

Bactéries Multi résistantes – Bactéries Hautement résistantes

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Généralités

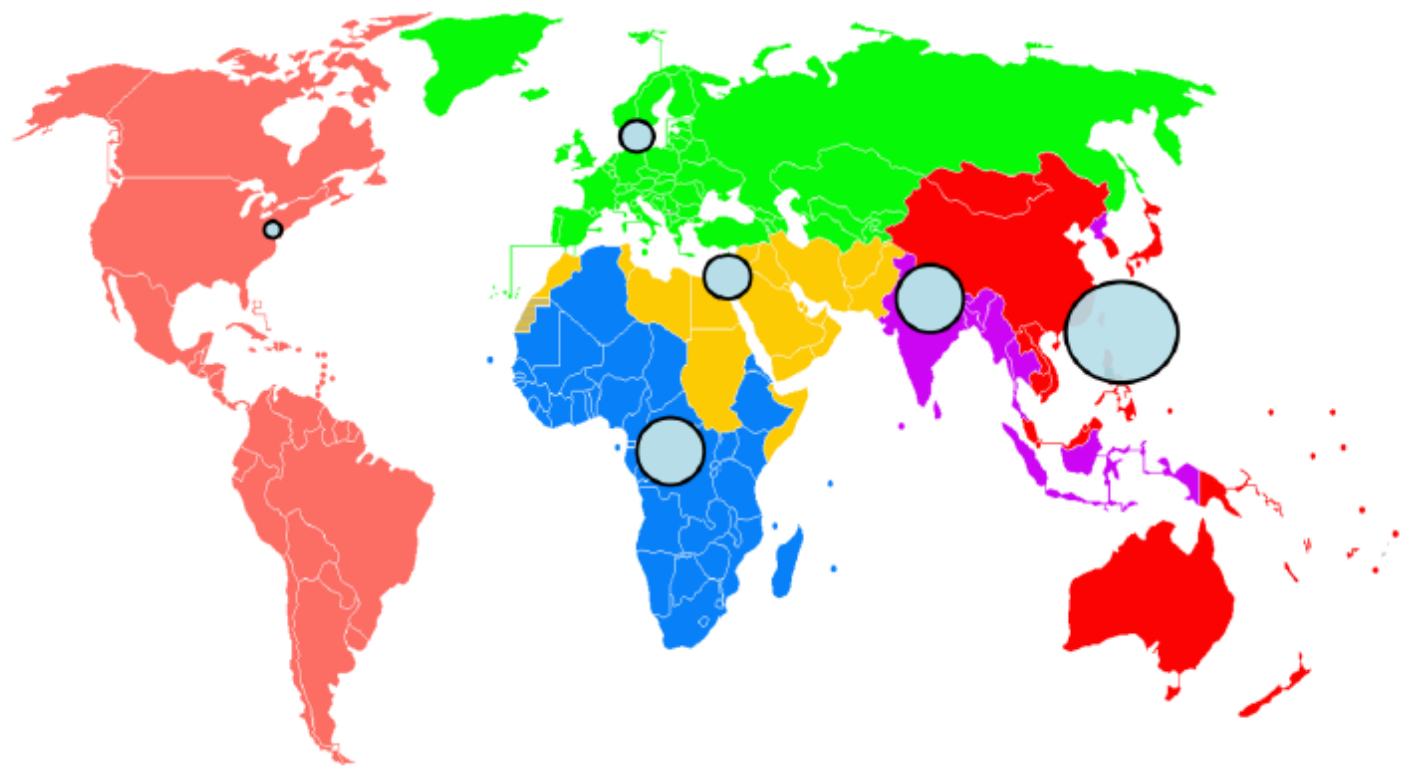


- Diffusion de la résistance, en communautaire et nosocomial
- Apparition de nouveaux mécanismes de résistances (résistance plasmidique à la colistine)
- Nombreuses épidémies avec des « parts » environnementales

Fecal colonization with ESBL-PE and risk factors among healthy individuals : a Systematic Review and Meta-analysis

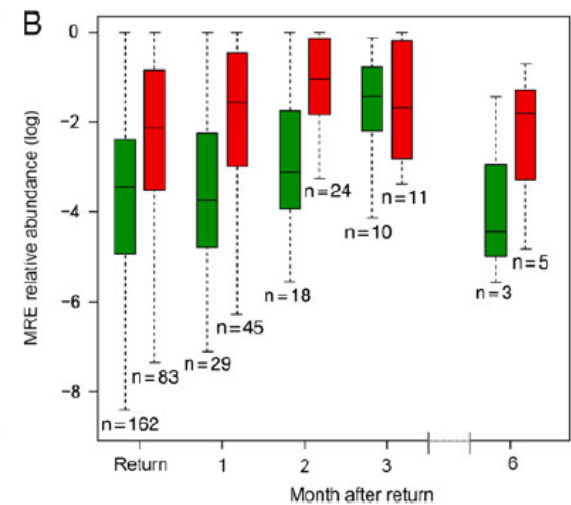
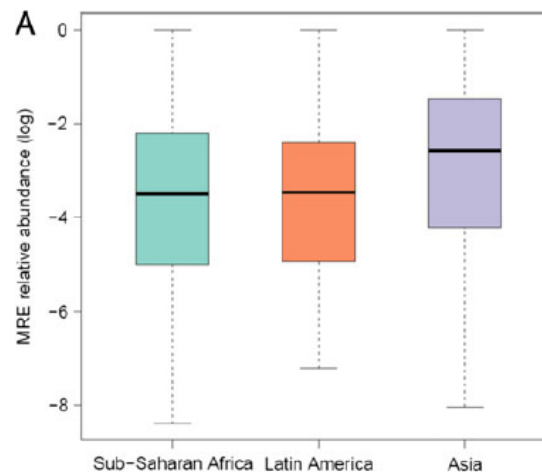
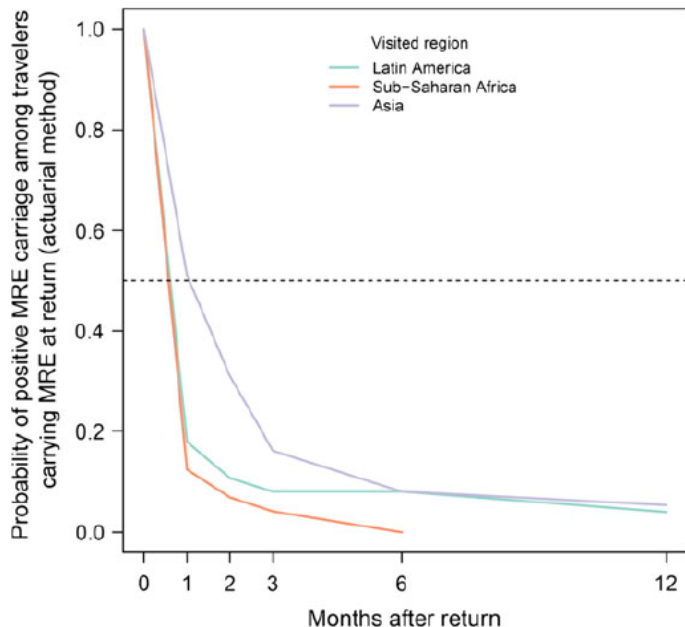
- 17479 études publiées dont 66 répondant aux critères (28 909 patients)
- Prévalence
 - Globale = 14%
 - Asie, Afrique = 15% - 46%, Europe centrale = 3%, Europe du Nord=4%, Europe du sud=6%, Amérique=2%
- Facteurs de risque de portage
 - Antibiothérapie préalable
 - 4 mois : RR =1,63; IC 95% [1,19 – 2,24]
 - 12 mois : RR=1,58; IC 95% [1,16 – 2,16]
 - Voyages : RR = 4,06; IC95% [1,33 – 12,41]

Fecal colonization with ESBL-PE and risk factors among healthy individuals : a Systematic Review and Meta-analysis



High Rate of Acquisition but Short Duration of Carriage of Multidrug-Resistant Enterobacteriaceae After Travel to the Tropics

- Dépistage des patients de retour de voyage (579 patients)
- 292 (50,9%) porteurs de BGN resistant
 - Asie 72%, Afrique 48%, Amérique Latine 31%
- Facteurs de risque : type de voyage, diarrhée, β -lactams
- Portage à 3 mois : 4,7%

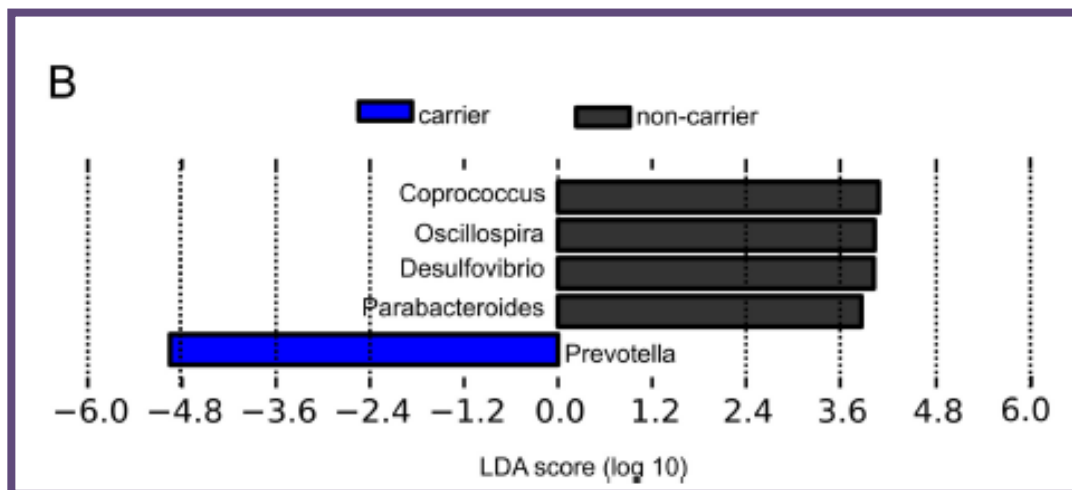


Carriage of Enterobacteria Producing Extended-Spectrum β -Lactamases and Composition of the Gut Microbiota in an Amerindian Community

- Existe-t-il des modifications du microbiote en cas de portage de EBLSE?
- Population: Amerindiens de Guyanne
- Comparaison: 8 porteurs de BLSE (CTX-M) vs 24 témoins
 - Témoins: Age, sexe, exposition aux antibiotiques dans l'année précédentes
- Etude : Richesses et diversité du microbiote

Carriage of Enterobacteria Producing Extended-Spectrum β -Lactamases and Composition of the Gut Microbiota in an Amerindian Community

Epidemiological parameter	Value(s)			
	Carriers (<i>n</i> = 8)	Nonrelated controls (<i>n</i> = 8) (<i>P</i> value)	Household controls (<i>n</i> = 8) (<i>P</i> value)	Family controls (<i>n</i> = 7) (<i>P</i> value)
Biodiversity of total microbiota				
Shannon diversity index (mean \pm SD)	1.94 \pm 0.50	2.10 \pm 0.48 (0.43)	2.04 \pm 0.48 (0.51)	2.36 \pm 0.50 (0.06)
Shannon equitability index (mean \pm SD)	0.53 \pm 0.10	0.56 \pm 0.10 (0.34)	0.54 \pm 0.10 (0.89)	0.63 \pm 0.10 (0.06)
Chao1 estimator (mean \pm SD)	43.91 \pm 10.47	46.62 \pm 9.94 (0.90)	53.15 \pm 9.94 (0.13)	52.52 \pm 10.47 (0.19)
Biodiversity of active microbiota				
Shanon diversity index (mean \pm SD)	1.90 \pm 0.70	2.46 \pm 0.65 (0.07)	2.30 \pm 0.65 (0.50)	2.79 \pm 0.70 (0.01)
Shanon equitability index (mean \pm SD)	0.45 \pm 0.15	0.57 \pm 0.14 (0.04)	0.55 \pm 0.14 (0.35)	0.64 \pm 0.15 (0.01)
Chao1 estimator (mean \pm SD)	85.99 \pm 27.41	86.26 \pm 25.39 (0.69)	74.80 \pm 25.39 (0.28)	89.34 \pm 27.41 (0.94)



Prospective Validation of Cessation of Contact Precautions for Extended-Spectrum β -Lactamase–Producing *Escherichia coli*¹

- Evaluation du taux de transmission des BLSE après levée des mesures d'isolement
- Dépistage des patients contacts en MCO et Long séjours

Table. Characteristics and exposures for hospitalized contact patients with and without transmission of ESBL-producing *Escherichia coli* from index patients, Basel, Switzerland*

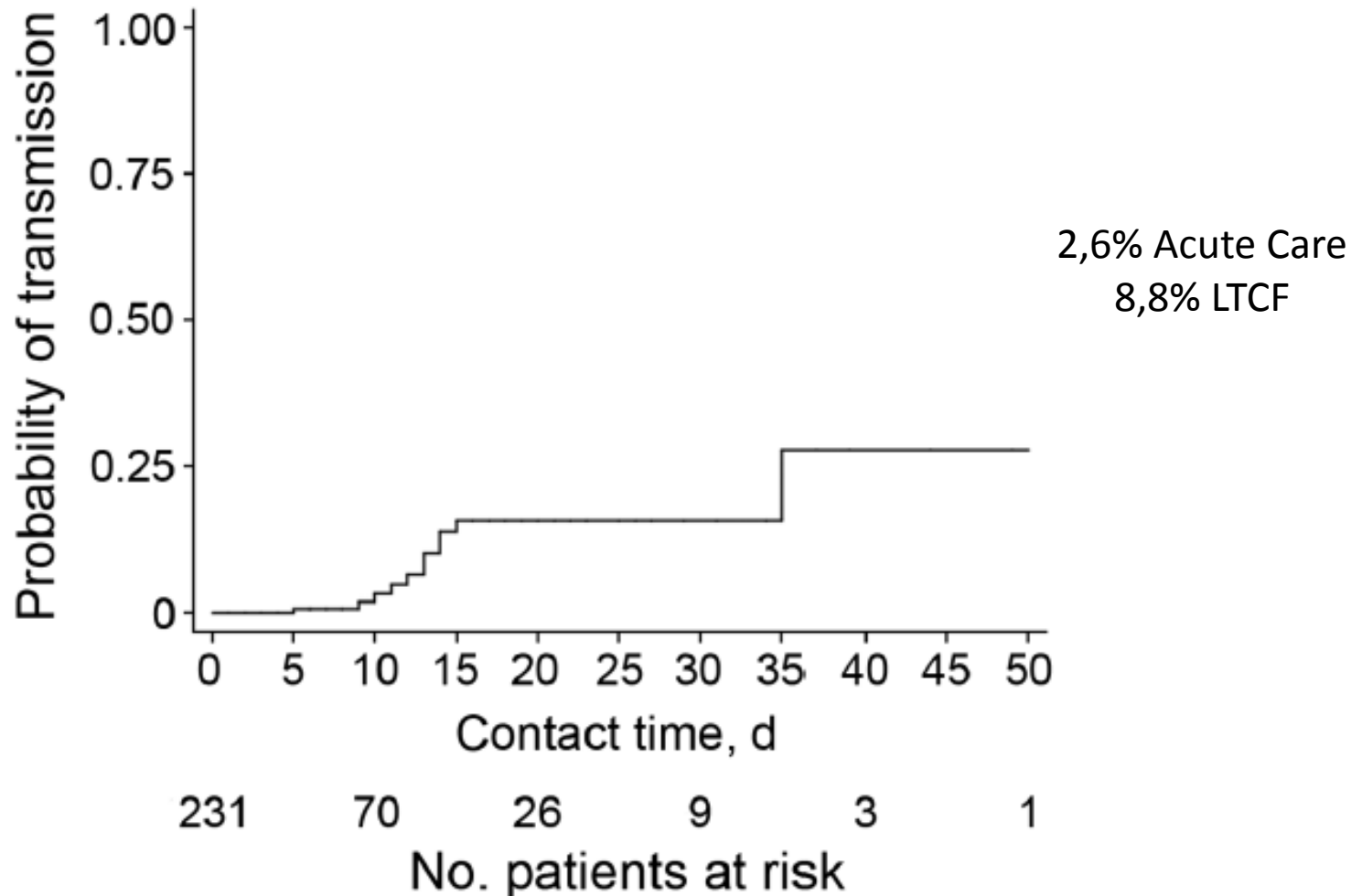
Patient characteristics and exposures	Contact patients with transmission of ESBL-producing <i>E. coli</i> , n = 11†	Contact patients without transmission of ESBL-producing <i>E. coli</i> , n = 220†	p value
Contact patient characteristics			
Age, y, median (IQR)	81 (77–82)	75 (64–82)	0.153
Charlson Comorbidity Index, median (IQR)	2 (1–4)	2 (1–3)	0.399
Contact time, d, median (IQR)	13 (10–15)	8 (5–12)	0.006
Intensive care unit stay	0	54 (24.8)	0.122
Received any antimicrobial drug	4 (36.4)	93 (42.3)	0.765
Received systemic antimicrobial drugs with activity against ESBL <i>E. coli</i>	1 (9.1)	19 (8.6)	1.000
Index patient characteristics			
Age of index patient, y, median (IQR)	79 (64–87)	73 (62–80)	0.175
Charlson Comorbidity Index, median (IQR)	2 (1–3)	2 (1–3)	0.572
Infected with ESBL-producing <i>E. coli</i>	6 (54.6)	84 (38.2)	0.346
ESBL-producing <i>E. coli</i> infection			
Bloodstream	0	3 (1.4)‡	1.000
Urinary tract	5 (45.5)	68 (30.9)	0.330
Respiratory tract	1 (9.1)	10 (4.6)	0.422
Surgical site	0	6 (2.7)	1.000
Colonized with ESBL <i>E. coli</i>	5 (45.4)	136 (61.8)	0.346
Received systemic antimicrobial drugs with activity against ESBL <i>E. coli</i>	6 (54.6)	84 (38.2)	0.346

*Bold indicates significance. Contact patient exposures occurred through the sharing of a room for at least 24 hours with an ESBL-producing *E. coli*-infected or colonized index patient in an acute-care hospital or a geriatric/rehabilitation center. ESBL, extended-spectrum β -lactamase; IQR, interquartile range.

†Values are no. (%) patients except as indicated.

‡All patients with bloodstream infections had urinary tract infections.

Prospective Validation of Cessation of Contact Precautions for Extended-Spectrum β -Lactamase-Producing *Escherichia coli*¹



The prevention paradox of extended-spectrum beta-lactamase-producing Enterobacteriaceae (ESBL-E): species-specific risk and burden of transmission

- Etude multi centrique randomisée comparant les mesures appliquées autour des patients porteurs d'EBLSE.
- Dépistage des patients séjournant (5-9J) dans la même unite qu'un patient porteur
- WGS effectué pour toutes les souches
- 662 patients index et 11,677 contacts .
- 1,076 (9.2%) de porteurs.
- Transmission dans 36 (5.4%) cas .

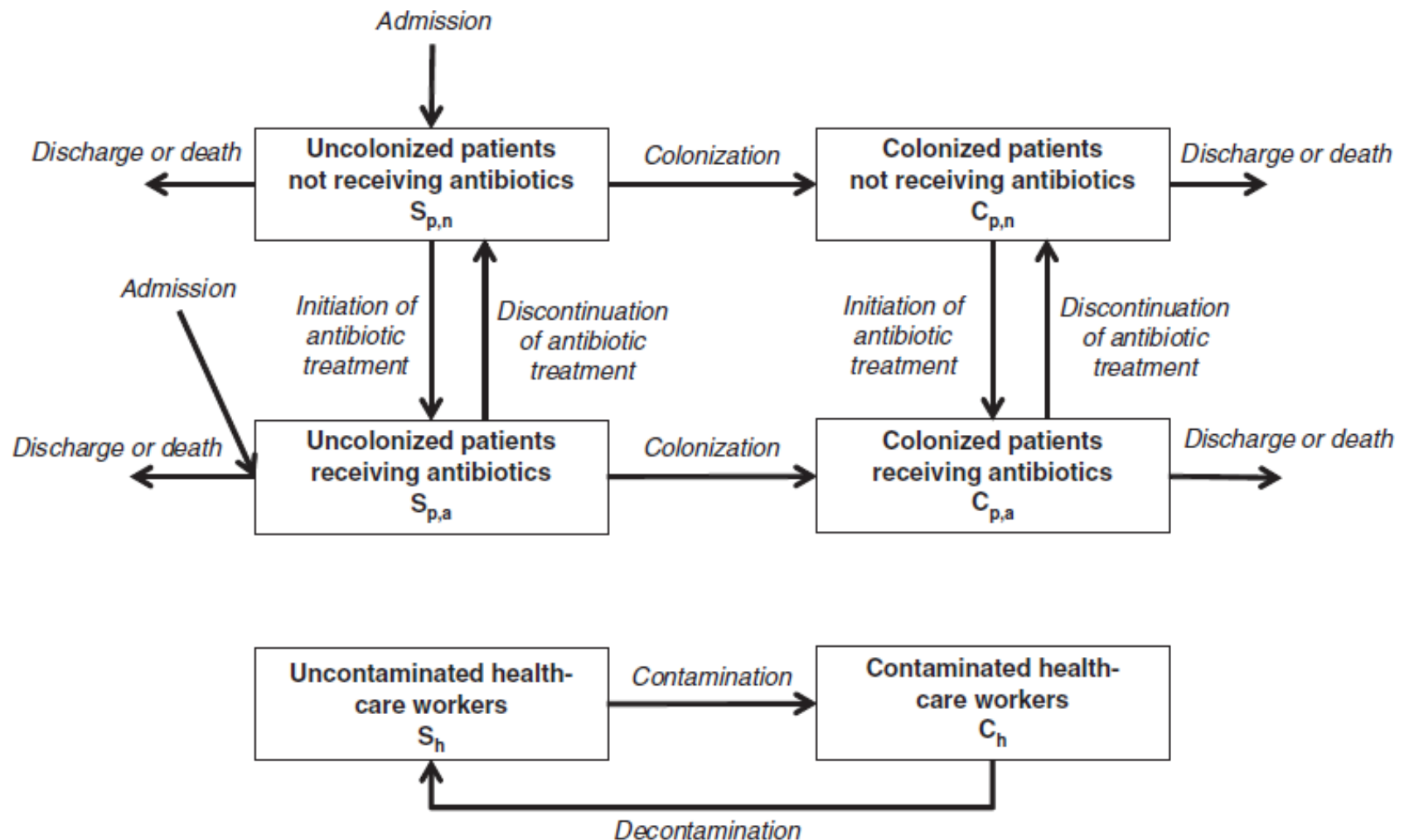
The prevention paradox of extended-spectrum beta-lactamase-producing Enterobacteriaceae (ESBL-E): species-specific risk and burden of transmission

- Le risqué de transmission est
 - 4.4% (22/501) pour *E coli*
 - 11.0% (10/91) pour *Klebsiella pneumoniae*
 - 10.0% (4/40) pour *Enterobacter cloacae*
- Le risque est donc comparativement à *E.coli*
 - *K. pneumonia* (RR 2.59; 95% CI 1.31-5.32)
 - *E. cloacae* (RR 2.28; 95% CI 0.68-6.43)
- *E. coli*, représente 61.1% [44.8%- 75.3%] des acquisitions
- Alors que 27.8% [95% CI 15.7%- 44.1%] et 11.1% [3.8%-25.9%] sont attribuable a *K. pneumoniae* et *E. cloacae*, respectivement

Hand Hygiene, Cohorting, or Antibiotic Restriction to Control Outbreaks of Multidrug-Resistant *Enterobacteriaceae*

- Model mathématique
- Utilisation des données issues d'études multi-centriques
- Modélisation d'une épidémie dans une réanimation de 10 lits
- Evaluation de 26 stratégies différentes incluant :
 - Augmentation de l'observance de l'HDM
 - Cohorting
 - Réduire l'antibiothérapie à l'admission ± réduction de la durée

Hand Hygiene, Cohorting, or Antibiotic Restriction to Control Outbreaks of Multidrug-Resistant *Enterobacteriaceae*



Hand Hygiene, Cohorting, or Antibiotic Restriction to Control Outbreaks of Multidrug-Resistant *Enterobacteriaceae*

Control Strategy	Mean, % (SD)	Reduction from Base Case, %	Simulations with 0 Nosocomial Acquisition, %	Median Persistence Time of ESBL-PE in the ICU, days
Base case	2.60 (3.85)	0	43	35
Hh 55%/60% ^b ; no cohorting; 56% of patients on antibiotics at ICU admission				
1 Intervention				
Hh 80%/80% ^c	0.24 (0.57)	91	80	25
Cohorting 75%	0.28 (0.66)	89	79	21
Hh 55%/80% ^d	0.73 (1.40)	72	63	26
Cohorting 50%	0.76 (1.50)	71	62	28
ATB prevalence and duration reduction	1.74 (2.72)	33	48	34
ATB prevalence reduction	2.00 (3.12)	23	47	32
2 Interventions				
Hh 80%/80% ^c + Cohorting 75%	0.04 (0.19)	98	95	22
Hh 55%/80% ^d + Cohorting 75%	0.11 (0.34)	96	88	22
Hh 80%/80% ^c + Cohorting 50%	0.12 (0.36)	96	88	24
Hh 80%/80% ^c + ATB prevalence and duration reduction	0.16 (0.46)	94	86	22
Hh 80%/80% ^c + ATB prevalence reduction	0.20 (0.51)	92	82	22
Cohorting 75% + ATB prevalence and duration reduction	0.23 (0.55)	91	80	24
Hh 55%/80% ^d + Cohorting 50%	0.27 (0.63)	90	78	24
Cohorting 75% + ATB prevalence reduction	0.27 (0.64)	90	78	25
Hh 55%/80% ^d + ATB prevalence and duration reduction	0.47 (0.89)	82	67	25
Cohorting 50% + ATB prevalence and duration reduction	0.49 (0.99)	81	69	25
Hh 55%/80% ^d + ATB prevalence reduction	0.56 (1.10)	79	66	25
Cohorting 50% + ATB prevalence reduction	0.73 (1.35)	72	64	25
3 Interventions				
Hh 80%/80% ^c + Cohorting 75% + ATB prevalence and duration reduction	0.03 (0.16)	99	97	21
Hh 80%/80% ^c + Cohorting 75% + ATB prevalence reduction	0.04 (0.20)	98	95	21
Hh 80%/80% ^c + Cohorting 50% + ATB prevalence and duration reduction	0.07 (0.28)	97	92	23
Hh 80%/80% ^c + Cohorting 50% + ATB prevalence reduction	0.08 (0.29)	97	91	21
Hh 55%/80% ^d + Cohorting 75% + ATB prevalence and duration reduction	0.09 (0.27)	97	90	24
Hh 55%/80% ^d + Cohorting 75% + ATB prevalence reduction	0.12 (0.37)	95	88	22
Hh 55%/80% ^d + Cohorting 50% + ATB prevalence and duration reduction	0.19 (0.51)	93	84	25
Hh 55%/80% ^d + Cohorting 50% + ATB prevalence reduction	0.23 (0.54)	91	81	23

Control of extended-spectrum β -lactamase–producing
Enterobacteriaceae nosocomial acquisition in an intensive care unit:
A time series regression analysis

- Population : Patients de reanimation
- Interventions : Restriction des C3G, Augmentation de la consommation des SHA, Augmentation du ratio soignant/soigné, Chagement d'unite
- Comparateur : Incidence mensuelle des EBLSE acquises
- Objectif : Identifier la relation temporelle et la mise en place de mesures de maitrise

Control of extended-spectrum β -lactamase–producing Enterobacteriaceae nosocomial acquisition in an intensive care unit: A time series regression analysis

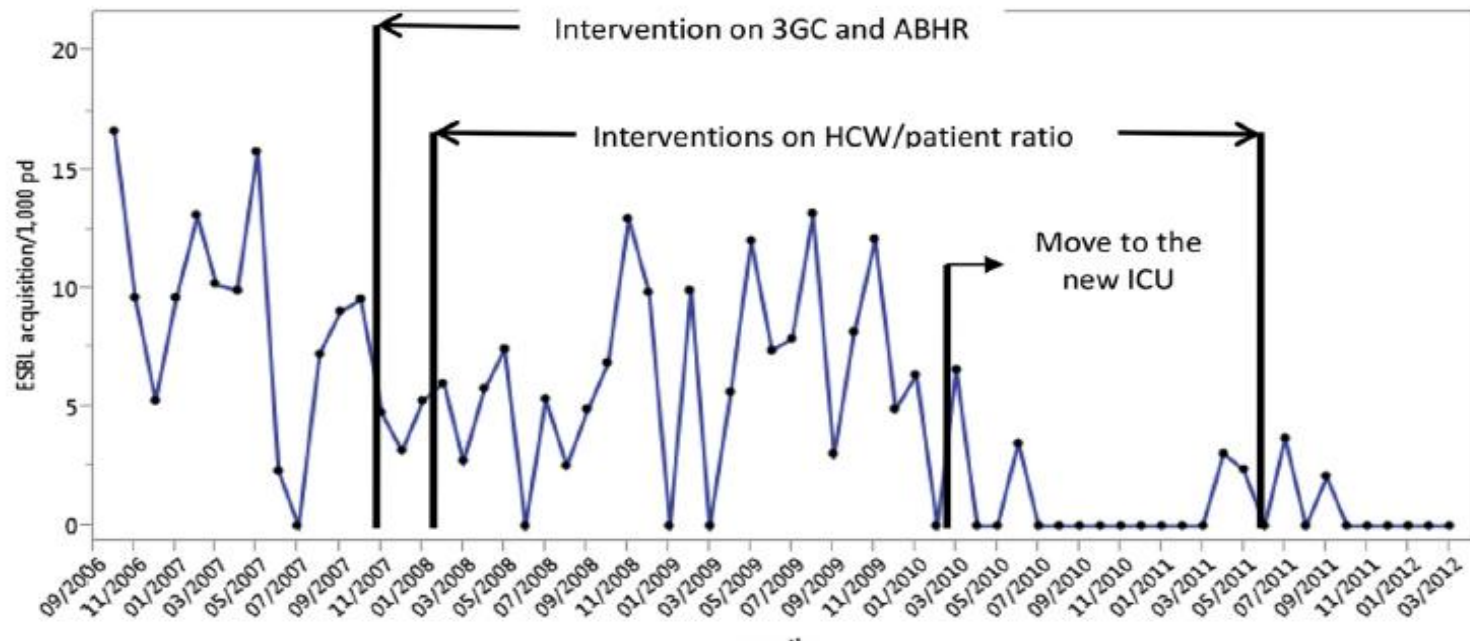
Annual characteristics of the ICU

Characteristic	2006	2007	2008	2009	2010	2011	2012	P value
Months, n	3	12	12	12	12	12	3	
Patients, n*	39.7 (1.9)	45.1 (9)	42.7 (5.9)	38.9 (6.1)	43.5 (10.8)	44.7 (7.6)	48.7 (7.1)	
Age, y	56.7 (1.7)	58.2 (2.9)	57.6 (1.8)	58.2 (2.1)	58.3 (2.6)	60.0 (2.1)	61.0 (1.4)	.082
Length of stay, d	8.3 (0.8)	8.6 (1.7)	8.7 (1.5)	9.6 (2.4)	8.2 (1.9)	8.3 (1.5)	8.6 (0.5)	.618
Total number of days, n, mean (SD)	329 (33)	383 (84)	367 (36)	362 (60)	338 (48)	364 (53)	414 (45)	.383
SAPS II	43.7 (1.9)	49.0 (2.8)	53.0 (3.0)	53.6 (3.6)	55.1 (2.7)	55.1 (2.8)	53.0 (4.1)	<.001
Urinary catheter/1,000 patient-days, n, mean (SD)	229 (37)	235 (79)	278 (45)	309 (71)	311 (42)	336 (44)	402 (34)	<.001
CVC/1,000 patient-days, n, mean (SD)	227 (12)	212 (75)	240 (47)	260 (53)	253 (48)	312 (40)	320 (20)	.001
Ventilation/1,000 patient-days, n, mean (SD)	206 (18)	221 (55)	229 (34)	238 (68)	220 (39)	229 (45)	267 (21)	.750
HCW:patient ratio	0.50	0.50	0.54	0.54	0.54	0.58	0.62	
Admission with ESBLE, n, mean (SD)	1.33 (0.5)	1.00 (1.2)	2.50 (1.6)	3.33 (2.2)	2.75 (2.0)	3.75 (2.5)	4.33 (2.6)	.026
Admission with ESBLE, %	3.3 (1.1)	2.3 (2.7)	5.8 (3.4)	8.4 (5.2)	6.1 (4.8)	8.0 (5.1)	8.6 (4.3)	.243
ESBLE acquisition, n, mean (SD)	3.33 (1.2)	3.17 (1.9)	2.17 (1.3)	2.58 (1.8)	0.42 (0.8)	0.33 (0.5)	0.00	<.001
ESBLE acquisition/1000 patient-days, n, mean (SD)	10.53 (4.7)	7.99 (4.4)	6.13 (3.3)	7.67 (4.6)	1.44 (2.6)	0.99 (1.4)	0.00	<.001

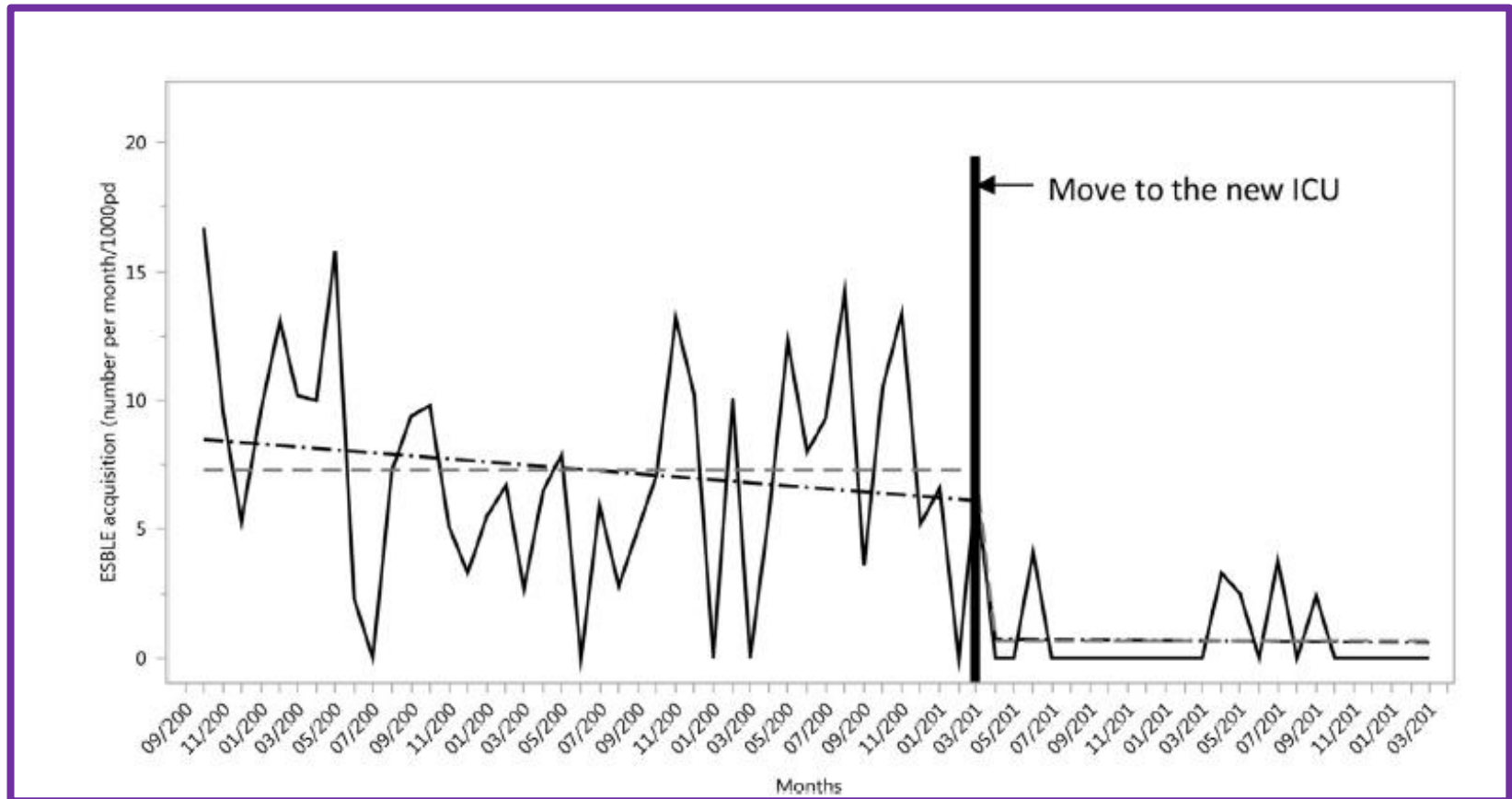
Table 3
Multivariate model* of the monthly number of ESBLE acquisitions

Variable	Coefficient	Standard error	χ^2	P value
Constant	-5.53	5.07	1.20	.27
ABHR	0.001	0.003	0.13	.71
ABHR, $m^{-1\dagger}$	0.002	0.003	0.86	.35
3 GC	0.001	0.002	0.25	.62
3 GC, $m^{-1\dagger}$	0.001	0.002	0.25	.61
HCW:patient ratio	-7.65	6.96	1.25	.26
Unit closure (after vs before)	-1.93	0.50	21.56	<.0001
Ln (number of patient-days) [‡]	1.66	0.60	8.07	.004

Control of extended-spectrum β -lactamase–producing Enterobacteriaceae nosocomial acquisition in an intensive care unit: A time series regression analysis



Control of extended-spectrum β -lactamase–producing Enterobacteriaceae nosocomial acquisition in an intensive care unit: A time series regression analysis



Modeling Spread of KPC-Producing Bacteria in Long-Term Acute Care Hospitals in the Chicago Region, USA

- Données issues de 4 unités épidémiques avec mise en place d'un "bundle" de mesures incluant :
 - » **Dépistage**
 - » **Toilettes à la chlorhexidine**
 - » **Formation du staff**
 - » **3 situations**
 - Cohorting
 - Cohorting géographique
 - Absence de cohortingS

Modeling Spread of KPC-Producing Bacteria in Long-Term Acute Care Hospitals in the Chicago Region, USA

TABLE 3. *bla*_{KPC}-Encoding Enterobacteriaceae (KPC) Acquisitions in the Original Model

LTACH	Floor type ^a	Modeled acquisitions per 1,000 patient days at risk per ward type, median (95% CrI) ^b	Modeled acquisition per month per ward type, (95% CrI)	Modeled acquisitions per month per LTACH, median (95% CrI)	Observed acquisitions per LTACH ^c	Modeled acquisitions per 1,000 patient days per LTACH, median (95% CrI)
A	Non-cohort	3.9 (2.8–5.1)	3.7 (2.7–4.8)	6.3 (4.8–7.9)	3.7	4.0 (3.0–5.0)
	Cohort	11.0 (6.4–16.6)	2.5 (1.6–3.6)			
B	Non-cohort	3.8 (2.4–5.2)	4.5 (2.8–6.2)	4.5 (2.8–6.2)	4.4	2.8 (1.7–3.8)
C	Non-cohort	5.5 (4.3–6.6)	7.3 (5.7–9.0)		11.5 (9.2–14.0)	8.3
	Cohort	7.0 (4.6–10.1)	4.2 (2.9–5.7)			
D	Non-cohort	2.4 (1.5–3.4)	2.2 (1.4–3.2)	3.6 (2.1–5.2)	2.0	2.7 (1.6–3.9)
	Cohort	20.6 (4.7–50.1)	1.4 (0.4–2.5)			

Et encore

- Controversies in guidelines for the control of MDR Gram-negative bacteria in EU countries.
J Otter, Clin Microb Inf 2015
- Risk factors for CPE colonization of asymptomatic carriers on admission to an Italian rehabilitation hospital
Rossini, J Hosp Inf 2016
- Screening of nursing home residents for colonization with carbapenem-resistant Enterobacteriaceae admitted to acute care hospitals: Incidence and risk factors
Cunha, AJIC 2016
- Outbreak of *Klebsiella pneumoniae* carbapenemase-producing *K pneumoniae*: A systematic review
Campos, AJIC 2016
- Et on guette toujours, l'étude de S Fournier sur la maitrise des BHRé à l'APHP.