

Qu'est-il arrivé aux BLSE ?

14 h 00 – 14 h 30

Prévention de la transmission

Bertrand Souweine (Clermont-Ferrand)

Qu'est-il arrivé aux BLSE ?

- | | |
|---|--|
| <ul style="list-style-type: none">• TEM• SHV• <i>K pneumoniae</i> +++• Épidémie nosocomiale• Réa et Long séjour• Transmission croisée• Sélection AB | <ul style="list-style-type: none">• CTX-M• Gène chromosomique résident chez <i>Kluyvera</i>• Cefotaximase > Ceftazidimase• <i>E Coli</i> +++• Communautaire et nosocomiale• Pandémie mondiale• Sélection AB +++• Transmission croisée |
|---|--|

Retard à l'AB efficace, impact pronostique
Réservoirs multiples, transmission interhumaine

Plan

- **Transmission interhumaine**
- **Prévention de la transmission**
 - **dépistage**
 - **incidence à l'admission**
 - **Réservoir**
 - **SDD**
 - **Mesures barrières**

**Diffusion
chez les hommes et
entre les hommes de
CTX-M ?**

Spread of *Escherichia coli* Strains with High-Level Cefotaxime and Ceftazidime Resistance between the Community, Long-Term Care Facilities, and Hospital Institutions

103 *E Coli* BLSE, CTX-M 15 génétiquement reliés

92/103 (60%) acquisition nosocomiale

Jesús Oteo JOURNAL OF CLINICAL MICROBIOLOGY, July 2006, p. 2359–2366

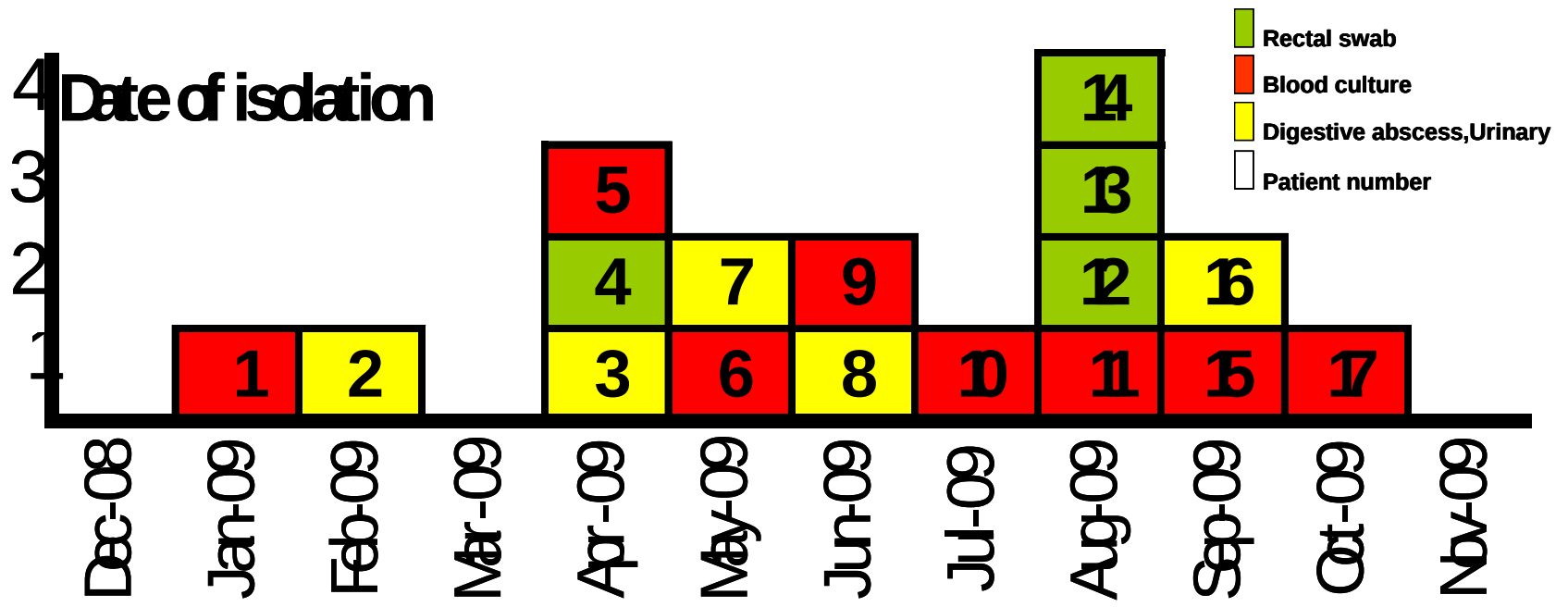
Spread of Extended-Spectrum β -Lactamase CTX-M-Producing *Escherichia coli* Clinical Isolates in Community and Nosocomial Environments in Portugal[▽]

119 *E Coli* BLSE, CTX-M

Sur 47 *E Coli* BLSE d'acquisition nosocomiale, 41 sont reliés à un même cluster et ont diffusé sur 3 sites hospitaliers

Nuno Mendonca. ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, June 2007, p. 1946–1955

Outbreak of CTX-M15 producing *K pneumoniae*



How important is patient-to-patient transmission in extended-spectrum β -lactamase *Escherichia coli* acquisition

Anthony D. Harris, MD, MPH,^{a,b} Mamuka Kotetishvili, PhD,^a Simone Shurland, MS,^a Judy A. Johnson, PhD,^b
I. Glenn Morris, MD, MPH,^a Lucia L. Nemov, MD,^{a,b} and I. Kristie Johnson, PhD^a (Am J Infect Control 2007;35:97-101)

3-year study

10-bed MICU and 19-bed SICU

Patients had perianal cultures on admission, weekly and upon discharge

1806 patients admitted to the ICUs

97 had ESBL-producing E coli,

74 present on admission (4%),

23 ICU acquired

14 unique type and 3 genetically related

13% cross transmission

27 patients acquired ESBL-producing KP

sommaire

Volume XVII - N° 2 - Avril 2009



THÉMATIQUE

Recommandations nationales

Prévention de la transmission croisée :
précautions complémentaires contact

Consensus formalisé d'experts
Avril 2009

entérobactéries productrices
d'une bêtalactamase à spectre étendu (EBLSE)

Politique générale

Politique spécifique

dépistage

décontamination

stratégie

mesures à mettre en œuvre

mains

EPI

organisations des soins

gestion dispositifs

circulation de patients

Politique générale (R1-3)

CLIN peut décider une stratégie limitée aux précautions standards des patients ESBLE si

PHA proches des patients,

consommation élevée de PHA

bonne observance mesurée à l'hygiène des mains

forte proportion d'utilisation des PHA

bon usage des gants

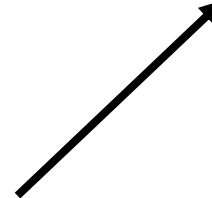
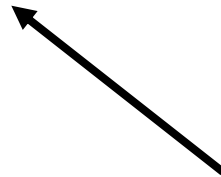
**connaissance de la prévalence des BMR concernées
sur des prélèvements de dépistage**

En pratique

adjoindre des précautions complémentaires de type contact (PC) aux précautions standards si ESBLE

outbreak

non-outbreak



Setting

How to prevent cross transmission in ICU

screening

Systematic surveillance cultures or screening limited to high risk patients

For epidemiologic purpose

To apply specific measures to colonized patients

Incidence of ESBL carriage on ICU admission

A 4-year retrospective study in two adult ICUs between 1999 and 2002

TABLE 2
RESULTS OF SCREENING CULTURES IN BOTH INTENSIVE CARE UNITS

ICU	No. of Admitted Patients	No. (Rate) of Specimens Screened	No. (Rate) of Patients With Positive Results on Screening Test	No. of Carriers Identified
Medical	1,825	1,475 (80.8%)	20 (1.35%)	10 (0.68%)
Surgical	1,853	1,408 (76.0%)	8 (0.57%)	3 (0.21%)
Total	3,678	2,883 (78.4%)	28 (0.97%)	13 (0.45%)

ICU = intensive care unit.

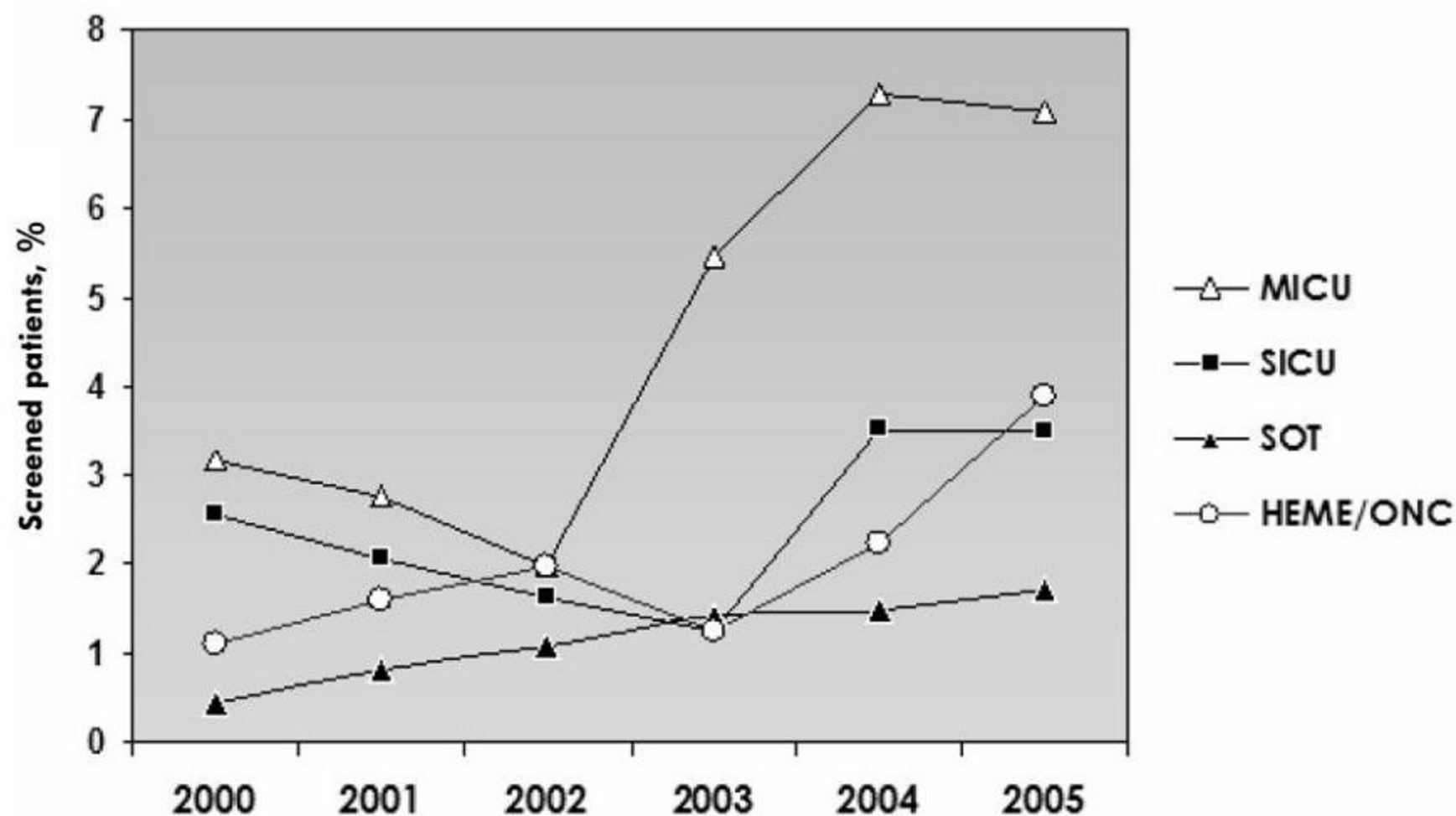
- a 3.5 year cohort prospective study in MICU/SICU
- admission cultures in 5209 patients
- 117 (2.2%) colonized with
ESBL- producing *E coli* or *Klebsiella* spp

Table 2. Independent predictors of ESBL-producing bacteria colonization in multivariable logistic regression model*

Predictor	OR	95% CI
Age >60	1.79	1.24, 2.60
CDS-ID	1.15	1.04, 1.27
Vancomycin†	2.11	1.34, 3.31
Piperacillin-tazobactam†	2.05	1.36, 3.10

†Antimicrobial drug exposures were assessed during the period between hospital admission and intensive care unit admission.

Percentage of screened patients colonized with : an extended-spectrum β -lactamase–producing Enterobacteriaceae



**Colonization of patients
with ESBL-producing
Enterobacteriaceae on ICU
admission ranges
between
0.54% - 7%!**

CONTROL OF ENTEROBACTERIACEAE PRODUCING EXTENDED-SPECTRUM BETA-LACTAMASE IN INTENSIVE CARE UNITS: RECTAL SCREENING MAY NOT BE NEEDED IN NON-EPIDEMIC SITUATIONS

Michelle Thouverez: Daniel Talon, PhD: Xavier Bertrand, PhD

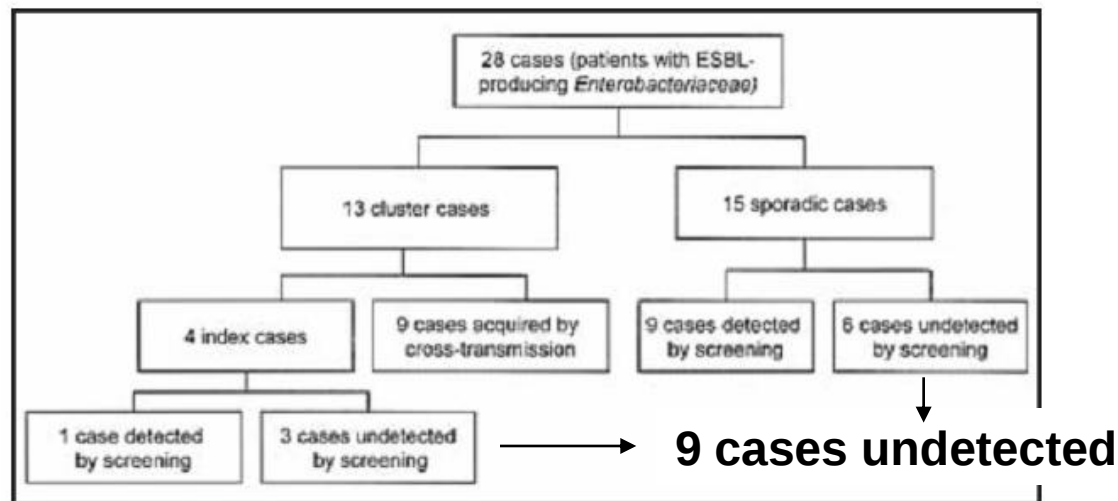


FIGURE. Classification of the patients with a positive result on a screening test for extended-spectrum beta-lactamase (ESBL)-producing *Enterobacteriaceae*.

Prévalence à l'admission = 0,97%

**19 importés
9 acquis**

Dépistage en réanimation (R58-60)

Situation d'épidémie récente

**Situation d'épidémie installée (endémo-épidémique)
si souche ou espèce épidémique**

**Ne pas dépister à la sortie en l'absence de dépistage
préalable**

Reservoir

Environment / fomite

Patient / personnel

Characterization of CTX-M-15-Producing *Klebsiella pneumoniae* and *Escherichia coli* Strains Isolated from Hospital Environments in Algeria

ABDELAZIZ TOUATI,¹ SAID BENALLAOUA,¹ FERHAT DJOUDI,¹ JANICK MADOUX,²
LUCIEN BRASME,² and CHRISTOPHE DE CHAMPS²

TABLE 1. CHARACTERISTICS AND SUSCEPTIBILITY OF THE THREE ISOLATES PRODUCING CTX-M-15

Isolates	Hospital	Wards ^a	MICs (μg/ml) ^b												pl	Other resistance markers
			Ctx	Caz	Cro	Cpd	Fep	Tic	Tcc	Amx	Amc	Fox	Imp	Cip		
<i>K. pneumoniae</i> S4	Amizour	CHR	>256	64	>256	64	32	>256	32	>256	16	2	0.125	0.5	5.4+ 7.6+ 8.6	Tet, Tob, Kan, Gen and Sxt
<i>K. pneumoniae</i> S5	Amizour	MED	>256	32	>256	64	32	>256	32	>256	16	4	0.125	0.5	5.4+ 7.6+ 8.6	Tob, Kan, Gen and Sxt
<i>E. coli</i> S16	Khelile-Amrane	CHR	>256	32	>256	64	32	>256	24	>256	16	4	0.125	0.5	5.4+ 8.6	Tet, Tob Kan, Gen and Sxt

^aCHR, chirurgical (surgical) ward; MED, medical ward

**MOLECULAR EPIDEMIOLOGY OF EXTENDED-SPECTRUM
BETA-LACTAMASE-PRODUCING ENTEROBACTERIACEAE
ISOLATED FROM ENVIRONMENTAL AND
CLINICAL SPECIMENS IN A CARDIAC SURGERY
INTENSIVE CARE UNIT**

Guillaume Kac

A 17-bed cardiac surgery ICU

2 rooms with 5 beds, 1 with 4, 1 with 2 and 1 with 1

Extensive contamination of the environment

26% (62/176) environmental cultures yielded ESBL

***K oxytoca* (N=37), *E aerogenes* (N=12), *C freudii* (N=9), *C diversens* (=4)**

faucets

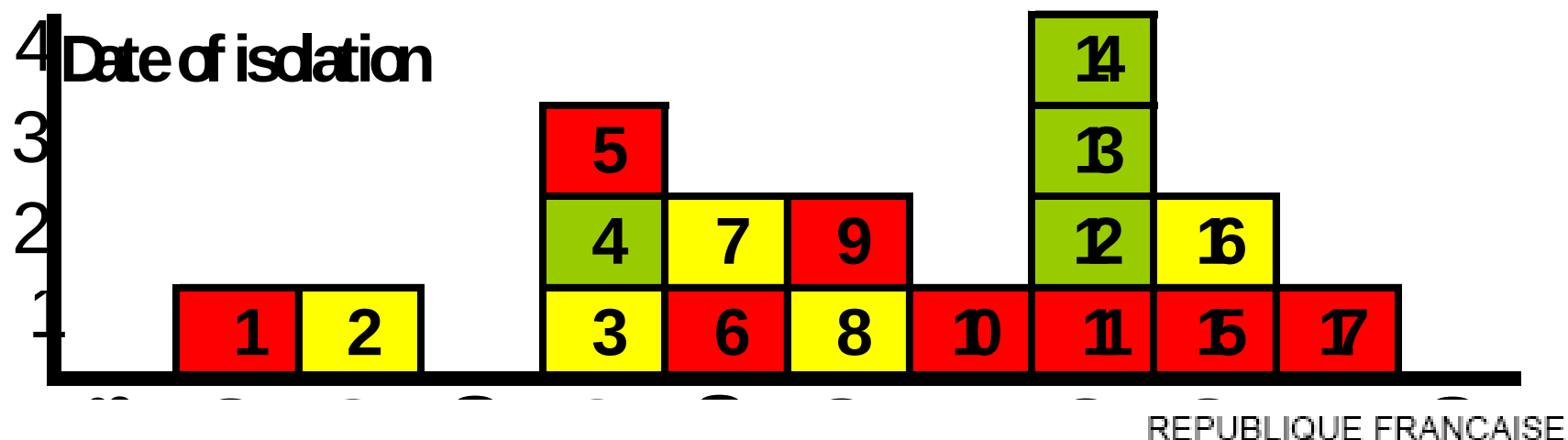
sinks drains

Joints of the countertops

43 clinical strains from 34 patients

4 identical between environmental and clinical strains

Outbreak of CTX-M producing *K pneumoniae*



Agence française de sécurité sanitaire
des produits de santé

**DIRECTION DE L'EVALUATION
DES DISPOSITIFS MÉDICAUX**

Département des vigilances
DVI-DOCS

Saint-Denis, le 10/10/2009

Référence du document : DM-RECO 09/...

A l'attention du directeur d'établissement et
du correspondant local de matériovigilance
pour diffusion aux services d'endoscopie et
d'hygiène.

INFORMATION DE SECURITE
concernant les duodénoscopes TJF 145 de la société Olympus

dispositifs / équipements (R108-114)

individualisation du matériel ré-utilisable

nettoyage et trt habituels de ces matériels

limiter le stockage dans la chambre

éliminer les EPI dans la chambre avant de sortir

ne pas jeter consommable non utilisé à la sortie

circuit vaisselle, linge, ordures ménagères circuit standard

**urines éliminées dans le circuit collectif sans
décontamination**

Table 1. Characteristics of ICU patients with cases of infection and/or colonization due to ESBL-producing *Klebsiella pneumoniae* strains during two periods of SDD.

Characteristic	Period 1 (7 mo; <i>n</i> = 239)	Period 2 (5 mo; <i>n</i> = 165)	<i>P</i> value
ICU-referred cases	5 (2.1)	2 (1.2)	NS
ICU-acquired cases	24 (10.0)	15 (9.1)	
Acquisition in digestive tract	10 (42)	9 (60)	.2
Mean time to acquisition $\pm$ SD in d (median)	16.3 $\pm$ 13.2 (15.0)	16.3 $\pm$ 11.0 (13.0)	>.25
Infected patients	18 (75)	6 (40)	.04
Infections	23	7	
Extraintestinal infected or colonized sites	31*	13 [†]	

Décontamination en réanimation (R82-83)

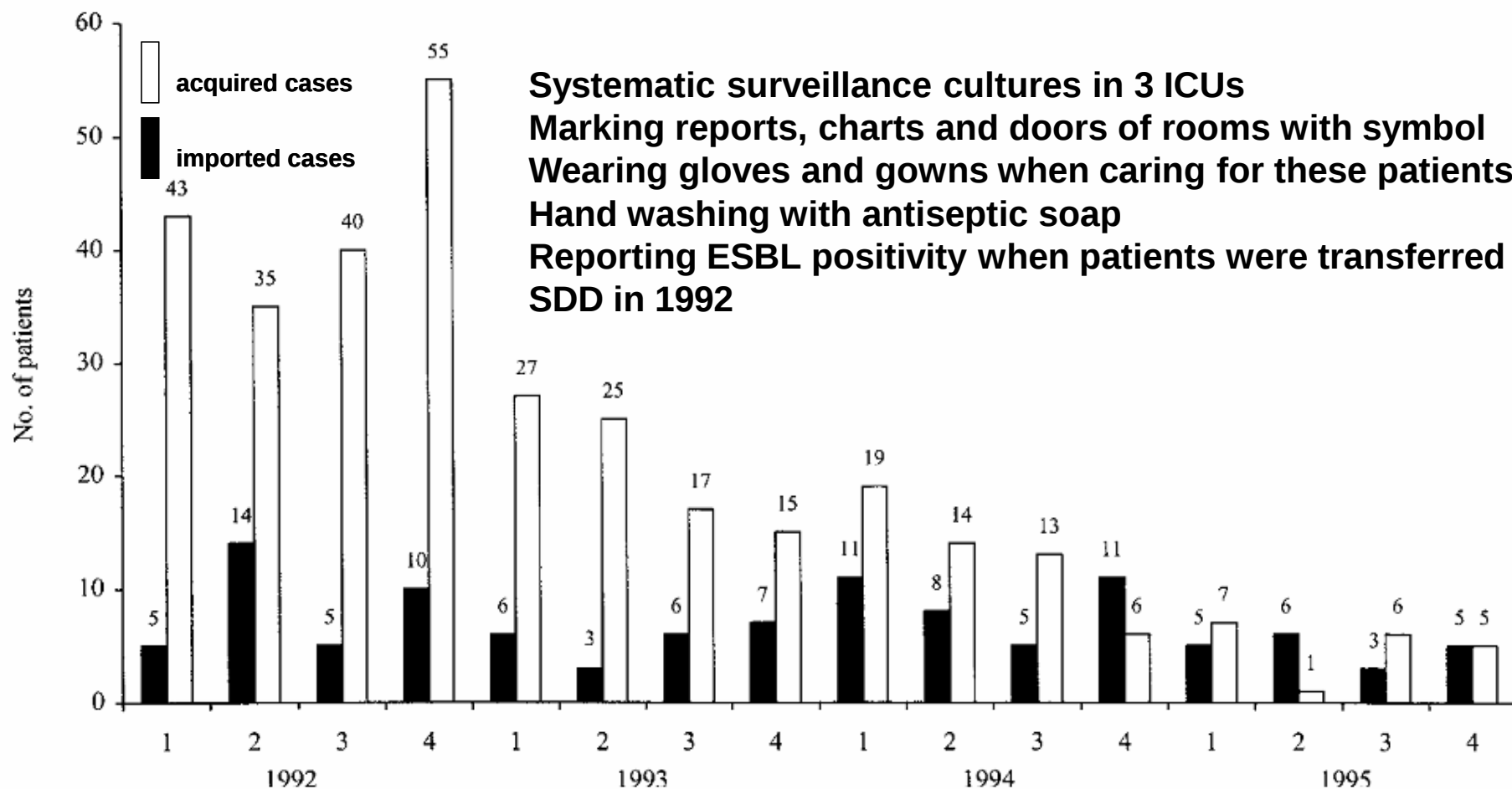
Ne pas tenter l'éradication du portage digestif d'EBLSE par antimicrobiens non absorbables ou systémiques en situation d'épidémie récente ou installée

Ne pas traiter à visée collective (prévention de la dissémination) une colonisation urinaire (bactériurie asymptomatique) avec des ESBLSE avec AB systémiques

Barrier precautions in outbreaks

Control of a Prolonged Outbreak of Extended-Spectrum β -Lactamase-Producing Enterobacteriaceae in a University Hospital

No. of patients from whom extended-spectrum β -lactamase-producing Enterobacteriaceae (ESBLPE) were isolated



Compliance with isolation procedures
after break in continuity of care^b

9/79 (11.4)

2/4 (50.0)^a

Evaluation of the contribution of isolation precautions in prevention and control of multi-resistant bacteria in a teaching hospital

Table II *Evolution of the incidence of methicillin-resistant Staphylococcus aureus and extended-spectrum β -lactamase producing Enterobacteriaceae per 1000 patient-days*

MRB	02/99– 05/99	06/99– 09/99	10/99– 01/00	P for trend
MRSA	0.95	0.95	0.78	Not significant
ESBL	0.51	0.38	0.23	<0.0001

Screening in ICUs

Contact precaution similar to CDC guidelines

Education of hospital staff

No changes in AB policy occurred during the year

Role of infection control measures in limiting morbidity associated with multi-resistant organisms in critically ill patients

Table IV *Frequency of infected or colonized patients and of infected patients according to aetiological agent*

Patients	PI ^a
	No. (%)
Infected or colonized with MRSA ^c	18 (7.7)
Infected or colonized with KPESBL ^d	4 (1.7)

10-bed MICU

P1, between 05/01/1994 and 04/30/1995

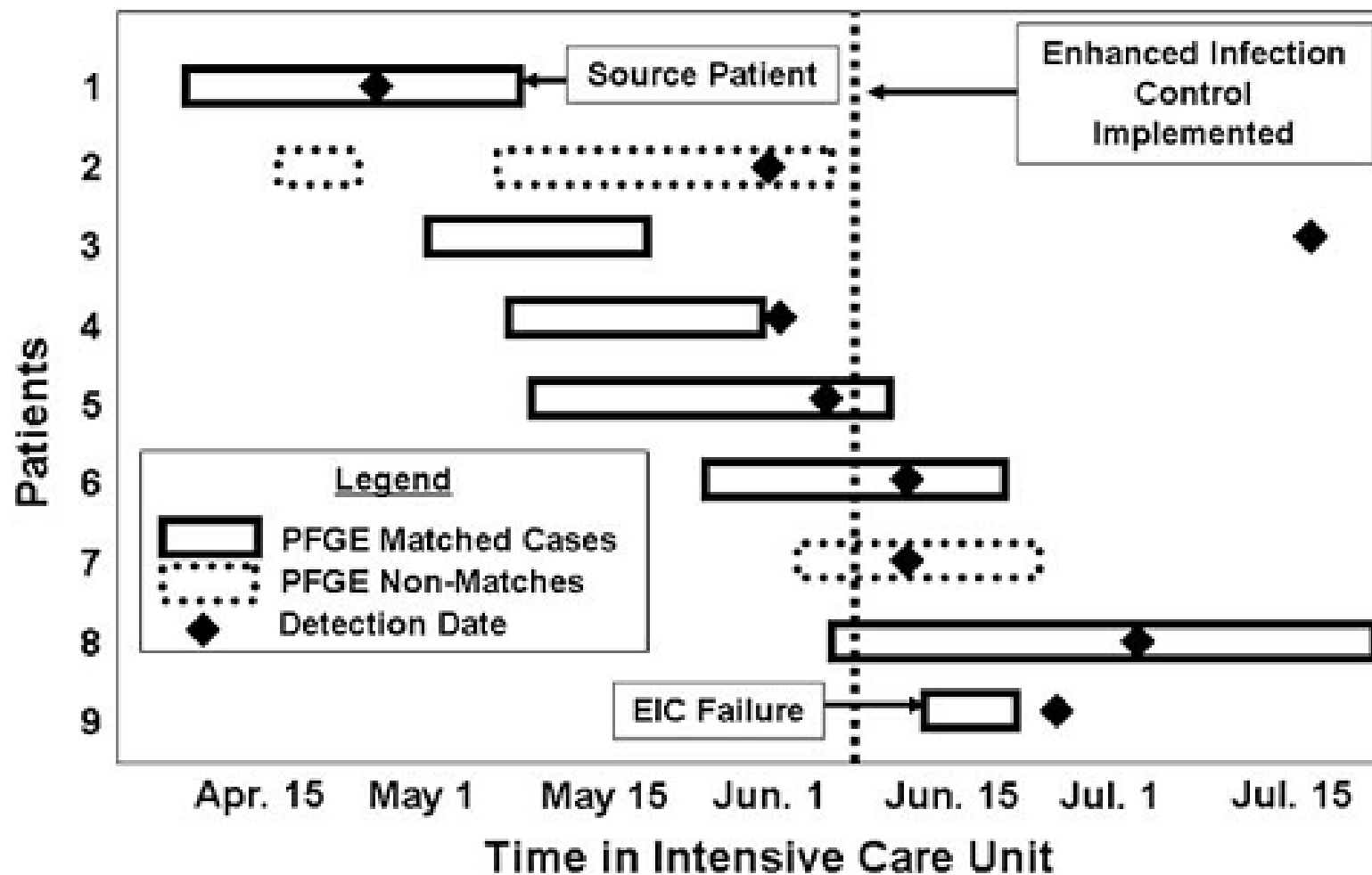
private rooms but neither isolation procedures nor surveillance cultures

P2, between 05/01/1995 and 04/30/1996

barrier precaution in accordance to HICPAC guidelines,
systematic surveillance cultures on admission, weekly and at discharge
Attempt to limit overuse of ABs

Positive cultures were not recorded as colonizations or infections

contact precaution until discharge
cohorting patients in adjacent private room
dedicated nursing staff
weekly terminal room cleaning
weekly peri-rectal swabs for cultures

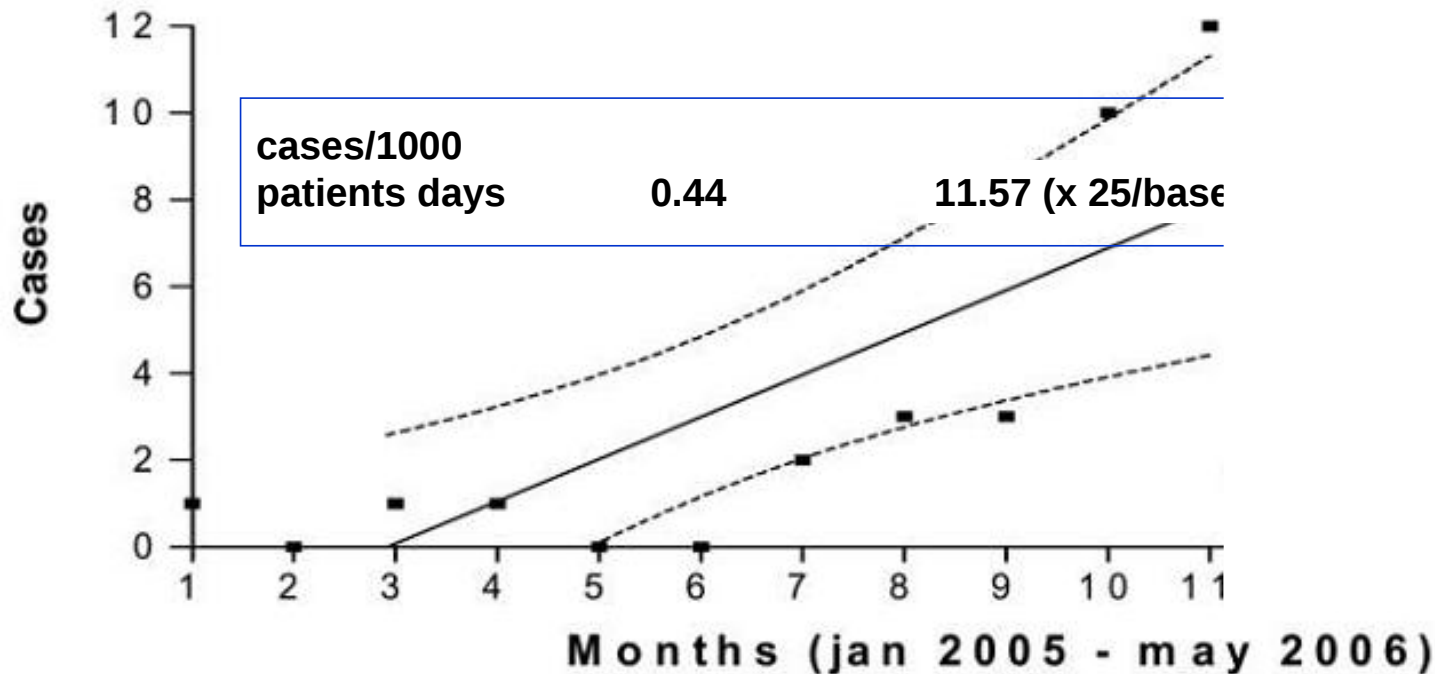


enhanced infection control measures in ESBL –positive patients

Intensive Care Unit Outbreak of Extended-Spectrum β -Lactamase-Producing *Klebsiella Pneumoniae* Controlled by Cohorting Patients and Reinforcing Infection Control Measures

C. Laurent, MD; H. Rodriguez-Villalobos, MD; F. Rost, RN; H. Strale, RN; J.-L. Vincent, MD, PhD;
A. Deplano, MSc; M. J. Struelens, MD, PhD; B. Byl, MD, PhD

admission and biweekly surveillance cultures
contact isolation precautions in ICU carriers



CTXM-15 recovered in 77% of the cases

Barrier precautions in endemic setting

Impact and cost of infection control measures to reduce nosocomial transmission of extended-spectrum β -lactamase-producing organisms in a non-outbreak setting

Cases were identified from clinical specimen yielding ESBL-positive organism

**Infection control intervention
on December 1, 2001**

**Private room
for the duration of hospital stay**

Contact precautions 

**as long as the patient met any of
the following criteria**

**ICU admission
uncontained drainage from
culture-positive site
diarrhea or incontinent of urine
or stool**

**Gown and gloves use
for anyone entering the
patient's room**

**Hand hygiene
entering and exiting the room**

Dedicated patient care equipment

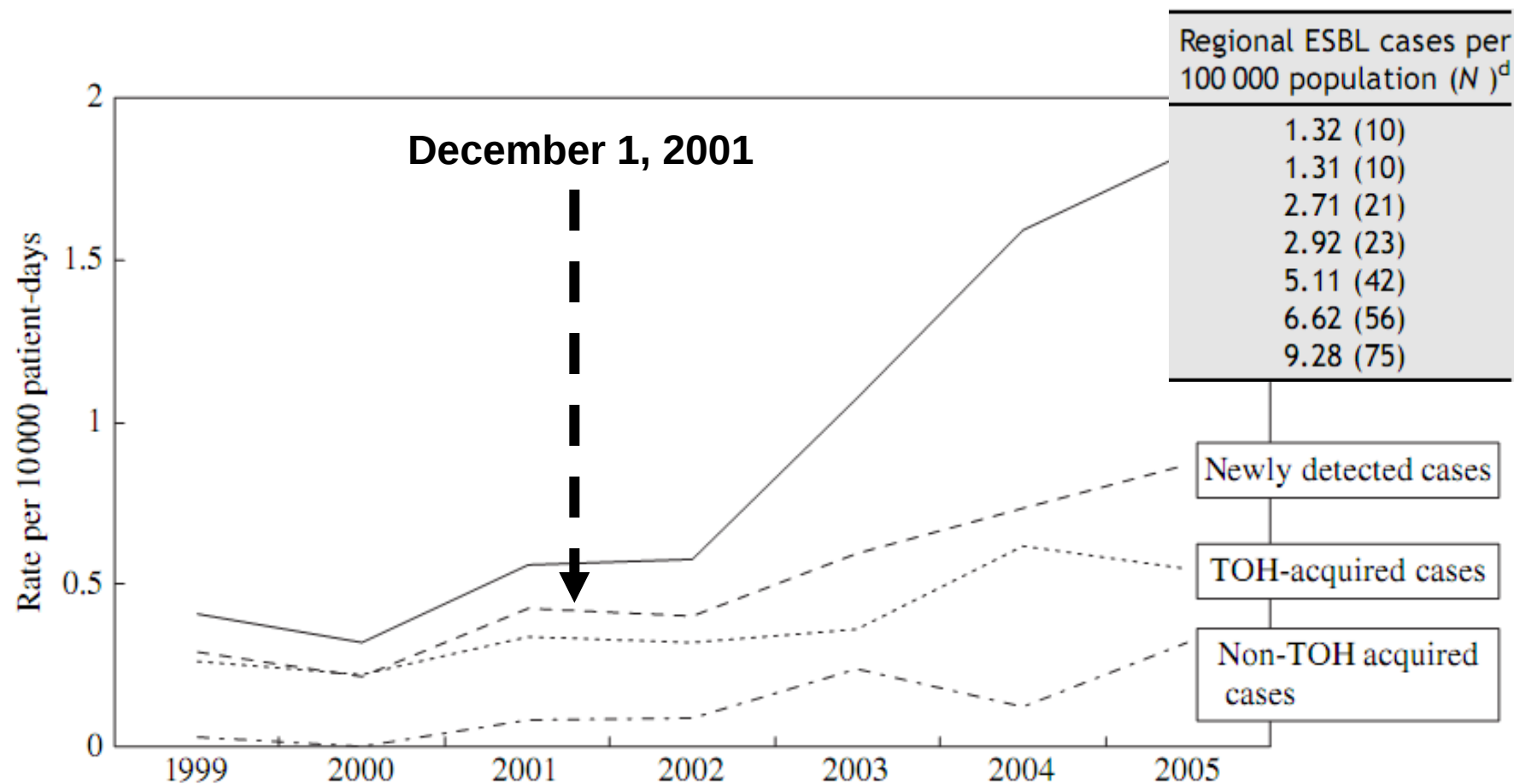
**Thorough environmental cleaning
upon patient discharge**

Alert code

No routine surveillance cultures

Without AB restriction

Figure 1 Trend in the rates of extended-spectrum β -lactamase (ESBL)-producing organisms at The Ottawa Hospital (TOH), 1999–2005.



Total cost of infection control measures

\$317 525.75
(58%)

\$234 660.75
(42%)

\$552 186.50

Cost of control measures/patient

\$3567.71

\$2793.58

\$3191.83

Impact and cost of infection control measures to reduce nosocomial transmission of extended-spectrum β -lactamase-producing organisms in a non-outbreak setting

Table I Extended-spectrum β -lactamase (ESBL) incidence at the Ottawa Hospital (TOH)

Year	New ESBL cases per 1000 admissions (N) ^a	TOH-acquired ESBL cases per 1000 patient-days (N) ^b	ICU-acquired ESBL cases per 1000 ICU-days (N) ^c
1999	0.28 (10)	0.03 (9)	0.08 (1)
2000	0.17 (8)	0.02 (8)	0.22 (3)
2001	0.33 (15)	0.03 (12)	0.46 (6)
2002	0.31 (14)	0.03 (11)	0
2003	0.45 (20)	0.04 (12)	0
2004	0.55 (25)	0.06 (21)	0.21 (3)
2005	0.67 (30)	0.05 (19)	0.12 (2)

No routine surveillance cultures
No AB restriction

Surveillance of extended-spectrum β -lactamase-producing bacteria and routine use of contact isolation: experience from a three-year period

**Between 1 January 2002 and 31 December 2004
In a 1400-bed university hospital (Hannover)**

Daily laboratory reports of ESBL-positive clinical samples

**contact isolation of ESBL –positive patients,
private room or cohorting
personnels instructed to wear gloves and gowns
room mates were screened**

**control measures removed if 3 negative consecutive clinical and
perirectal samples**

**no specific surveillance culture program
no specific eradication protocol were used**

Surveillance of extended-spectrum β -lactamase-producing bacteria and routine use of contact isolation: experience from a three-year period

HICPAC guidelines, no specific surveillance culture program
and no specific eradication protocol were used

Table 1 Characteristics of cases positive for extended-spectrum β -lactamase (ESBL)-producing organisms 2002–2004

	2002	2003	2004	Total
ESBL-positive organisms (%)				
Total	54	43	50	147
Cases/1000 patient days	0.14	0.11	0.12	0.12
Cases/100 patients	0.13	0.11	0.11	0.12
Nosocomial cases (% of total cases)	39 (72.2)	25 (58.1)	32 (64.0)	96 (65.3)
Transmissions (% of room-mates with screening cultures)	5 (20.8)	2 (9.5)	0	7 (11.1)

There were 89 patients who shared the same room with ESBL-positive cases. Of these, 63 were still in the hospital when patients with ESBL-positive strains were diagnosed and possible transmission was investigated. Seven of these patients were found to be positive for an ESBL-producing strain of the same species. One patient developed

Stratégie, (R84-88; 90-91)

Précautions complémentaires de type contact (PC) en cas de EBLSE

Que le patient soit infecté ou colonisé

Notification de l'EBLSE par le laboratoire

Politique de **signalisation** du portage de EBLSE justifiant de PC

Information du patient ou de ses proches,

Information des correspondants médicaux

En cas de ré-admission, système d'alerte, application de PC

Mesures barrières (R92.92,95,99,100)

Mains et gants =

Précautions standards

Tablier plastique UU si soins direct

Chambre individuelle

Regrouper les patients porteurs de la même BMR

Dédier personnel soignant si épidémie non contrôlée

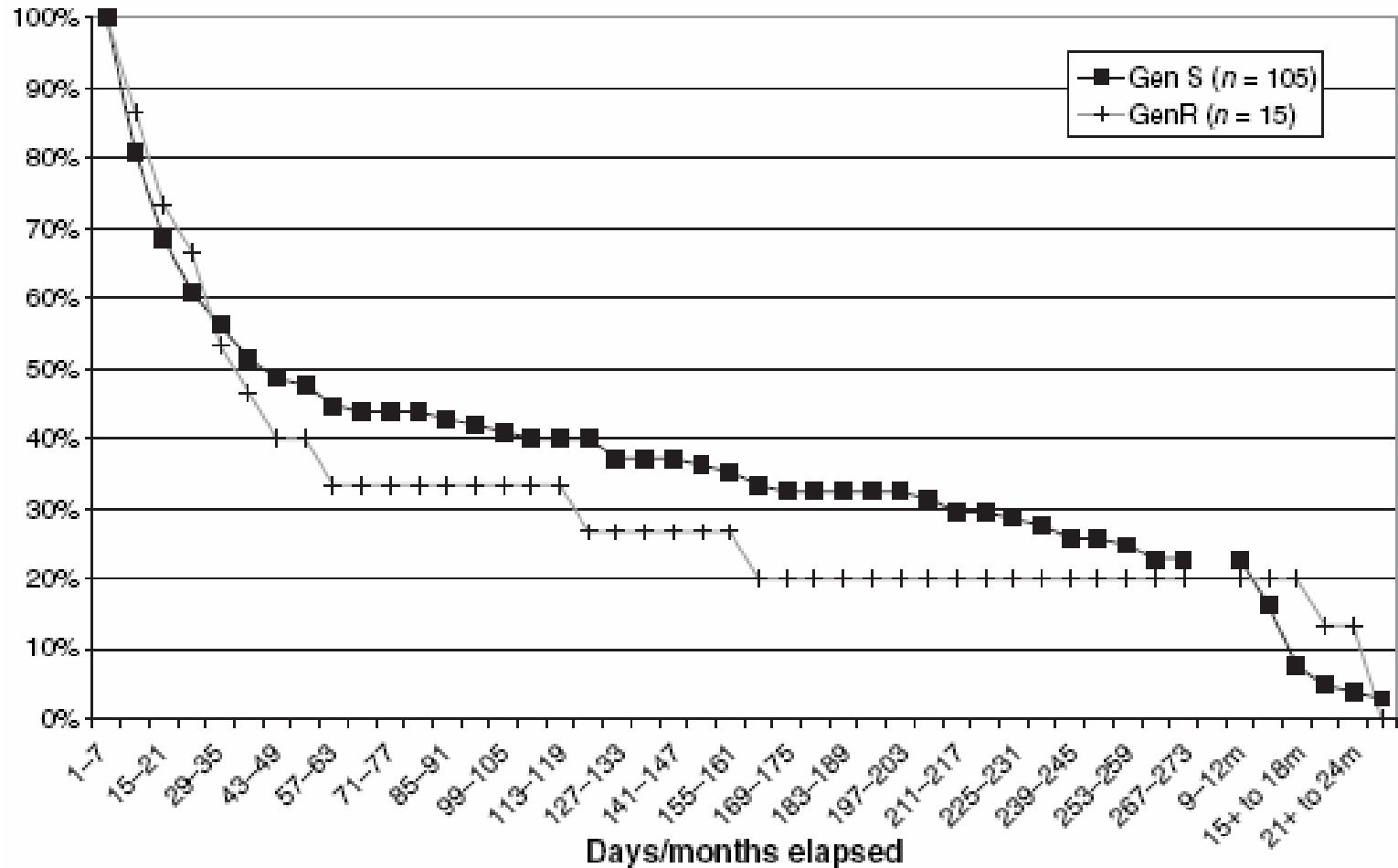
Levée des PC (R117)

maintien pendant la dure d'hospitalisation

**si décontamination ≥ 2 prélèvements successifs
négatifs**

Carriage may be prolonged, increasing the likelihood of recurrent infection and exacerbating the difficulty of control.

% patients with positive faeces by days post diagnosis of infection



Screening for Extended-Spectrum β -Lactamase–Producing Enterobacteriaceae among High-Risk Patients and Rates of Subsequent Bacteremia

413 patients ESBL-E coli

- 54 (13,1 %) had screening at subsequent hospital admission
 - 40 (74 %) readmitted within 1 yr after the 1st positive culture sample
 - 15 (37,5 %) still ESBL-E colonized
 - 14 (26 %) readmitted > 1 yr after the 1st positive culture sample
 - 2 (14,3 %) positive results when screened again

control for preventing ESBL spread

alcoholic hand rub disinfection

Education of health care workers

wise antibiotics use

Additional measures such as contact precaution

If outbreak

reinforcement of ABH

identification of the reservoir

**specific isolation procedures based on
private room**

cohorting of patients with dedicated teams

identification of carriers by surveillance culture

digestive decolonization is not recommended

