24 i 25 d'octubre de 2014
Tarragona

Què podem fer per evitar les infeccions? Estratègies de prevenció

Dr. Juan Carlos Yébenes
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Hospital de Mataró - CSdM

SERVEI DE
MEDICINA INTENSIVA
CONSORCI SANITARI
DEL MARESME

jyebenes@csdm.cat

12:30 **TAULA RODONA 2**
14:00 **KEY POINTS en la infecció de material protèsic**

Moderador ▸ Josep-Antón Capdevila Morell. Servei de Medicina Interna, Hospital de Mataró, Barcelona

Epidemiologia i rellevància clínica de les infeccions de material protèsic
Benito Almirante Gragera. Servei de Malalties Infecciones, Hospital Universitari Vall d'Hebron, Barcelona

De la fisiopatologia al tractament: bases fisiopatològiques per optimitzar el tractament. Noves opcions terapèutiques
José Luis del Pozo León. Área Enfermedades Infecciosas, Servicio de Microbiología, Clínica Universidad de Navarra, Pamplona

Què podem fer per evitar la infecció? Estratègies de prevenció
Joan-Carles Yébenes Reyes. Servei de Medicina Intensiva i Crítica, Hospital de Mataró

Conclusions

Què podem fer per evitar la infecció? Estratègies de prevenció
Joan-Carles Yébenes Reyes. Servei de Medicina Intensiva i Crítica, Hospital de Mataró

1. El millor que podem fer és evitar que els microorganismes entrin en contacte amb materials inerts

2. "Audit and feedback" és útil quan el problema és prevalent i la incidència inapropiadament alta

3. Tenir protocols no garanteix el cumpliment.

4. La tecnologia "pot" ajudar o pot camuflar.

Conclusions

Què podem fer per evitar la infecció? Estratègies de prevenció
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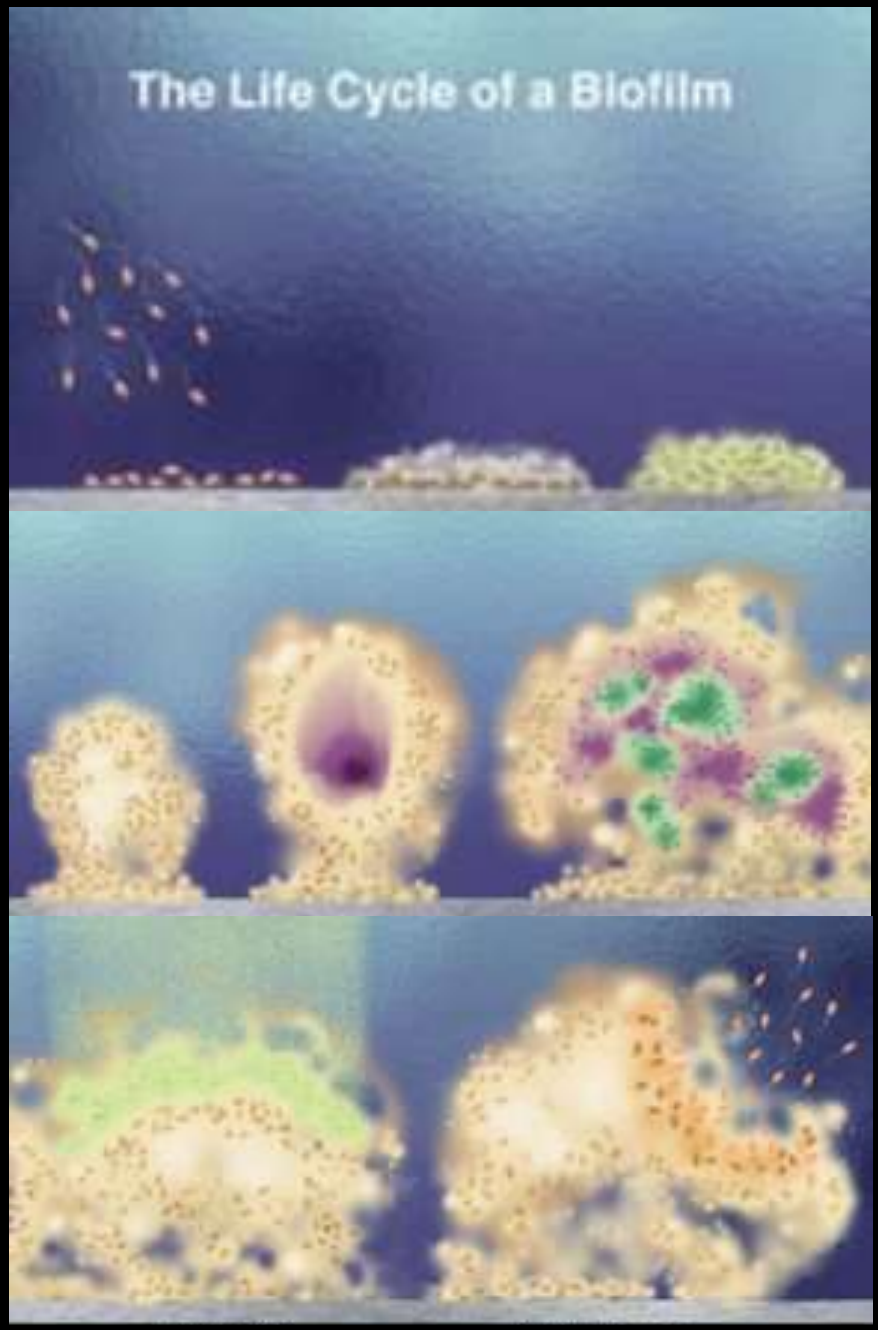
1. El millor que podem fer és evitar que els microorganismes entrin en contacte amb materials inerts
   Amor a primera vista
2. "Audit and feedback" és útil quan el problema és prevalent i la incidència inapropiadament alta
   El ojo del amo engorda el caballo
3. Tenir protocols no garanteix el cumpliment.
   Haz lo que digo y no lo que hago
4. La tecnologia "pot" ajudar o pot camuflar.
   No me grites que no te veo

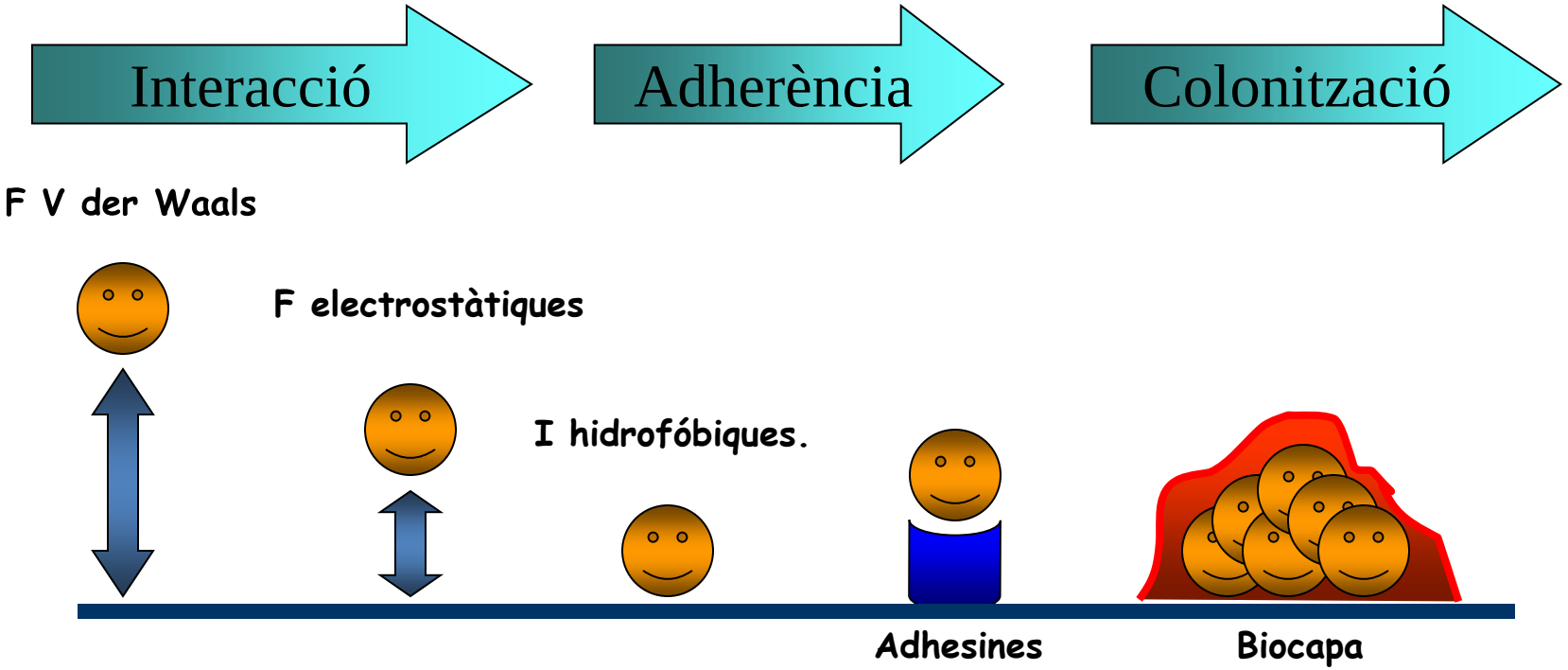
Microorganismes i material protèsic
Amor a primera vista



www.sciencenews.org

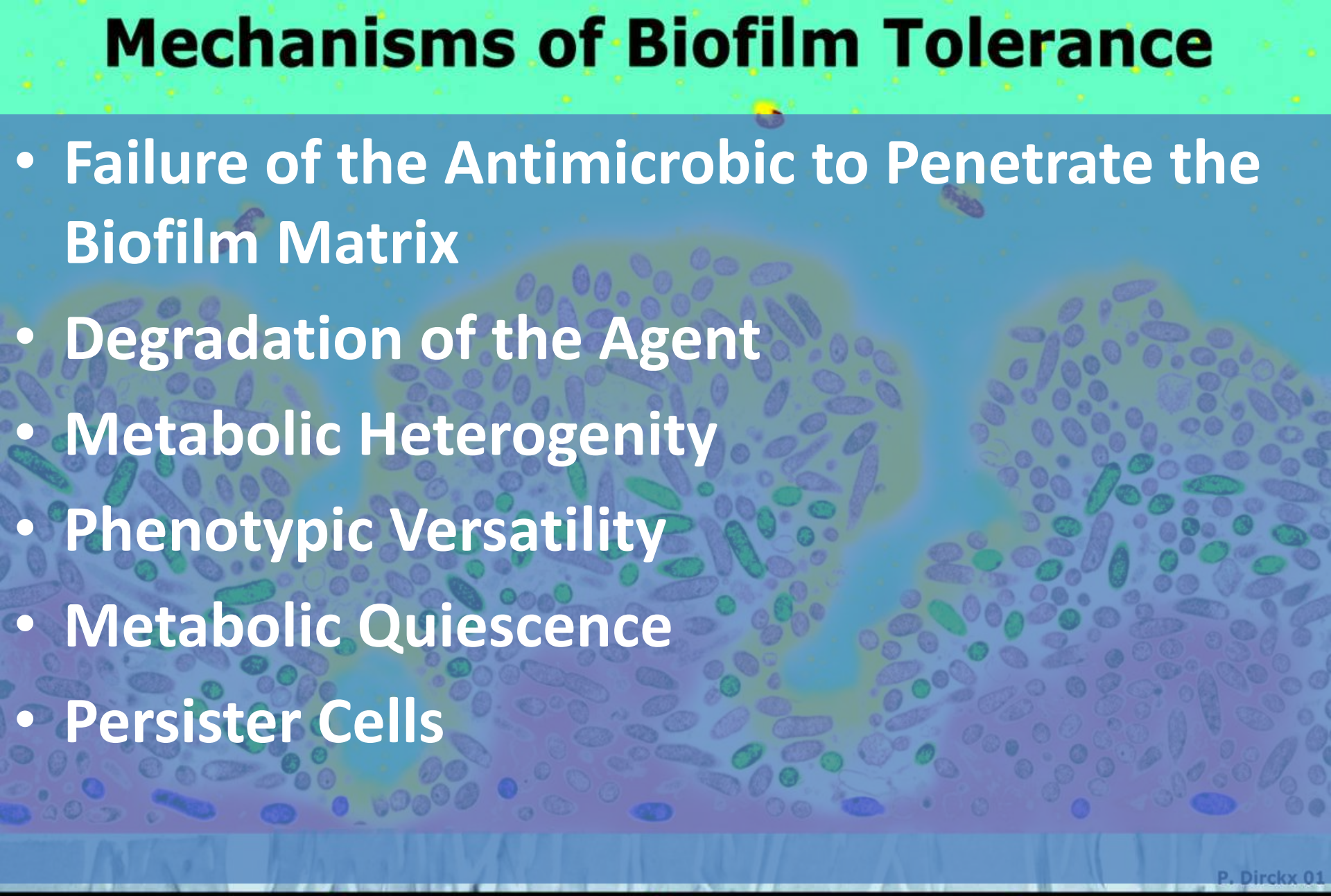
La adhesió bacteriana depèn de la interacció entre la superfície del material inert i el microorganisme

La cinètica del procés està marcada per factors ambientals.



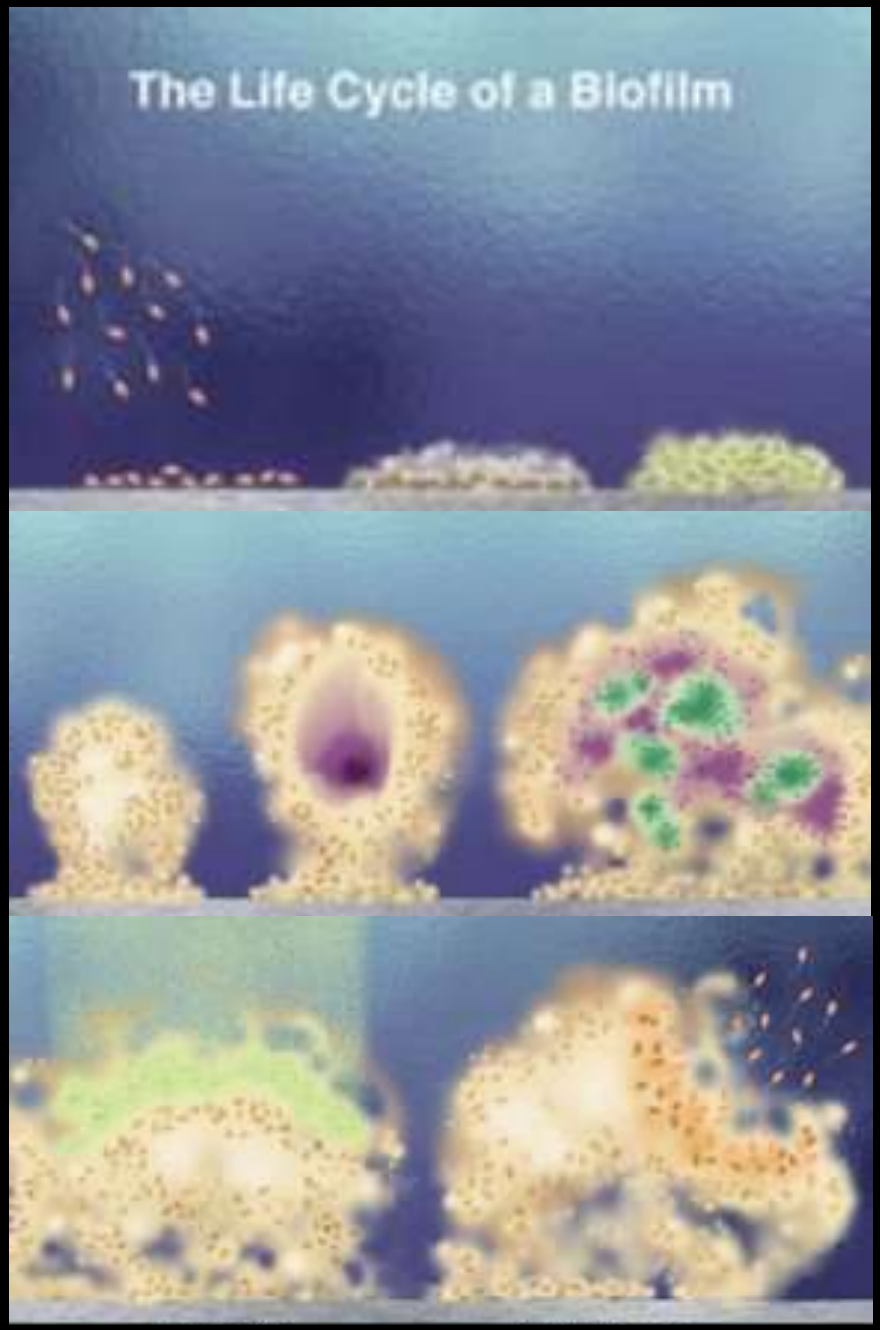
Mechanisms of Biofilm Tolerance

- Failure of the Antimicrobic to Penetrate the Biofilm Matrix
- Degradation of the Agent
- Metabolic Heterogenity
- Phenotypic Versatility
- Metabolic Quiescence
- Persister Cells



P. Dirckx 01

Slow Penetration	Stress Response	Altered Microenvironment	Persisters



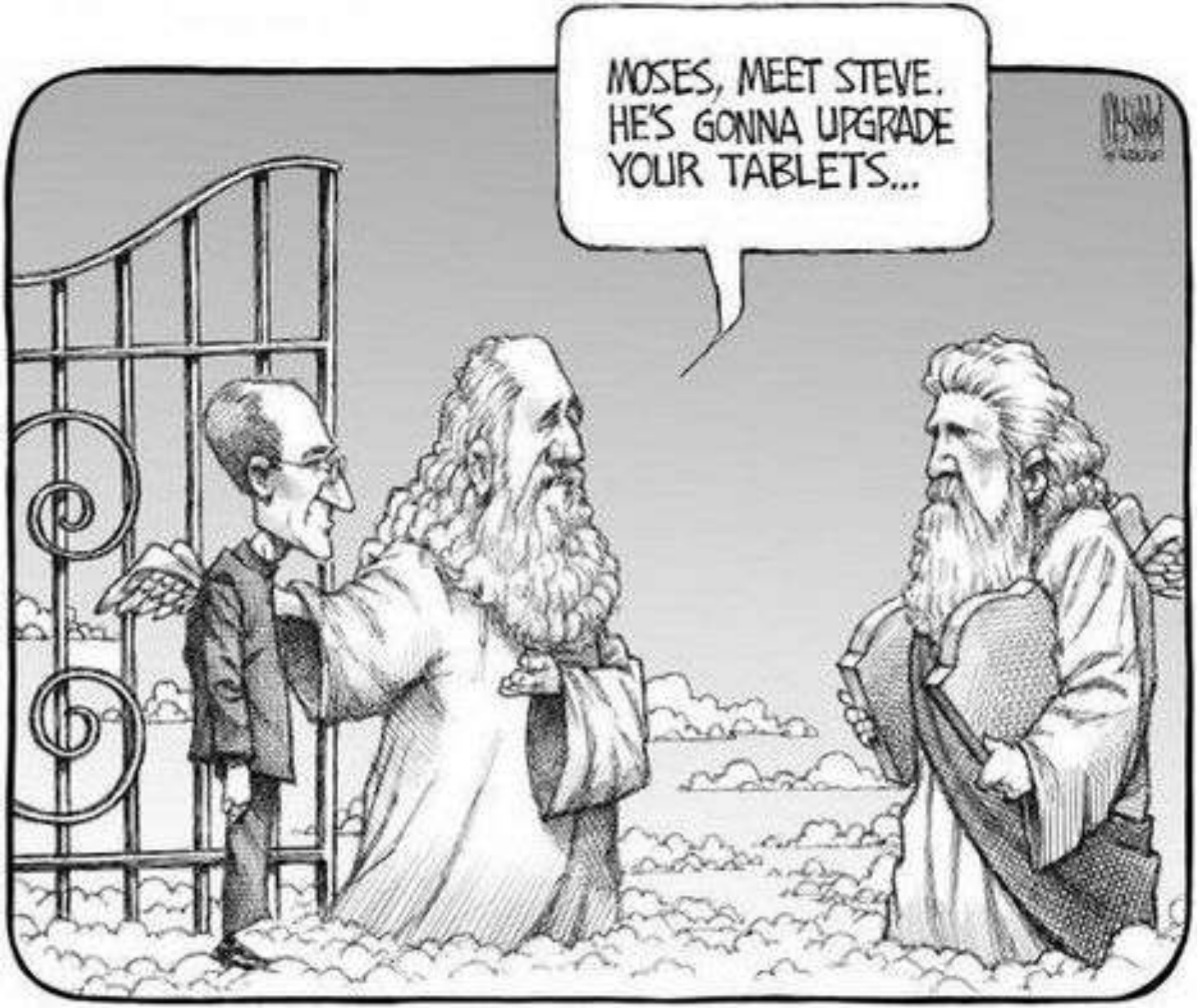
www.sciencenews.org

"We tend to think of bacteria as primitive, single-celled creatures.

But in biofilms, they differentiate, communicate, cooperate, and deploy collective defenses against antibiotics.

Individual microorganisms in a biofilm act together like one multicellular organism."

Phil Stewart
Center for Biofilm Engineering
Montana State University

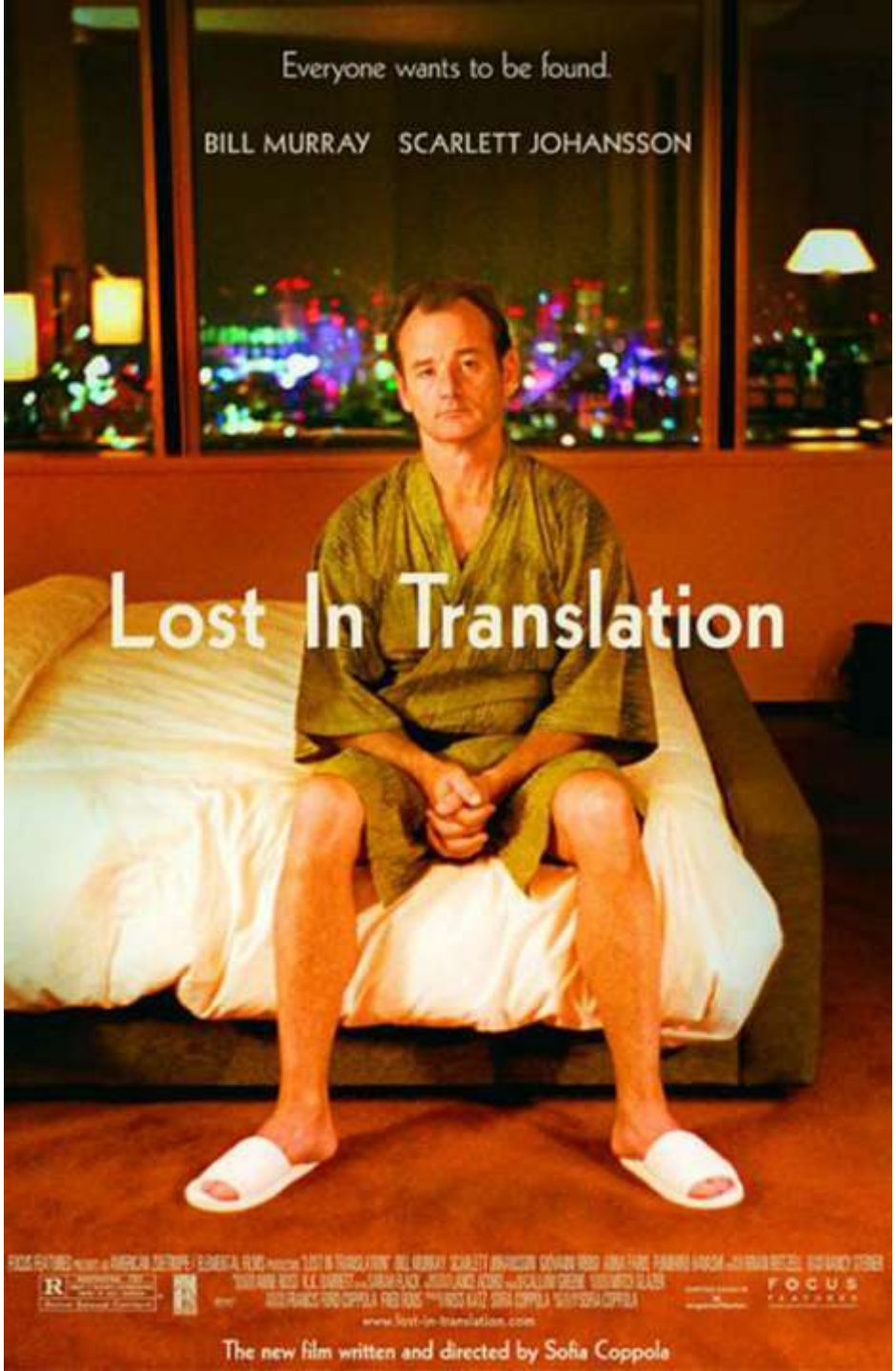

MOSES, MEET STEVE. HE'S GONNA UPGRADE YOUR TABLETS...

N ENGL J MED 348;26 WWW.NEJM.ORG JUNE 26, 2003

The Quality of Health Care Delivered to Adults in the United States

Table 3. Adherence to Quality Indicators, Overall and According to Type of Care and Function.

Variable	No. of Indicators	No. of Participants Eligible	Total No. of Times Indicator Eligibility Was Met	Percentage of Recommended Care Received (95% CI)*
Overall care	439	6712	98,649	54.9 (54.3–55.5)
Type of care				
Preventive	38	6711	55,268	54.9 (54.2–55.6)
Acute	153	2318	19,815	53.5 (52.0–55.0)
Chronic	248	3387	23,566	56.1 (55.0–57.3)
Function				
Screening	41	6711	39,486	52.2 (51.3–53.2)
Diagnosis	178	6217	29,679	55.7 (54.5–56.8)
Treatment	173	6707	23,019	57.5 (56.5–58.4)
Follow-up	47	2413	6,465	58.5 (56.6–60.4)


Everyone wants to be found.
BILL MURRAY SCARLETT JOHANSSON
Lost In Translation
R
FOCUS
www.lost-in-translation.com
The new film written and directed by Sofia Coppola

APLICABILITAT

Audit and feedback: effects on professional practice and health care outcomes (Review)

Jamtvedt G, Young JM, Kristoffersen DT, O'Brien MA, Oxman AD

Authors' conclusions

Audit and feedback can be effective in improving professional practice. When it is effective, the effects are generally small to moderate. The relative effectiveness of audit and feedback is likely to be greater when baseline adherence to recommended practice is low and when feedback is delivered more intensively.

EL MUNDO

Edición España Versión Clásica

ALERTA SANITARIA El personal sanitario se queja de la poca formación que ha recibido

'Mañana me toca atender a la enferma de ébola y nadie me ha enseñado a ponerme el traje'

- Médicos de La Paz denuncian haber recibido información 'insuficiente' para tratar ébola
- 'Han dado charlas de 10 minutos y hay fotos en la pared de cómo vestirse'

El doctor Santiago Yus, este martes. | A. DI LOLLI

EL ÉBOLA EN ESPAÑA »

Consejero de Sanidad: "No hace falta hacer un máster para ponerse el traje"

- Javier Rodríguez insiste en que la enfermera ocultó información
- "Si tuviera que dimitir, dimitiría", ha dicho, aclarando que es médico y tiene "la vida resuelta"
- SER Escuche la entrevista completa

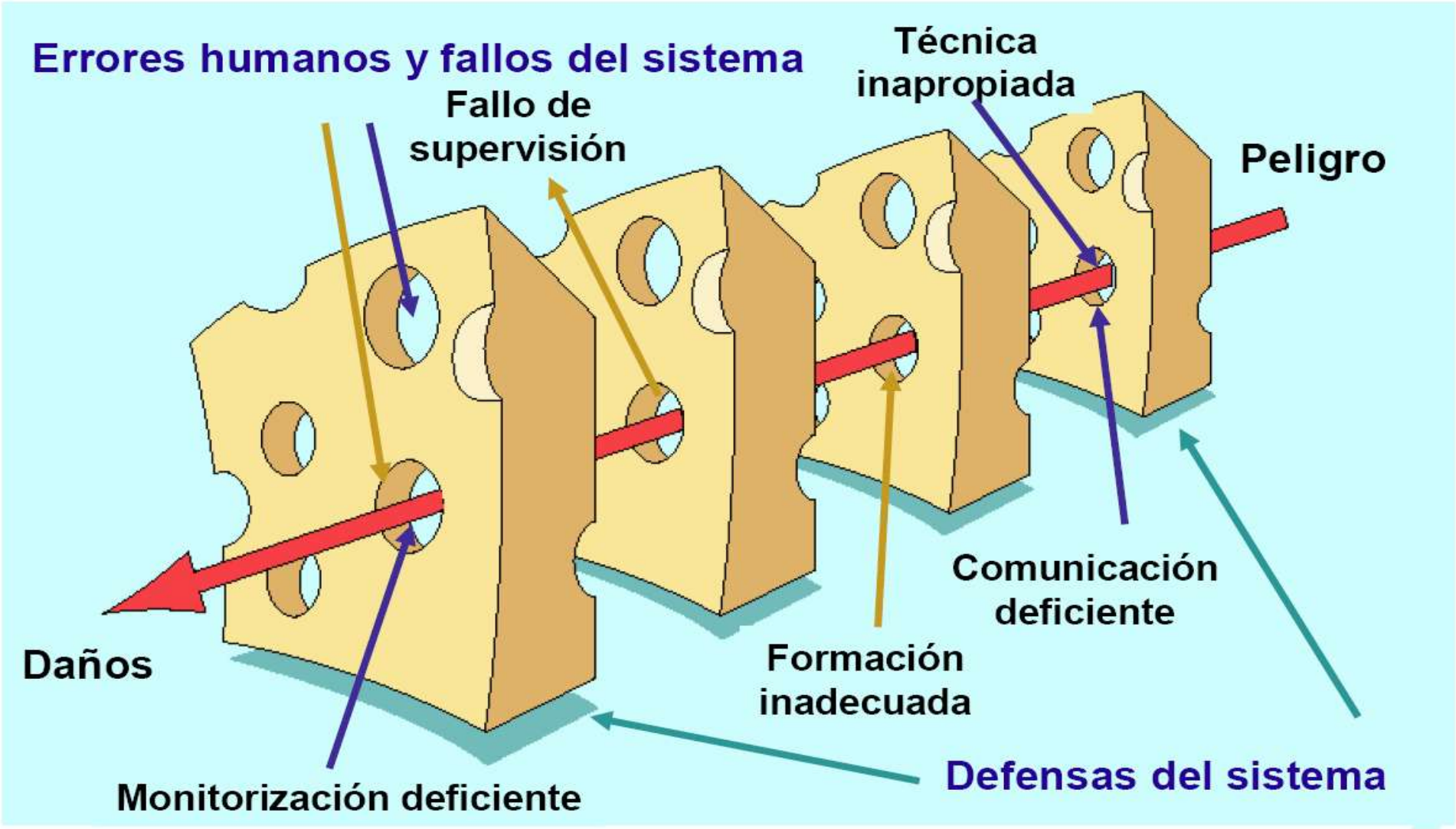
EL PAÍS | Madrid | 9 OCT 2014 - 14:31 CEST 551

Archivado en: Sanidad pública | Francisco Javier Rodríguez | Ébola | Sistema sanitario | Epidemia | Enfermedades infecciosas | Sanidad | Enfermedades | Medicina | Salud

El consejero de Sanidad de la Comunidad de Madrid, Javier Rodríguez. / BALLESTEROS (EFE)

El consejero de Sanidad de la Comunidad de Madrid, Javier Rodríguez, calificó esta mañana de "poco afortunada" la expresión que el miércoles empleó para decir que la enfermera contagiada de ébola pudo haber mentido sobre su salud, pero se ratificó en que la sanitaria ocultó información sobre un posible contacto con el virus. En declaraciones a la Cadena SER, Rodríguez aseguró que el servicio de prevención del Hospital Carlos III de Madrid no tomó medidas cuando la profesional llamó para advertir de que tenía fiebre porque el protocolo marca que "hay que alarmarse" cuando el paciente pasa de 38,6 grados y ella no dijo que hubiera


MISS KITTIN
GLORIA


Errores humanos y fallos del sistema
Fallo de supervisión
Técnica inapropiada
Peligro
Daños
Formación inadecuada
Comunicación deficiente
Monitorización deficiente
Defensas del sistema

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 DECEMBER 28, 2006 VOL. 355 NO. 26

An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D., Gary Roth, M.D., Joseph Bander, M.D., John Kepros, M.D., and Christine Goeschel, R.N., M.P.A.

Resumir la evidència

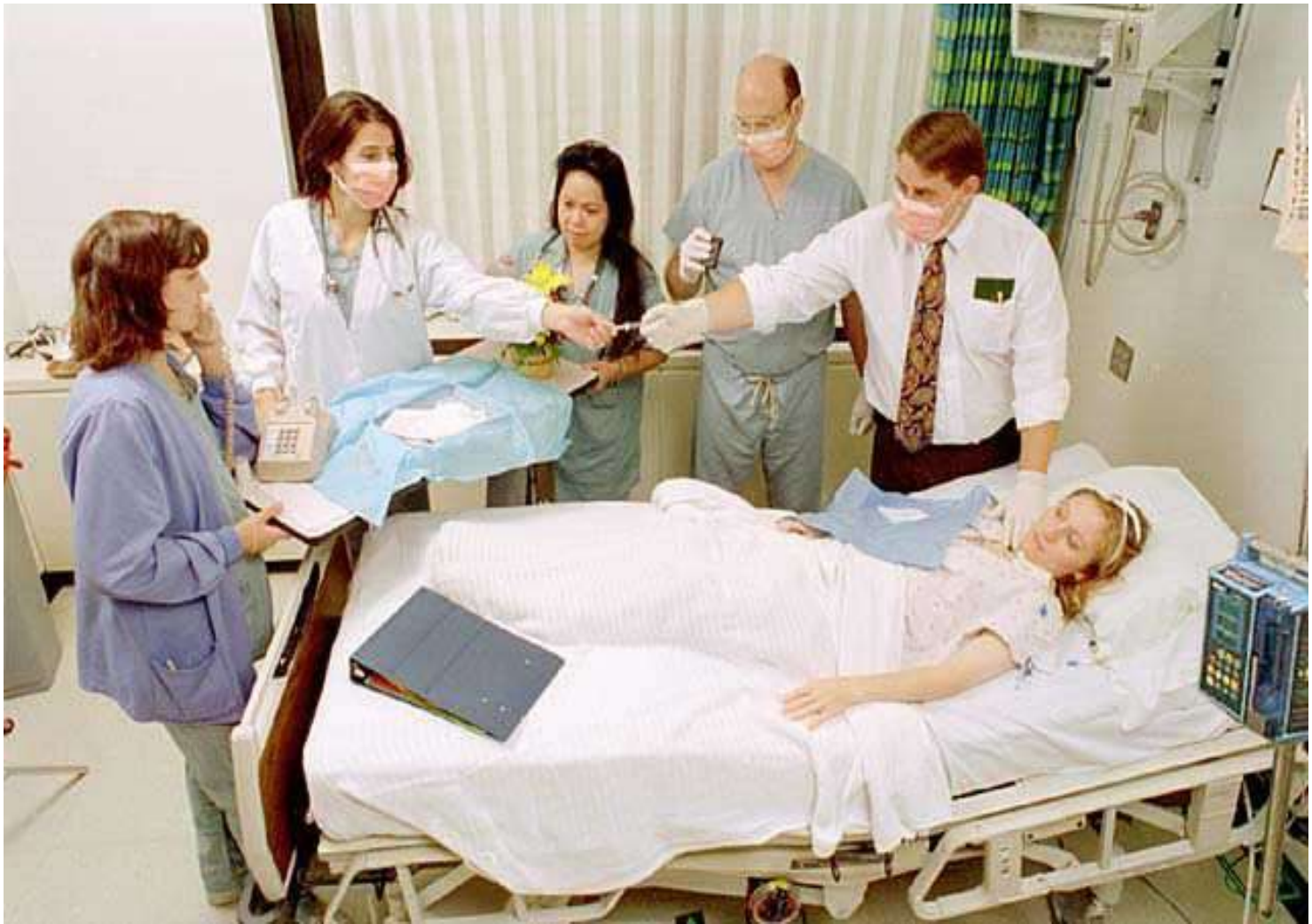
MMWR™

Morbidity and Mortality Weekly Report

Guidelines for the Prevention of Intravascular Catheter-Related Infections

Resumir la evidència

Identificar barreres locals a la implementació



Resumir la evidència

Identificar barreres locals a la implementació

Catheter-related Blood Stream Infection
Care Team Checklist

Purpose: To work as a team to decrease patient harm from catheter-related blood stream infections
When: During **all** central venous or central arterial line insertions or re-wires
By whom: Bedside nurse

1. Today's date _____ / _____ / _____ (month / day / year)

2. Procedure: ☐ New line ☐ Rewire

3. Is the procedure: ☐ Elective ☐ Emergent

4.

	Yes	No	Don't know
Before the procedure, did the housestaff:			
Wash hands (chlorhexidine or soap) immediately prior	☐	☐	☐
Sterilize procedure site	☐	☐	☐
Drape entire patient in a sterile fashion	☐	☐	☐
During the procedure, did the housestaff:			
Use sterile gloves	☐	☐	☐
Use hat, mask and sterile gown	☐	☐	☐
Maintain a sterile field	☐	☐	☐
Did all personnel assisting with procedure follow the above precautions	☐	☐	☐
After the procedure:			
Was a sterile dressing applied to the site	☐	☐	☐

Please return completed form to the designated location in your ICU.

Resumir la evidència

Identificar barreres locals a la implementació

Dissenyar l'acció (4-6 ordres)

Catheter-Related Blood Stream Infections (CR-BSI) FACT SHEET

Bottom line

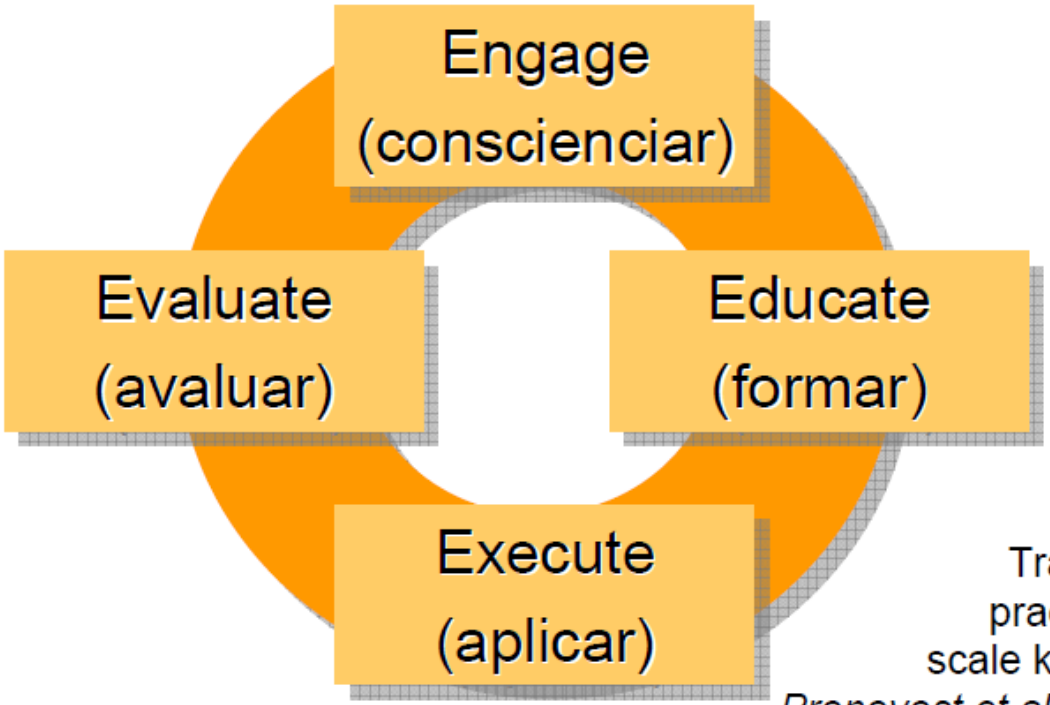
1. **CR-BSIs are associated with increased morbidity, mortality and costs of care.**
2. **CR-BSIs are a preventable complication that causes as many as 11 deaths every day in the U.S.**
3. **The following interventions decrease the risk for CR-BSIs:**
   - Appropriate hand hygiene,
   - Use of chlorhexidine for skin preparation,
   - Use of full-barrier precautions during central venous catheter insertion,
   - Subclavian vein placement as the preferred site, and
   - Removing unnecessary central venous catheters.

Resumir la evidència

Identificar barreres locals a la implementació

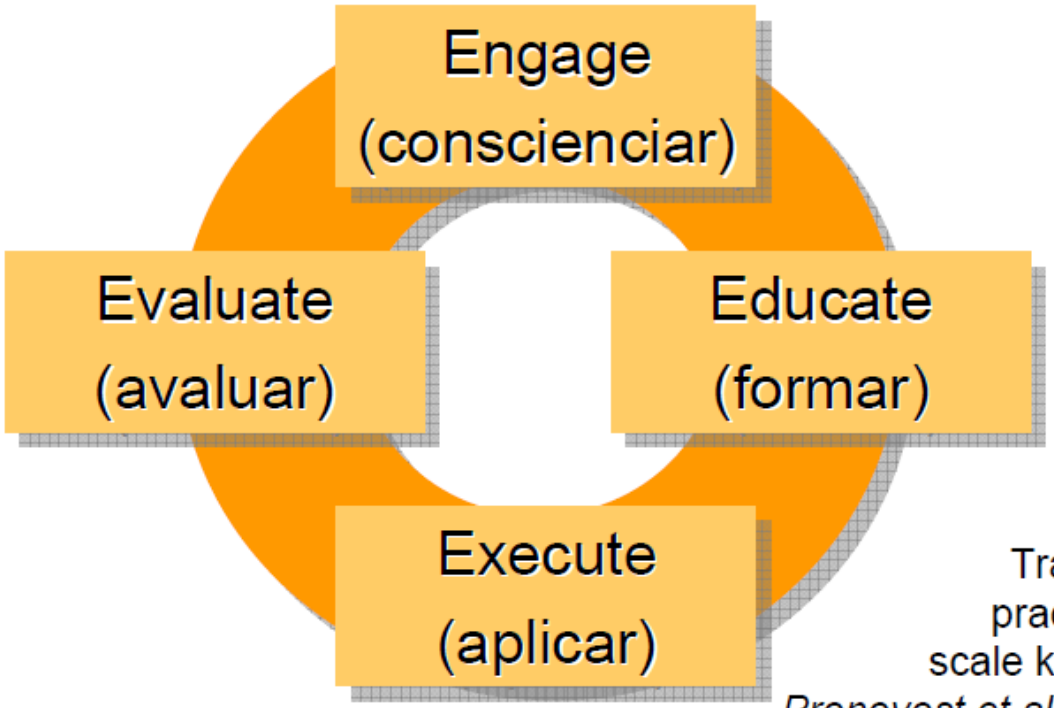
Dissenyar l'acció (4-6 ordres)

Implementar l'acció



Translating evidence into practice: a model for large scale knoweledge translation. *Pronovost et al. BMJ 2008;337:a1714*

Implementar l'acció



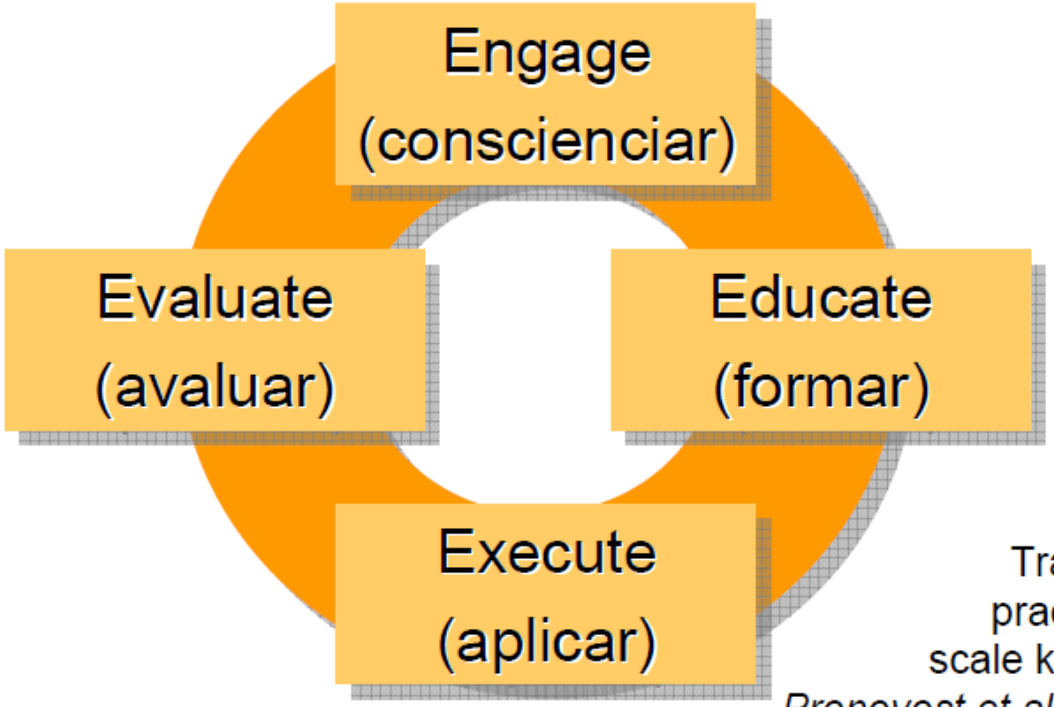
Translating evidence into practice: a model for large scale knoweledge translation.
Pronovost et al. BMJ 2008;337:a1714

Table 4. Incidence-Rate Ratios for Catheter-Related Bloodstream Infections.*

Variable	Incidence-Rate Ratio (95% CI)	P Value
Study period		
Baseline	1.00	
During implementation	0.76 (0.57–1.01)	0.063
After implementation		
0–3 mo	0.62 (0.47–0.81)	0.001
4–6 mo	0.56 (0.38–0.84)	0.005
7–9 mo	0.47 (0.34–0.65)	<0.001
10–12 mo	0.42 (0.28–0.63)	<0.001
13–15 mo	0.37 (0.20–0.68)	0.001
16–18 mo	0.34 (0.23–0.50)	<0.001
Teaching hospital	1.34 (0.73–2.46)	0.35
Bed size (per 100 beds)	1.03 (0.97–1.09)	0.33

The overall median rate of catheter-related bloodstream infection decreased from 2.7 (mean, 7.7) infections per 1000 catheter-days at baseline to 0 (mean, 2.3) at 0 to 3 months after implementation of the study intervention (P≤0.002) and was sustained at 0 (mean, 1.4) during 18 months of follow-up (Table 3). A significant decrease was observed in both teaching and nonteaching hospitals and in small hospitals (<200 beds) and large hospitals (≥200 beds) (Table 3).

Implementar l'acció



Translating evidence into practice: a model for large scale knoweledge translation.
Pronovost et al. BMJ 2008;337:a1714

EL ÉBOLA EN ESPAÑA »

Hilitos de plastilina, caldo de vaca loca y otros errores en gestión de crisis

Los políticos tienden a culpar al último eslabón y a minimizar los riesgos ante los grandes problemas

NATALIA JUNQUERA | Madrid | 19 OCT 2014 - 21:43 CEST

Archivado en: Ébola Ana Mato Mariano Rajoy Miguel Arias Cañete Celia Villalobos Talero Accidente tren Santiago Gripe A Carme Chacón Teresa Romero Ministerio de Sanidad Catástrofe Prestige Colza Epidemia Mareas negras Enfermedades respiratorias Prevención enfermedades Contagio

El consejero de Sanidad madileño, Javier Rodriguez, que se burló de la capacidad de Romero para ponerse el traje de protección, y la ministra de Sanidad, Ana Mato, regelada del mando de la gestión de crisis por el contagio de ébola. / ALEJANDRO RUESGA (EL PAÍS)

No es la primera vez que ante una crisis el Gobierno tiene que relegar al ministro del ramo tras un aluvión de críticas. Lo ha hecho Mariano Rajoy con Ana Mato en la crisis del ébola y ya lo hizo cuando él era *número dos* de José María Aznar y recibió el encargo de crear un comité especial por las vacas locas —Celia Villalobos, de Sanidad, y Miguel Arias Cañete, de Agricultura, se quedaron fuera—. La experiencia de los últimos años muestra que muy pocos políticos han sabido dominar el reflejo de esquivar responsabilidades y culpar al último eslabón de la cadena (la auxiliar de enfermería, el maquinista del Alvia, el patrón del Prestige...) y que la mayoría minimiza el problema, lo que casi siempre acaba agravándolo. Este es un repaso a los patrones de improvisación, frivolidad u opacidad que se repiten. Las lecciones no aprendidas.

Miércoles, 8 de octubre 2014

LA VANGUARDIA.com | Sanidad

"El ébola es la enfermedad de la disciplina"

Médicos sin Fronteras sólo ha tenido dos contagios entre su personal internacional y ha tratado a 4.000 enfermos en África

Sanidad | 07/10/2014 - 21:35h | Última actualización: 08/10/2014 - 09:09h

Personal sanitario atiende en Monrovia, Liberia, a personas que han entrado en contacto con el virus del ébola Ap / Abbas Dulleh

Aparte de ir perfectamente protegido con los vestidos reglamentarios cuando están dentro de la sala de enfermos, “siempre vamos a pares: uno actúa y el otro cuida de ti, de que no se mueva el guante, que cuando tocas a un enfermo te laves los guantes con agua clorada antes de ver al siguiente Ese otro vigila y advierte si hay un error. Eso supone mucho más personal, pero también mucha más seguridad”.

También se cronometran. No se puede estar más de una hora dentro de la ropa protectora porque hay un gran riesgo de deshidratación. “Me he pesado después de una visita de hora y 50 minutos y había perdido 1,6 kilos. Así que antes de entrar bebemos, y al salir bebemos y tomamos plátano o tomate, para recuperar potasio”, cuenta Miriam Alía. Esa deshidratación pone en peligro al personal, porque provoca mareos, dolor de cabeza. Facilita los errores.

La tercera pieza de la disciplina es la rotación. Cada profesional se alterna con otro en las visitas. Una sí y otra no. También limitan las semanas de trabajo, no más de ocho. Luego hay que parar. “Hemos visto que los errores se concentran en dos momentos: al principio, por desconocimiento e impericia, y a partir de la cuarta semana, por fatiga”.

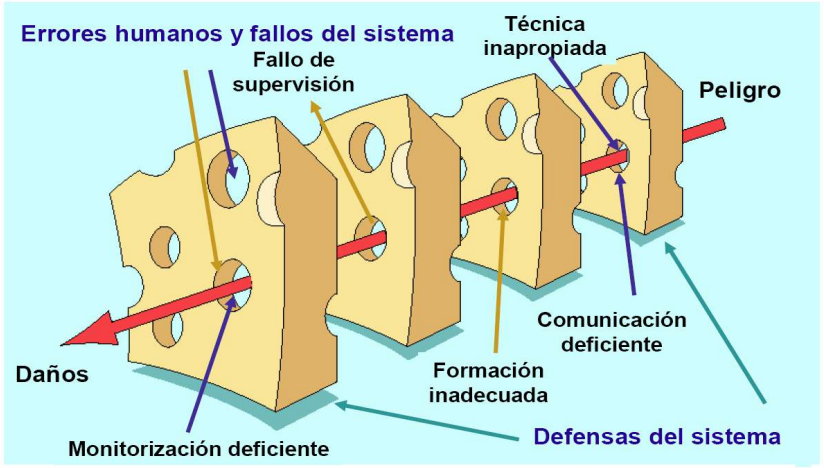
MSF no quiere opinar sobre el caso de Madrid, porque no sabe de sus normas ni de del material que emplean. “pero esperamos que sirva de reactivo, para que se actualicen protocolos y se tomen más medidas de protección. Es fundamental detectar cuando antes los casos sospechosos. Nosotros visitamos cada día durante los 21 días de vigilancia a todo aquel que ha estado en contacto con el virus. Así puedes detectar los síntomas desde el primer día y actuar inmediatamente. Es importante para el pronóstico del enfermo y, sobre todo, es lo que interrumpe la propagación”, explica la experta.

SOCIEDAD

Los cinco errores que precipitaron la crisis del ébola en España

ABC | Día 08/10/2014 - 13.45h

- El posible contacto con el equipo de protección contaminado, una formación indecuada y una actuación poco rápida, entre las claves



1. Contacto con la capa exterior del equipo de protección contaminado

HOSPITAL La Paz

Trabajar dentro de un traje di
fícil. Los miembros del equipo
a Pajares y García Viejo ya aseg
El protocolo para ponérselo, y
extremadamente detallado y t

2. Formación inadecuada

Dentro de las líneas de investigación q
investigar, está la de que se comprueb
si estaba en óptimas condiciones o si s
profesionales. Una charla de apenas 2
para asimilar correctamente un echau
para quitarse el traje se requieren 15 m

3. Al Hospital de Alcorcón

JOSÉ RAMÓN LADRA

Resulta difícil de explicar que una persona
con pacientes de ébola llame en tres ocasio
encuentra mal y que en lugar de enviarla a
hospital de referencia, el de Alcorcón, donde
fue estricto.

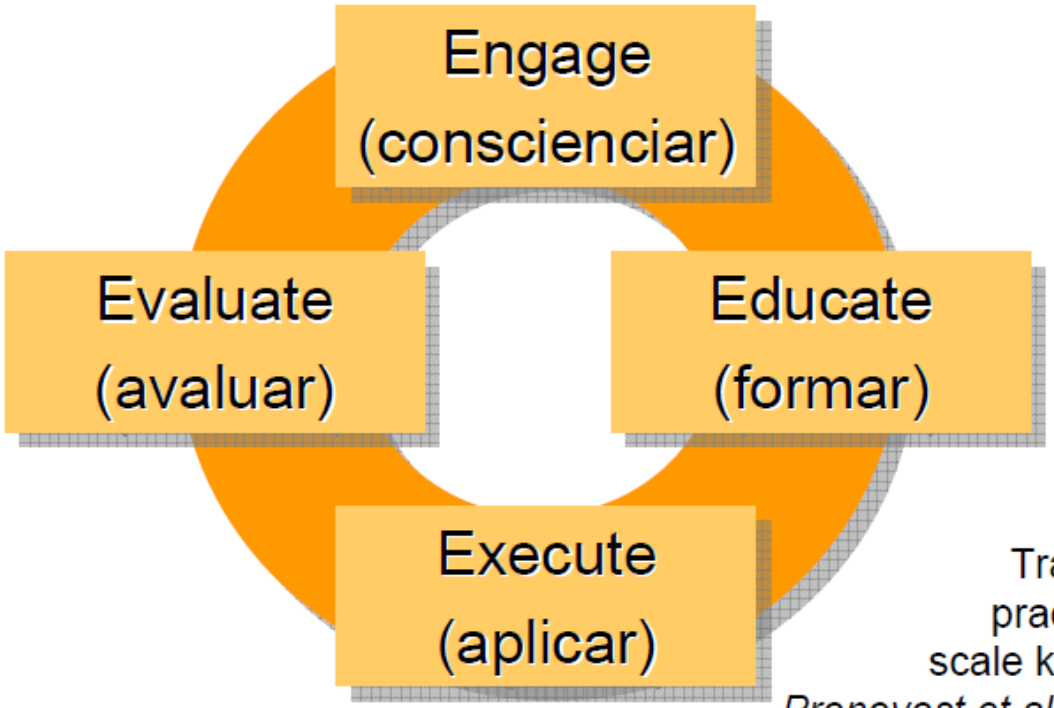
4. Acudió a una oposición al día siguiente de trabajar con ébola

ANGEL NAVARRETE

La organización con más experiencia en el
Fronteras. Y ellos, cuando retan a su perso
tienen durante los 21 días recluidos hasta q
manifiestan síntomas. En el caso español, l
tomó vacaciones al día siguiente y se presen

5. Síntomas vagos en casa

El principal motivo por el que no se actuó con rapidez ante la aparición de los «síntomas vagos» es que la auxiliar aseguraba no tener fiebre alta, uno de los principales elementos de filtrado de los casos sospechosos. Que afirmase tener manchas cutáneas no fue suficiente para que saltase la alarma.



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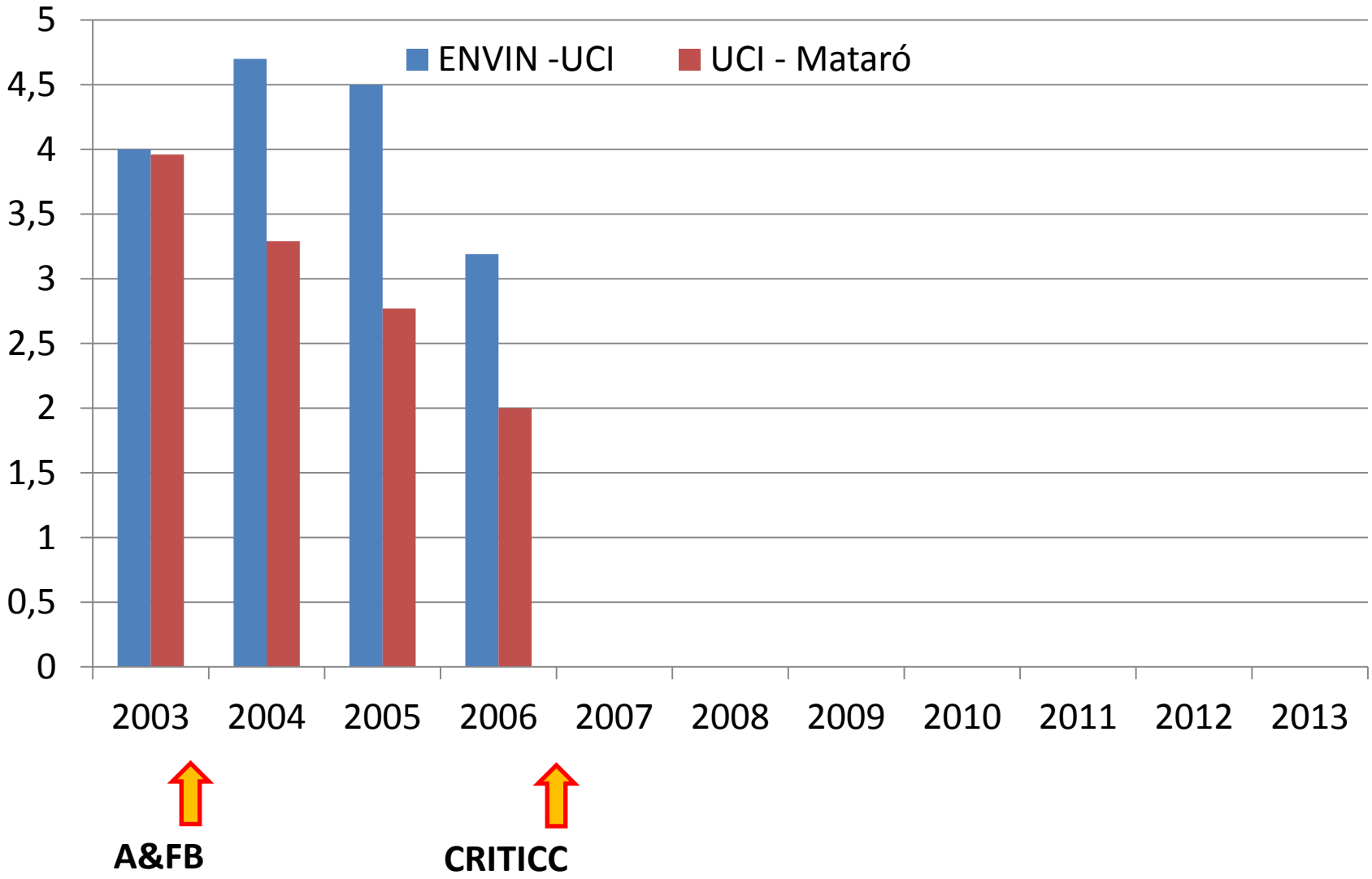
Pronovost et al. BMJ 2008;337:a1714

BP + BRC / Dies de CVC+ Dies CA



SERVEI DE MEDICINA INTENSIVA
CONSORCI SANITARI DEL MARESME

COM EVITAR LES INFECCIONS PER CATÈTER

Les infeccions per catèter causen més de una mort no esperada al dia a l'estat espanyol

1. MÍNIM RISC

(PERIFÈRICA – DRUM – SUBCLAVIA – JUGULAR - FEMORAL)

2. INSERCIÓ ESTÈRIL

(TÈCNICA QUIRÚRGICA, MONITORITZACIÓ PUNT D'INSERCIÓ)

3. DESINFECCIÓ TAPS

(MANIPULACIÓ ESTÈRIL ACCESOS I EQUIPS)

4. RETIRADA PRECOÇ

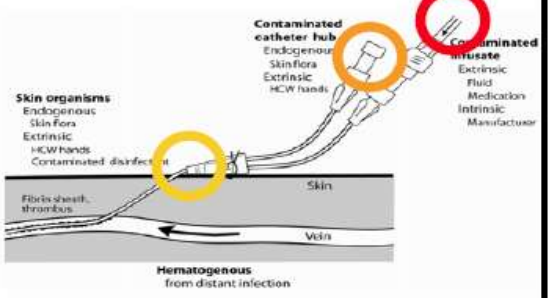
(EVITEU CATÈTERS INACTIUS)

Triptychs used for the non-attendance education

HOSPITAL DE MATARÓ

EL PER QUÈ DE LES ESTRATÈGIES PER PREVENIR LES INFECCIONS PER CATÈTER

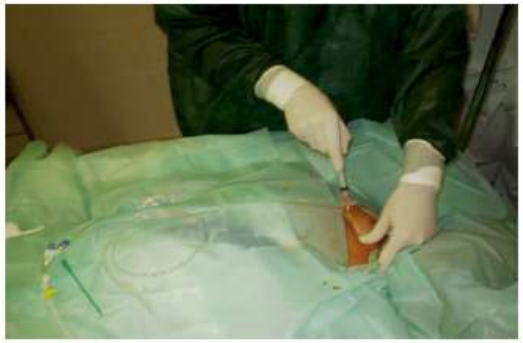
Grup per la prevenció de les infeccions associades a catèters endovasculars



Els catèters endovasculars posen en contacte una cavitat estèril (la sang) amb el mitjà extern. A la pell dels malalts i dels treballadors sanitaris hi viuen prop de 1.000 unitats formadores de colònies de bacteris per cm^2. Si la pell del malalt, les connexions o els equips d'infusió no es manipulen correctament moltes d'aquestes bactèries poden passar des de la pell del malalt o des de les mans dels treballadors sanitaris al catèter (colonització) i arribar a la sang a on la temperatura (37ºC) i la presencia de nutrients afavoreix el seu creixement i el desenvolupament d'infeccions a la sang (bacterièmies).

La inserció dels catèters es probablement el moment de major risc de contaminació. Qualsevol contacte del catèter amb una superfície no estèril provocarà la colonització del catèter pels microorganismes de l'entorn i afavorirà el desenvolupament d'una posterior bacterièmia.

La inserció del catèter s'ha d'entendre com un acte quirúrgic, pel que s'ha de procedir amb estrictes mesures d'esterilitat (rentat de mans estèril, bata i guants estèrils, mascareta i gorro, tallatge estèril ample).



Check-list inserció

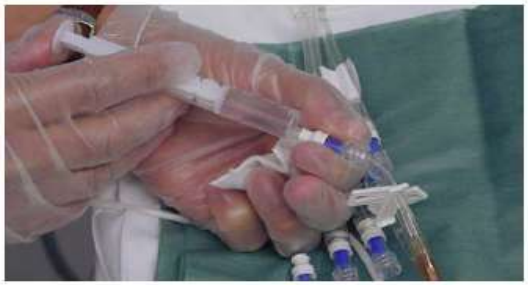
1. Està justificat insertar el catèter
2. Segons l'estat del malalt hem escollit el lloc d'inserció amb menys complicacions sèptiques i mecàniques.
3. Hem desinfectat la pell amb clorhexidina alcohòlica 1%.
4. Hem preparat un camp estèril ample, i hem adoptat mesures extremes d'asèpsia.
5. Hem col·locat un apòsit estèril amb tècnica estèril.

Jyebenes@csdm.cat

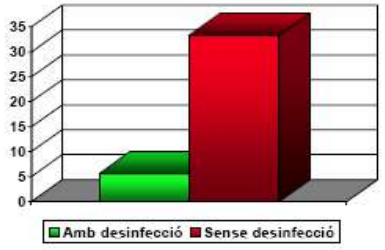
Triptychs used for the non-attendance education

Check-list manteniment

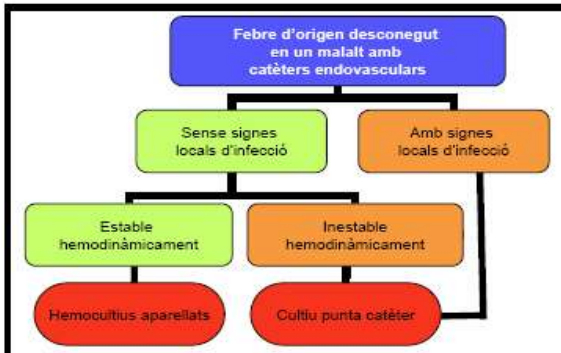
1. He fet higiene de mans abans i després de manipular el catèter o les seves connexions
2. He netejat els connectors amb antisèptic abans d'administrar un bolus o connectar un equip d'infusió.
3. He manipulat la nutrició parenteral amb tècnica estèril.
4. He recanviat els connectors amb tècnica estèril.
5. He retirat aquells catèters que ja no calen o que presenten signes locals d'infecció.



La manipulació dels connectors i dels equips d'infusió es l'origen de les bacterièmies fins en un 80% dels casos d'infecció quan els catèters estan insertats més de 1 setmana. La administració d'un bolus sense desinfecció prèvia del connector produeix el pas de microorganismes a la sang fins en un 35% dels casos, afavorint la colonització del catèter



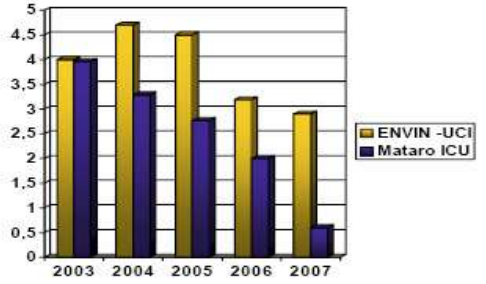
Percentatge de pas de microorganismes a través dels connectors amb o sense desinfecció



La retirada sistemàtica de catèters per febre d'origen no filiat sol ser un gest inútil en mes d'un 75% dels casos. Si el punt d'inserció es net i el malalt no està xocat no cal retirar els catèters, s'han de fer hemos aparellats. Per altre banda si no necessitem un catèter, mantenir-lo insertat incrementa el risc de infecció innecessariament.

La bacterièmia per catèter te una mortalitat directament atribuïble d'un 20% (entre un 10 i un 35% depenent del microorganisme i l'estat del malalt). Això vol dir que si evitem 5 bacterièmies...

...SALVEM UNA VIDA!!!.



Taxes de bacterièmia sense focus i associada a catèter (per 1000 dias amb catèter) a la UCI de Mataró en comparació a las mitja de les UCIs espanyoles

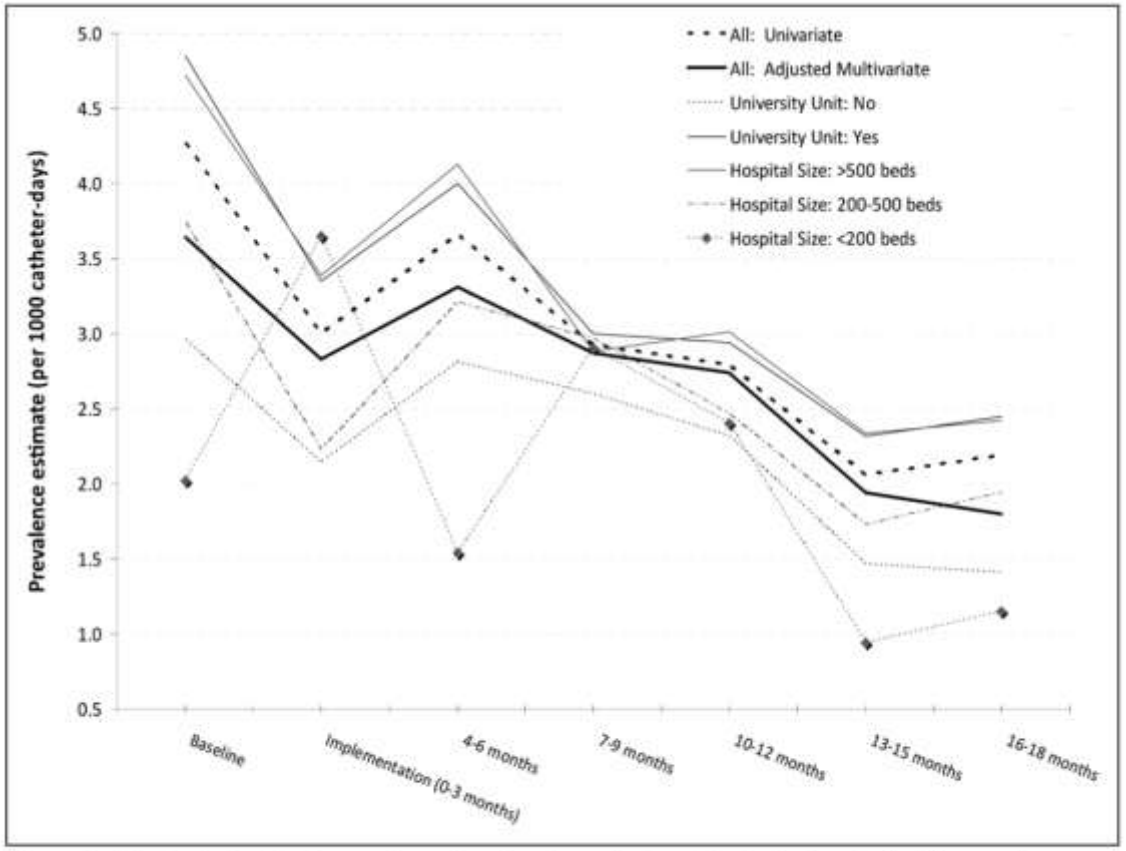


Figure 1. Adjusted period incidence rates estimations for catheter-related infection. *Dashed line* = all: univariate, *black continuous line* = all: adjusted multivariate, *dotted line* = university unit: no, *blue continuous line* = university unit: yes, *red continuous line* = hospital size: > 500 beds, *dotted and dashed line* = hospital size: 200–500 beds, *dotted line and red diamond* = hospital size: < 200 beds.

Impact of a National Multimodal Intervention to Prevent Catheter-Related Bloodstream Infection in the ICU: The Spanish Experience

Mercedes Palomar, MD, PhD[1]; Francisco Álvarez-Lerma, MD, PhD[2]; Alba Riera, RN[3]; María Teresa Díaz, RN[41]; Ferrán Torres, MD, PhD[5]; Yolanda Agra, MD, PhD[6]; Itziar Larizgoitia, MD, MPH, PhD[4]; Christine A. Goeschel, ScD, MPA, MPS, RN[7]; Peter J. Pronovost, MD, PhD[7]; on behalf of the Bacteremia Zero Working Group

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Médico del M. D. Anderson es reconocido por haber inventado un catéter antimicrobiano que evita anualmente 25 000 muertes relacionadas con infecciones

por David Galloway

Extraído de *OncoLog*, septiembre 2004, Vol. 49, No. 9

El **Dr. Issam I. Raad**, profesor y director interino del Departamento de Enfermedades Infecciosas, Control de Infecciones y Salud de los Empleados, fue reconocido recientemente por haber inventado un catéter antimicrobiano que evita las infecciones, salvando 25 000 vidas al año. Aquí, el Dr. Raad hace una demostración a un paciente antes de insertar el catéter.

http://www2.mdanderson.org/depts/oncolog/sp/articles/04/9-sep/9-04-3.html

Annals of Internal Medicine

Central Venous Catheters Coated with Minocycline and Rifampin for the Prevention of Catheter-Related Colonization and Bloodstream Infections

A Randomized, Double-Blind Trial

Issam Raad, MD; Rabih Darouiche, MD; Jacques Dupuis, MD; Dima Abi-Said, PhD; Andrea Gabrielli, MD; Ray Hachem, MD; Matthew Wall, MD; Richard Harris, MD; James Jones, MD; Antonio Buzaid, MD; Claudia Robertson, MD; Salwa Shenaq, MD; Patrick Curling, MD; Thomas Burke, MD; and Charles Ericsson, MD

15 August 1997 | Volume 127 Issue 4 | Pages 267-274

Characteristic	Uncoated Catheter Group (n = 151)	Coated Catheter Group (n = 147)
Median age (range), y	56 (17–88)	58 (19–87)
Sex, n (%)		
Male	92 (61)	86 (58)
Female	59 (39)	61 (42)
Underlying disease or procedure, n (%)		
Cancer	34 (23)	35 (24)
Cardiopulmonary disease	37 (24)	40 (27)
Neurosurgery or head trauma	36 (24)	32 (22)
Abdominal surgery	36 (24)	30 (20)
Other	8 (5)	10 (7)
Neutropenia (<1000 polymorphonuclear cells/mm³), n (%)	5 (3)	5 (3)
Thrombocytopenia (<100 000 platelets/mm³), n (%)	10 (7)	12 (8)
Therapeutic interventions, n (%)		
Antibiotics	122 (81)	123 (84)
Blood products	15 (10)	21 (14)
Hyperalimentation	19 (13)	29 (20)
Interleukin-2	5 (3)	3 (2)
High-dose steroids	32 (21)	29 (20)
Other immunosuppressive drugs	11 (7)	11 (8)
Difficulty in catheter insertion, n (%)	6 (4)	7 (5)
Insertion site, n (%)		
Femoral vein	18 (12)	11 (8)
Jugular vein	46 (30)	46 (31)
Subclavian vein	87 (58)	90 (61)
Hospital site of insertion, n (%)		
Intensive care unit	98 (65)	91 (62)
Other	53 (35)	56 (38)
Median duration of catheterization (range), d	6 (1–21)	6 (1–28)
Reason for catheter removal, n (%)		
Catheter no longer needed	109 (72)	97 (66)
Suspected infection	18 (12)	24 (16)
Clotted catheter or thrombosis	1 (1)	3 (2)
Other	23 (15)	23 (16)

* No significant differences were seen between the two groups (P = 0.2).
† Unless otherwise indicated, values are the number (percentage) of patients.

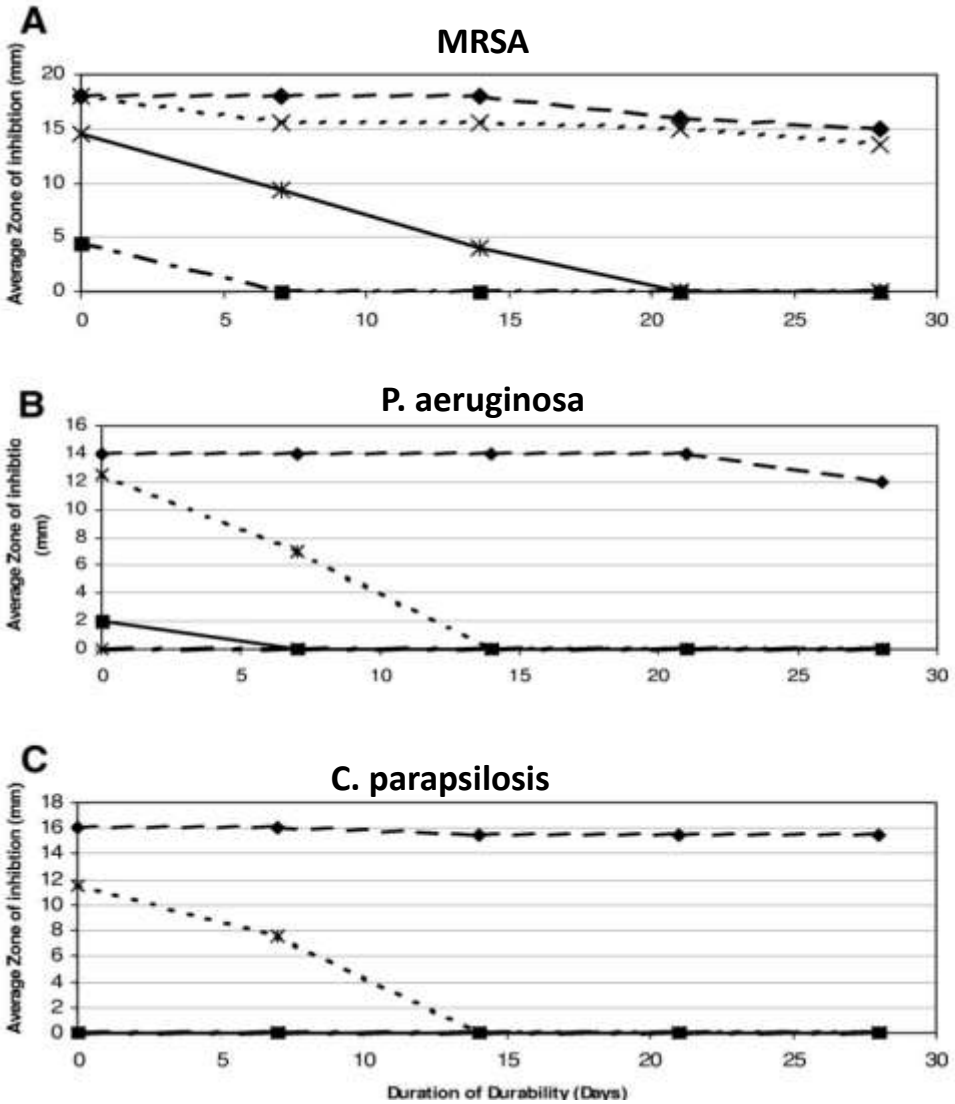
Variable	Uncoated Cultured Catheters (n = 136)	Coated Cultured Catheters (n = 130)	P Value
Catheter colonization, n (%)*	36 (26)	11 (8)	<0.001
Staphylococcus epidermidis	16 (12)	2 (2)	<0.001
Other coagulase-negative staphylococci	3 (2)	0	0.01
S. aureus	1 (1)	0	>0.2
Gram-negative bacilli	3 (2)	2 (2)	>0.2
Candida albicans	1 (1)	3 (2)	>0.2
C. tropicalis	0	1 (1)	>0.2
Polymicrobial	12 (9)	3 (2)	>0.02
Catheter-related bloodstream infections, n (%)†	7 (5)	0	<0.01
Infections confirmed by DNA typing, n (%)†	5 (4)	0	0.02
Infections/1000 catheter-days, n‡	7.34	0	<0.01
Infections confirmed by DNA typing/ 1000 catheter-days, n‡	5.16	0	0.03

* Catheter colonization was defined as the isolation of at least 15 colony-forming units of any organism by the roll-plate method or at least 10^3 colony-forming units by the sonication method. The Fisher exact test was used to compare the two groups. Relative risk for colonization for uncoated catheters was 3.13 (95% CI, 1.66 to 5.88).
† Exact log-rank test was used; relative risks were undefined.
‡ Binomial exact test was used.

ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, Oct. 2006, p. 3283–3288 Vol. 50, No. 10
0066-4804/06/$08.00+0 doi:10.1128/AAC.01622-05

Comparative In Vitro Efficacies and Antimicrobial Durabilities of Novel Antimicrobial Central Venous Catheters

Hend Hanna,* Paul Bahna, Ruth Reitzel, Tanya Dvorak, Gassan Chaiban, Ray Hachem, and Issam Raad



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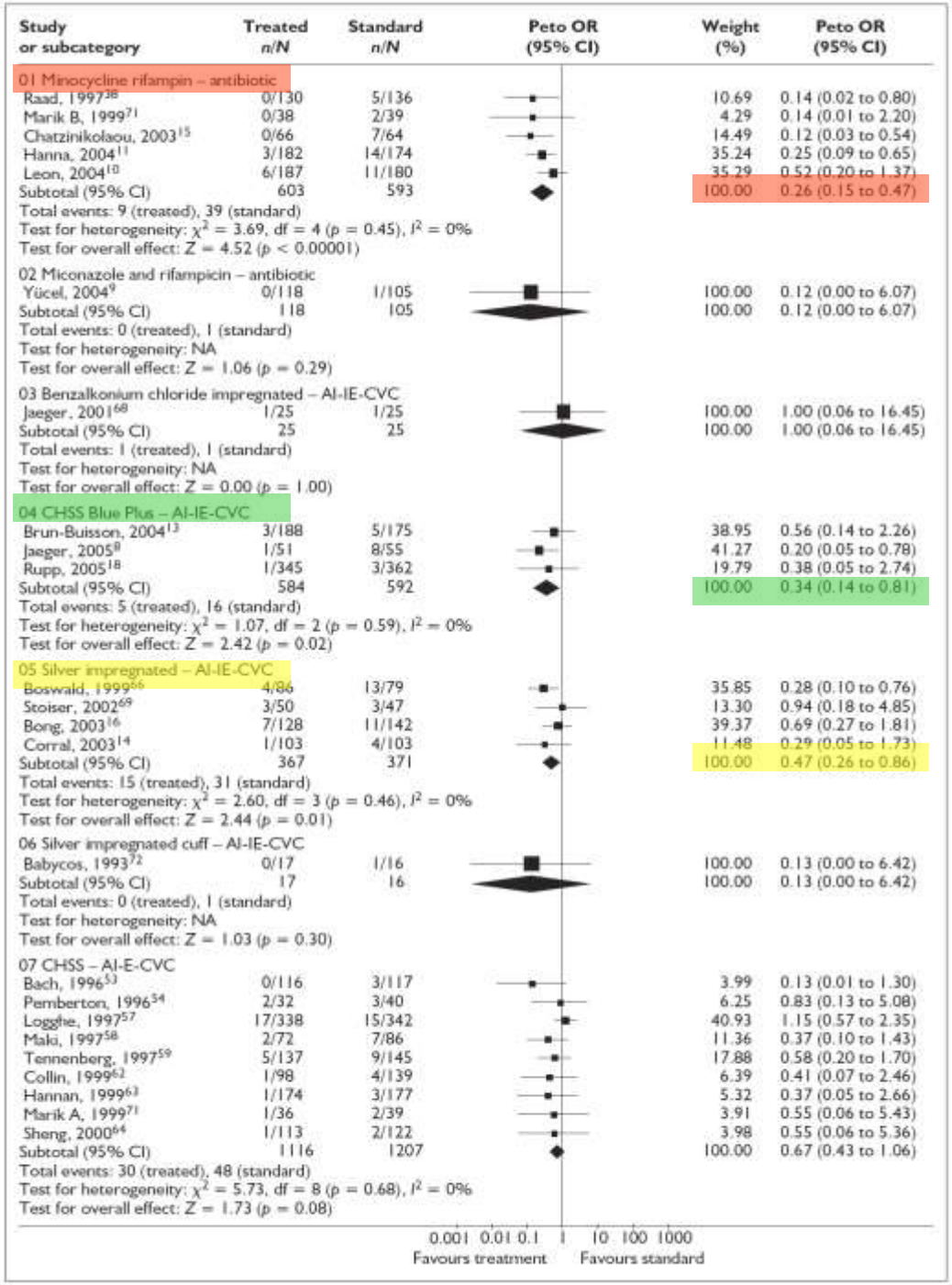

FIGURE 8 *CRBSI rates, subgrouped by different CVCs*

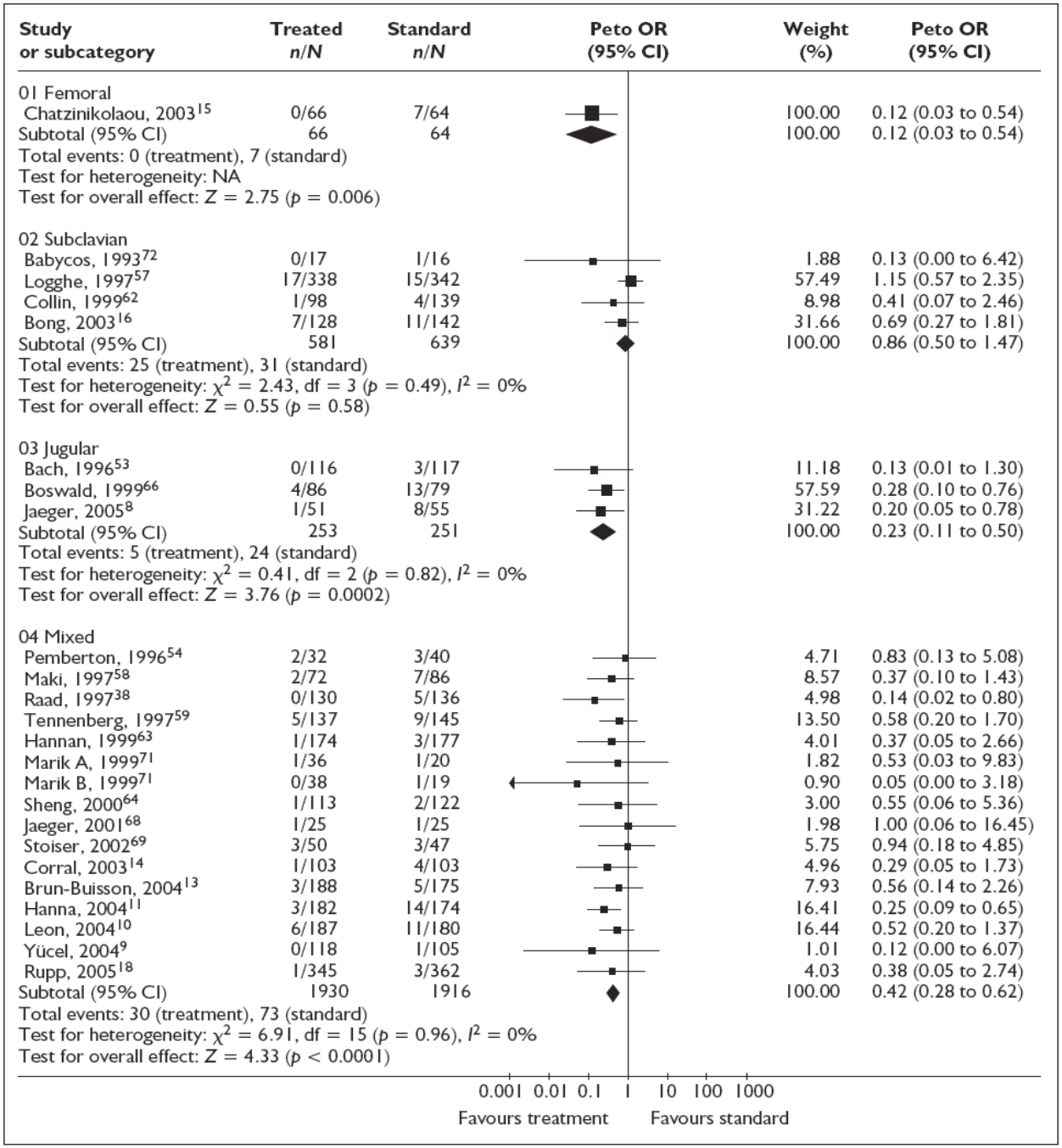

FIGURE 14 *CRBSI rates, subgrouped by insertion site*

The Use of Rifampicin-Miconazole–Impregnated Catheters Reduces the Incidence of Femoral and Jugular Catheter-Related Bacteremia

Leonardo Lorente,[1] Maria Lecuona,[2] María José Ramos,[2] Alejandro Jiménez,[3] María L. Mora,[1] and Antonio Sierra[2]

Departments of [1]Critical Care and [2]Microbiology and [3]Research Unit, Hospital Universitario de Canarias, La Laguna, Santa Cruz de Tenerife, Spain

Table 1. Characteristics of patients with either rifampicin-miconazole–impregnated catheters (RMC group) or standard catheters (SC group) placed at either the femoral or central jugular venous sites.

	Femoral placement			Central jugular placement		
Variable	RMC group (n = 73)	SC group (n = 111)	P	RMC group (n = 114)	SC group (n = 127)	P
No. of catheter-days	634	927		1107	1217	
Age, mean years ± SD	59.77 ± 17.71	58.05 ± 16.48	.24	64.10 ± 14.57	65.04 ± 14.23	.65
Male sex	47 (64.4)	78 (70.3)	.42	75 (65.8)	80 (63.0)	.69
APACHE II score, mean value ± SD	17.51 ± 5.49	17.35 ± 6.20	.77	16.55 ± 5.87	16.72 ± 7.18	.65
Diagnosis group			.97			.84
Cardiac surgery	11 (15.1)	21 (18.9)		18 (15.8)	16 (12.6)	
Cardiology	9 (12.3)	17 (15.3)		13 (11.4)	18 (14.2)	
Respiratory	17 (23.3)	22 (19.8)		27 (23.7)	37 (29.1)	
Digestive	12 (16.4)	18 (16.2)		33 (28.9)	34 (26.8)	
Neurological	10 (13.7)	15 (13.5)		15 (13.2)	16 (12.6)	
Traumatology	13 (17.8)	16 (14.4)		8 (7.0)	6 (4.7)	
Intoxication	1 (1.4)	2 (1.8)		0 (0)	0 (0)	
Order of catheter insertion			.41			.45
First	40 (54.8)	66 (59.5)		71 (62.3)	85 (66.9)	
Second	18 (24.7)	29 (26.1)		34 (29.8)	34 (26.8)	
Third	15 (20.5)	16 (14.4)		9 (7.9)	8 (6.3)	
Use of tracheostomy	25 (34.2)	36 (32.4)	.87	27 (23.7)	27 (21.3)	.76
Reintubation	9 (12.3)	10 (9.0)	.62	14 (12.3)	13 (10.2)	.68
Use of mechanical ventilation	68 (93.2)	101 (91.0)	.78	99 (86.8)	106 (83.5)	.48
Use of antimicrobial drugs	56 (76.7)	90 (81.1)	.58	92 (80.7)	98 (77.2)	.53
Use of total parenteral nutrition	7 (9.6)	12 (10.8)	.81	19 (16.7)	16 (12.6)	.46
Use of paralitic agents	9 (12.3)	13 (11.7)	.99	10 (8.8)	11 (8.7)	.99
Use of urinary catheter	71 (97.3)	106 (95.5)	.70	113 (99.1)	122 (96.1)	.22
Use of vasoactive agents	24 (32.9)	35 (31.5)	.87	41 (36.0)	41 (32.3)	.59
Use of propofol	23 (31.5)	31 (27.9)	.62	27 (23.7)	33 (26.0)	.77
Reason for catheter removal			.71			.85
Death	11 (15.1)	18 (16.2)		16 (14.0)	20 (15.7)	
Suspicion of catheter-related infection	28 (38.4)	45 (40.5)		31 (27.2)	32 (25.2)	
Catheter no longer needed	30 (41.1)	38 (34.2)		59 (51.8)	69 (54.3)	
Accidental removal	4 (5.5)	10 (9.0)		8 (7.0)	6 (4.7)	
Duration of catheter use, mean days ± SD	8.68 ± 4.90	8.35 ± 4.49	.77	9.71 ± 5.11	9.58 ± 4.55	.89
CVCRB	0 (0)	8 (7.2)	.02	0 (0)	6 (4.7)	.02
No. of CVCRB cases per 1000 catheter-days	0	8.62	.03	0	4.93	.04
Death	11 (15.1)	21 (18.9)	.56	16 (14.0)	21 (16.5)	.60

NOTE. Data are no. (%) of patients, unless otherwise indicated. APACHE, Acute Physiology and Chronic Health Evaluation; CVCRB, central venous catheter–related bacteremia.

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15 August 1997 | Volume 127 Issue 4 | Pages 267-274

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Other	8 (5)	10 (7)
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Thrombocytopenia (<100 000 platelets/mm³), n (%)	10 (7)	12 (8)
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Candida albicans	1 (1)	3 (2)	>0.2
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Polymicrobial	12 (9)	3 (2)	>0.02
Catheter-related bloodstream infections, n (%)†	7 (5)	0	<0.01
Infections confirmed by DNA typing, n (%)†	5 (4)	0	0.02
Infections/1000 catheter-days, n‡	7.34	0	<0.01
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* Catheter colonization was defined as the isolation of at least 15 colony-forming units of any organism by the roll-plate method or at least 10^3 colony-forming units by the sonication method. The Fisher exact test was used to compare the two groups. Relative risk for colonization for uncoated catheters was 3.13 (95% CI, 1.66 to 5.88).
† Exact log-rank test was used; relative risks were undefined.
‡ Binomial exact test was used.

Clinical and Economic Outcomes in Critically Ill Patients with Nosocomial Catheter-Related Bloodstream Infections

Stijn I. Blot,[1,3] Pieter Depuydt,[1] Lieven Annemans,[4] Dominique Benoit,[1] Eric Hoste,[1,3] Jan J. De Waele,[1] Johan Decruyenaere,[1] Dirk Vogelaers,[2] Francis Colardyn,[1] and Koenraad H. Vandewoude[1,3]

[1]Intensive Care Department and [2]Department of Infectious Diseases, Ghent University Hospital, [3]Hogeschool Gent, Health Care Department "Vesalius," and [4]Public Health, Ghent University, Ghent, Belgium

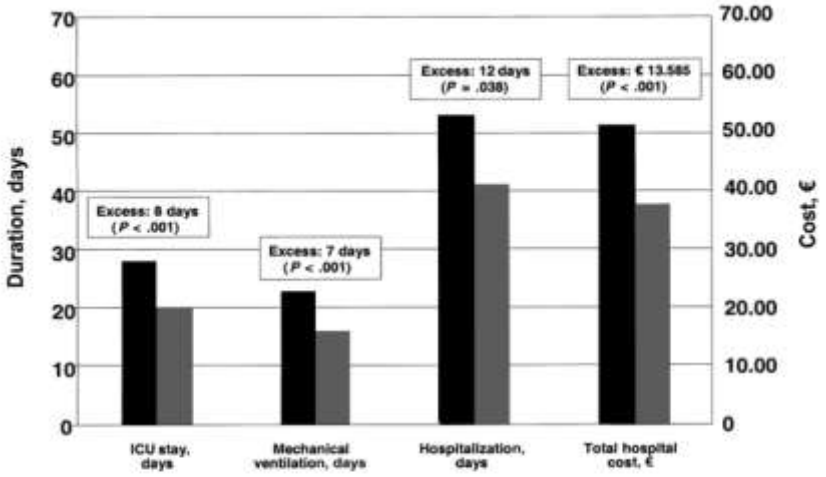

Figure 2. Economic determinants for critically ill patients with catheter-related bloodstream infection ($n = 176$) and for matched control patients ($n = 315$). Black bars represent patients with catheter-related bloodstream infection, and gray bars represent matched control patients. Values are expressed as medians, and excesses are calculated by subtracting the median value for the control subjects from the median value for the patients with catheter-related bloodstream infection.

Table 3. In-hospital mortality rates for subgroups of critically ill patients with catheter-related bloodstream infection (CR-BSI) and matched control patients.

Characteristic	No. of patients who died/ no. with characteristic (%)		*P*	Attributable mortality, % (95% CI)
	Patients with CR-BSI	Matched control patients		
Monomicrobial CR-BSI	42/146 (28.8)	71/262 (27.1)	.730	1.7 (−7.4 to 10.8)
Polymicrobial CR-BSI	7/30 (23.3)	11/53 (20.8)	.788	2.5 (−16.2 to 21.2)
CoNS in monomicrobial CR-BSI	19/72 (26.4)	37/133 (27.8)	.871	NA[a]
All CR-BSI without CoNS[b]	30/104 (28.8)	45/182 (24.7)	.446	4.1 (−6.6 to 14.8)
Gram-positive bacteria[c]	30/121 (24.8)	58/217 (26.7)	.796	NA
Staphylococcus aureus[c]	4/14 (28.6)	8/23 (34.8)	.779	NA
Gram-negative bacteria[c]	13/47 (27.7)	22/83 (26.5)	.999	1.2 (−14.7 to 17.1)
Candida species[c]	9/20 (45.0)	8/36 (22.2)	.128	22.8 (−2.9 to 48.5)
Prompt catheter removal[d]	41/154 (26.0)	71/273 (26.6)	.909	0.6 (−8.1 to 9.3)
Delayed catheter removal[d]	8/22 (36.4)	11/42 (26.2)	.406	10.2 (−13.9 to 34.3)
Appropriate antimicrobial therapy[e]	35/127 (27.6)	58/231 (25.1)	.617	2.5 (−7.1 to 12.1)
No appropriate antimicrobial therapy	11/38 (28.9)	18/65 (27.7)	.999	1.2 (−16.9 to 19.3)

Intensive Care Med (2004) 30:1891–1899
DOI 10.1007/s00134-004-2378-2

ORIGINAL

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Benefits of minocycline and rifampin-impregnated central venous catheters

A prospective, randomized, double-blind, controlled, multicenter trial

Table 2 Differences of central venous catheter colonization and catheter-related bloodstream infection (CRBSI) according to catheter type and culture Method

Data	Minocycline and rifampin-impregnated catheters (n=187)		Non-impregnated catheters (n=180)		Relative risk (95% CI)
	No. (%)	Episodes per 1000 catheter days	No. (%)	Episodes per 1000 catheter days	
Catheter colonization					
Semi-quantitative culture (roll-plate method)					
Hub	28 (15)	14.5	42 (23.3)	22.4	0.65 (0.4–1.05)
Subcutaneous segment	20 (10.7)	10.4	47 (26.1)	25.1	0.41 (0.25–0.7)
Tip	20 (10.7)	10.4	45 (25)	24	0.43 (0.26–0.73)
All sections (tip and/or subcutaneous segment and/or hub)					
Coagulase-negative staphylococci	13 (7)	6.8	52 (28.9)	27.8	0.24 (0.13–0.45)
Candida spp.	12 (6.4)	6.2	2 (1.1)	1.1	5.84 (1.31–26.1)
Quantitative culture (sonication method)					
Subcutaneous segment	26 (13.9)	13.5	40 (22.2)	21.4	0.63 (0.39–1.04)
Tip	17 (9.1)	8.8	34 (18.9)	18.2	0.49 (0.27–0.87)
All sections (tip and/or subcutaneous segment and/or hub)					
Coagulase-negative staphylococci	7 (3.7)	3.6	33 (18.3)	17.6	0.21 (0.09–0.47)
Candida spp.	10 (5.3)	5.2	2 (1.1)	1.1	4.87 (1.07–22.2)
Catheter-related bloodstream infection	6 (3.2)	3.1	11 (6.1)	5.9	0.53 (0.2–1.44)
Catheter-related clinical infectious complications	11 (5.9)	5.7	16 (8.9)	8.6	0.67 (0.31–1.44)
Patients given parenteral nutrition[a]	1 (1.6)	0.5	10 (13.9)	5.3	0.1 (0.01–0.76)
Patients given parenteral lipid emulsions[b]	2 (2.1)	1	13 (12.4)	6.9	0.15 (0.03–0.66)
Patients not given parenteral lipid emulsions[c]	9 (9.9)	4.7	3 (4)	1.6	2.92 (0.79–10.78)

[a] Minocycline and rifampin catheters, n=63; non-impregnated catheters, n=72
[b] Minocycline and rifampin catheters (including lipid-based parenteral nutrition), n=94; non-impregnated catheters, n=105
[c] Minocycline and rifampin catheters, n=91; non-impregnated catheters, n=75

Intensive Care Med (2004) 30:1891–1899
DOI 10.1007/s00134-004-2378-2

ORIGINAL

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Benefits of minocycline and rifampin-impregnated central venous catheters

A prospective, randomized, double-blind, controlled, multicenter trial

Table 2 Differences of central venous catheter colonization and catheter-related bloodstream infection (CRBSI) according to catheter type and culture Method

Data	Minocycline and rifampin-impregnated catheters (n=187)		Non-impregnated catheters (n=180)		Relative risk (95% CI)
	No. (%)	Episodes per 1000 catheter days	No. (%)	Episodes per 1000 catheter days	
Catheter colonization					
Semi-quantitative culture (roll-plate method)					
Hub	28 (15)	14.5	42 (23.3)	22.4	0.65 (0.4–1.05)
Subcutaneous segment	20 (10.7)	10.4	47 (26.1)	25.1	0.41 (0.25–0.7)
Tip	20 (10.7)	10.4	45 (25)	24	0.43 (0.26–0.73)
All sections (tip and/or subcutaneous segment and/or hub)					
Coagulase-negative staphylococci	13 (7)	6.8	52 (28.9)	27.8	0.24 (0.13–0.45)
Candida spp.	12 (6.4)	6.2	2 (1.1)	1.1	5.84 (1.31–26.1)
Quantitative culture (sonication method)					
Subcutaneous segment	26 (13.9)	13.5	40 (22.2)	21.4	0.63 (0.39–1.04)
Tip	17 (9.1)	8.8	34 (18.9)	18.2	0.49 (0.27–0.87)
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[a] Minocycline and rifampin catheters, n=63; non-impregnated catheters, n=72
[b] Minocycline and rifampin catheters (including lipid-based parenteral nutrition), n=94; non-impregnated catheters, n=105
[c] Minocycline and rifampin catheters, n=91; non-impregnated catheters, n=75

Annals of Internal Medicine | ARTICLE

Effect of a Second-Generation Venous Catheter Impregnated with Chlorhexidine and Silver Sulfadiazine on Central Catheter–Related Infections

A Randomized, Controlled Trial

Mark E. Rupp, MD; Steven J. Lisco, MD; Pamela A. Lipsett, MD; Trish M. Perl, MD, MSc; Kevin Keating, MD; Joseph M. Civetta, MD; Leonard A. Mermel, DO, ScM; David Lee, MD; E. Patchen Dellinger, MD; Michael Donahoe, MD; David Giles, MD; Michael A. Pfaller, MD; Dennis G. Maki, MD; and Robert Sherertz, MD

Variable	Control Catheter Group	Antiseptic Catheter Group
Definite and possible catheter colonization, *n (%)*†	59 (16.3)	32 (9.3)
Colonization/1000 catheter-days	24.1	13.3
De novo insertion, *n (%); rate/1000 d*	42 (17.3); 23.8	17 (7.4); 10.4
Guidewire exchange, *n (%); rate/1000 d*	17 (14.3); 24.9	15 (13); 19.1
Microbiological characteristics, *n*		
Coagulase-negative staphylococci	42	22
Staphylococcus aureus	10	4
Enterococcus sp.	6	6
Diptheroid	12	3
Gram-negative bacilli	9	1
Candida sp.	2	4
Other	1	2
Polymicrobic	19	9
Definite CVC-associated BSI, *n (%)*	3 (0.8)	1 (0.3)
BSI/1000 catheter-days	1.24	0.42
De novo insertion, *n (%); rate/1000 d*	3 (1.25); 1.7	1 (0.4); 0.6
Guidewire exchange, *n (%); rate/1000 d*	0	0
Microbiological characteristics, *n*		
S. aureus	2	0
Enterococcus sp.	0	1
Gram-negative bacilli	1	0
Candida sp.	0	1
Polymicrobic	0	1
Definite and possible CVC-associated BSI, *n (%)*‡	8 (2.2)	6 (1.7)
BSI/1000 catheter-days	3.27	2.48
De novo insertion, *n (%); rate/1000 d*	6 (2.5); 3.4	2 (0.9); 1.2
Guidewire exchange, *n (%); rate/1000 d*	2 (1.7); 2.9	4 (3.5); 5.1
Microbiological characteristics, *n*		
Coagulase-negative staphylococci	2	1
S. aureus	3	1
Enterococcus sp.	2	2
Gram-negative bacilli	1	0
Candida sp.	0	3
Other	1	0
Polymicrobic	1	2

Can Antibiotic-Coated Catheters Help Decrease the Incidence of Bloodstream Infections in Patients in the Intensive Care Unit?

Summaries for Patients are a service provided by *Annals* to help patients better understand the complicated and often mystifying language of modern medicine.

The full report is titled "Effect of a Second-Generation Venous Catheter Impregnated with Chlorhexidine and Silver Sulfadiazine on Central Catheter–Related Infections. A Randomized, Controlled Trial." It is in the 18 October 200[illegible] *Annals*.

What is the problem and what is known about it so far?

Doctors commonly insert long thin plastic tubes (catheters) into the veins of critically ill patients to deliver fluids and medicines and also to measure pressures inside blood vessels near the heart. This type of catheter (central venous catheter) is inserted into a large vein in the neck (jugular vein) or under the collarbone (subclavian). Although central venous catheters can be very useful, they also have a significant risk for becoming contaminated (colonized) with bacteria, which may then spread to the bloodstream. One potentially useful approach to preventing bacterial colonization and spread is using a catheter that has been coated with an antiseptic. A new catheter, which is coated on both its outer surface and its inner surface, has recently been developed.

Why did the researchers do this part[illegible]

To find out whether this [illegible] infection[illegible]

What are the implications of this study?

Because bacterial colonization of catheters usually precedes bloodstream infection, antibiotic-coated catheters are potentially useful in preventing such infections. Also, the rate of infection in the control group (without the antiseptic-coated catheters) was lower than expected, most likely because of the careful attention paid to aseptic technique during insertion and dressing changes. This implies that serious infections in our hospitals could be avoided with simple preventive measures.

[illegible]ection,

[illegible] control catheters but only 9% of the coated catheters became [illegible]ized. When existing catheters were replaced with study catheters, approximately 10% of the control catheters became colonized whereas none of the antiseptic-coated catheters were affected. Definite spread of bacteria to the bloodstream occurred from 3 control catheters but only from 1 coated catheter. Possible bloodstream infection occurred in 5 additional patients from each group. An equal number of deaths occurred in each group, all attributable to the underlying illness rather than to the catheter.

What are the limitations of the study?

Because there were so few instances of spread of bacteria to the bloodstream in either group, the study could not determine with certainty whether the antiseptic-coated catheter actually protected against infection.

What are the implications of this study?

Because bacterial colonization of catheters usually precedes bloodstream infection, antibiotic-coated catheters are potentially useful in preventing such infections. Also, the rate of infection in the control group (without the antiseptic-coated catheters) was lower than expected, most likely because of the careful attention paid to aseptic technique during insertion and dressing changes. This implies that serious infections in our hospitals could be avoided with simple preventive measures.

EFFECT OF NURSE STAFFING AND ANTIMICROBIAL-IMPREGNATED CENTRAL VENOUS CATHETERS ON THE RISK FOR BLOODSTREAM INFECTIONS IN INTENSIVE CARE UNITS

Juan Alonso-Echanove, MD; Jonathan R. Edwards, MS; Michael J. Richards, MB, BS; Patrick Brennan, MD; Richard A. Venezia, PhD;

TABLE 2
CHARACTERISTICS OF THE CENTRAL VENOUS CATHETERS, NATIONAL NOSOCOMIAL INFECTIONS SURVEILLANCE SYSTEM–DETAILED ICU SURVEILLANCE COMPONENT STUDY, 1997 TO 1999

Variable	No.	
Total CVC-days	56,627	-
Mean CVC-days (± SD)	6.6 (± 5)	-
Type of CVC		
Nontunneled	5,185	60
Swan-Ganz	2,203	26
PICC	637	7
Central hemodialysis	498	6
Other*	70	1
Insertion site		
Internal jugular vein	3,751	44
Subclavian vein	3,204	37
Femoral vein	932	11
Arm	697	8
CVC characteristics		
Multiple lumens	7,542	88
Needleless access system	5,314	62
First CVC in the patient	3,696	43
Overlapping CVC†	2,384	28
CVC in place 48 hours after ICU discharge	319	4
TPN	2,365	28
Insertion in OR or SPR	2,129	25
Antimicrobial impregnated‡	1,774	21
Inserted by guidewire exchange	1,578	18
No antibiotic given for 48 hours after insertion	1,088	13

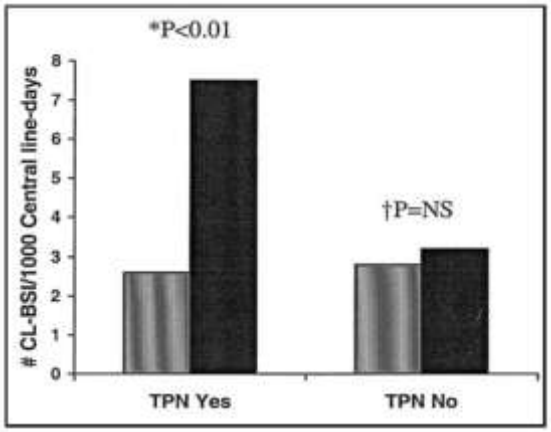

FIGURE 1. Effect of the use of total parenteral nutrition (TPN) on the protective role of antimicrobial-impregnated central venous catheters (CVCs), National Nosocomial Infections Surveillance System–Detailed ICU Surveillance Component Study, 1997 to 1999. The lighter bars represent bloodstream infection (BSI) rates per 1,000 CVC-days for non–antimicrobial-impregnated CVCs. The darker bars represent BSI rates per 1,000 CVC-days for antimicrobial-impregnated CVCs. *Relative risk, 0.41; 95 confidence interval, 0.22 to 0.75. †Relative risk, 0.95; 95 confidence interval, 0.61 to 1.48. CL-BSI = central venous catheter–associated bloodstream infection; NS = not significant.

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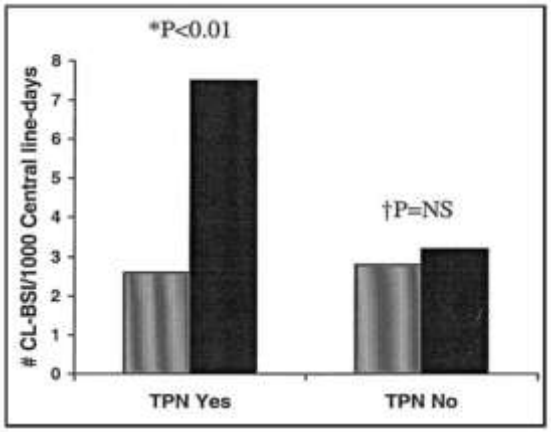

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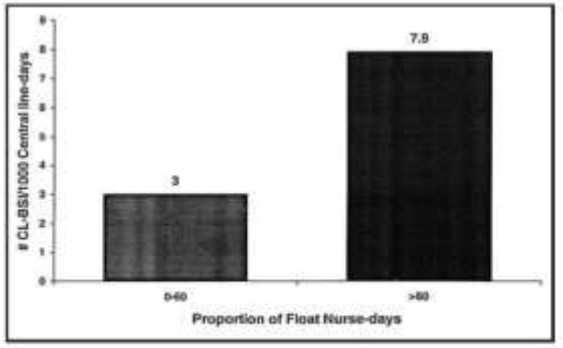

FIGURE 2. Effect of float nurses on the risk for central venous catheter–associated bloodstream infections, National Nosocomial Infections Surveillance System–Detailed ICU Surveillance Component Study, 1997 to 1999. Rate ratio, 2.61; 95 confidence interval, 1.21 to 5.59. CL-BSI = central venous catheter–associated bloodstream infection.

Què podem fer per evitar les infeccions? Estratègies de prevenció

Dissenyar un protocol aplicable

Fugir de les revisions bibliogràfiques

Emfatitzar els punts “FEBLES”

Monitoratge d’indicadors de procés i resultat

Feedback (dificultats vs culpables)

La tecnologia ajuda, no relaxa

Cooperació direcció mèdica

SERVEI DE MEDICINA INTENSIVA
CONSORCI SANITARI DEL MARESME

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