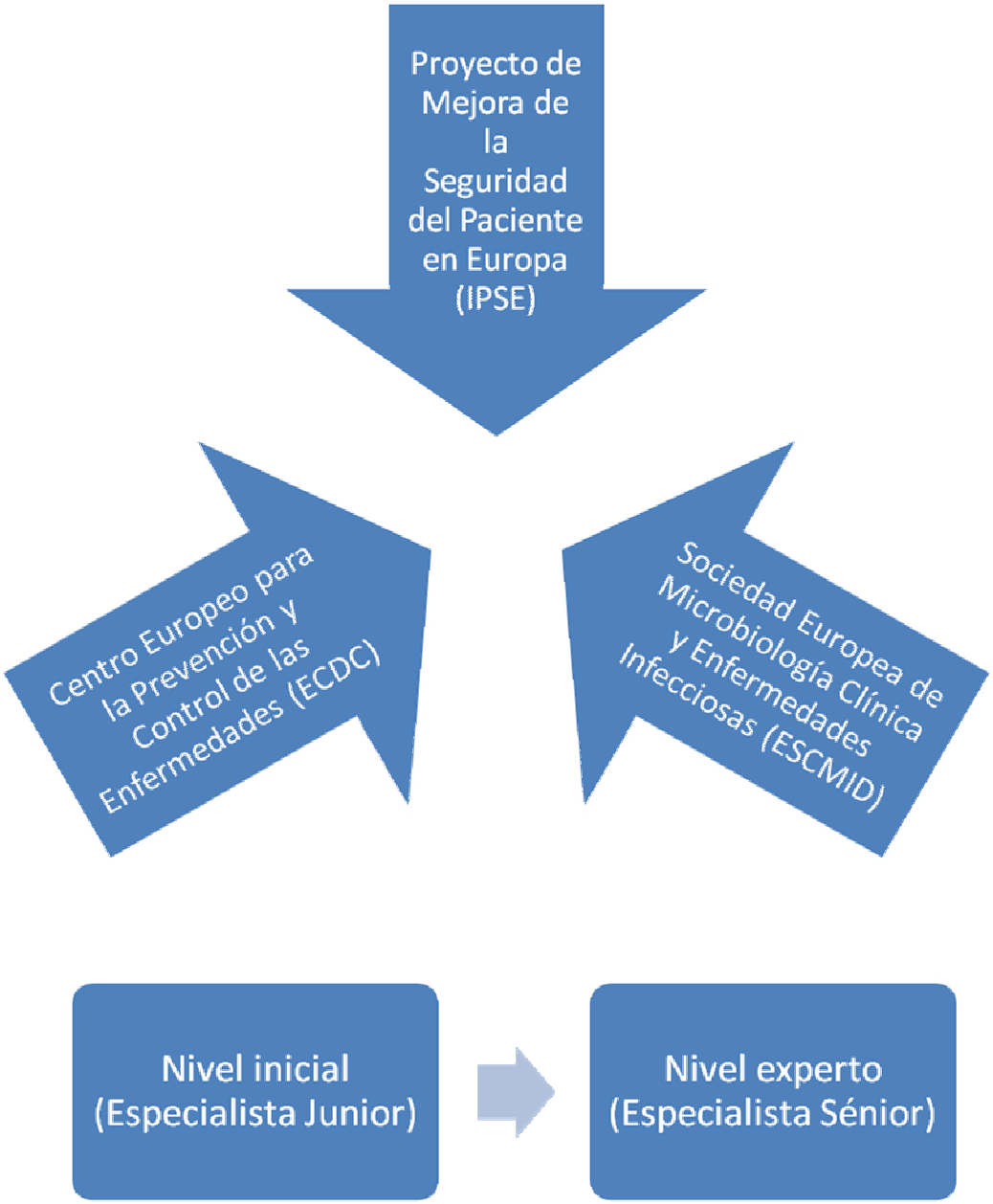
Bacteriemia Zero

(no UCI)

PROTOCOLO PREVENCIÓN DE LAS BACTERIEMIAS RELACIONADAS CON CATÉTERES VENOSOS

¿A dónde vamos?


ecdc
TECHNICAL DOCUMENT
Core competencies for infection control and hospital hygiene professionals in the European Union
Marzo 2013
www.ecdc.europa.eu


Proyecto de Mejora de la Seguridad del Paciente en Europa (IPSE)
Centro Europeo para la Prevención y Control de las Enfermedades (ECDC)
Sociedad Europea de Microbiología Clínica y Enfermedades Infecciosas (ESCMID)
Nivel inicial (Especialista Junior)
Nivel experto (Especialista Sénior)

Nuevas repercusiones IN

- Económicas
- Éticas
- Penales

Mejora sistemas vigilancia

- Vigilancia automática
- Plataformas informaticas
- Vigilancia global

Nuevas formas diagnosticas mas rápidas y fiables

- Métodos cromogénicos
- Moleculares (PCR multiplex -SeptiFast…)
- Proteómicos (Maldi-Tof…)
- Animales

Nuevas formas manejo MMR

- Higiene
- Descolonización trasversal
- Nuevas recomendaciones sociedades científicas

No utilización antibióticos

- Trasplante fecal
- Probióticos
- Fagos

Utilización correcta antibióticos

- PROA
- Resistencia Zero
- Programas informáticos de ayuda

Nuevos antibióticos

- 10 x 20

Prevención infecciones

- Cobre en entorno
- Plata en dispositivos (TOT, CVC …)
- Nuevos apósitos y tejidos
- Nuevas formas desinfección (luz, gases…)
- Mejora cumplimiento higiene de manos
- Medidas adicionales (checklist quirófano..)
- Mantenimiento campañas existentes (BZ,NZ…)

Infection control, ethics and accountability

Gwendolyn L Gilbert, Paul Y Cheung and Ian B Kerridge

Nuevas repercusiones IN

- Failure to protect patients from avoidable harm, including HAIs, has significant ethical implications; it often reflects both organisational systems failure and non-compliance of health care workers with evidence-based policies, including hand hygiene.
- If implemented with appropriate safeguards, infection control "bundles" that include sanctions for poor compliance with hand hygiene and other infection control policies, will achieve sustained improvements where previous approaches have failed.

MJA 2009; 190: 696–698

Automated Surveillance for Healthcare-Associated Infections: Opportunities for Improvement

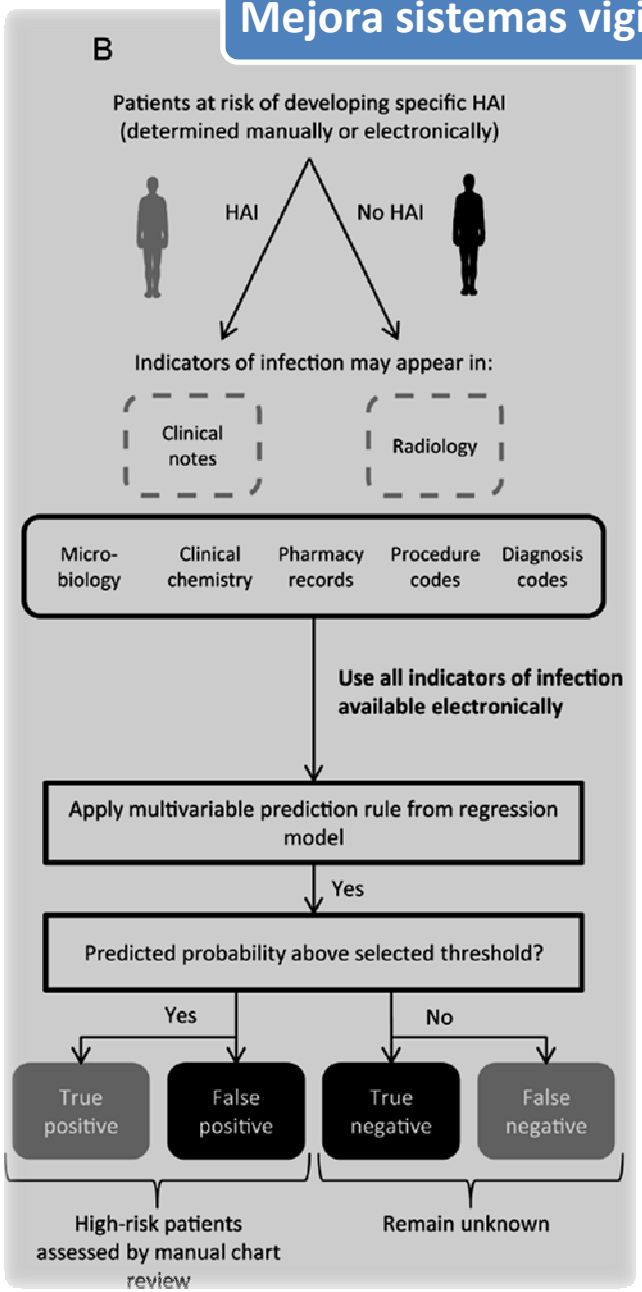
Maaike S. M. van Mourik,[1] Annet Troelstra,[1] Wouter W. van Solinge,[2] Karel G. M. Moons,[3] and Marc J. M. Bonten[1,3]

Table 1. Overview of Surveillance Methodologies

Method	Characteristics
Traditional surveillance	Manual medical records review of all patients at risk of specific healthcare-associated infection
Classification algorithm	Limited number of electronic data sources in unweighted classification algorithm with consecutive dichotomous decision steps to identify high-risk patients for manual medical records review[a]
Multivariable regression model	Electronic data sources in a weighted multivariable regression, or prediction, model to classify patients as low or high risk followed by manual review of high-risk patients[b]

S 83% → **PPV 73%** → **Revisión 18%**

Mejora sistemas vigilancia

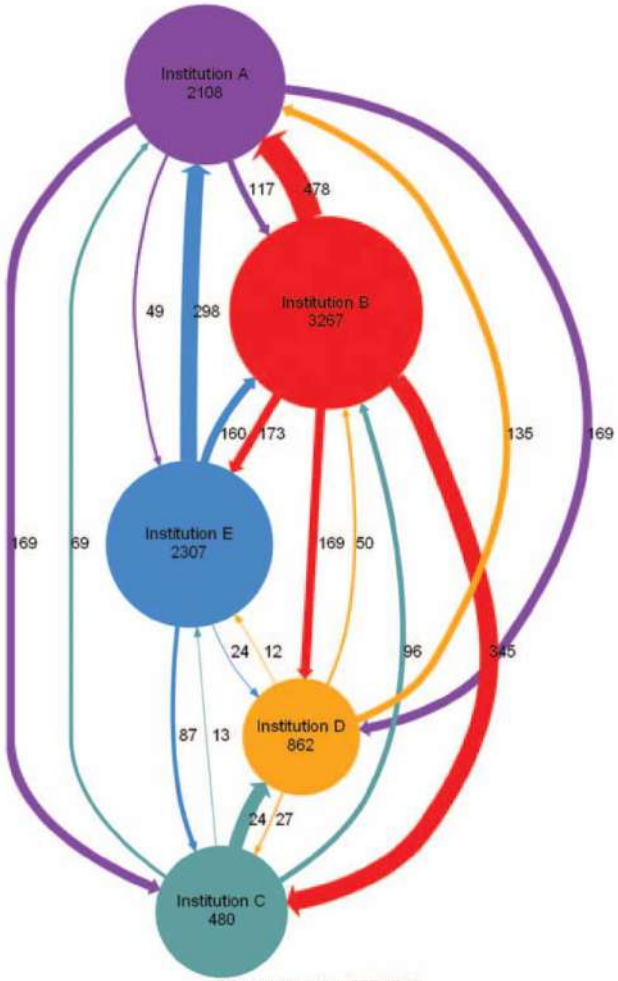


Clinical Infectious Diseases 2013;57(1):85–93

A Regional Informatics Platform for Coordinated Antibiotic-Resistant Infection Tracking, Alerting, and Prevention

Abel N. Kho,[1,2] Bradley N. Doebbeling,[2,3,4] John P. Cashy,[1] Marc B. Rosenman,[2,5] Paul R. Dexter,[2] David C. Shepherd,[2,*] Larry Lemmon,[2] Evgenia Teal,[2] Shahid Khokar,[2] and J. Marc Overhage[2,*]

Mejora sistemas vigilancia



MRSA Admissions 2007-2010

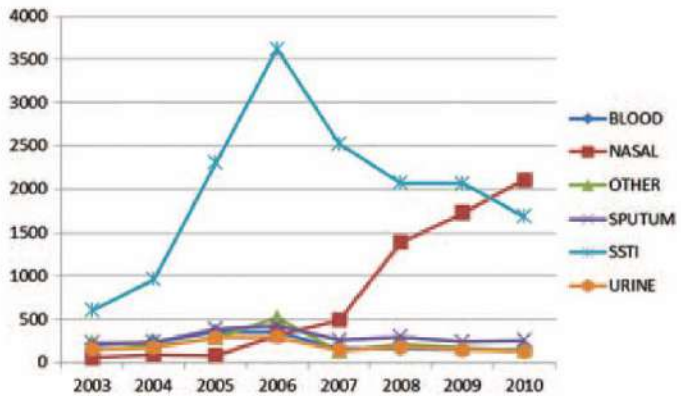
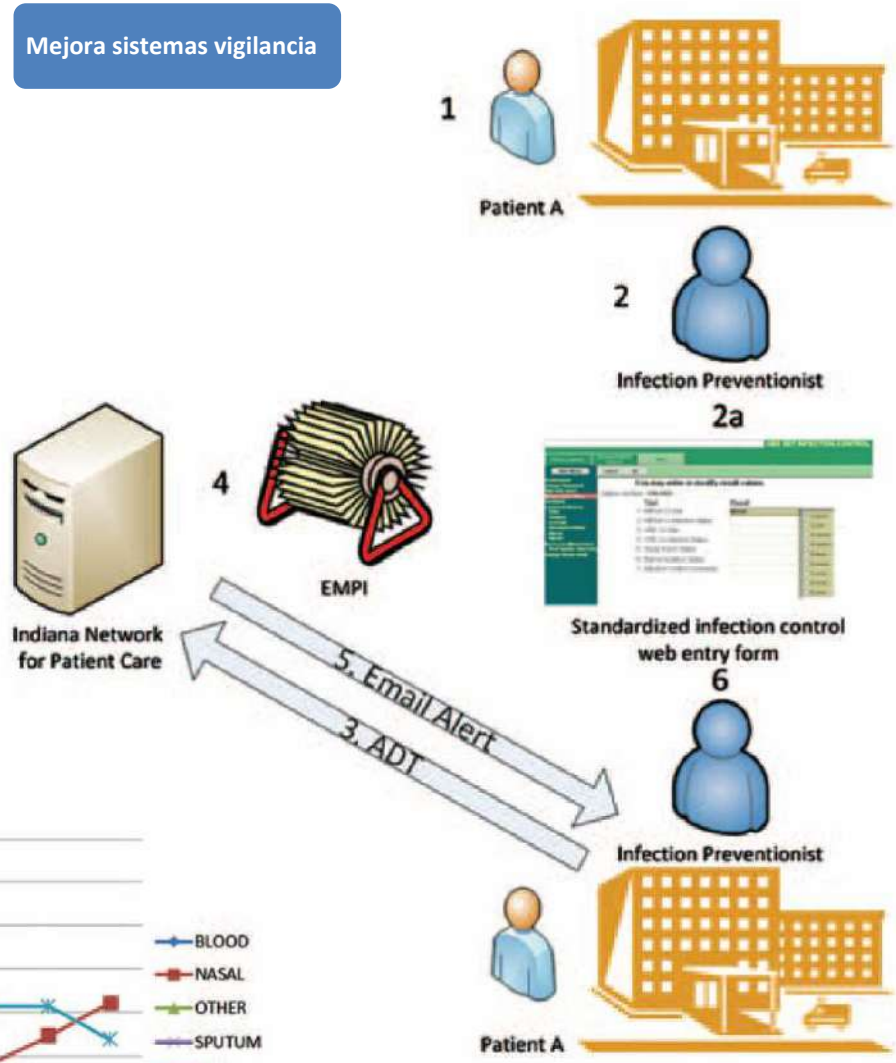


Figure 4. Counts of positive methicillin-resistant *Staphylococcus aureus* culture sites by year. Abbreviation: SSTI, skin and soft tissue site.

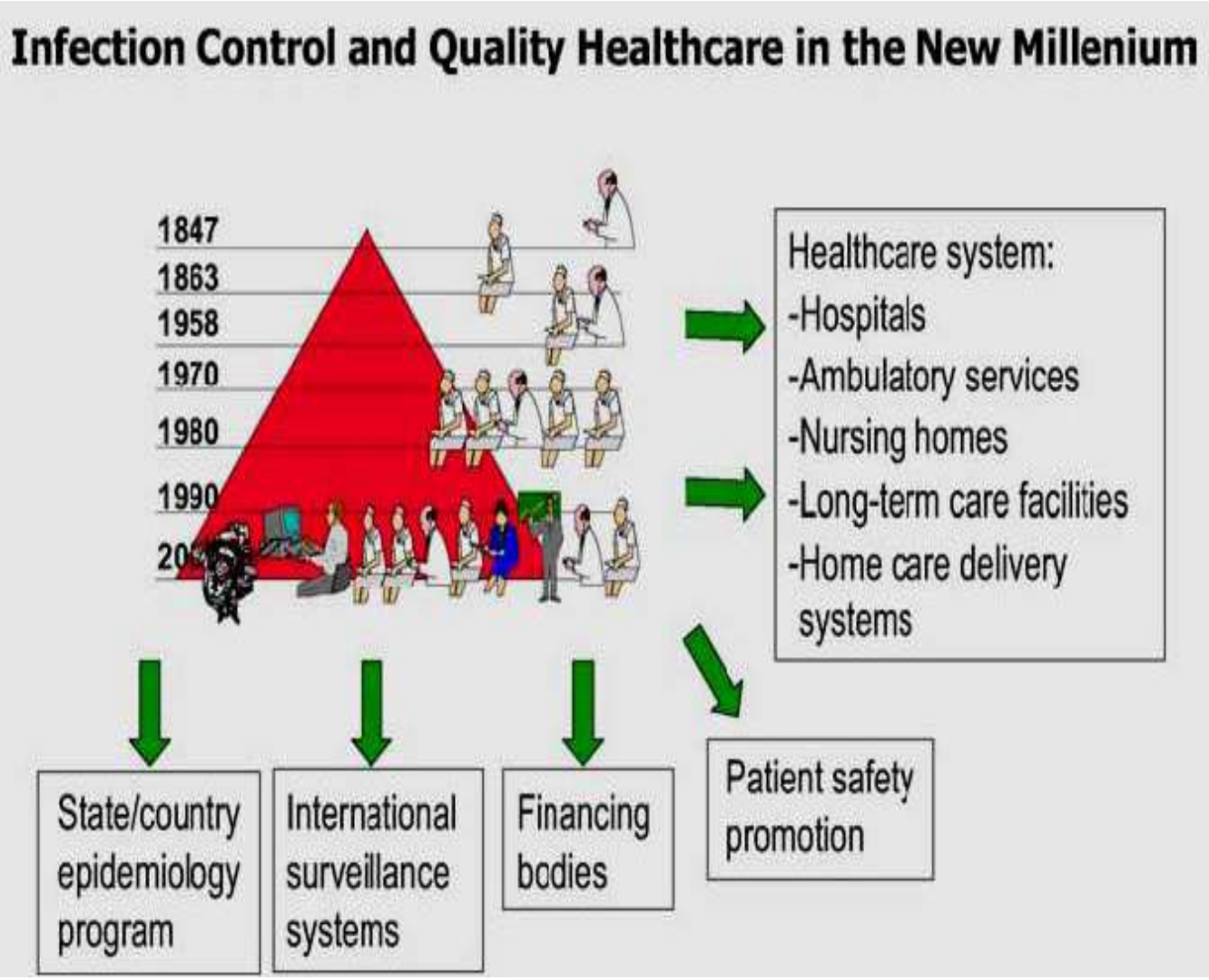


Clinical Infectious Diseases Advance Access published May 16, 2013

Infection control and quality health care in the new millenium

Mejora sistemas vigilancia

Didier Pittet, MD, MS



Am J Infect Control 2005;33:258-67

Programa Global "Vigilancia y control de la Infección Relacionada a Atención Sanitaria"

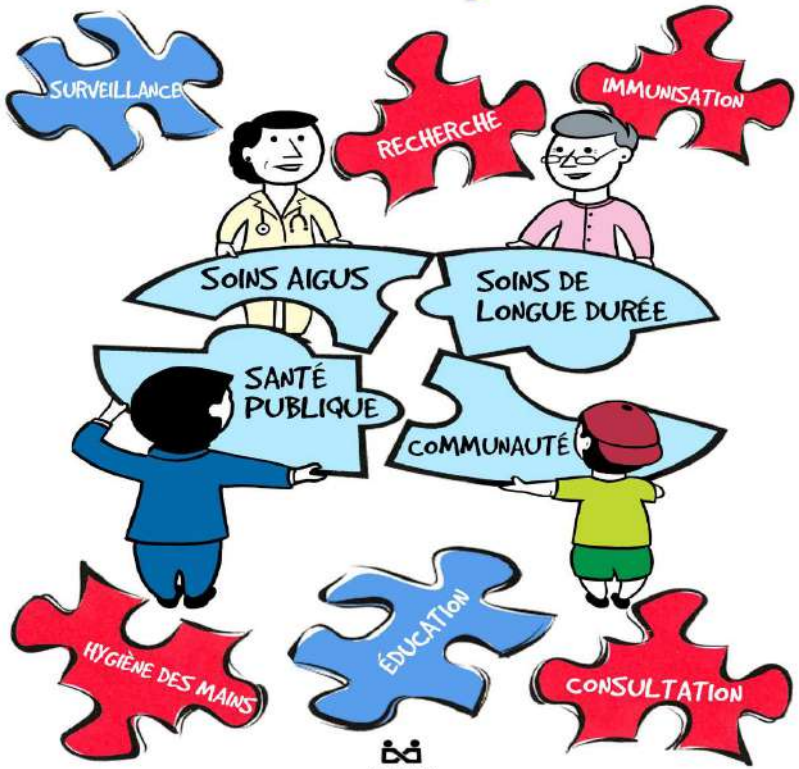
Jarvis WR. Emerg Infec Dis 2001

CHICA-CANADA

Community and Hospital Infection Control Association - Canada
L'Association pour la prévention des infections à l'hôpital et dans la communauté - Canada

Professionnels de la prévention des infections

Partenaires en prévention



CHICA - CANADA

ASSOCIATION POUR LA PRÉVENTION DES INFECTIONS À L'HÔPITAL ET DANS LA COMMUNAUTÉ-CANADA

Conception de l'affiche : **Lori Jazzomo** inf. aut., B. Sc. Inf., CPN(C), Capital District Health Authority, Halifax (Nouvelle-Écosse) | Commanditaire du concours : ECOLAB HEALTHCARE

Nuevas formas diagnosticas

Detección automática de bacterias y hongos en sangre

José Miguel Molina[a], Juan Córdoba[a], Paula Ramírez[b] y Miguel Gobernado[a]

TABLA 1. **Panel de microorganismos disponibles en el equipo LightCycler® SeptiFast Test Mgrade**

Gramnegativos	Grampositivos	Hongos
Klebsiella (pneumoniae / oxytoca)	Estafilococos coagulasa-negativa[a]	*Candida tropicalis*
Serratia marcescens	*Streptococcus pneumoniae*	*Candida parapsilosis*
Enterobacter (cloacae / aerogenes)	*Streptococcus* spp.[b]	*Candida glabrata*
Proteus mirabilis	*Enterococcus faecium*	*Candida krusei*
Pseudomonas aeruginosa	*Enterococcus faecalis*	*Aspergillus fumigatus*
Acinetobacter baumanii		
Stenotrophomonas maltophilia		

6 horas

Enferm Infecc Microbiol Clin. 2008;26 Supl 9:75-80

Identificación bacteriana basada en el espectro de masas de proteínas: Una nueva mirada a la microbiología del siglo XXI

Patricia García, Fidel Allende, Paulette Legarraga, Marcos Huilcaman y Sandra Solari

Equipo/método	Fundamento	Utilidad	Tamaño molecular
Detector de masas por tiempo de vuelo con desorción láser asistida por una matriz (MALDI-TOF matrix-assisted desorption ionization-time of flight)	Consiste en el cálculo de tiempo de vuelo de cada fragmento de una molécula a través de un trayecto predeterminado con una ionización láser previa de la molécula en una matriz determinada	Identificación de microorganismos: bacterias y hongos	< 100.000 Da (macromoléculas) 2.000 - 20.000 Da

2-3 horas tras hemocultivo +

Rev Chilena Infectol 2012; 29 (3): 263-272

Using a dog's superior olfactory sensitivity to identify *Clostridium difficile* in stools and patients: proof of principle study

Marije K Bomers *consultant*[1], Michiel A van Agtmael *consultant*[1], Hotsche Luik *canine trainer and psychologist*[2], Merk C van Veen *resident*[3], Christina M J E Vandenbroucke-Grauls *professor*[4], Yvo M Smulders *professor*[1]

Nuevas formas diagnosticas

	S	E
Heces	100	100
Pacientes	83	98

What this study adds

A dog can be trained to identify *C difficile* with high estimated sensitivity and specificity, both in stool samples and in hospital patients with CDI

The potential of using a dog for detection is the ability to screen hospital wards for infected patients

Such screening could overcome common delays in diagnosis and thus help to control and prevent CDI outbreaks

BMJ 2012;345:e7396 doi: 10.1136/bmj.e7396 (Published 13 December 2012)

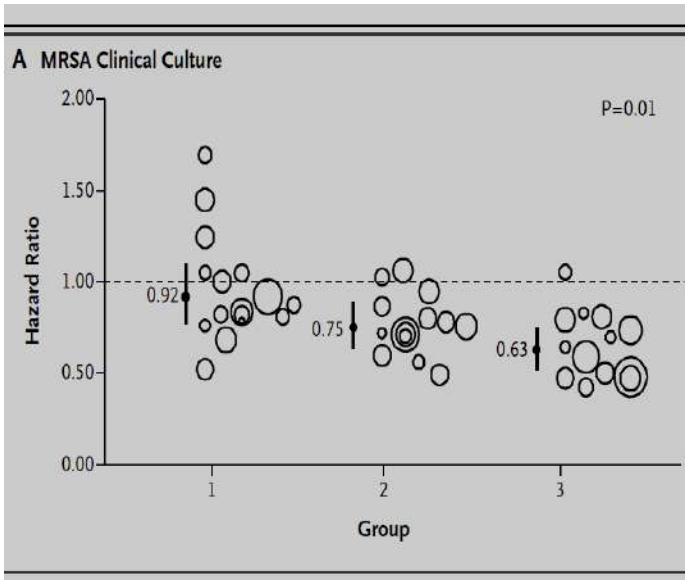
Targeted versus Universal Decolonization to Prevent ICU Infection

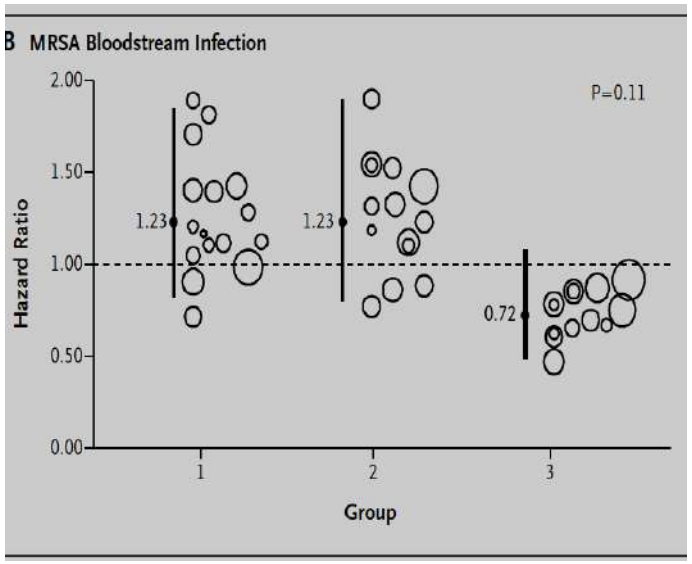
Nuevas formas manejo MMR

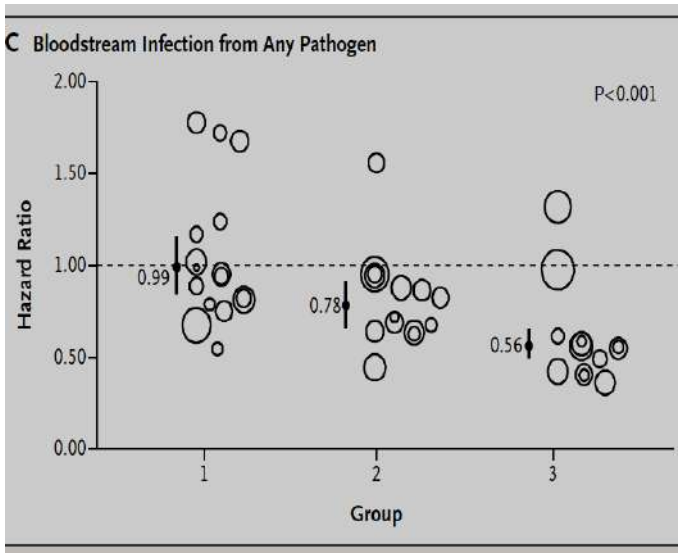
Susan S. Huang, M.D., M.P.H., Edward Septimus, M.D., Ken Kleinman, Sc.D., Julia Moody, M.S., Jason Hickok, M.B.A., R.N., Taliser R. Avery, M.S., Julie Lankiewicz, M.P.H., Adrijana Gombosev, B.S., Leah Terpstra, B.A., Fallon Hartford, M.S., Mary K. Hayden, M.D., John A. Jernigan, M.D., Robert A. Weinstein, M.D., Victoria J. Fraser, M.D., Katherine Haffenreffer, B.S., Eric Cui, B.S., Rebecca E. Kaganov, B.A., Karen Lolans, B.S., Jonathan B. Perlin, M.D., Ph.D., and Richard Platt, M.D., for the CDC Prevention Epicenters Program and the AHRQ DECIDE Network and Healthcare-Associated Infections Program*

43 hospitales → 74 UCIs → 74.256 pacientes

Grupo 1	Grupo 2	Grupo 3
Cribado + aislamiento	Cribado + aislamiento + descolonización	Descolonización universal







N Engl J Med 2013.
DOI: 10.1056/NEJMoa1207290

Impact of the administration of probiotics on the incidence of ventilator-associated pneumonia: A meta-analysis of randomized controlled trials*

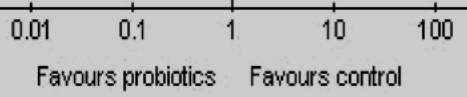
No utilización antibióticos

Ilias I. Siempos, MD; Theodora K. Ntaidou, MD; Matthew E. Falagas, MD, MSc, DSc

Review: Impact of the administration of probiotics on the incidence of ventilator-associated pneumonia: a meta-analysis of randomized controlled trials
Comparison: 01 Incidence of ventilator-associated pneumonia
Outcome: 01 Incidence of ventilator-associated pneumonia

Study or sub-category	Probiotics n/N	Control n/N	OR (fixed) 95% CI	Weight %	OR (fixed) 95% CI
Knight	12/130	17/129		25.17	0.67 [0.31, 1.47]
Forestier	24/102	24/106		29.25	1.05 [0.55, 2.00]
Klarin	1/23	3/21		4.87	0.27 [0.03, 2.85]
Spindler-Vesel	4/26	34/87		21.51	0.28 [0.09, 0.89]
Kotzampassi	19/35	24/30		19.20	0.30 [0.10, 0.91]
Total (95% CI)	316	373		100.00	0.61 [0.41, 0.91]

Total events: 60 (Probiotics), 102 (Control)
Test for heterogeneity: Chi² = 6.56, df = 4 (P = 0.16), I² = 39.0%
Test for overall effect: Z = 2.42 (P = 0.02)



Crit Care Med 2010 Vol. 38, No. 3

Probiotics for the Prevention of *Clostridium difficile*–Associated Diarrhea

No utilización antibióticos

A Systematic Review and Meta-analysis

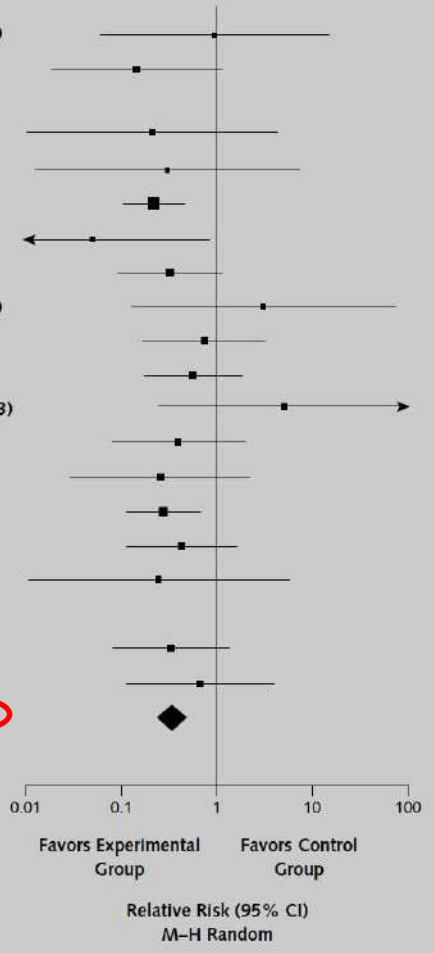
Bradley C. Johnston, PhD; Stephanie S.Y. Ma, MD; Joshua Z. Goldenberg, BSc; Kristian Thorlund, PhD; Per O. Vandvik, MD, PhD; Mark Loeb, MD; and Gordon H. Guyatt, MD

Figure 2. Probiotics for the prevention of *Clostridium difficile*–associated diarrhea.

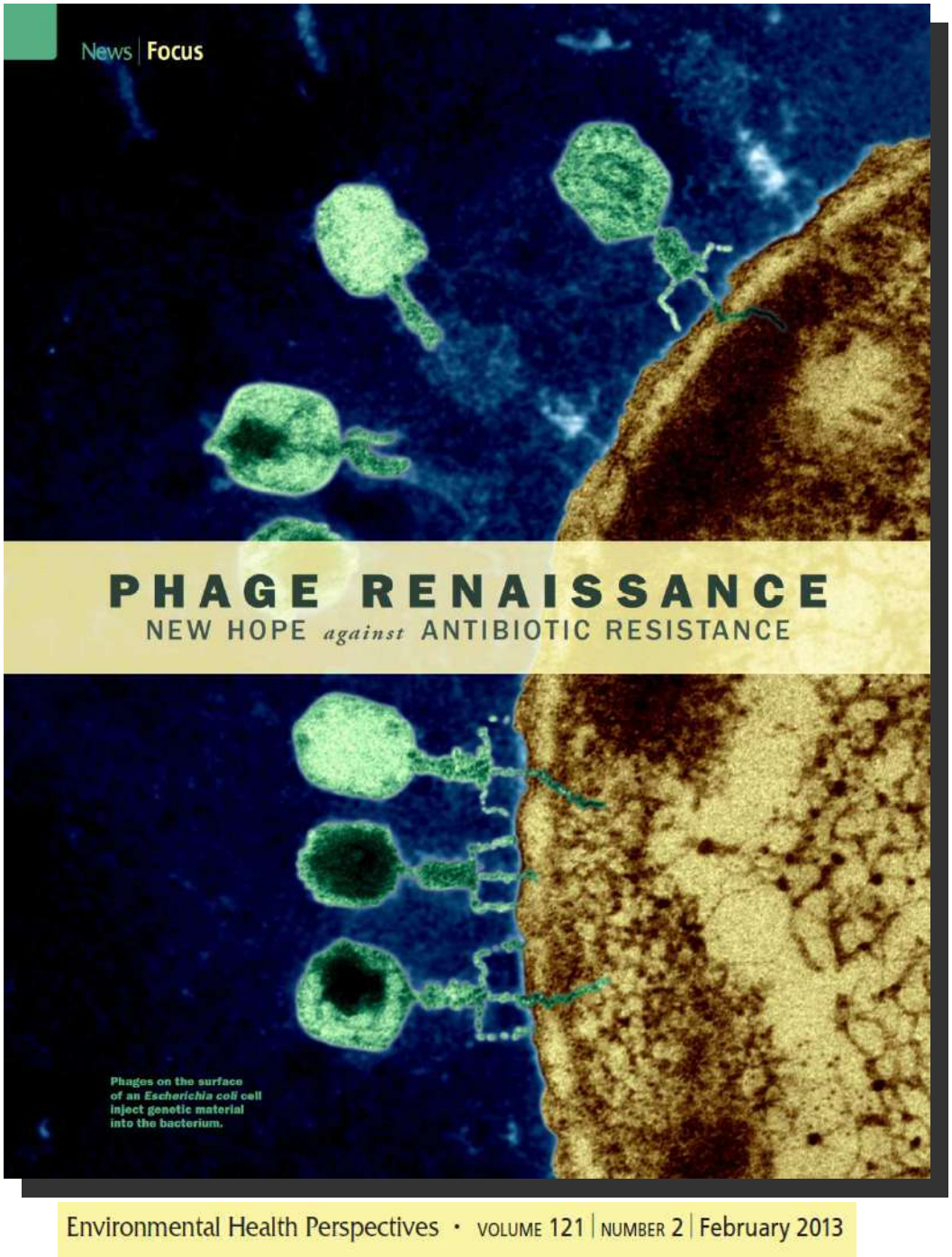
Study, Year (Reference)	Experimental Group, *n* Events	Experimental Group, *n* Total	Control Group, *n* Events	Control Group, *n* Total	Weight, %	Relative Risk (95% CI) M–H Random
Arvola et al, 1999 (32)	1	61	1	58	1.7	0.95 (0.06–14.85)
Beausoleil et al, 2007 (33)	1	44	7	45	3.0	0.15 (0.02–1.14)
Bravo et al, 2008 (34)	0	41	0	45	–	Not estimable
Can et al, 2006 (35)	0	73	2	78	1.4	0.21 (0.01–4.37)
Duman et al, 2005 (36)	0	196	1	180	1.2	0.31 (0.01–7.47)
Gao et al, 2010 (37)	9	171	20	84	23.0	0.22 (0.11–0.46)
Hickson et al, 2007 (38)	0	56	9	53	1.6	0.05 (0.00–0.84)
Kotowska et al, 2005 (39)	3	119	10	127	7.9	0.32 (0.09–1.14)
Lönnermark et al, 2010 (40)	1	80	0	83	1.3	3.11 (0.13–75.26)
McFarland et al, 1995 (41)	3	97	4	96	5.9	0.74 (0.17–3.23)
Miller et al, 2008 (47)	4	95	7	94	8.9	0.57 (0.17–1.87)
Miller et al, 2008 (47)*	2	157	0	159	1.4	5.06 (0.25–104.63)
Plummer et al, 2004 (42)	2	69	5	69	4.9	0.40 (0.08–1.99)
Psaradellis et al, 2010 (48)	1	216	4	221	2.7	0.26 (0.03–2.27)
Rafiq et al, 2007 (49)	5	45	22	55	16.1	0.28 (0.11–0.67)
Ruszczyński et al, 2008 (43)	3	120	7	120	7.2	0.43 (0.11–1.62)
Safdar et al, 2008 (44)	0	23	1	17	1.3	0.25 (0.01–5.79)
Selinger et al, 2011 (50)	0	62	0	62	–	Not estimable
Surawicz et al, 1989 (45)	3	116	5	64	6.5	0.33 (0.08–1.34)
Thomas et al, 2001 (46)	2	133	3	134	4.0	0.67 (0.11–3.96)
Total (95% CI)		1974		1844	100.0	0.34 (0.24–0.49)
Total events, *n*	40		108			

Heterogeneity: $\tau^2 = 0.00$; chi-square = 12.09; $P = 0.79$; $I^2 = 0\%$

Test for overall effect: $Z = 5.87$; $P < 0.001$



Ann Intern Med. 2012;157:878-888.



No utilización antibióticos

En 2011 la Fundación Bill y Melinda Gates financia al Centro Nacional de Biotecnología para generar mutantes de bacteriófagos que eliminen enterobacterias

Fecal microbiota transplantation and emerging applications

Thomas J. Borody and Alexander Khoruts

No utilización antibióticos

Nat. Rev. Gastroenterol. Hepatol. **9**, 88–96 (2012)

No utilización antibióticos

Systematic Review of Intestinal Microbiota Transplantation (Fecal Bacteriotherapy) for Recurrent *Clostridium difficile* Infection

Ethan Gough,[1] Henna Shaikh,[2] and Amee R. Manges[1,3]

Clinical Infectious Diseases 2011;53(10):994–1002

Treating *Clostridium difficile* Infection With Fecal Microbiota Transplantation

JOHAN S. BAKKEN,* THOMAS BORODY,‡ LAWRENCE J. BRANDT,§ JOEL V. BRILL,‖ DANIEL C. DEMARCO,¶ MARC ALARIC FRANZOS,# COLLEEN KELLY** ALEXANDER KHORUTS,‡‡ THOMAS LOUIE,§§ LAWRENCE P. MARTINELLI,‖‖ THOMAS A. MOORE,¶¶ GEORGE RUSSELL,## and CHRISTINA SURAWICZ,*** for the Fecal Microbiota Transplantation Workgroup

CLINICAL GASTROENTEROLOGY AND HEPATOLOGY 2011;9:1044–1049

Duodenal Infusion of Donor Feces for Recurrent *Clostridium difficile*

Els van Nood, M.D., Anne Vrieze, M.D., Max Nieuwdorp, M.D., Ph.D., Susana Fuentes, Ph.D., Erwin G. Zoetendal, Ph.D., Willem M. de Vos, Ph.D., Caroline E. Visser, M.D., Ph.D., Ed J. Kuijper, M.D., Ph.D., Joep F.W.M. Bartelsman, M.D., Jan G.P. Tijssen, Ph.D., Peter Speelman, M.D., Ph.D., Marcel G.W. Dijkgraaf, Ph.D., and Josbert J. Keller, M.D., Ph.D.

N ENGL J MED 368;5 NEJM.ORG JANUARY 31, 2013

Fecal Microbiota Transplantation — An Old Therapy Comes of Age

Ciarán P. Kelly, M.D.

N ENGL J MED 368;5 NEJM.ORG JANUARY 31, 2013

Faecal transplantation for recurrent *C difficile* diarrhoea

As evidence supporting faecal microbiota therapy for recurrent *Clostridium difficile* diarrhoea grows, can we overcome the yuck factor to this promising approach? Kathryn Senior investigates.

www.thelancet.com/infection Vol 13 March 2013

Fecal microbiota transplantation in relapsing *Clostridium difficile* infection

Faith Rohlke and Neil Stollman

Ther Adv Gastroenterol (2012) 5(6) 403–420

Fecal microbiota transplantation: past, present and future

Olga C. Aroniadis and Lawrence J. Brandt

Curr Opin Gastroenterol 2013, 29:79–84

3rd Global challenge Antimicrobial Resistance

GOBIERNO DE ESPAÑA — MINISTERIO DE SANIDAD, POLÍTICA SOCIAL E IGUALDAD

SEEIUC Sociedad Española de Enfermería Intensiva y Unidades Coronarias

SeMicyuc LOS PROFESIONALES DEL ENFERMO CRÍTICO

Neumonía Zero

Bacteriemia Zero

The "Epic" Challenge of Optimizing Antimicrobial Stewardship: The Role of Electronic Medical Records and Technology

Ravina Kullar,[1,a] Debra A. Goff,[2] Lucas T Schulz,[3] Barry C. Fox,[4] and Warren E. Rose[5]

Clinical Infectious Diseases Advance Access published June 6, 2013

Resistencia Zero

Documento de consenso

Programas de optimización de uso de antimicrobianos (PROA) en hospitales españoles: documento de consenso GEIH-SEIMC, SEFH y SEMPSPH☆,☆☆

Enferm Infecc Microbiol Clin. 2012;**30(1)**:22.e1–22.e23

seimc

Utilización correcta antibióticos

Nuevos antibióticos

New Delhi Metallo-β-Lactamase–producing *Enterobacteriaceae*, United States

J. Kamile Rasheed, Brandon Kitchel, Wenming Zhu, Karen F. Anderson, Nancye C. Clark, Mary Jane Ferraro, Patrice Savard, Romney M. Humphries, Alexander J. Kallen, and Brandi M. Limbago

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 19, No. 6, June 2013

Emergence of antibiotic resistance: need for a new paradigm

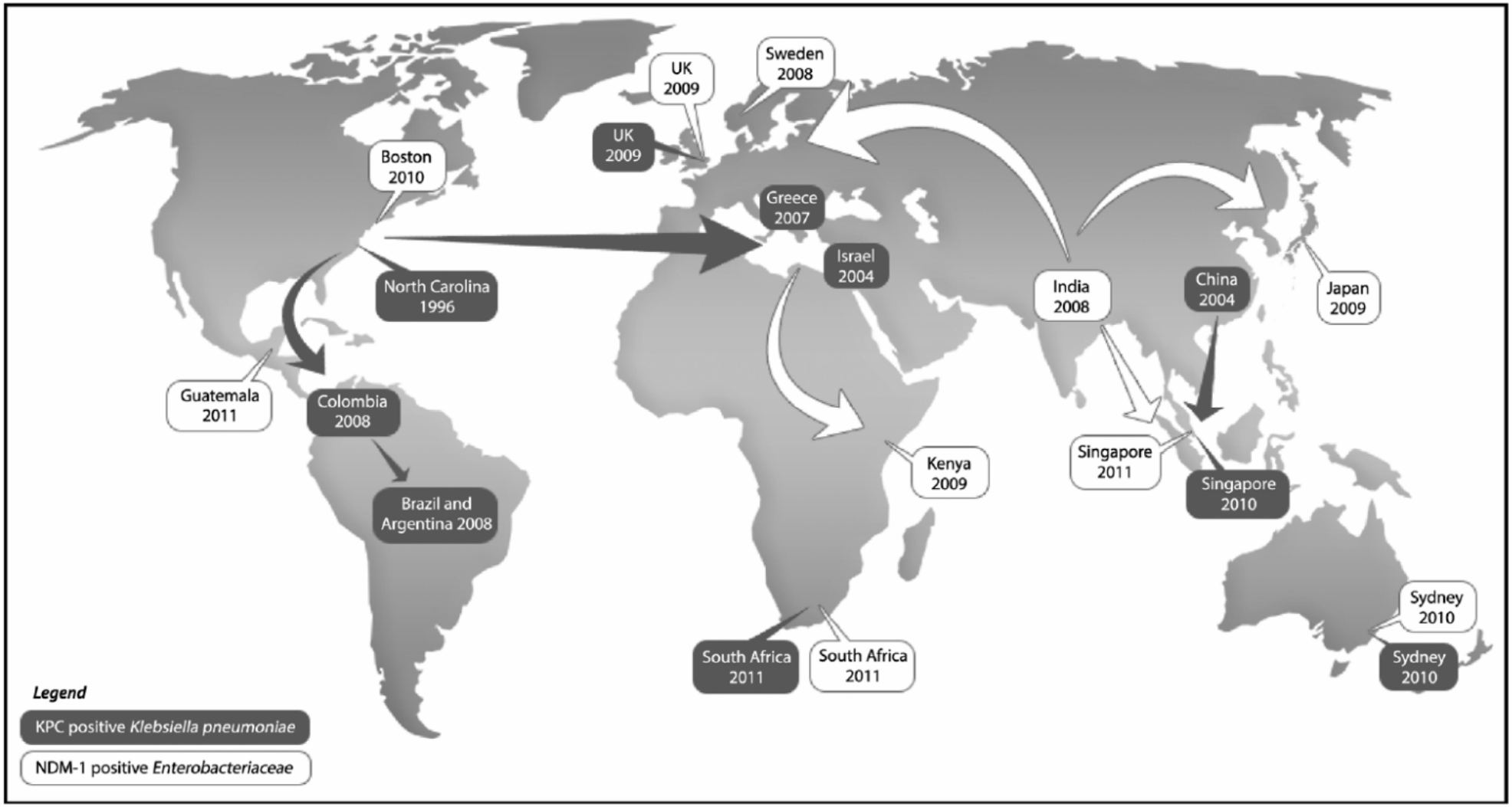
J. M. Rolain[1], R. Canton[2] and G. Cornaglia[3]

Clinical Microbiology and Infection, Volume 18 Number 7, July 2012

Carbapenem resistance in *Enterobacteriaceae*: here is the storm!

Patrice Nordmann, Laurent Dortet and Laurent Poirel

Trends in Molecular Medicine May 2012, Vol. 18, No. 5



Clinical Infectious Diseases 2013;56(9):1310–8

The 10 × '20 Initiative: Pursuing a Global Commitment to Develop 10 New Antibacterial Drugs by 2020

Nuevos antibióticos

Infectious Diseases Society of America[a]
Infectious Diseases Society of America, Arlington, Virginia

Clinical Infectious Diseases 2010;50:1081–1083

"Ha llegado el momento de un compromiso mundial para el desarrollo de nuevos antibacterianos. Datos actuales documentan el inminente desastre debido a la confluencia de la disminución de inversión en investigación de nuevos antibacterianos con el aumento documentado de resistencias a los fármacos actualmente con licencia"

"El marco normativo financiero para el desarrollo de fármacos antibacterianos es un problema mundial "

Table 1. Key Global Leaders Needed to Solve the Antibacterial Pipeline Problem

Individual stakeholders cannot, and have not, been able to solve the problem of development of new, effective antibiotics for ever more-resistant bacteria. Diverse voices are essential to drive action. The first step is the global commitment of the leadership of

- The executive branch of the government (both US and global counterparts), including the US Department of Health and Human Service's Food and Drug Administration, Biomedical Advanced Research and Development Authority, National Institutes of Health, Centers for Disease Control and Prevention, and Department of Commerce
- The US Congress and global counterparts
- The pharmaceutical and diagnostics industries
- Health care providers (including those engaged in cancer care and treatment, surgery, pediatrics, transplantation, and infectious diseases) and their professional societies
- Policy and legal communities (including experts in pharmacoeconomics, intellectual property, and reimbursement policy)
- Medical universities and independent research institutes
- Medical and public health philanthropic organizations
- Affected patient advocacy groups

Prevención infecciones

MINIREVIEWS

Metallic Copper as an Antimicrobial Surface[▽]

Gregor Grass,[1] Christopher Rensing,[2] and Marc Solioz[3]*

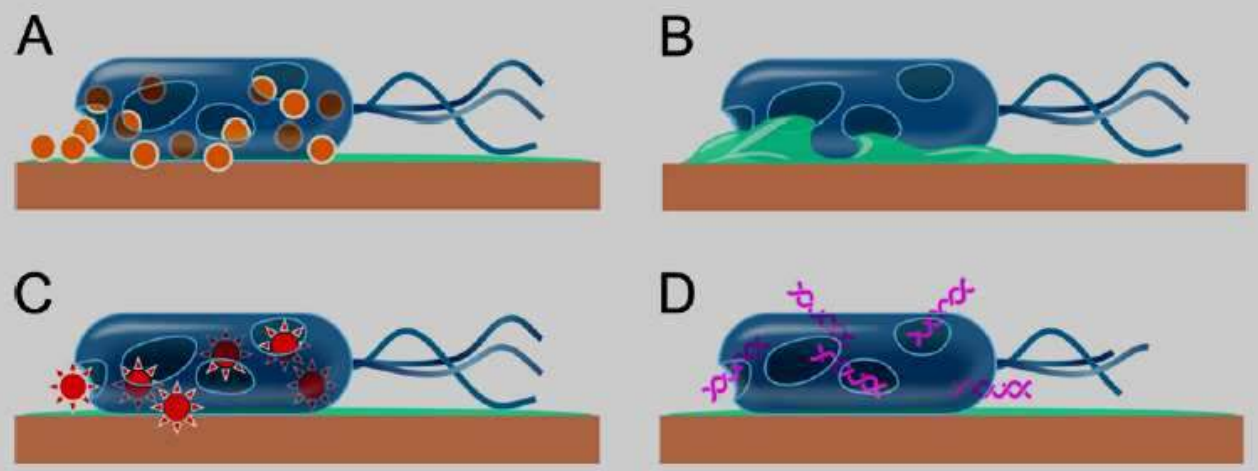


FIG. 1. Cartoon of the tentative events in contact killing. (A) Copper dissolves from the copper surface and causes cell damage. (B) The cell membrane ruptures because of copper and other stress phenomena, leading to loss of membrane potential and cytoplasmic content. (C) Copper ions induce the generation of reactive oxygen species, which cause further cell damage. (D) Genomic and plasmid DNA becomes degraded.

APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Mar. 2011, p. 1541–1547

Prevención infecciones

The Antimicrobial Efficacy of Copper Alloy Furnishing in the Clinical Environment: A Crossover Study

T. J. Karpanen, PhD;[1] A. L. Casey, PhD;[1] P. A. Lambert, DSc;[2] B. D. Cookson, FRCPath;[3] P. Nightingale, PhD;[4] L. Miruszenko, RGN;[5] T. S. J. Elliott, DSc[5]

Infect Control Hosp Epidemiol 2012;33(1):3-9

Copper Surfaces Reduce the Rate of Healthcare-Acquired Infections in the Intensive Care Unit

Cassandra D. Salgado, MD;[1] Kent A. Sepkowitz, MD;[2] Joseph F. John, MD;[3] J. Robert Cantey, MD;[1] Hubert H. Attaway, MS;[4] Katherine D. Freeman, DrPH;[5] Peter A. Sharpe, MBA;[6] Harold T. Michels, PhD;[7] Michael G. Schmidt, PhD[4]

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY MAY 2013, VOL. 34, NO. 5

Evaluation of the Antimicrobial Properties of Copper Surfaces in an Outpatient Infectious Disease Practice

Infect Control Hosp Epidemiol 2012;33(2):200-201

Copper Continuously Limits the Concentration of Bacteria Resident on Bed Rails within the Intensive Care Unit

Michael G. Schmidt, PhD;[1] Hubert H. Attaway III, MS;[1] Sarah E. Fairey, BS;[1] Lisa L. Steed, PhD;[2] Harold T. Michels, PhD;[3] Cassandra D. Salgado, MD, MS[4]

Infect Control Hosp Epidemiol 2013;34(5):530-533

Antimicrobial activity of copper surfaces against carbapenemase-producing contemporary Gram-negative clinical isolates

Maria Souli[1]*, Irene Galani[1], Diamantis Plachouras[1], Theofano Panagea[1]†, Apostolos Armaganidis[2], George Petrikkos[1] and Helen Giamarellou[1]‡

J Antimicrob Chemother 2013; **68**: 852–857

Prevención infecciones

Miércoles, 19 de septiembre de 2012 GESTIÓN DIARIO MÉDICO 15

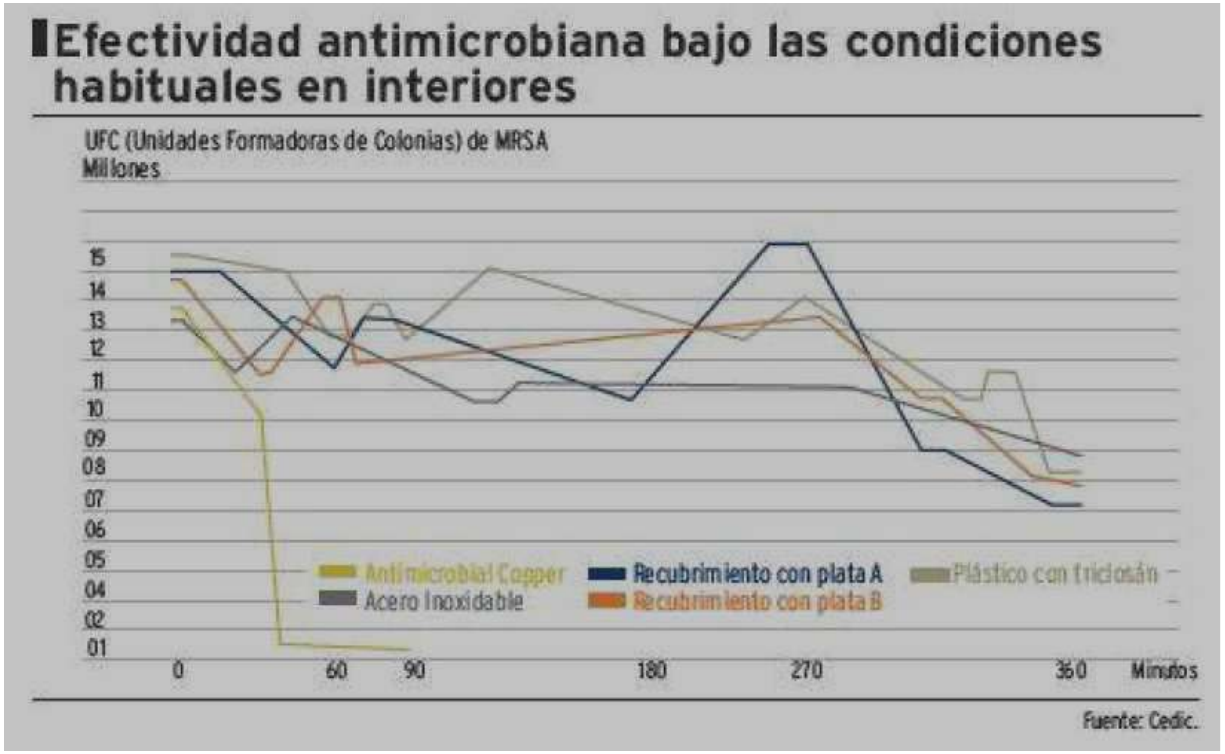
[EL REPORTAJE DEL DÍA]

PREVENCIÓN DE RIESGOS En la batalla contra las infecciones nosocomiales, las armas elegidas son vitales para que la sanidad pueda alzarse con la victoria o, al menos, sufrir el menor daño posible. Una posibilidad que varias organizaciones están empezando a probar es la utilización del cobre para reducir las contaminaciones bacterianas. Colegios, fábricas y hospitales empiezan a cambiar sus picaportes, dispensadores... En el caso de los hospitales, son muchos los elementos que pueden beneficiarse de la capacidad antimicrobiana del cobre.

Medalla de cobre en seguridad del paciente

El cobre antimicrobiano es un conjunto de aleaciones de cobre que elimina mas del 99,9 % De las bacterias en menos de 2 horas

▽ IN 40-70%



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Sociedad Imprimir

INNOVACIÓN EN UN EQUIPAMIENTO SANITARIO

Vall d'Hebron recubre con cobre la unidad de fibrosis quística para evitar infecciones

El material, un potente elemento antimicrobiano y antivírico, protegerá a los hospitalizados

Miércoles, 24 de abril del 2013 - 19:32h.

Prevención infecciones

Use of Silver in the Prevention and Treatment of Infections: Silver Review

SURGICAL INFECTIONS
Volume 14, Number 1, 2013

Amani D. Politano, Kristin T. Campbell, Laura H. Rosenberger, and Robert G. Sawyer

TABLE 1. SUMMARY OF SILVER APPLICATIONS FOR TREATMENT OF INFECTIONS

Modality	*Pros*	*Cons*	*Cost effectiveness*	*Recommendation*
Topical application for burns	• Several preparations available • Reduced infection rates • Prolonged silver ion release with some preparations • Potentially fewer dressing changes • Better wound healing and skin graft adherence	• Several preparations available • Concern about toxicity for host cells • Electrolyte leaching with silver nitrate	Favors use of prolonged-release silver, although no comparison of all products is available [53]	Difficult to compare wide variety of applications; recommended for initial/early decontamination of burn wounds
Topical application for ulcers	• Several preparations available • Potentially longer wear time for dressings • Reduction in wound size; less odor and exudate • Less pain	• Several preparations available • Potentially more frequent office visits and longer total duration of wound care • Several studies failed to show benefit in overall wound healing	Some studies favor use of silver-releasing foam dressing [55,60,62], whereas others show higher cost [59,61]	Current data do not support routine use of silver for this application
Surgical incisions	• Fewer surgical site infections in cardiac, colorectal, or lower extremity revascularizations • Shorter time to re-epithelialization of skin graft donor sites [69]	• Longer time to re-epithelialization of skin graft donor sites in one study [68] • Studies of silver-impregnated mesh or suture material are still in early phases	Cost comparison data not available	Current data do not support routine use of silver for this application
Blood stream infections	• Reduced catheter colonization and CR-BSI rates with CSS catheters (more so with second-generation catheters)	• Benefit may not be seen with low institutional baseline infection rates • Use of antibiotic-impregnated catheters may confer greater reduction of infections	Favors use of CSS and RM catheters in high-risk patients or with high baseline infection rates [96,97]	Recommended if elevated institutional CR-BSI rates despite a comprehensive control program
Urinary tract infections	• Reduced infection rates in some studies with use of silver-alloy catheters	• Studies are heterogeneous • Several large studies did not find benefit	Favors use of silver alloy catheters [109]	Recommended if baseline infection rates are high
Ventilator/endotracheal tubes	• Lower incidence of VAP • Reduced mortality rate in patients with VAP	• Higher mortality rate in patients without VAP • Use of care bundles may negate contribution of silver-coated tubes	Favors use of silver-coated tubes [131]	Recommended if elevated institutional VAP rates despite a comprehensive control program
Orthopedic hardware	• Decreased bacterial adherence to silver-coated external fixation pins • Better cyto-compatibility • Fewer infections when combined with chlorhexidine for pin-site dressings • Lower infection rates with silver-coated implant devices	• Increased serum silver concentrations in one study • Early-phase studies only; need further investigation	Cost comparison data not available	Current data do not support routine use of silver for this application
Vascular prostheses	• Lowered rates of infection when used as primary prosthesis, although differing results have been reported	• Inconsistent data regarding risk of reinfection • May activate neutrophils and inhibit their antibacterial properties	Cost comparison data not available	Current data do not support routine use of silver for this application
Heart valves	• Low rates of recurrent endocarditis in early studies	• Higher rates of embolization • More moderate and severe paravalvular leaks • Substantial need for reoperation	No longer available	Not recommended

CR-BSI = catheter-related blood stream infection; CSS = chlorhexadine–silver sulfadiazine; RM = rifampicin–minocycline; VAP = ventilator-associated pneumonia.

Prevención infecciones

Apósitos usan nanotecnología para combatir la infección

Nuevos apósitos que cambian de color cuando surge la infección

El vendaje liberara antibióticos en nano capsulas desencadenado por la presencia de bacterias causantes de infecciones. El objetivo es iniciar el tratamiento de forma muy precoz

Avances en la eliminación de las bacterias infecciosas de los tejidos sanitarios

El Grupo de Biología Molecular e Industrial de la Universidad Politécnica de Cataluña ha mejorado el efecto antimicrobiano de los tejidos sanitarios con un pretratamiento enzimático y la deposición simultánea de nanopartículas y biopolímeros con ultrasonidos.

Han creado un material textil completamente aséptico a la presencia de microorganismos y evita la aparición de IN

ENHANCED ENVIRONMENTAL DISINFECTION SYSTEMS

Prevención infecciones

ENHANCED ENVIRONMENTAL DISINFECTION SYSTEMS ARE DESIGNED TO DISINFECT SURFACES OF PATIENT ROOMS USING VAPORIZED AGENTS, UV LIGHT, OR OTHER TECHNIQUES. BUT JUST HOW EFFECTIVE ARE THEY AT REDUCING HEALTHCARE-ASSOCIATED INFECTION RATES? THE JURY IS STILL OUT.

HEALTH DEVICES MAY 2011

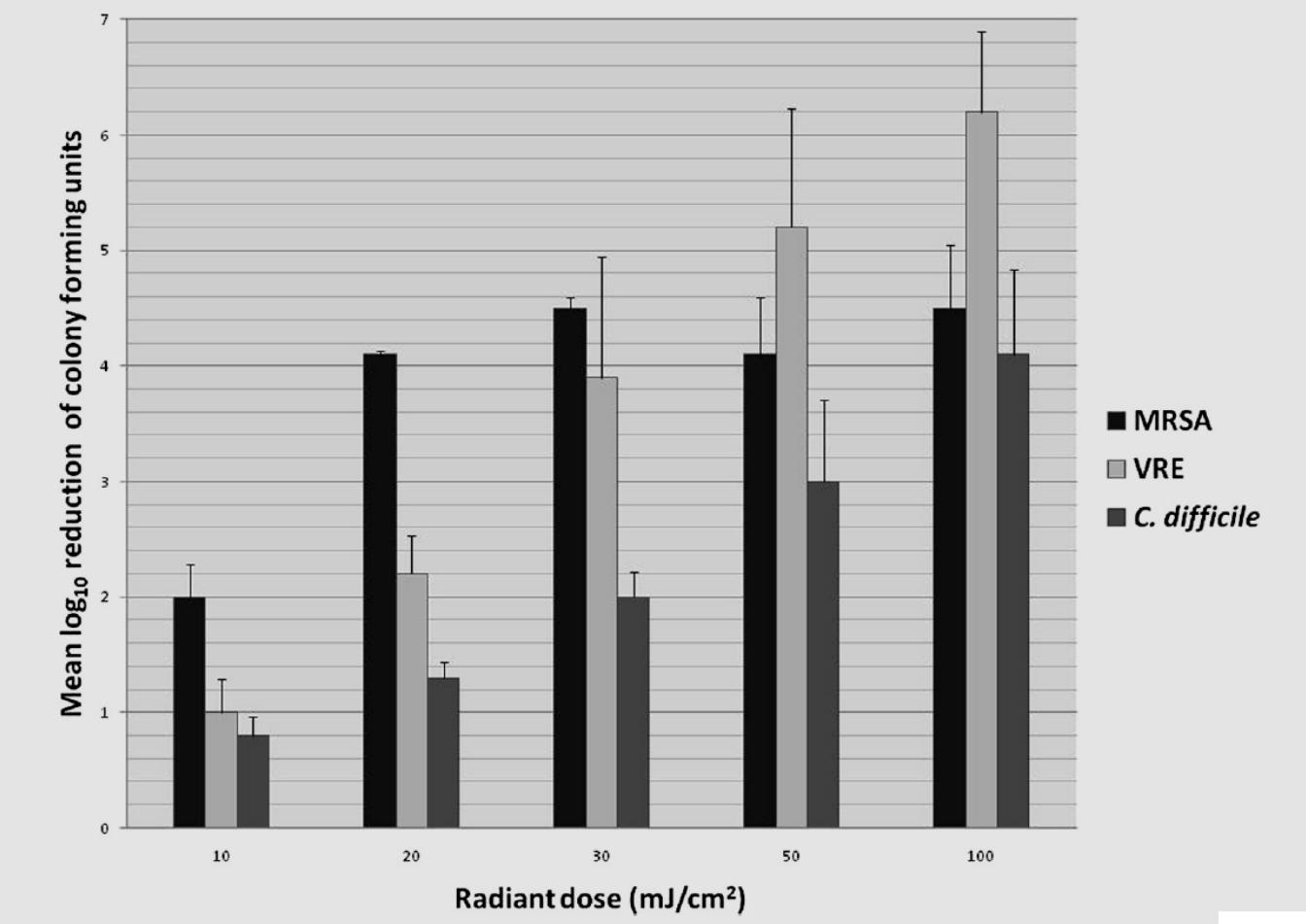
ENHANCED ENVIRONMENTAL DISINFECTION SYSTEMS: PRODUCT SUMMARY

	Bioquell systems*	Lumalier TRU-D	Xenex PX-UV
Technology	Hydrogen peroxide vapor	UV light	UV light
Effectiveness	Among the assessed devices, these systems have the most documented antimicrobial effectiveness (including effectiveness against spores), as well as the most published reports of clinical success, when used in conjunction with other infection control measures.	There are only a few published studies on this product's effectiveness for environmental disinfection in healthcare settings. (However, UV environmental decontamination has proven effective in other applications.)	There are only a few published studies on this product's effectiveness for environmental disinfection in healthcare settings. (However, UV environmental decontamination has proven effective in other applications.)
Workflow disruption	Most disruptive of all assessed devices (includes room preparation and two-hour exposure time)	Moderately disruptive (in vegetative mode, the system operates for 20 to 30 minutes on average; in spore mode, operating time increases to achieve necessary exposure levels)	Minimally disruptive (cycle time varies based on room size and configuration, but one source [Stibich et al. 2011] reported an operating time of four minutes at each of three positions [12 minutes total] for a standard patient room)
Cost	List price: $44,000 (Model Q-10)	List price: $124,500	List price not provided; $3,000 per month to lease (information obtained from ECRI Institute's SELECTplus client database)

Prevención infecciones

Evaluation of a hand-held far-ultraviolet radiation device for decontamination of Clostridium difficile and other healthcare-associated pathogens

Michelle M Nerandzic[1], Jennifer L Cadnum[1], Kevin E Eckart[1] and Curtis J Donskey[1,2*]



BMC Infectious Diseases 2012, **12**:120

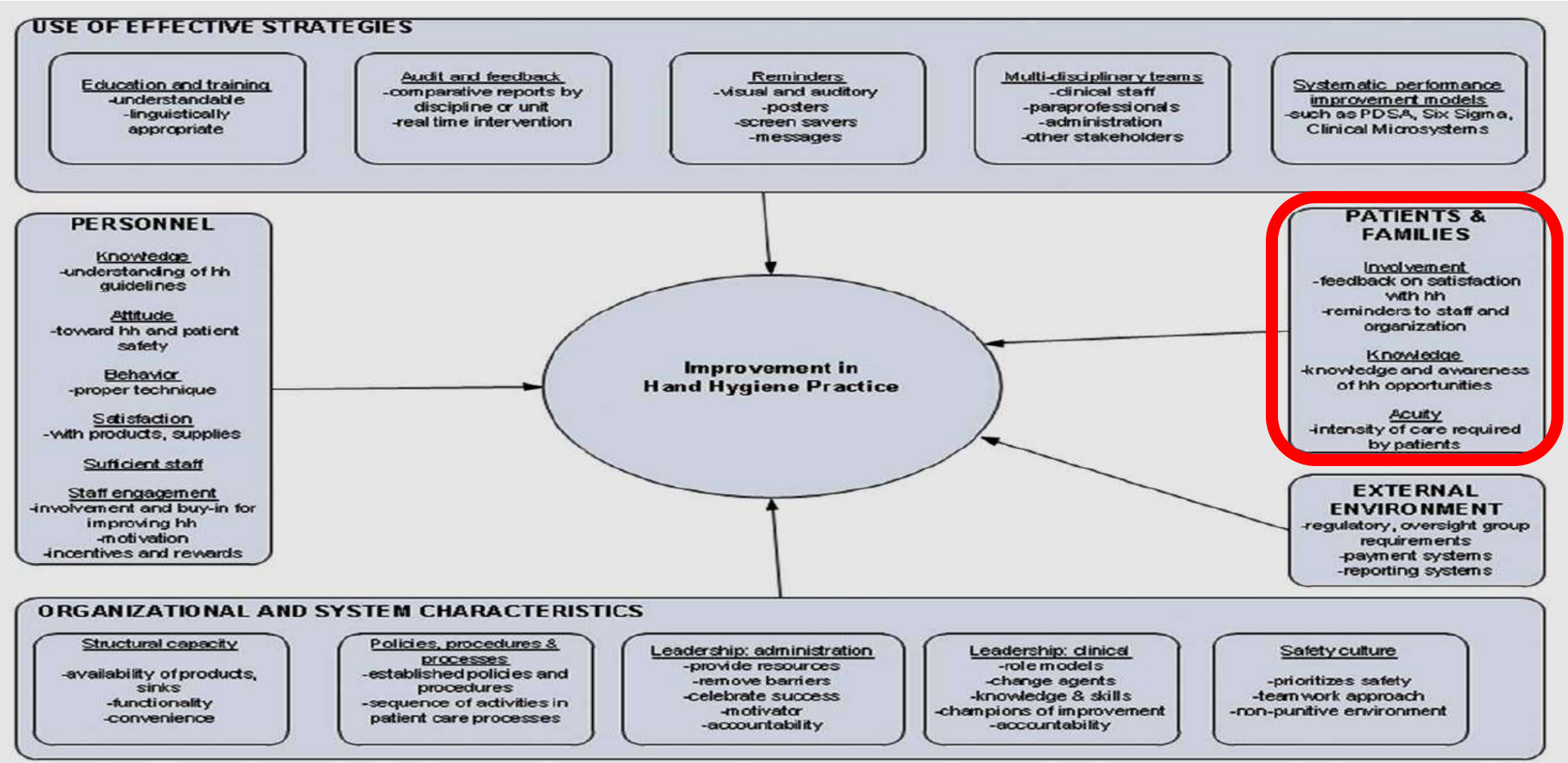


Fig 1. Factors affecting the success of hand hygiene improvement initiatives. hh, hand hygiene. (© The Joint Commission, 2011; reprinted with permission.[10])

Bundling hand hygiene interventions and measurement to decrease health caree associated infections. Pincock T et al. Am J Infect Control 40 (2012) S18-S27

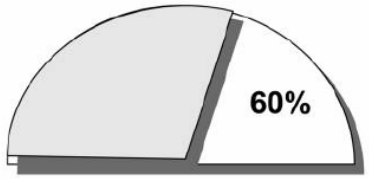
Measuring Healthcare Worker Hand Hygiene Activity: Current Practices and Emerging Technologies

John M. Boyce, MD

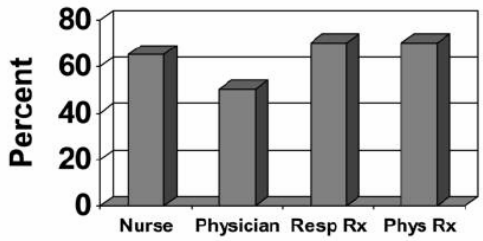
TABLE 3. Advantages and Disadvantages of Wireless Systems Used for Real-Time Locating Systems

Technology	Advantages
WiFi	Hospitals may have existing WiFi infrastructure, reducing initial costs; long communication range; can be used in conjunction with other technologies
RFID	Better location accuracy than WiFi alone
ZigBee	Low power consumption; can be portable; less expensive than some other wireless systems
ANT	Very low power consumption; faster transmission speeds than ZigBee; low system cost; long battery life
Infrared (IR)	Does not penetrate walls, so location accuracy good to subroom level; IR room ID devices can be battery-operated, so wiring not needed
Ultrasound	Does not penetrate walls, so high-level room and subroom accuracy; no electromagnetic interference with other equipment; does not require line of sight between tag and detector
IR/RFID combination	Provides good location accuracy
Ultrawide band	Low power, resistant to interference; good location accuracy

Compliance Rate for This Week



Compliance Rate by HCW Type



Compliance Rate by Floor

Floor	Compliance
2 East	52%
2 West	65%
2 North	72%
3 East	58%
3 West	60%
3 North	62%

Least Compliance Personnel

Employee	Compliance
Bruce Filth	25%
Cindy Dontcare	35%
Timmy Tufast	37%

Infect Control Hosp Epidemiol 2011;32(10):1016-1028

Prevención infecciones

Using High-Technology to Enforce Low-Technology Safety Measures: The Use of Third-party Remote Video Auditing and Real-time Feedback in Healthcare

Donna Armellino,[1] Erfan Hussain,[2] Mary Ellen Schilling,[1] William Senicola,[3] Ann Eichorn,[5] Yosef Dlugacz,[5] and Bruce F. Farber[4]

- Hospital NY
- UCI 17 camas
- Junio 2008 a junio 2010
- Auditor externo (India)
- Cumplimiento OK antes + después
- Feedback continuo (pantallas)
- Informes via email

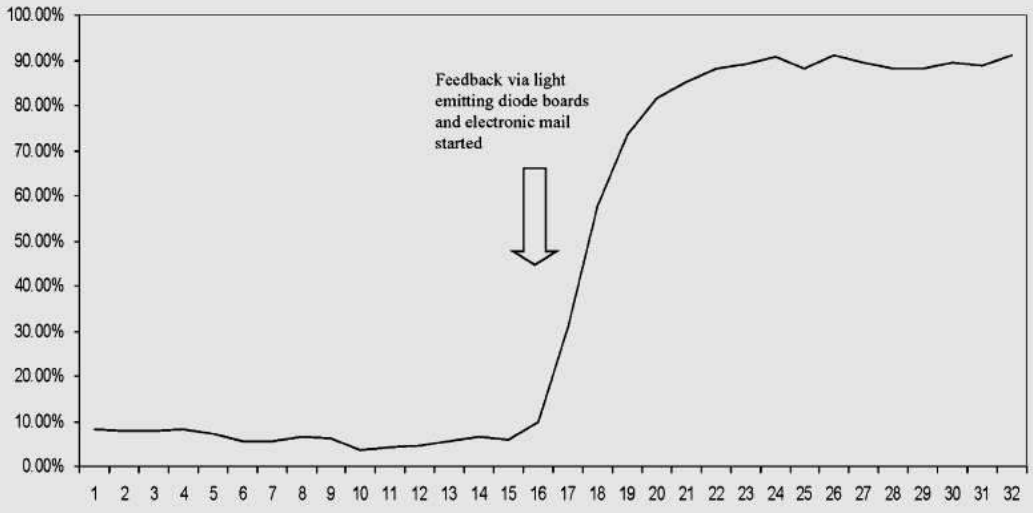


Figure 3. Hand hygiene compliance by week during impact period following feedback.

TÉCNICA	Tiempo	nº observaciones	% cumplimiento
Observado	Previo		60
Video oculto	16 semanas	60.000	**6,5** !!!!!
Video inicio	16 semanas	73.000	81,6
Video seguimiento	75 semanas	300.000	87

Clinical Infectious Diseases 2012;54(1):1–7

Convertirlo en socialmente inaceptable

Atención:
No lavarse las manos es perjudicial para su salud y para la de los pacientes que atiende

FUTURO ECOLOGICO

Medical-Grade Honey Kills Antibiotic-Resistant Bacteria In Vitro and Eradicates Skin Colonization

Paulus H. S. Kwakman,[1,2] Johannes P. C. Van den Akker,[3] Ahmet Güçlü,[1,3] Hamid Aslami,[1,3] Jan M. Binnekade,[3] Leonie de Boer,[1] Laura Boszhard,[1] Frederique Paulus,[3] Pauline Middelhoek,[3] Anje A. te Velde,[2] Christina M. J. E. Vandenbroucke-Grauls,[1,4] Marcus J. Schultz,[3] and Sebastian A. J. Zaat[1]

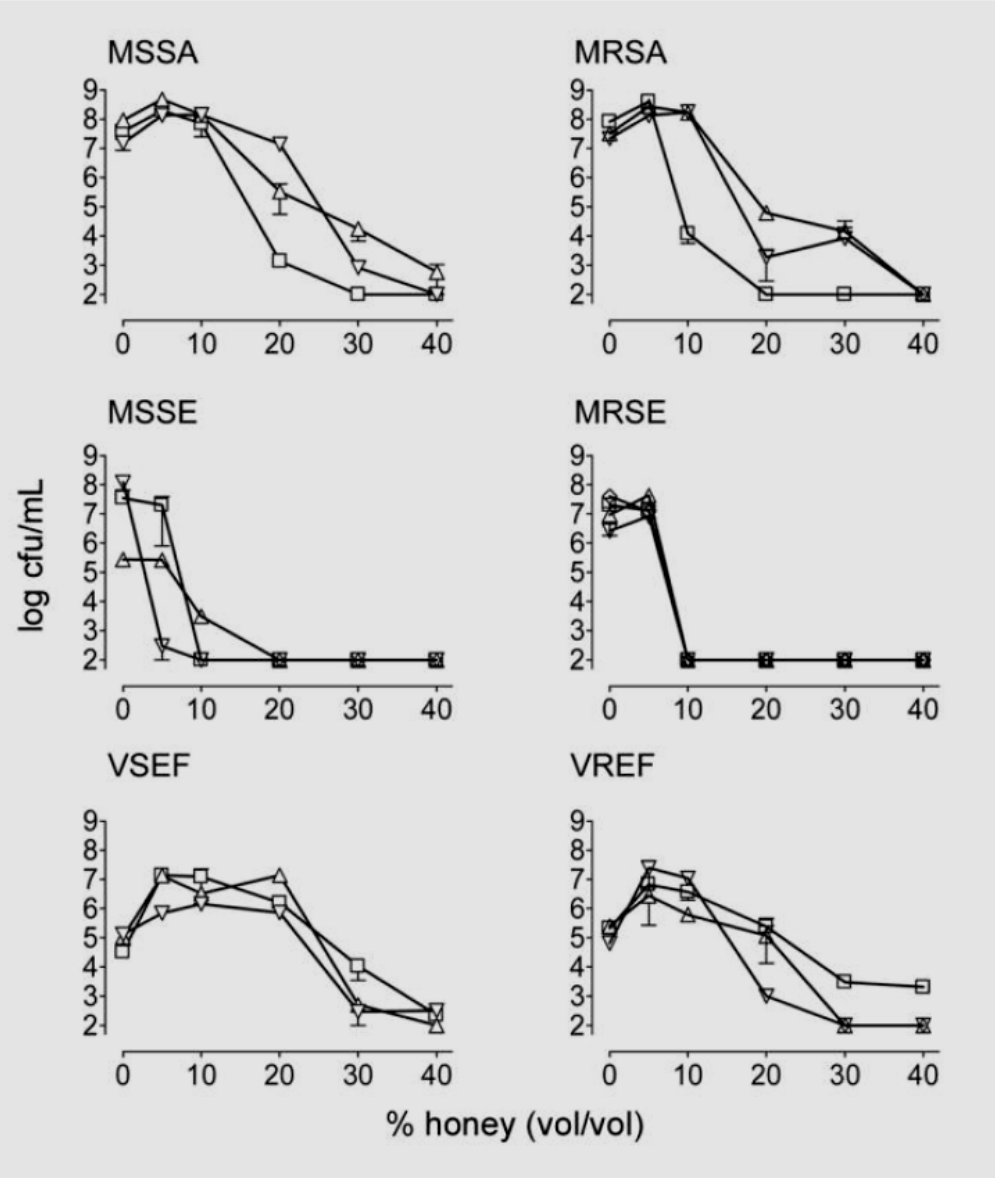


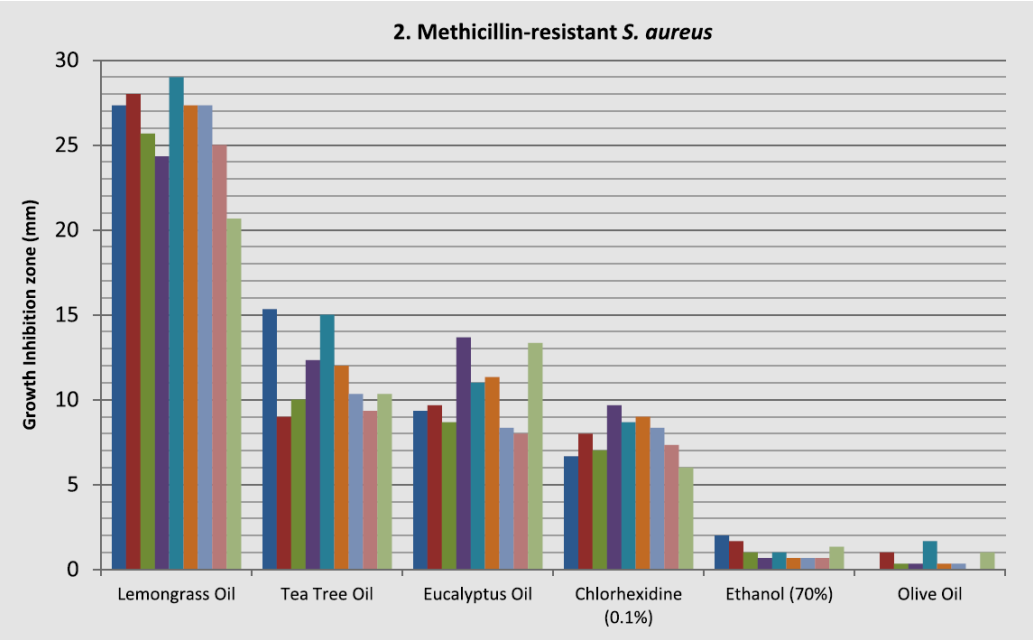
Figure 2. Susceptibility of gram-positive bacteria to honey. Methicillin-susceptible *Staphylococcus aureus* (MSSA), methicillin-resistant *S. aureus* (MRSA), methicillin-susceptible *Staphylococcus epidermidis* (MSSE), methicillin-resistant *S. epidermidis* (MRSE), vancomycin-susceptible *Enterococcus faecium* (VSEF), and vancomycin-resistant *E. faecium* (VREF) isolates were exposed to the indicated concentrations of honey for 24 h, after which survival was determined quantitatively as cfu/mL.

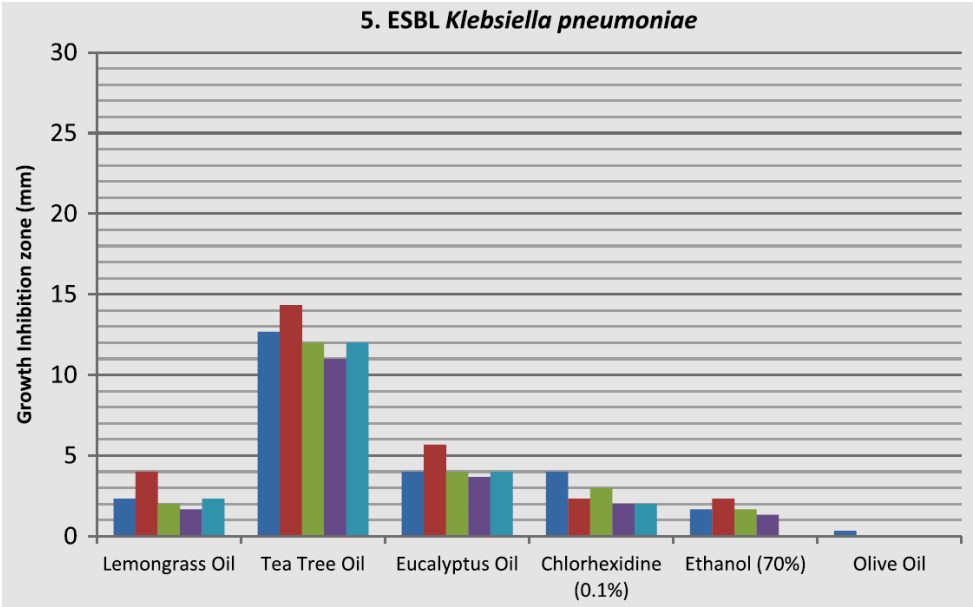
Conclusions. Revamil is a promising topical antimicrobial agent for prevention or treatment of infections, including those caused by multidrug-resistant bacteria.

Clinical Infectious Diseases 2008; 46:1677–82

The ongoing battle against multi-resistant strains: *In-vitro* inhibition of hospital-acquired MRSA, VRE, *Pseudomonas*, ESBL *E. coli* and *Klebsiella* species in the presence of plant-derived antiseptic oils

Patrick H. Warnke[a,b,*], Alexander J.S. Lott[b], Eugene Sherry[c], Joerg Wiltfang[d], Rainer Podschun[e]





Journal of Cranio-Maxillo-Facial Surgery 41 (2013) 321–326

Screening of antibacterial activity in marine green and brown macroalgae from the coast of Morocco

Chiheb Ibtissam[1], Riadi Hassane[1*], Martinez-Lopez José[2], Dominguez Seglar Josè Francisco[3], Gomez Vidal Josè Antonio[3], Bouziane Hassan[1] and Kadiri Mohamed[1]

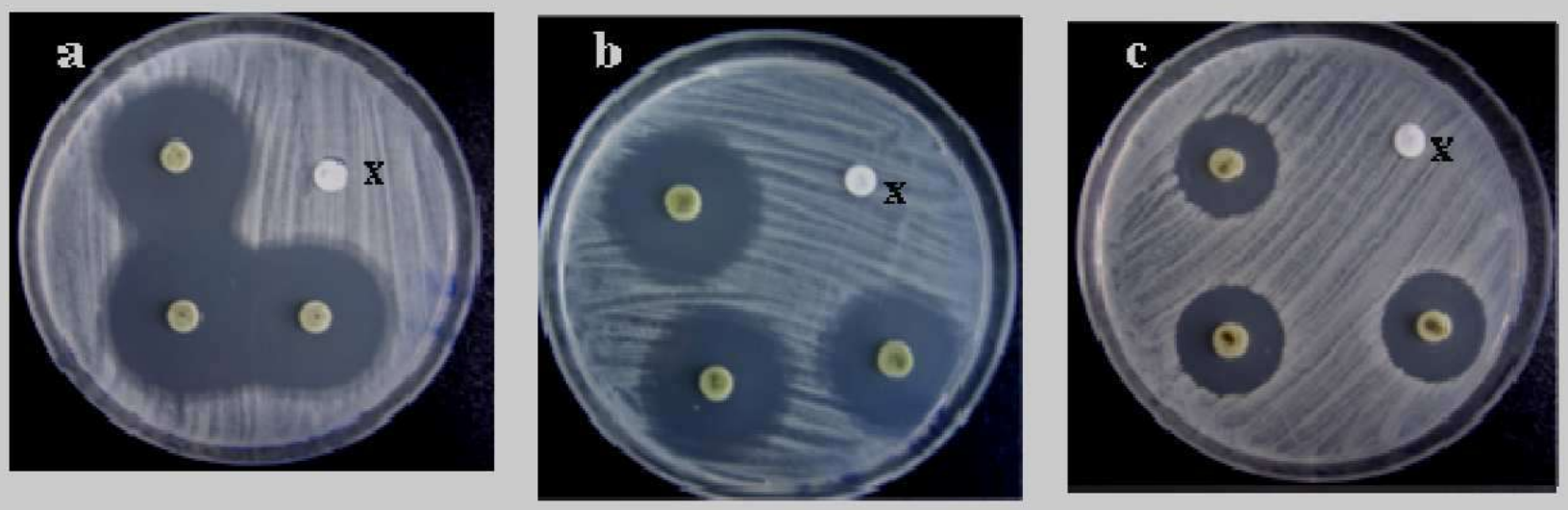


Figure 1. Inhibition zones obtained by the methanol extracts against *Staphylococcus aureus*: a: *Cystoseira mediterranea*, b: *U lactuca*, c: *Codium dichotomum*, X: negative control.

African Journal of Biotechnology Vol. 8 (7), pp. 1258-1262, 6 April, 2009

Tea and Coffee Consumption and MRSA Nasal Carriage

Eric M. Matheson, MD, MS
Arch G. Mainous III, PhD
Charles J. Everett, PhD
Dana E. King, MD, MS

Table 2. Logistic Regression Models Showing Odds of MRSA Nasal Carriage by Beverage Consumption

Beverage Consumption	Unadjusted OR (95% CI)	Adjusted[a] OR (95% CI)
Coffee		
None	1.00	1.00
<1 cup per month or more	0.53 (0.28-1.02)	0.47 (0.24-0.93)
Hot tea		
None	1.00	1.00
<1 cup per month or more	0.47 (0.31-0.70)	0.47 (0.31-0.71)
Coffee or hot tea		
None	1.00	1.00
<1 cup per month or more of either	0.41 (0.20-0.81)	0.33 (0.16-0.70)
Iced tea		
None	1.00	1.00
<1 cup per month or more	0.81 (0.39-1.68)	0.88 (0.39-1.99)
Soft drinks during the summer		
Never to 2-3 times per month	1.00	1.00
1-6 times per week or more	0.85 (0.44-1.66)	0.97 (0.48-1.96)
Soft drinks during the rest of the year		
Never to 2-3 times per month	1.00	1.00
1-6 times per week or more	1.07 (0.57-1.99)	1.28 (0.68-2.42)

CI = confidence interval; MRSA = methicillin-resistant *Staphylococcus aureus;* OR = odds ratio.

[a] Adjusted for age, race/ethnicity, sex, poverty-income ratio, current health status, hospitalization in the past year, and antibiotic use in the past month.

METHODS We performed a secondary analysis of data from the 2003-2004 National Health and Nutrition Examination Survey to investigate the relationship between the consumption of coffee, hot tea, cold tea, and soft drinks, and MRSA nasal carriage among the noninstitutionalized population of the United States.

CONCLUSIONS Consumption of hot tea or coffee is associated with a lower likelihood of MRSA nasal carriage. Our findings raise the possibility of a promising new method to decrease MRSA nasal carriage that is safe, inexpensive, and easily accessible.

Ann Fam Med 2011;9:299-304

National MRSA rates run along with fair play of national football teams: a cross-national data analysis of the European Football Championship, 2008

E. Meyer · P. Gastmeier · F. Schwab

Table 1 Antibiotics use (ambulatory care), methicillin-resistant *Staphylococcus aureus* (MRSA) proportions, entire playing time and number of yellow and red cards in the European Football Championship, 2008

	MRSA (%) (MRSA/100 *S. aureus* isolates)	Antibiotic use (DDD/1,000 inhabitant-days)[a]	Entire playing time (min)	Red cards	Yellow cards	Cards/100 min
Czech Republic	14.6	17.4	270		4	1.48
France	22.8	28.0	270	1	7	2.96
Germany	18.4	14.5	540	1	7	1.48
Greece	40.4	32.4	270		8	2.96
Italy	37.4	28.5	390		9	2.31
Netherlands	1.0	11.2	390		5	1.29
Poland	20.2	20.7	270		7	2.59
Portugal	49.1	22.6	360		8	2.22
Romania	34.4	n.a.	270		7	2.59
Spain	26.0	19.7	570		8	1.40
Sweden	1.0	14.6	270		3	1.11

Infection (2013) 41:215–218

Eradication of an outbreak of vancomycin-resistant Enterococcus (VRE): the cost of a failure in the systematic screening

Antimicrobial Resistance and Infection Control 2013, **2**:18 doi:10.1186/2047-2994-2-18

A VRE outbreak was triggered by a failure in the systematic VRE screening in a medico-surgical ward specialised in liver transplantation as a patient was not tested for VRE. This failure was likely caused by the reduction of healthcare resource. The outbreak involved 13 patients. Colonized patients were grouped in a dedicated part of the infectious diseases unit and tended by a dedicated staff. Transmission was halted within two months after discovery of the index case.

Table 1 Cost of the eradication of a vancomycin-resistant *Enterococcus faecium* (VRE) outbreak in severely ill colonized patients (n = 13 patients, 16 stays)

Resources	Cost, 2008 Euros*
Infection control measures (A)	60 524
Staffing (overtime plus interim staff)cpa	5 719
Gowns, gloves, single use materials, hydroalcoholic solutions, disinfection procedures	14 538
Screening and surveillance cultures, typing of isolates	15 125
Antibiotics	25 142
Loss of income from spare isolation beds† (B)	110 915
VRE-related hospital loss (A + B)	171 439

"El futuro esperanzador es posible...

... y necesario"

fbarcenilla.lleida.ics@gencat.cat