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AMIENS
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9^{ème} Journée
Amiénoise en
hygiène hospitalière

Infections associées aux soins en
établissement de santé
Informar, former, éduquer
pour mieux prévenir

Jeudi 23 novembre 2017

CHU Amiens-Picardie
Site Sud - Amphithéâtre des Instituts de Formation et des Ecoles

BMR/BHRe : Succes story ?

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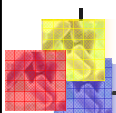
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The MiHAR Lab

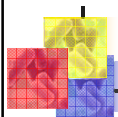


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Aucun conflit d'intérêt industriel en relation avec la thématique

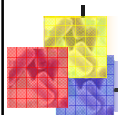
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Plan

- Contexte international des voyages et des BMR/BHRe
- Maîtrise de la diffusion des EBLSE
 - Taux d'acquisition et clairance intestinale lors de voyages
 - Risque de diffusion communautaire
- Maîtrise de la diffusion des EPC
 - Circulation mondiale et nationale des carbapénémases et risque d'importation
 - Gestion des épidémies
- Quizz

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Contexte

- Les voyages internationaux
- Exposition mondiale des populations humaines et animales aux ATB
- Evolution de la multirésistance
 - Zones de haute prévalence
 - Diffusion mondiale
 - Tourisme
 - Voyages d'affaires
 - Expatriation
 - Hospitalisation à l'étranger
 - Rapatriement sanitaire



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Estimation du risque sanitaire

- 15 à 17 000 rapatriés sanitaires par an en France
 - 50% hospitalisés au retour
- 5% des voyageurs ont des contacts avec le système de santé
- 0,1% à 0,5% sont hospitalisés



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REVIEWS

Risk of Highly Resistant Bacteria Importation from Repatriates and Travelers Hospitalized in Foreign Countries: About the French Recommendations to Limit Their Spread

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Stephen et al J Infect Dis 1987; J Travel Med 2008

Van Herck et al J Travel Med 2003 et 2004

Hill J Travel Med 2000

BEH 25-26 2007

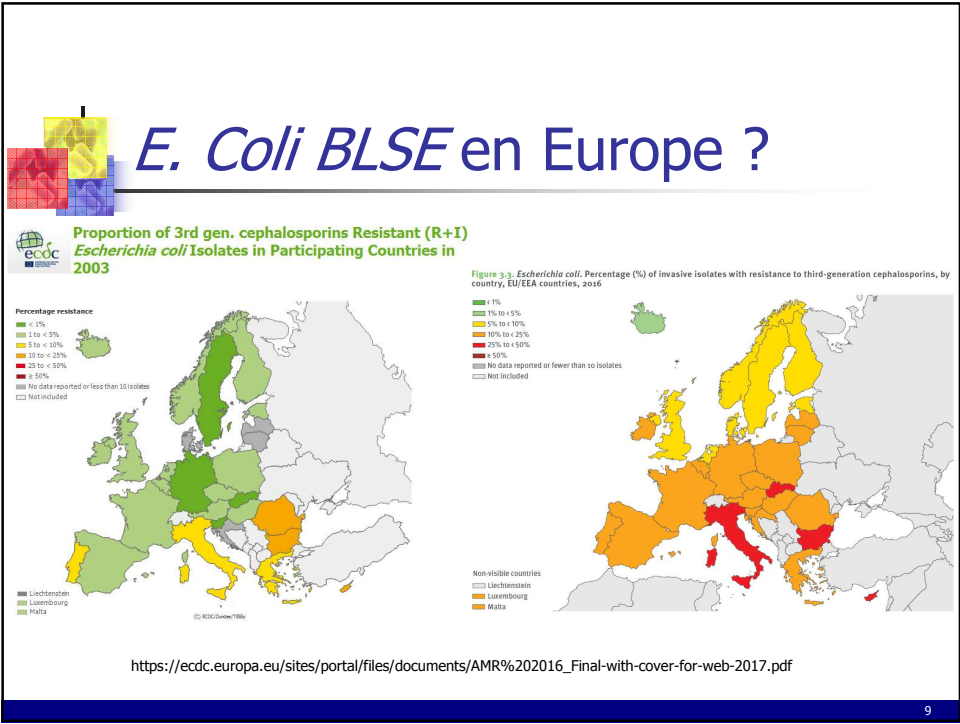
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Au final, quel risque ?

- **Risque d'importation en France de BMR/BHRe à partir de zone d'endémie à l'étranger**
 - Soit à partir des voyageurs étrangers visitant la France
 - Soit à partir des français visitant les pays étrangers ou des expatriés pris en charge en France
- **Risque de diffusion autochtone mais également de sélection de la résistance par pression ATB**

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Country	2013			2014			2015			2016			Trend 2013–2016	
	N	%R	(95%CI)	N	%R	(95%CI)	N	%R	(95%CI)	N	%R	(95%CI)	All laboratories	Continuously reporting laboratories*
Iceland	121	5.0	(2–10)	152	3.3	(1–8)	173	1.7	(0–5)	192	4.2	(2–8)		
Norway	3 077	5.5	(5–6)	3 421	5.8	(5–7)	3 301	6.0	(5–7)	3 617	5.6	(5–6)		
Netherlands	4 740	5.8	(5–7)	6 497	5.7	(5–6)	5 378	5.7	(5–6)	6 397	6.4	(6–7)		
Denmark	2 451	8.1	(7–9)	4 410	7.0	(6–8)	4 561	7.5	(7–8)	4 659	6.6	(6–7)		
Finland	3 720	7.1	(6–8)	4 009	5.4	(5–6)	4 342	6.1	(5–7)	4 742	6.9	(6–8)		
Sweden	7 532	5.2	(5–6)	6 546	5.6	(5–6)	5 995	6.2	(6–7)	6 958	8.3	(8–9)	N/A	
Estonia	340	7.4	(5–11)	410	9.3	(7–12)	246	11.4	(8–16)	701	9.0	(7–11)		
United Kingdom	6 586	14.7	(14–16)	6 221	10.3	(10–11)	5 169	11.3	(10–12)	21 846	9.2	(9–10)		↓
Austria	4 376	9.8	(9–11)	4 739	9.4	(9–10)	4 900	9.7	(9–11)	5 267	10.0	(9–11)		
Belgium	4 051	8.0	(7–9)	2 802	9.7	(9–11)	2 593	9.7	(9–11)	3 737	10.5	(10–12)		↑
France	10 154	9.5	(9–10)	10 349	9.9	(9–11)	11 051	11.0	(10–12)	11 313	11.2	(11–12)		↑
Ireland	2 480	10.6	(9–12)	2 691	10.7	(10–12)	2 638	11.4	(10–13)	2 985	11.4	(10–13)		
Germany	5 335	10.7	(10–12)	6 246	10.5	(10–11)	8 724	10.4	(10–11)	15 777	11.5	(11–12)		
EU/EEA (population-weighted mean)	79 076	12.6	(12–13)	85 092	12.0	(12–12)	89 819	13.1	(13–13)	121 674	12.4	(12–13)		↑
Slovenia	1 224	8.7	(7–10)	1 216	12.7	(11–15)	1 326	13.7	(12–16)	1 420	12.5	(11–14)		↑
Luxembourg	301	10.6	(7–15)	368	12.0	(9–16)	347	12.7	(9–17)	418	13.6	(10–17)		
Poland	1 036	10.9	(9–13)	1 085	10.5	(9–12)	1 610	11.9	(10–14)	2 719	13.7	(12–15)		
Malta	242	8.7	(5–13)	268	10.8	(7–15)	238	11.8	(8–17)	328	14.6	(11–19)		↑
Cyprus	162	38.9	(31–47)	153	28.8	(22–37)	123	28.5	(21–37)	149	30.2	(23–38)		
Bulgaria	187	39.6	(33–47)	218	40.4	(34–47)	205	38.5	(32–46)	238	41.6	(35–48)		

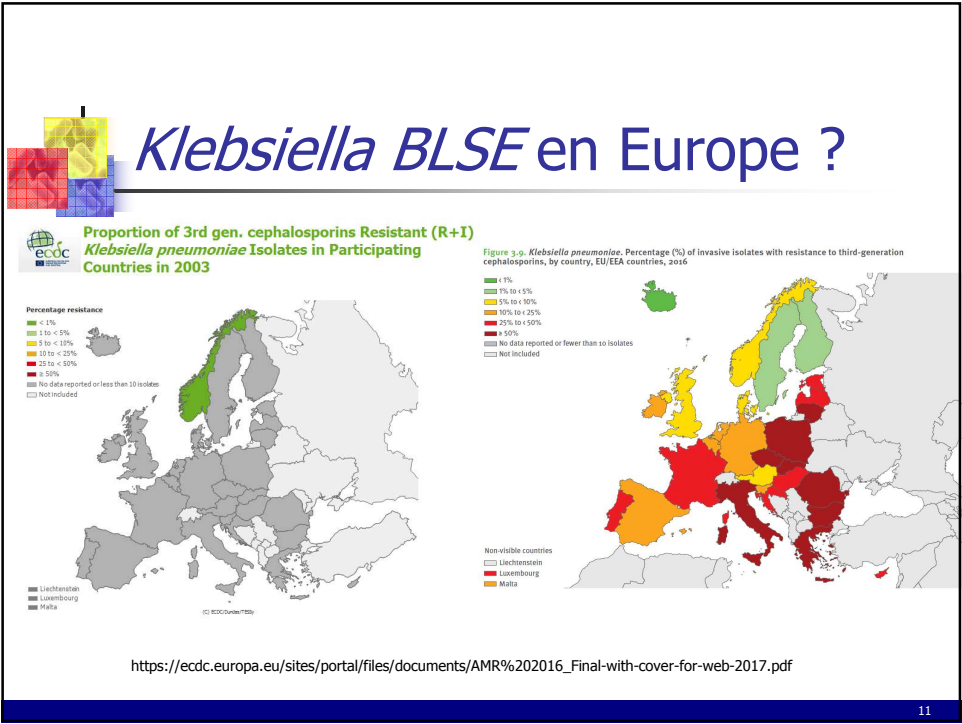


Table 3.10. *Klebsiella pneumoniae*. Total number of invasive isolates tested (N) and percentage with resistance to third-generation cephalosporins (%R), including 95 % confidence intervals (95 % CI), EU/EEA countries, 2013–2016

Country	2013			2014			2015			2016			Trend 2013–2016	
	N	%R	(95%CI)	N	%R	(95%CI)	N	%R	(95%CI)	N	%R	(95%CI)	All laboratories	Continuously reporting laboratories*
Iceland	30	0.0	(0–12)	28	0.0	(0–12)	36	0.0	(0–10)	25	0.0	(0–14)		
Finland	550	2.2	(1–4)	582	2.4	(1–4)	644	3.0	(2–5)	760	4.1	(3–6)		↑
Sweden	1300	3.6	(3–5)	1000	4.5	(3–6)	1001	3.3	(2–5)	1537	4.9	(4–6)		
Norway	645	4.0	(3–6)	746	5.9	(4–8)	701	5.0	(4–7)	811	5.8	(4–8)		
Denmark	529	11.5	(9–15)	925	7.6	(6–9)	929	7.8	(6–10)	1118	7.5	(6–9)		↓
United Kingdom	1077	13.6	(12–16)	978	9.3	(8–11)	916	10.5	(9–13)	3914	8.9	(8–10)		↓
Austria	941	10.7	(9–13)	996	8.2	(7–10)	1050	8.4	(7–10)	1245	9.6	(8–11)		
Netherlands	644	7.5	(6–10)	911	5.5	(4–7)	908	8.6	(7–11)	1134	10.3	(9–12)		↑
Ireland	316	19.3	(15–24)	354	11.6	(8–15)	387	14.7	(11–19)	452	13.5	(10–17)		
Germany	766	16.1	(14–19)	1006	12.7	(11–15)	1518	10.1	(9–12)	2812	13.7	(12–15)		
Malta	67	28.4	(18–41)	99	28.3	(20–38)	88	15.9	(9–25)	102	21.6	(14–31)		
Spain	1241	19.8	(18–22)	1265	18.0	(16–20)	1491	20.3	(18–22)	1678	22.3	(20–24)		↑
Slovenia	245	29.0	(23–35)	233	26.6	(21–33)	237	22.8	(18–29)	267	22.8	(18–28)		
Belgium	594	15.3	(13–18)	485	16.3	(13–20)	406	19.7	(16–24)	669	22.9	(20–26)		
EU/EEA (population-weighted mean)	18331	30.1	(29–31)	20188	29.3	(29–30)	22448	30.3	(30–31)	30192	25.7	(25–26)		↓
France	1938	28.0	(26–30)	2192	29.6	(28–32)	2338	30.5	(29–32)	2597	28.9	(27–30)		
Bulgaria	138	69.6	(61–77)	151	74.8	(67–82)	96	75.0	(65–83)	160	72.5	(65–79)		
Greece	1208	70.1	(67–73)	1092	72.5	(70–75)	1185	69.5	(67–72)	1181	72.5	(70–75)		

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EBLSE en France après un voyage à l'étranger ?

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

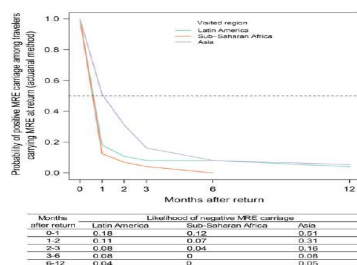


Figure 2. Survival curve representing multidrug-resistant Enterobacteriaceae (MRE) carriage rates among travelers during follow-up, according to the visited geographic area.

Ruppé E et al, Clin Infect Dis 2015

Table 2. Follow-up of Travelers After Their Return

Time After Return, mo	Proportion of MRE Carriers Among Carriers at Return (%) ^a				Proportion of MRE Carriers Among All Travelers (%) ^a			
	All	Sub-Saharan Africa	Latin America	Asia	All	Sub-Saharan Africa	Latin America	Asia
0	292/292 (100)	93/93 (100)	57/57 (100)	142/142 (100)	292/574 (50.9)	93/195 (47.7)	57/183 (31.1)	142/196 (72.4)
1	83/245 (33.9)	9/72 (12.5)	10/50 (20)	64/123 (52)	83/527 (15.7)	9/174 (5.2)	10/176 (5.7)	64/177 (36.2)
2	45/236 (19.1)	5/72 (6.9)	5/48 (10.4)	35/116 (30.2)	45/518 (8.7)	5/174 (2.9)	5/174 (2.9)	35/170 (20.6)
3	24/233 (10.3)	3/72 (4.2)	3/47 (6.4)	18/114 (15.8)	24/515 (4.7)	3/174 (1.7)	3/173 (1.7)	18/168 (10.7)
6	11/230 (4.8)	0/72 (0)	3/47 (6.4)	8/111 (7.2)	11/512 (2.1)	0/174 (0)	3/173 (1.7)	8/165 (4.8)
12	5/227 (2.2)	0/72 (0)	1/46 (2.2)	4/109 (3.7)	5/509 (1)	0/174 (0)	1/172 (0.6)	4/163 (2.5)

Abbreviation: MRE, multidrug-resistant Enterobacteriaceae.

^a Travelers lost to follow-up, those whose stool sample was sent out of time as scheduled, and those who subsequently traveled to tropical regions were excluded at each time point.

598 • CID 2015:61 (15 August) • Ruppé et al

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Table 1. Univariate and Multivariate Analysis in Travelers With or Without Acquisition of Multidrug-Resistant Enterobacteriaceae

Variable	Total Travelers, No. (%)	Travelers Without MRE Acquisition, No. (%)	Travelers With MRE Acquisition, No. (%)	Univariate Analysis		Multivariate Analysis	
				Odds Ratio (95% CI)	P Value	Odds Ratio (95% CI)	P Value
Antibiotic use during travel							
Total	574	282	292				
β-lactam	25 (4.4)	5 (1.8)	20 (6.8)	4.22 (1.47–12.08)	.01	4.08 (1.39–11.97)	.011
Fluoroquinolone	13 (2.3)	3 (1.1)	10 (3.4)	2.44 (.62–9.54)	.2		
Nifuroxazide	45 (7.8)	16 (5.7)	29 (9.9)	1.79 (.91–3.51)	.09		
Other	5 (0.9)	4 (1.4)	1 (0.3)	0.26 (.03–2.52)	.24		
Diarrhea during the travel							
Total	568	277	291		<.001		
Yes	228 (40.1)	88 (31.8)	140 (48.1)	1.89 (1.32–2.72)		1.90 (1.31–2.75)	<.001
Attendance to a healthcare facility during travel							
Total	567	277	290				
Yes	24 (4.2)	9 (3.2)	15 (5.1)	1.49 (.60–3.66)	.39		
Type of travel							
Total	574	282	292		.03		.033
All-inclusive resort	27 (4.7)	19 (6.7)	8 (2.7)	1.00		1.00	
Mix of all-inclusive resorts and organized tours	78 (13.6)	45 (16.0)	33 (11.3)	1.58 (.59–4.24)		1.23 (.45–3.36)	
Family	142 (24.7)	79 (28.0)	63 (21.6)	2.23 (.88–5.64)		1.95 (.76–4.98)	
Backpacking	200 (34.8)	77 (27.3)	123 (42.1)	2.96 (1.18–7.47)		2.42 (.95–6.15)	
Organized tour	127 (22.1)	62 (22.0)	65 (22.3)	3.07 (1.20–7.86)		2.74 (1.07–7.06)	
Visited region							
Latin America (reference)						1	<.001
Sub-Saharan Africa						2.21 (1.40–3.48)	
Asia						5.72 (3.55–9.24)	
Duration of travel, wk, median (IQR)	2.86 (2.14–4.29)	2.71 (1.86–4.00)	3.14 (2.29–4.43)	1.06 (.99–1.12)	.09		

Abbreviations: CI, confidence interval; IQR, interquartile range; MRE, multidrug-resistant Enterobacteriaceae.

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EBLSE en France en EHPAD ?



Incidence EBLSE 114/1155 = 9,9%
(38 nursing Homes)

Extended-Spectrum β -Lactamase-Producing Enterobacteriaceae in French Nursing Homes: An Association between High Carriage Rate among Residents, Environmental Contamination, Poor Conformity with Good Hygiene Practice, and Putative Resident-to-Resident Transmission

Hélène Cochard¹*, Benjamin Aublier², Roland Quentin³, Nathalie van der Mee-Marquet^{1,2,3,4} ...
DOI: <https://doi.org/10.1086/675599> Published online: 10 May 2016

Journal of Hospital Infection 97 (2017) 258–259
Available online at www.sciencedirect.com
Journal of Hospital Infection
Journal homepage: www.elsevier.com/locate/jhin

Letter to the Editor

Multi-drug-resistant Enterobacteriaceae carriage in highly exposed nursing homes: prevalence in western France

Incidence EBLSE 16/234 = 6,4%
(6 Nursing homes)

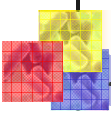


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éditorial

Les entérobactéries multirésistantes aux antibiotiques par production de BLSE ou de carbapénémases se sont-elles exportées dans les Ehpads françaises ?





Et le risque par la consommation ?

Journal of Antimicrobial Chemotherapy (2006) **58**, 211–215
doi:10.1093/jac/dk1211
Advance Access publication 23 May 2006

JAC

Extended-spectrum β -lactamase-producing Enterobacteriaceae in different environments (humans, food, animal farms and sewage)

Raül Jesús Mesa^{1,2}, Vanessa Blanc², Anicet R. Blanch³, Pilar Cortés², Juan José González⁴, Susana Lavilla⁴, Elisenda Miró¹, Maite Muniesa³, Montserrat Saco³, M^oTeresa Tórtola^{2,4}, Beatriz Mirelis^{1,2}, Pere Coll^{1,2}, Montserrat Llagostera^{2,6}, Guillem Prats^{2,4} and Ferran Navarro^{1,2,*}

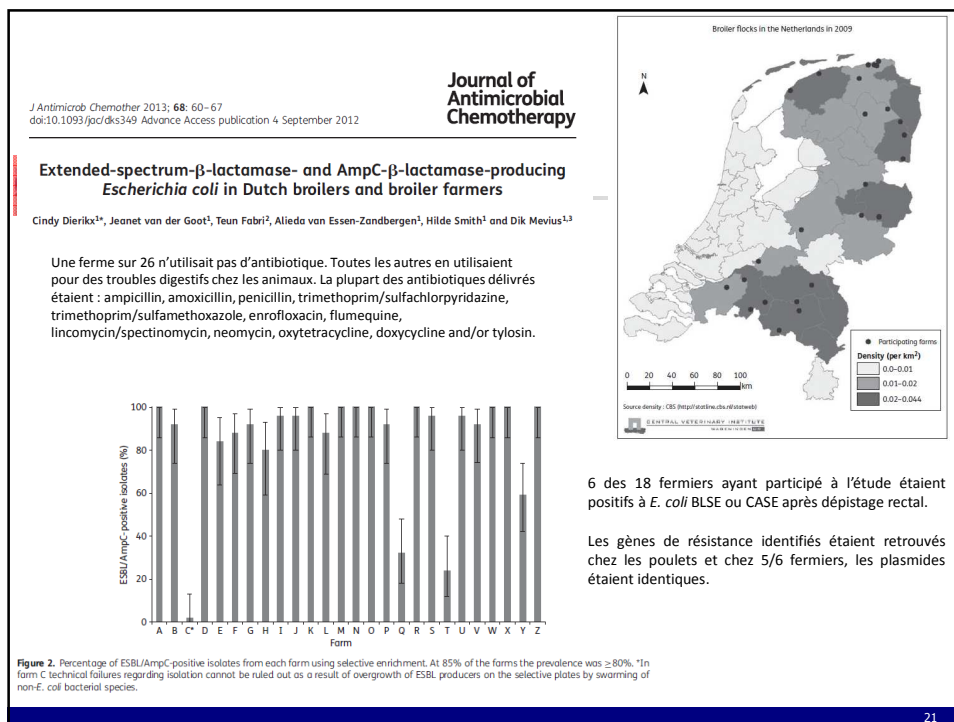


ESBLs in different environments

Table 1. Prevalence of ESBL-producing Enterobacteriaceae in the different environments evaluated

	Number of samples	Positive for ESBL	Prevalence (%)	CI (95%)
Infections	8020	155 127 <i>E. coli</i> 14 <i>K. pneumoniae</i> 5 <i>S. enterica</i> 4 <i>E. cloacae</i> 2 <i>K. oxytoca</i> 2 <i>P. aeruginosa</i> 1 <i>C. freundii</i>	1.9	1.63–2.23
Faecal carriers	948	63 73 <i>E. coli</i> 1 <i>K. pneumoniae</i> 1 <i>C. aerar</i>	6.6	6.26–9.8
Human sewage	5	5 ^a	100	47.8–100
Poultry farms	10 ^b	10 ^{b,c}	100	69.2–100
Pig farms	10 ^b	8 ^{b,c}	80	44.4–97.5
Rabbit farms	10 ^b	2 ^a 2 <i>E. coli</i> 1 <i>E. cloacae</i>	20	2.5–55.6
Foodst.	738	3 2 <i>E. coli</i> 1 <i>K. pneumoniae</i>	0.4	0.08–1.2
Food-borne outbreaks	61 ^a	10 ^b	31.1	19.4–44.3

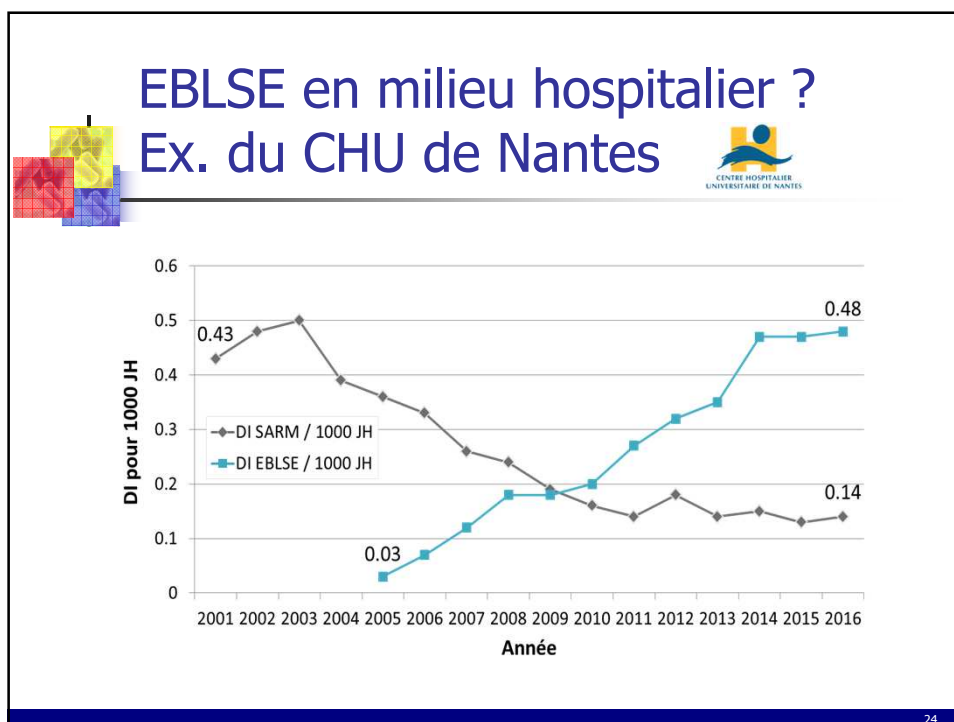
CI, confidence interval.
Number of farms studied: Ten faecal samples of each farm were evaluated.
^aAll patients affected by each food-borne outbreak were evaluated.
^bAll were *E. coli* isolates.



Mode de transmission entre homme et animal ?

Extended-spectrum β -lactamase-producing Enterobacteriaceae in hospital food: a risk assessment.

[Stewardson et al. Infect Control Hosp Epidemiol. 2014 Apr;35\(4\):375-83.](#)



Pourquoi les mesures qui marchent pour le SARM sont inefficaces pour les EBLSE ? Le réservoir

- $\sim 10^{10}$ *E.coli* BLSE par patient porteur (selles) et par jour
- $\sim 10^9$ *E.coli* BLSE dans les urines d'un patient infecté par jour
- $\sim 10^7$ bactéries sur la peau



The Success Story

Tendance
épidémiologique des
EPC ?

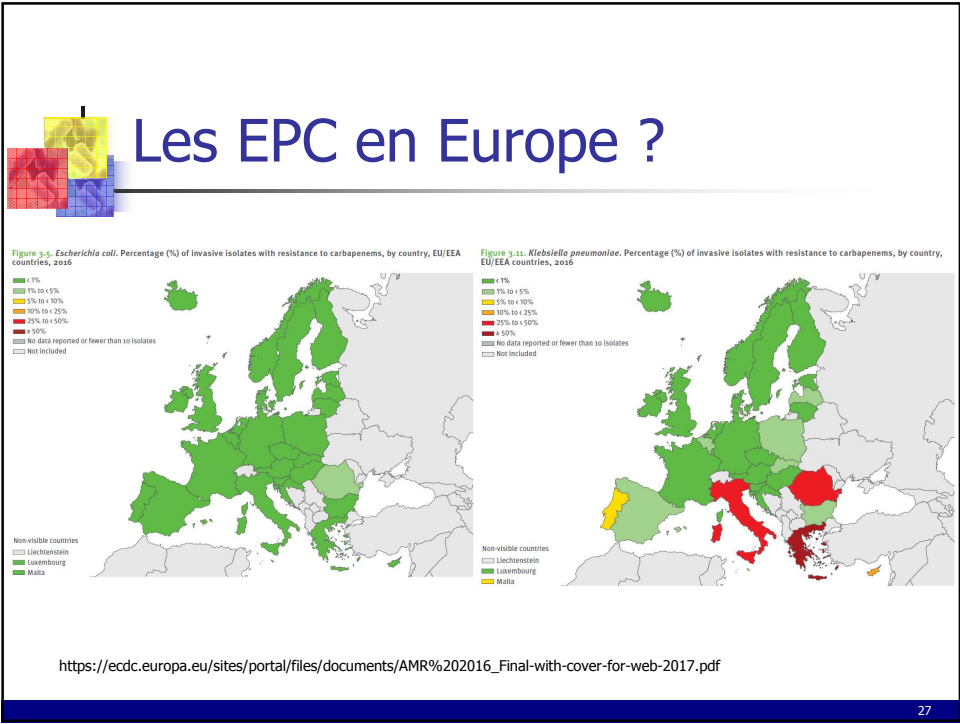
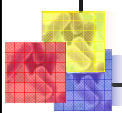


Table 3.12. *Klebsiella pneumoniae*. Total number of invasive isolates tested (N) and percentage with resistance to carbapenems (%R), including 95 % confidence intervals (95 % CI), EU/EEA countries, 2013–2016

Country	2013			2014			2015			2016			Trend 2013–2016	
	N	%R	(95%CI)	N	%R	(95%CI)	N	%R	(95%CI)	N	%R	(95%CI)	All laboratories	Continuously reporting laboratories*
Croatia	376	0.5	(0–2)	334	0.9	(0–3)	380	2.4	(1–4)	323	0.0	(0–1)	2.4 1.2 6.0	
Czech Republic	1133	0.5	(0–1)	1148	0.1	(0–0)	1100	0.3	(0–1)	1096	0.0	(0–0)	0.95 0.25 0.35	↓
Estonia	74	2.7	(0–9)	92	0.0	(0–4)	56	0.0	(0–6)	168	0.0	(0–2)	2.8 1.4 0.0	↓
Finland	550	0.0	(0–1)	583	0.0	(0–1)	658	0.0	(0–1)	770	0.3	(0–1)	0.35 0.35 0.05	
United Kingdom	1051	0.5	(0–1)	1069	0.8	(0–2)	962	0.4	(0–1)	4068	0.3	(0–0)	0.8 0.5 0.3	
France	1842	0.7	(0–1)	2103	0.5	(0–1)	2244	0.5	(0–1)	2528	0.4	(0–1)	0.8 0.4 0.4	
EU/EEA (population-weighted mean)	17 930	8.2	(8–9)	19 617	7.1	(7–7)	21 745	8.1	(8–8)	29 892	6.1	(6–6)	8.2 7.2 6.3	
Cyprus	68	5.9	(2–14)	80	5.0	(1–12)	62	12.9	(6–24)	75	10.7	(5–20)	13.5 9.4 5.0	
Romania	215	20.5	(15–26)	257	31.5	(26–38)	271	24.7	(20–30)	334	31.4	(26–37)	31.0 26.4 20.0	
Italy	1453	34.3	(32–37)	1315	32.9	(30–36)	1999	33.5	(31–36)	2307	33.9	(32–36)	34.5 33.5 32.0	
Greece	1209	59.4	(57–62)	1088	62.3	(59–65)	1185	61.9	(59–65)	1180	66.9	(64–70)	67.0 63.0 59.0	↑

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Les enjeux en France

- **Prévalence faible**
 - EPC : environ 0,7 % des isolats cliniques d'entérobactéries sont résistants aux carbapénèmes et environ 12% le sont par production de carbapénémases [enquête Trans-Réseaux ONERBA : SFM 2013]
 - ERG : ≤1% des isolats cliniques d'*E. faecium* sont résistants aux glycopeptides [rapport 2015 de l'ECDC, EARS-net]
- Beaucoup de cas sporadiques mais aussi des épidémies

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SURVEILLANCE AND OUTBREAK REPORTS

Control of a multi-hospital outbreak of KPC-producing *Klebsiella pneumoniae* type 2 in France, September to October 2009

A. Carhonne (anne.carhonne@aphp.fr)^{1,2}, J.M. Thieblot¹, S. Fourclet¹, N. Fortinneau¹, N. Kassir-Chikhasi¹, J. Boytchev¹, M. Aggoune¹, J.C. Séguyer¹, H. Sénéchal¹, M.P. Taveille¹, B. Colgnant¹, P. Astagneau^{1,3}, V. Jarlier^{1,4,5,6}

SURVEILLANCE AND OUTBREAK REPORTS

Extented measures for controlling an outbreak of VIM-1 producing imipenem-resistant *Klebsiella pneumoniae* in a liver transplant centre in France, 2003–2004

N. Kassir-Chikhasi (nassir-chikhasi@aphp.fr)^{1,2}, F. Saliba¹, A. Carhonne¹, S. Neuviller¹, D. Decze^{1,3}, C. Sengelin^{1,4}, C. Guery¹, M. Gantibari¹, A. Lantier-Kilian¹, C. Bostelmer¹, G. Acher^{1,5,6}, D. Spongel^{1,7}, B. Colgnant^{1,8}, E. Decosse^{1,9}, V. Jarlier^{1,4,5,6}

SURVEILLANCE AND OUTBREAK REPORT

National survey of colistin resistance among carbapenemase-producing *Enterobacteriaceae* and outbreak caused by colistin-resistant OXA-48-producing *Klebsiella pneumoniae*, France, 2014

A. Iavel¹, L. Poirel¹, L. Dortet^{1,2}, P. Nordmann^{1,3}

SURVEILLANCE AND OUTBREAK REPORT

Persisting transmission of carbapenemase-producing *Klebsiella pneumoniae* due to an environmental reservoir in a university hospital, France, 2012 to 2014

B. Clarivet¹, D. Grau¹, E. Jumas-Bilak^{1,2}, H. Jean-Pierre¹, A. Pantel^{1,3}, S. Parer^{1,4}, A. Lotthé^{1,5}

ARTICLE

Faecal carriage of carbapenemase-producing Gram-negative bacilli in hospital settings in southern France

A. Pantel¹, H. Marchandin¹, M.-E. Prière¹, A. Boute-Dubois¹, N. Brice-Roché¹, A. Gaschet¹, A. Davin-Regli¹, A. Sotto¹, J.-E. Lavigne¹

AMERICAN JOURNAL OF INFECTION CONTROL

Contents lists available at ScienceDirect

American Journal of Infection Control

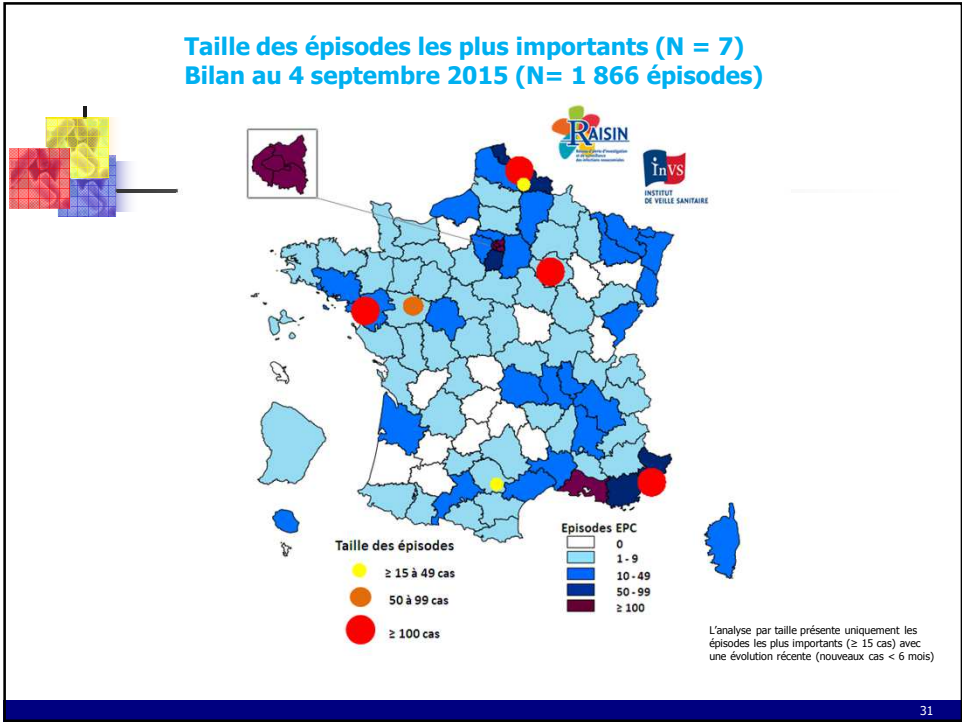
journal homepage: www.ajicjournal.org

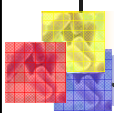
Brief report

Environmental persistence of OXA-48–producing *Klebsiella pneumoniae* in a French intensive care unit

Alix Pantel PharmD^{1,2}, Brigitte Richard-Morel PharmD³, Michel Cazaban MD⁴, Nicole Bougues MD^{1,5}, Albert Sotto MD, PhD^{1,6}, Jean-Philippe Lavigne MD, PhD^{1,7,8}

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Des situations difficiles

American Journal of Infection Control 43 (2015) 1070-5

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org



Major article

Prolonged delay for controlling KPC-2-producing *Klebsiella pneumoniae* outbreak: The role of clinical management

T. Delory MD, MPH^{a,*}, E. Seringe MD^{b,c}, G. Antoniotti MD^b, I. Novakova RN^a, C. Goulenok MD^b, I. Paysant RN^a, S. Boyer PharmD^{b,c}, A. Carbonne MD^d, T. Nias PhD^{c,d,e}, P. Astagneau MD, PhD^{a,b}



ORIGINAL ARTICLE

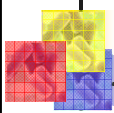
EPIDEMIOLOGY

Measures to eradicate multidrug-resistant organism outbreaks: how much do they cost?

G. Birgand^{1,2,3}, L. S. P. Moore¹, C. Bourigault⁴, V. Vella¹, D. Lepelletier¹, A. H. Holmes¹ and J.-C. Lucet^{1,2}

Clin Microbiol Infect 2016; 22: 162.e1–162.e9
Clinical Microbiology and Infection © 2015 European Society of Clinical Microbiology and Infectious Diseases. Published by Elsevier Ltd. All rights reserved
<http://dx.doi.org/10.1016/j.cmi.2015.10.001>

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Les hôpitaux français sont-ils prêts ?

Eur J Clin Microbiol Infect Dis (2015) 34:1615–1620
DOI 10.1007/s10996-015-2396-8

ARTICLE

Control of emerging extensively drug-resistant organisms (eXDRo) in France: a survey among infection preventionists from 286 healthcare facilities

D. Lepelletier¹ · J. C. Lucet² · P. Astagneau³ · B. Coignard⁴ · S. Vaux⁴ · C. Rahaut⁵ · B. Grandbastien⁶ · P. Berthelin⁷

Eur J Clin Microbiol Infect Dis (2015) 34:1615–1620 1617

Table 1 Strategies to control the spread of emerging extensively drug-resistant organisms (eXDRo) from repatriates or patients with recent hospitalization in foreign hospitals among 286 French hospitals in 2012

Categories	Hospitals, n (%)	eXDRo including GRE and CPE, n (%) ^a	Reported detecting procedures		Detection and systematic alert to ICT <24 h, n (%) ^f	Operational procedure, n (%) ^d
			Repatriates, n (%) ^b	Patients with recent hospitalization in foreign hospitals, n (%) ^c		
>500 beds	55 (19.4)	53 (96.4)	42 (77.8)	37 (67.3)	28 (50.9)	5 (9.1)
301–500 beds	54 (18.9)	46 (85.2)	33 (63.5)	29 (54.7)	27 (50.9)	13 (24.1)
101–300 beds	98 (34.3)	69 (70.4)	43 (47.8)	42 (45.7)	37 (40.2)	39 (39.8)
<100 beds	76 (26.6)	44 (57.9)	35 (46.7)	28 (37.8)	24 (32.4)	39 (51.3)
Total	283 ^a	212 (74.1)	153 (56.5)	136 (49.6)	116 (42.3)	96 (33.6)

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Comment maîtriser ?

- Est-on en train de passer de l'état sporadique/épidémique limité à un état endémique ?
- Les recommandations du HCSP 2013 sont-elles toujours réalisables ?



Journal of Hospital Infection 90 (2015) 186–195

Available online at www.sciencedirect.com

Journal of Hospital Infection

Journal homepage: www.elsevier.com/locate/jhin

Review

French recommendations for the prevention of 'emerging extensively drug-resistant bacteria' (eXDR) cross-transmission[☆]

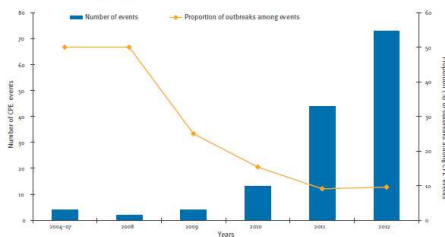
D. Lepelletier^{a,b,*}, P. Berthelot^c, J.-C. Lucet^d, S. Fournier^e, V. Jarlier^{f,g}, B. Grandbastien^h and the National Working Groupⁱ

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Long-term control of carbapenemase-producing Enterobacteriaceae at the scale of a large French multihospital institution: a nine-year experience, France, 2004 to 2012

Figure

Number of carbapenemase-producing Enterobacteriaceae (CPE) events (n=140) and proportion of outbreaks among these events at Assistance Publique-Hôpitaux de Paris, France, 2004–2012



Year	Number of events	Proportion of outbreaks among events (%)
2004	4	50
2005	4	50
2006	4	25
2007	12	17
2008	17	12
2009	22	12
2010	32	12
2011	38	12
2012	60	12

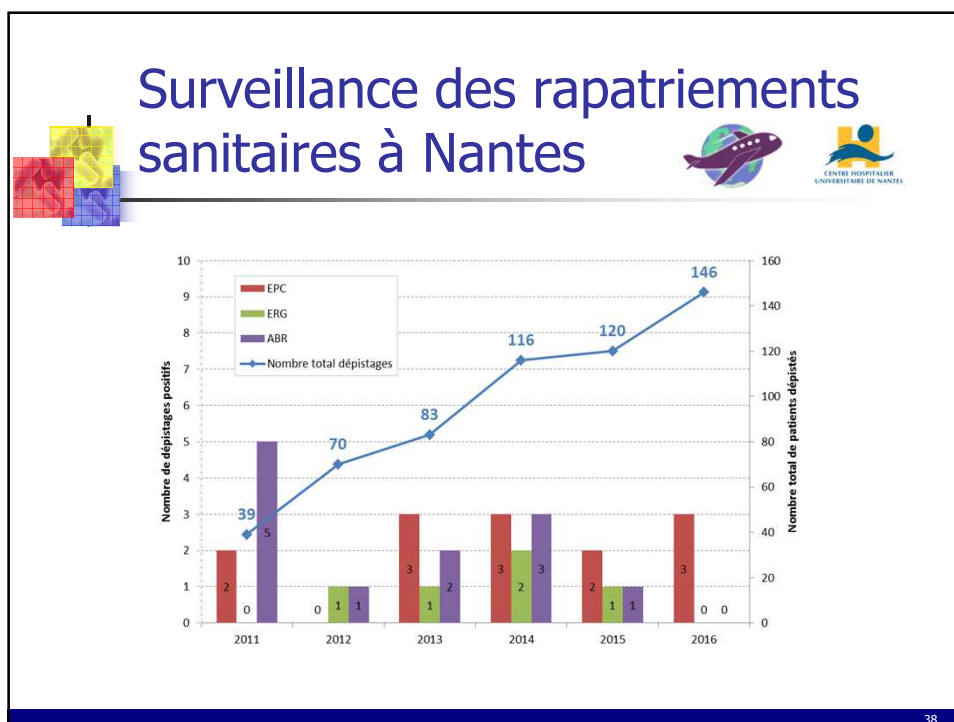
A CPE event was defined as one index case (respectively defined as infected or colonised with CPE, followed or not by secondary cases).

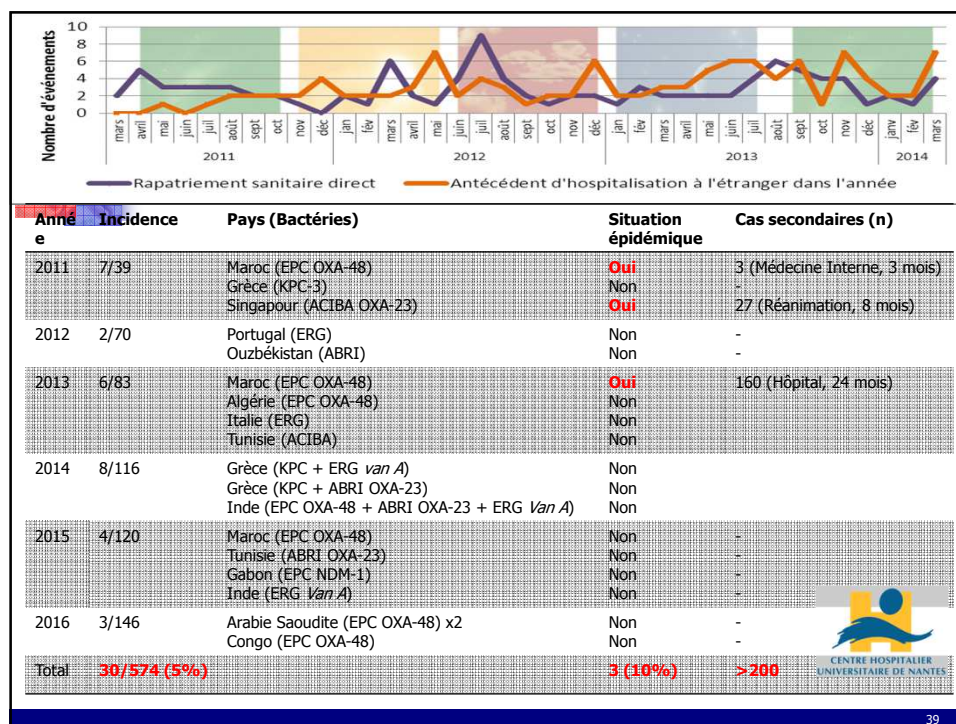
TABLE 1

Number of carbapenemase-producing Enterobacteriaceae (CPE) outbreaks among CPE events and number of secondary cases among all CPE cases, before and after implementation of a CPE control programme at Assistance Publique-Hôpitaux de Paris, France, 2004–2012

	2004–2009	2010–2012	P value
Number of events	15	17	—
Number of outbreaks (proportion of outbreaks among events)	4 (26%)	13 (76%)	0.02
Number of cases	32	168	—
Number of secondary cases (proportion of secondary cases among total cases)	22 (69%)	38 (23%)	< 0.001

Over the whole period from 2004 to 2012 there were a total of 17 outbreaks among 140 CPE events and 60 secondary cases among 200 CPE cases.





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J Antimicrob Chemother 2012
doi:10.1093/jac/dkr547
Advance Access publication 4 January 2012

Nosocomial outbreak of carbapenem-resistant *Enterobacter cloacae* highlighting the interspecies transferability of the *bla*_{OXA-48} gene in the gut flora

Lise Crémet^{1,2}, Céline Bourigault¹, Didier Lepelletier^{1,2}, Aurélie Guillouzoic^{1,2}, Marie-Emmanuelle Juvin¹, Alain Reynaud^{1,2}, Stéphane Corvec^{1,2} and Nathalie Caroff^{2*}

American Journal of Infection Control 41 (2013) 652-3
Contents lists available at ScienceDirect
American Journal of Infection Control
journal homepage: www.ajicjournal.org

Brief report

Investigation and management of multidrug-resistant *Acinetobacter baumannii* spread in a French medical intensive care unit: One outbreak may hide another

Céline Bourigault PharmD^{a,*}, Stéphane Corvec PharmD, PhD^{a,b}, Cédric Bretonnière MD^{b,c}, Aurélie Guillouzoic PharmD^d, Lise Crémet PharmD^{a,b}, Julie Marraillac AS^d, Marie-Emmanuelle Juvin PharmD^e, Pascale Berner MD^e, Florence Le Gallou PharmD^a, Alain Reynaud PharmD, PhD^{a,b}, David Boutolle MD, PhD^{b,d}, Daniel Villers MD, PhD^c, Didier Lepelletier MD, PhD^{a,b}

Journal of Hospital Infection 89 (2015) 248–253



Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevierhealth.com/journals/jhin



Challenges of controlling a large outbreak of OXA-48 carbapenemase-producing *Klebsiella pneumoniae* in a French university hospital[☆]

B. Semin-Pelletier^a, L. Cazet^a, C. Bourigault^a, M.E. Juvin^a, D. Boutolle^{b,c}, F. Raffi^b, M. Hourmant^d, G. Blancho^d, C. Agard^e, J. Connault^d, S. Corvec^{a,c}, J. Caillon^{a,c}, E. Batard^{c,f}, D. Lepelletier^{a,c,*}

40

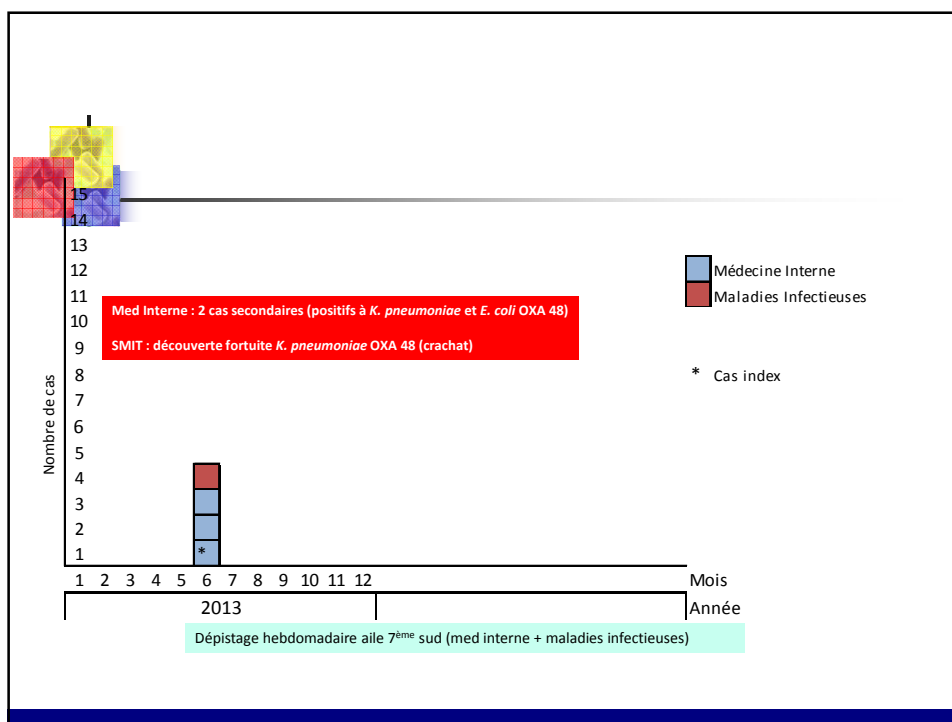
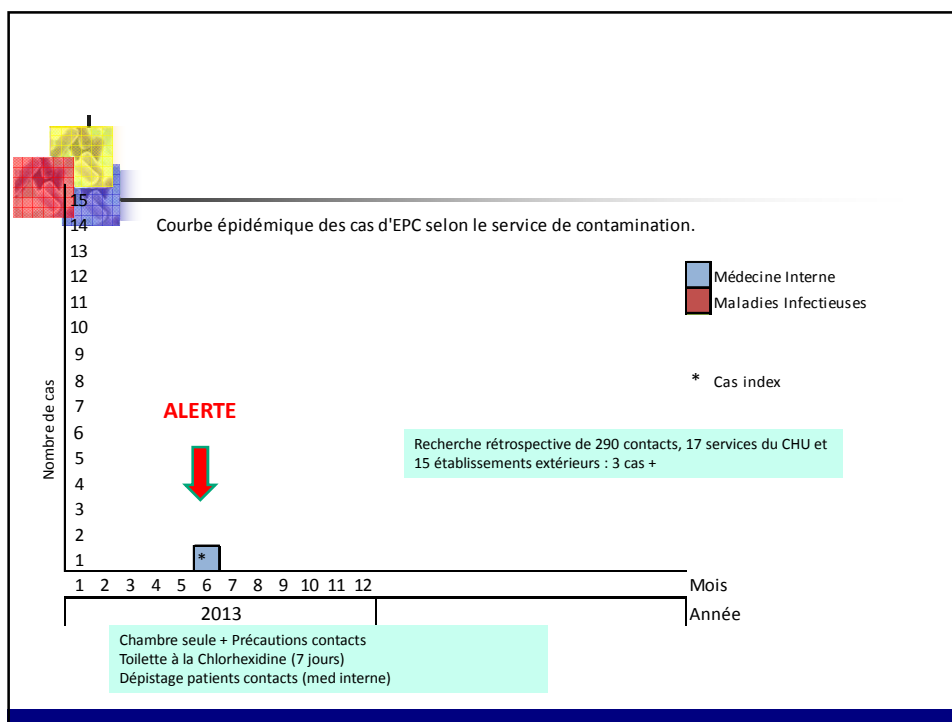


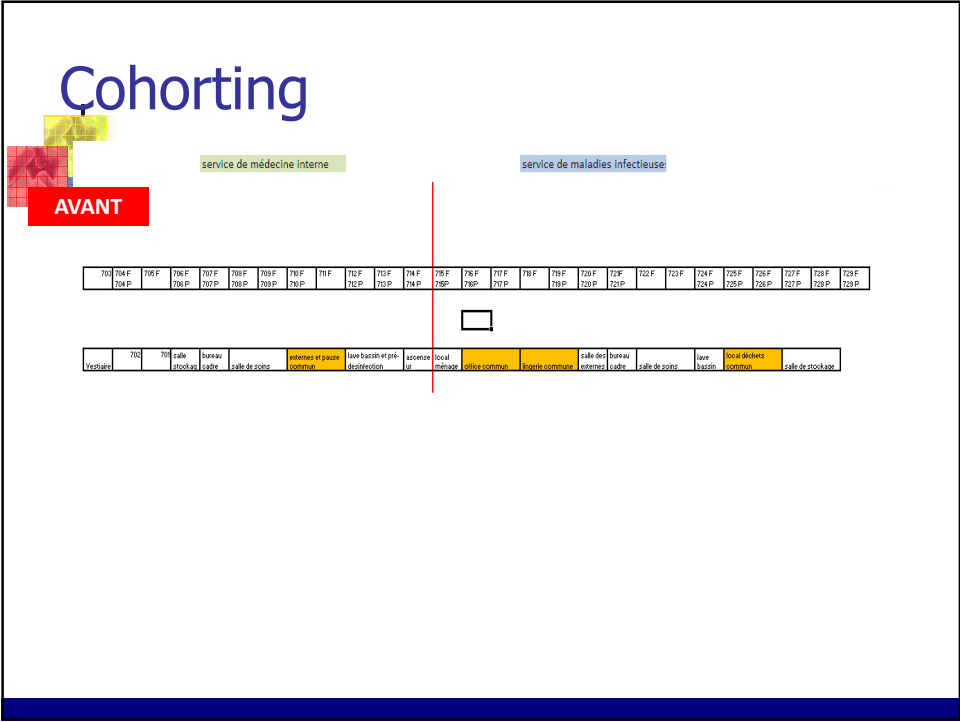
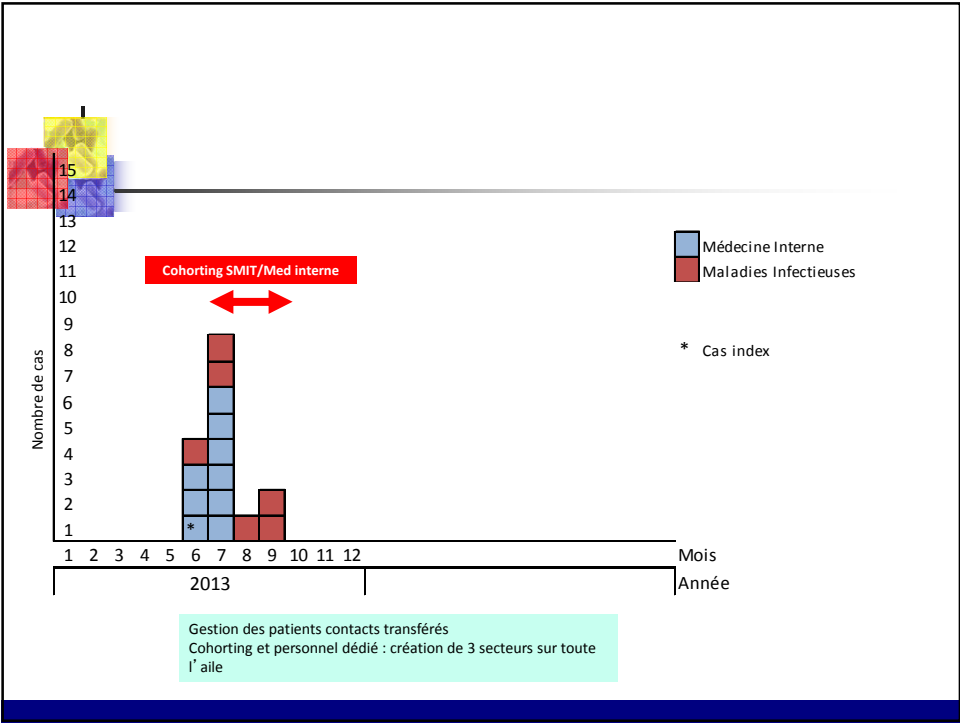
Alerte

- 17/06/2013 : alerte du laboratoire de bactériologie du CHU de Nantes
 - Isolement d'une souche de *Citrobacter freundii* productrice d'une carbapénémase de type OXA-48 dans un ECBU réalisé le 13/06/2013 chez un patient hospitalisé en médecine interne.

=> Patient de 85 ans hospitalisé en médecine interne depuis le **02/05/2013** en chambre double, après un passage aux urgences, pour insuffisance rénale.

=> Réside à Fay-de-Bretagne, aucune notion de contact avec l'étranger (voyage ou hospitalisation).





Cohorting

AVANT

702	704 F	705 F	706 F	707 F	708 F	709 F	710 F	711 F	712 F	713 F	714 F	715 F	716 F	717 F	718 F	719 F	720 F	721 F	722 F	723 F	724 F	725 F	726 F	727 F	728 F	729 F
704 P	706 P	707 P	708 P	709 P	710 P	711 P	712 P	713 P	714 P	715 P	716 P	717 P	718 P	719 P	720 P	721 P	722 P	723 P	724 P	725 P	726 P	727 P	728 P	729 P		

Verrière	702	704	706	708	710	712	714	716	718	720	722	724	726	728	730	732	734	736	738	740	742	744	746	748	750	752	754	756	758	760	762	764	766	768	770	772	774	776	778	780	782	784	786	788	790	792	794	796	798	800	802	804	806	808	810	812	814	816	818	820	822	824	826	828	830	832	834	836	838	840	842	844	846	848	850	852	854	856	858	860	862	864	866	868	870	872	874	876	878	880	882	884	886	888	890	892	894	896	898	900	902	904	906	908	910	912	914	916	918	920	922	924	926	928	930	932	934	936	938	940	942	944	946	948	950	952	954	956	958	960	962	964	966	968	970	972	974	976	978	980	982	984	986	988	990	992	994	996	998	1000
Verrière	702	704	706	708	710	712	714	716	718	720	722	724	726	728	730	732	734	736	738	740	742	744	746	748	750	752	754	756	758	760	762	764	766	768	770	772	774	776	778	780	782	784	786	788	790	792	794	796	798	800	802	804	806	808	810	812	814	816	818	820	822	824	826	828	830	832	834	836	838	840	842	844	846	848	850	852	854	856	858	860	862	864	866	868	870	872	874	876	878	880	882	884	886	888	890	892	894	896	898	900	902	904	906	908	910	912	914	916	918	920	922	924	926	928	930	932	934	936	938	940	942	944	946	948	950	952	954	956	958	960	962	964	966	968	970	972	974	976	978	980	982	984	986	988	990	992	994	996	998	1000

APRES

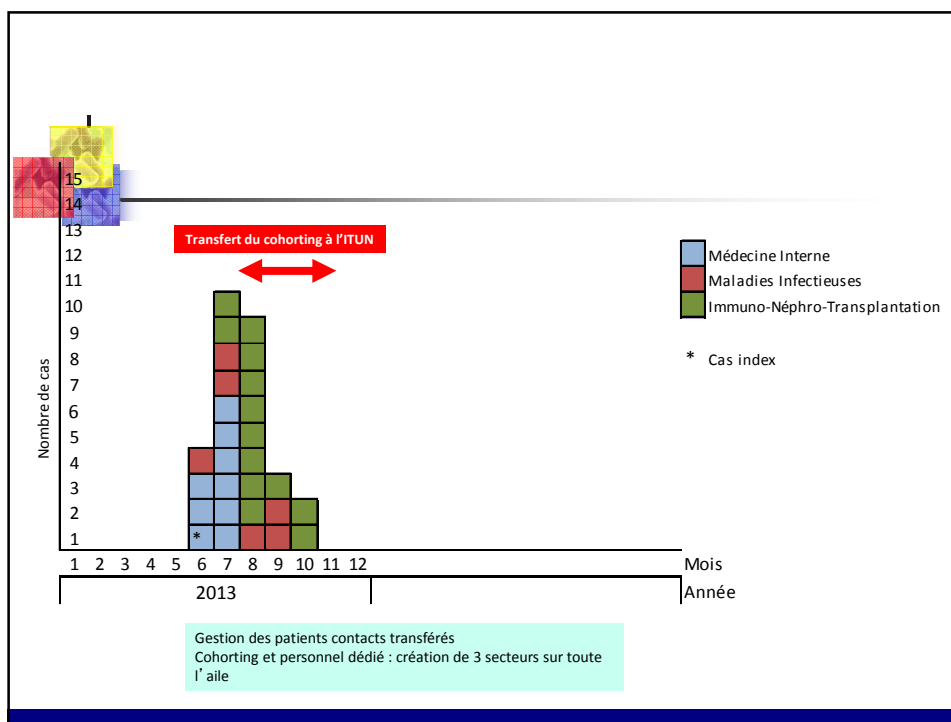
702	704	705 F	706 F	707 F	708 F	709 F	710 F	711 F	ménage litige	logement litige	office litige	714	715	716 F	717 F	718 F	719 F	720 F	721 F	722 F	723 F	724 F	725 F	726 F	727 F	728 F	729 F	730 F	731 F	732 F	733 F	734 F	735 F	736 F	737 F	738 F	739 F	740 F	741 F	742 F	743 F	744 F	745 F	746 F	747 F	748 F	749 F	750 F	751 F	752 F	753 F	754 F	755 F	756 F	757 F	758 F	759 F	760 F	761 F	762 F	763 F	764 F	765 F	766 F	767 F	768 F	769 F	770 F	771 F	772 F	773 F	774 F	775 F	776 F	777 F	778 F	779 F	780 F	781 F	782 F	783 F	784 F	785 F	786 F	787 F	788 F	789 F	790 F	791 F	792 F	793 F	794 F	795 F	796 F	797 F	798 F	799 F	800 F	801 F	802 F	803 F	804 F	805 F	806 F	807 F	808 F	809 F	810 F	811 F	812 F	813 F	814 F	815 F	816 F	817 F	818 F	819 F	820 F	821 F	822 F	823 F	824 F	825 F	826 F	827 F	828 F	829 F	830 F	831 F	832 F	833 F	834 F	835 F	836 F	837 F	838 F	839 F	840 F	841 F	842 F	843 F	844 F	845 F	846 F	847 F	848 F	849 F	850 F	851 F	852 F	853 F	854 F	855 F	856 F	857 F	858 F	859 F	860 F	861 F	862 F	863 F	864 F	865 F	866 F	867 F	868 F	869 F	870 F	871 F	872 F	873 F	874 F	875 F	876 F	877 F	878 F	879 F	880 F	881 F	882 F	883 F	884 F	885 F	886 F	887 F	888 F	889 F	890 F	891 F	892 F	893 F	894 F	895 F	896 F	897 F	898 F	899 F	900 F	901 F	902 F	903 F	904 F	905 F	906 F	907 F	908 F	909 F	910 F	911 F	912 F	913 F	914 F	915 F	916 F	917 F	918 F	919 F	920 F	921 F	922 F	923 F	924 F	925 F	926 F	927 F	928 F	929 F	930 F	931 F	932 F	933 F	934 F	935 F	936 F	937 F	938 F	939 F	940 F	941 F	942 F	943 F	944 F	945 F	946 F	947 F	948 F	949 F	950 F	951 F	952 F	953 F	954 F	955 F	956 F	957 F	958 F	959 F	960 F	961 F	962 F	963 F	964 F	965 F	966 F	967 F	968 F	969 F	970 F	971 F	972 F	973 F	974 F	975 F	976 F	977 F	978 F	979 F	980 F	981 F	982 F	983 F	984 F	985 F	986 F	987 F	988 F	989 F	990 F	991 F	992 F	993 F	994 F	995 F	996 F	997 F	998 F	999 F	1000 F																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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Nombre de cas

1 2 3 4 5 6 7 8 9 10 11 12 Mois Année

Pendant la même période :
Transfert d'un patient contact du SMIT
vers le service d'INT... qui se positive

Médecine Interne
Maladies Infectieuses
Immuno-Néphro-Transplantation
* Cas index

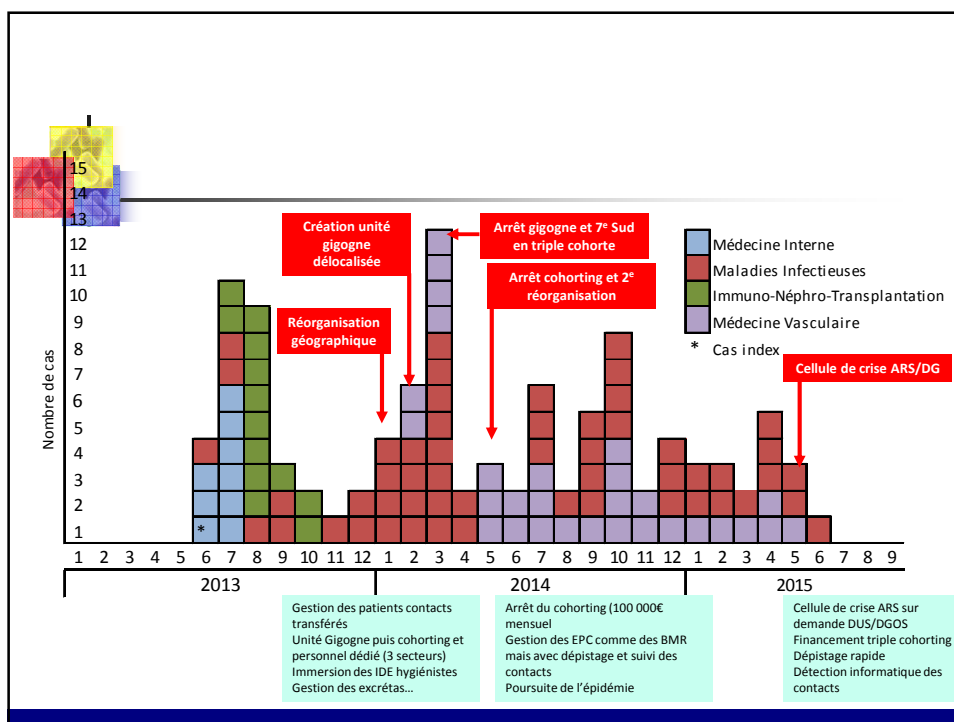
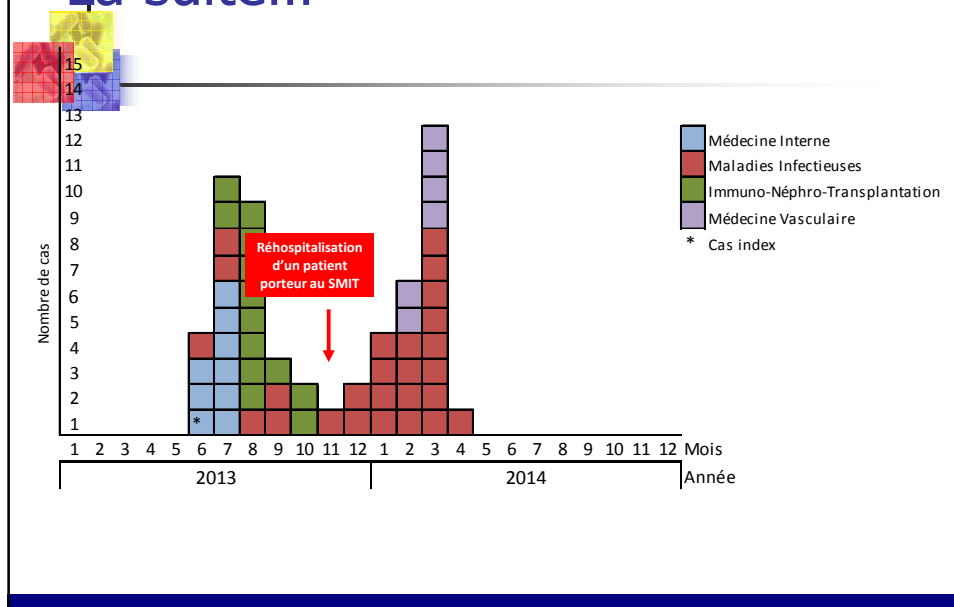


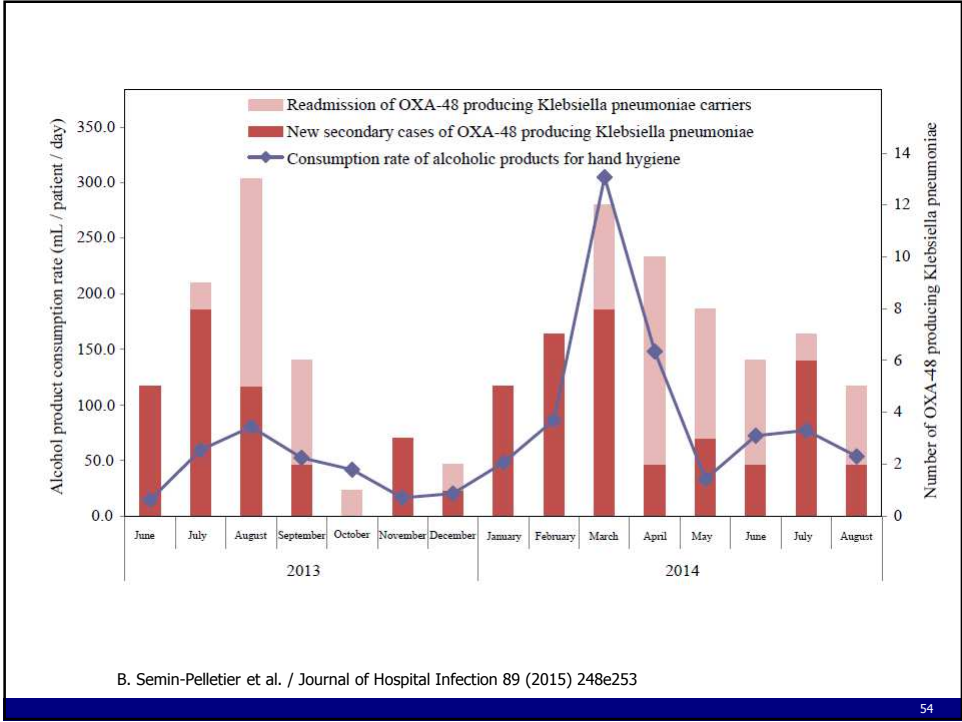
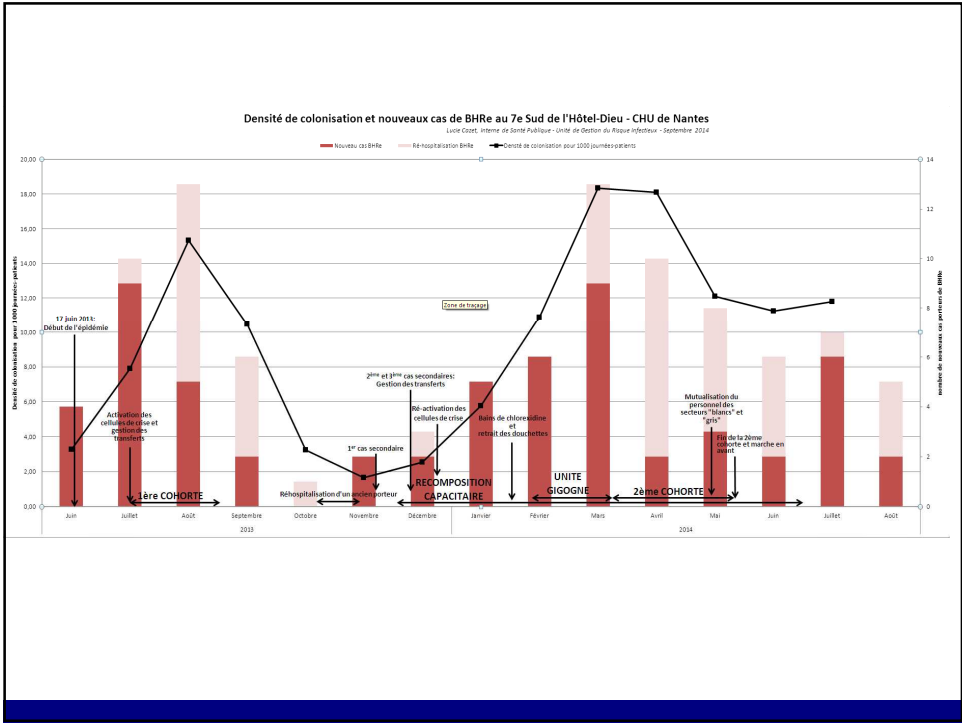
En quelques chiffres....

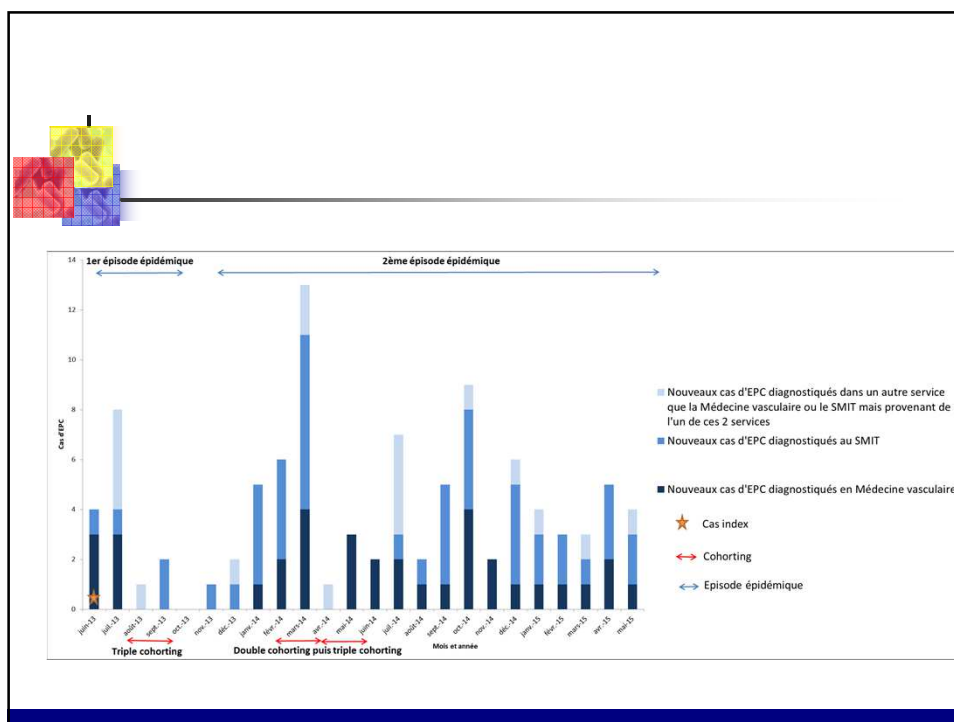
- 1er épisode épidémique maîtrisé dans les deux zones (7^e Sud et ITUN) fin octobre 2013
 - Efficacité du cohorting au prix d'une organisation et d'un coût
 - Surveillance de plus de 1000 contacts par dépistage digestif
 - Durée épidémie 5 mois
 - Au total 29 cas secondaires à partir du cas index, majoritairement des colonisations digestives
 - 14 cas secondaires au SMIT/ 13 à l'ITUN / 3 hors CHU par transferts

Mais, mais

La suite...







Des difficultés, oui bien évidemment !

- Epuisement des équipes médicales et paramédicales des secteurs concernés
 - Durée de l'épidémie
 - Lourdeur des mesures
 - Contexte organisationnel
 - Nombre d'unités avec cas transféré nécessitant un dépistage des contacts (jusqu'à 9 unités sur quatre sites)
- Coût
 - Fermeture de lits / Perte d'activité
 - Personnel dédié / Ressources
- Temps dédié à la gestion de ces épisodes

Characteristics	A single case (suspicion ≤ 48h after admission)	Episode with > 1 secondary case
Staff reinforcement	€ 770	€12 900
Microbiological analysis	€ 530	€ 6 700
Protective equipment	€ 630	€ 1 990
Interruption of admissions	€ 2 500	€ 115 000
Overall mean cost (€)	€ 4 430	€ 136 590

Birgand et al. BMJ Open 2016



Et maintenant, quid des porteurs ?

- 190 patients EPC (juin 2013/ mai 2016)
 - Dont 150 porteurs pour la seule épidémie
 - 114 sont revenus au moins une fois (60%)
 - 33% une fois, les autres entre 2 et 13 fois
 - 3 services représentent 72% des ré-hospitalisations
 - Délai médian de ré-hospitalisation 32 jours
 - 88 patients EPC (77%) négatifs au dépistage à la ré-admission
 - Dont 65 sont restés négatifs et 23 se sont de nouveaux positifs
 - L'exposition aux ATB significativement associée au fait de se re-positiver

Politique de gestion des porteurs

- Stratégie du J0 J7
 - Ré-admission en chambre seule et PCC
 - Si tjs positifs à J0 ou J7 (porteurs excréteurs) :
 - dépistage des contacts
 - 21% des réadmis
 - Si négatifs J0 et J7 (porteurs non excréteurs) :
 - Pas de dépistage des contacts
 - Dépistage du porteur si ATB
 - 40% des réadmis avec DMS <7 j

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Et maintenant quid des contacts ?

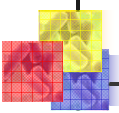
- 3 600 contacts
 - Dont 2150 pour la seule épidémie
 - Détection informatique systématique à la réadmission
 - Création d'un code fictif sans le SIH
 - Alerte EOH et unités sur interface informatique dans les unités
 - Un seul dépistage et exit de la liste si négatif
 - PCR seulement au SAU pour ventilation rapide des patients
 - Planning et astreinte des IDE hygiénistes pour leur gestion
- 960 réadmis et dépistés
 - 6 positifs à l'entrée (0,6%)

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The Success Story

- Détecter
- Alerter
- Mettre vite les PCC
- Analyser le risque de diffusion et adapter les mesures
- Appliquer les reco HCSP de 2013 en cas de diffusion secondaire non contrôlée, seules efficaces
- Communiquer en interne et en aval avec l'aide des Cepias
- Gérer son réservoir



QUIZZ

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Journal of Hospital Infection 91 (2015) 181–182
Available online at www.sciencedirect.com
Journal of Hospital Infection
journal homepage: www.elsevierhealth.com/journals/hin

Continuing Professional Development and the Journal of Hospital Infection

Questions linked to Lepelletier D, Berthelot P, Lucet J-C, Fournier S, Jarlier V, Grandbastien B and the National Working Group. French recommendations for the prevention of 'emerging extensively drug-resistant bacteria' (eXDR) cross-transmission. *J Hosp Infect* 2015;90:186–195.
Available online 7 July 2015

1. What are the two emerging extensively drug-resistant bacteria (eXDR) targeted by the French guidelines? (Select two answers.)

- Carbapenemase-producing *Acinetobacter baumannii*.
- Glycopeptide-resistant *Enterococcus faecium*.
- Meticillin-resistant *Staphylococcus aureus*.
- Carbapenemase-producing *Pseudomonas aeruginosa*.
- Carbapenemase-producing Enterobacteriaceae.

2. Which of the following statements apply to the rationale for the French guideline targeting specific types of eXDR bacteria? (More than one answer may apply.)

- The choice is related to the number of antibiotic resistances, as defined by European definitions.
- Plasmid-borne eXDR antimicrobial resistance is transferable to other species.
- The eXDR bacteria are not currently epidemic in France.
- The bacteria belong to the commensal gastrointestinal tract flora, are therefore likely to be carried for a long time, and can potentially spread in hospitals and in the community.
- They are opportunistic saprophytic bacteria.

3. Which of the following patient groups must be hospitalized in a single room with contact precautions pending the results of rectal swab screening for eXDR bacteria? (More than one answer may apply.)

- Direct repatriates as inpatients from an overseas health institution for a hospital stay or repeated treatments (excluding consultations).
- Patients transferred from abroad by medical repatriation or by an insurance company, directly or indirectly, from a healthcare facility situated in a country other than France.
- Patients with a history of hospitalization in a medical or surgical ward abroad within the previous year.
- Patients with previous history of eXDR carriage.
- Patients with a history of contact with eXDR patients.

4. Which of the following define a contact patient? (More than one answer may apply.)

- A patient directly exposed to an eXDR bacteria carrier patient.
- A patient whose inpatient care has involved sharing paramedical healthcare workers with one or more eXDR bacteria carrier patients.
- A patient whose inpatient care has involved sharing medical healthcare workers with one or more eXDR bacteria carrier patients.

5. What are the main measures that must be taken at the time of admission of an at-risk patient? (More than one answer may apply.)

- Isolation in a single room.
- Contact precautions.
- Patient rectal screening for eXDR colonization.
- Rectal screening of all contact patients for eXDR colonization.
- Temporarily stopping admissions.
- Stopping transfers of eXDR carriers and contact patients.
- Temporarily stopping admissions.
- Cohorting of eXDR bacteria carriers, contact patients, and newly admitted patients into three different sectors, each with dedicated staff.
- Weekly rectal screening of contact patients.
- Screening of contact patients who were already transferred to another institution.

6. In an outbreak situation, which additional measures can be implemented to control the eXDR bacteria spread, according to the local hospital context? (More than one answer may apply.)