Antibiorésistance :
De l'Origine De La Prévention et Contrôle des Infections
À Son Rôle dans l'Antibiogouvernance

AIPI May 2023

Centre universitaire de santé McGill
McGill University Health Centre

Conflit d’interet

- Aucun

Objectifs

- Historique du développement du concept de l' antibio résistance.
- État de situation à l'échelle mondiale.
- Données canadiennes pour les pathogènes d'intérêt hospitaliers (comparaison québécoises)
- Exemples québécois de contrôle de la résistance : SARM / ERV
- Antibio gouvernance : concepts fondamentaux des programmes d'antibiogouvernance
- Rôle de la PCI dans l'antibiogouvernance :
  - exemples locaux

Historique

- 1941 : pénicilline
  - Habilité de traiter / guérir infection auparavant mortel
- 1943 : résistance apparait après usage de pénicilline
- 1950 : production de masse…surplus!
- 1960: utilisation de masse pour traiter tout
  - Perception peu de toxicité , cela ne peut pas nuire…

"Don't forget to take a handful of our complimentary antibiotics on your way out."

Historique

- 1950 : Maxwell Finland / Louis Wenstein
  - Observation de résistance clinique
    - *Les infections redeviennent mortelles !*
  - Corrélation entre usage augmenté et développement de la R
    - *Milieu de soins Intensifs*
    - *Procédures invasives*
    - *Milieu hospitalier propice à la transmission*

1960 : Éducation et Persuation

- Convaincre MD de restreindre l'usage des AB
- Toxicité de nouveaux AB reconnus (AG, Sulfa)
- Changement des agents pathogénes :
  - 1960 : S.aureus R penicillin
  - 1970:
    - *- moins de S.aureus*
    - *+ Gram négatifs / Champignons*
- Estimation 60 % usage excessif d' AB…

1970-90

- Arrivé de multitude de nouveaux AB
  - 1980 : Cephalosporin de 2 +3 ème génération
  - 1990 :
    - *Inhibiteurs de B-lactamases*
    - *Fluroquinolones*
    - *Carbapénems*

- Émergence années 90 :
  - SARM
  - ERV
  - ESBL

- Programme de restrictions surtout à cause des $$$:
  - Usage limitée à Microbio
  - Rapport sélectif des sensibilités
  - Lignes directrices

Antibiotic Approved or Released	Year Released	Resistant Germ Identified	Year Identified
Penicillin	1941	Penicillin-resistant *Staphylococcus aureus*[20, 21]	1942
		Penicillin-resistant *Streptococcus pneumoniae*[8,10]	1967
		Penicillinase-producing *Neisseria gonorrhoeae*[11]	1976
Vancomycin	1958	Plasmid-mediated vancomycin-resistant *Enterococcus faecium*[12,13]	1988
		Vancomycin-resistant *Staphylococcus aureus*[14]	2002
Amphotericin B	1959	Amphotericin B-resistant *Candida auris*[15]	2016
Methicillin	1960	Methicillin-resistant *Staphylococcus aureus*[16]	1960
Extended-spectrum cephalosporins	1980 (Cefotaxime)	Extended-spectrum beta-lactamase- producing *Escherichia coli*[17]	1983
Azithromycin	1980	Azithromycin-resistant *Neisseria gonorrhoeae*[18]	2011
Imipenem	1985	*Klebsiella pneumoniae* carbapenemase (KPC)-producing *Klebsiella pneumoniae*[19]	1996
Ciprofloxacin	1987	Ciprofloxacin-resistant *Neisseria gonorrhoeae*[20]	2007
Fluconazole	1990 (FDA approved)	Fluconazole-resistant *Candida*[21]	1988
Caspofungin	2001	Caspofungin-resistant *Candida*[22]	2004
Daptomycin	2003	Daptomycin-resistant methicillin-resistant *Staphylococcus aureus*[23]	2004
Ceftazidime-avibactam	2015	Ceftazidime-avibactam-resistant KPC-producing *Klebsiella pneumoniae*[24]	2015

Revised Dec. 2019

CDC
U.S. Department of Health and Human Services
Centers for Disease

Fardeau de l'antibiorésistance à l'échelle Mondiale en 2019

Lancet : V322 p629 (2022)

- Revue systématique
  - Évaluation de 23 pathogènes / combinaisons de 88 AB
  - Revue de 7585 données/publications/années
  - Modèle statistique de prévision for tous les pays /continents
- Résultats:
  - 4.95 millions de décès associés à ABR
  - Mortalité attribuable plus élevée en Afrique subsaharienne (27.3/100000)
    - *Plus faible en Australie (6.5/100000)*
  - Pathogène les plus frèquent :
    - *E.coli, S.aureus , Klebsiella*
    - *Spneumonia , Acinetobacter, Pseudo monas*

CoVid = 6.9 Millions de décès en 3 ans !!!!

Syndrome cliniques associées à ABR

Lancet : V322 p629 (2022)

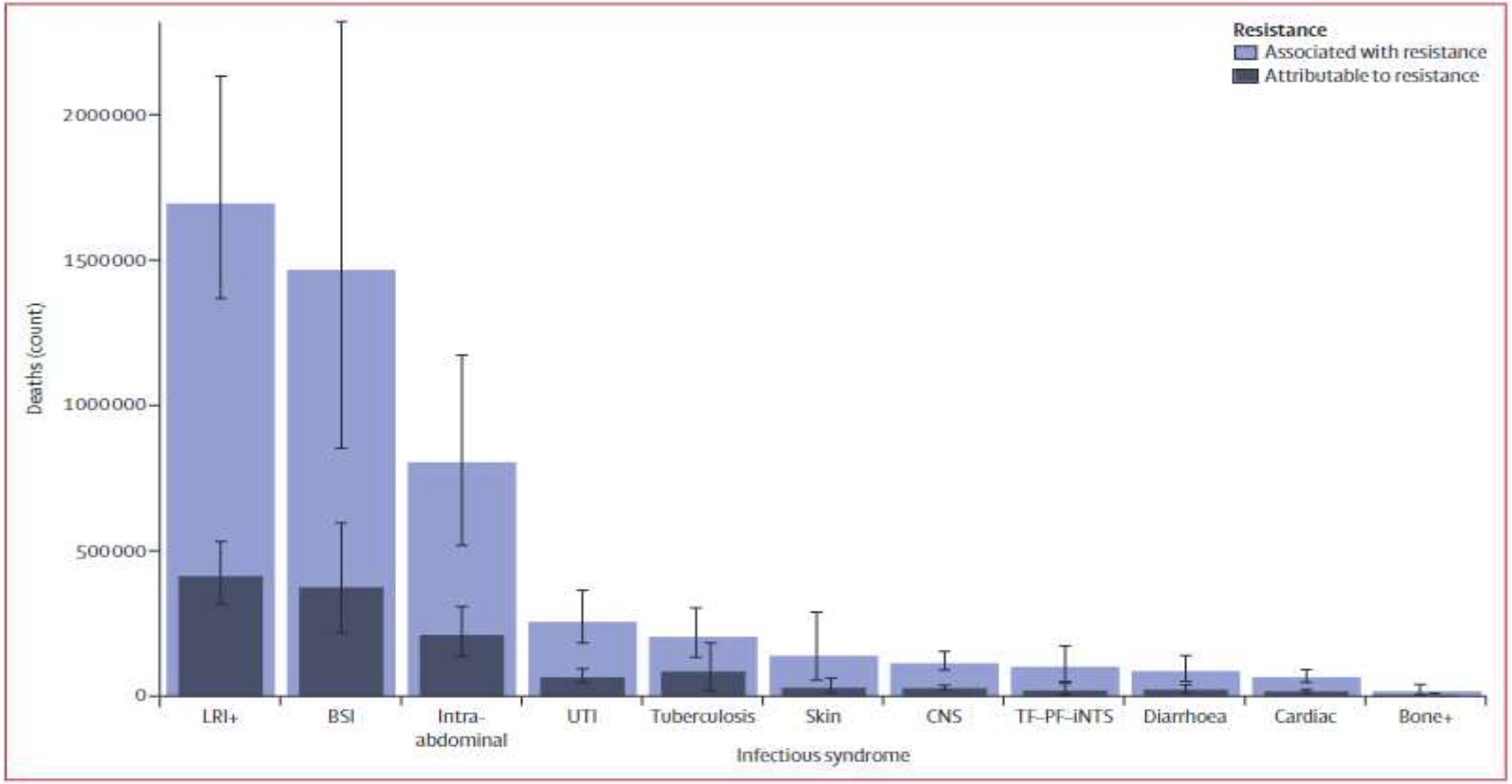

Figure 3: **Global deaths (counts) attributable to and associated with bacterial antimicrobial resistance by infectious syndrome, 2019**
Estimates were aggregated across drugs, accounting for the co-occurrence of resistance to multiple drugs. Error bars show 95% uncertainty intervals. Does not include gonorrhoea and chlamydia because we did not estimate the fatal burden of this infectious syndrome. Bone+–infections of bones, joints, and related organs. BSI–bloodstream infections. Cardiac–endocarditis and other cardiac infections. CNS–meningitis and other bacterial CNS infections. Intra-abdominal–peritoneal and intra-abdominal infections. LRI+–lower respiratory infections and all related infections in the thorax. Skin–bacterial infections of the skin and subcutaneous systems. TF–PF–iNTS– typhoid fever, paratyphoid fever, and invasive non-typhoidal *Salmonella* spp. UTI–urinary tract infections and pyelonephritis.

Bactéries responsable

Lancet : V322 p629 (2022)

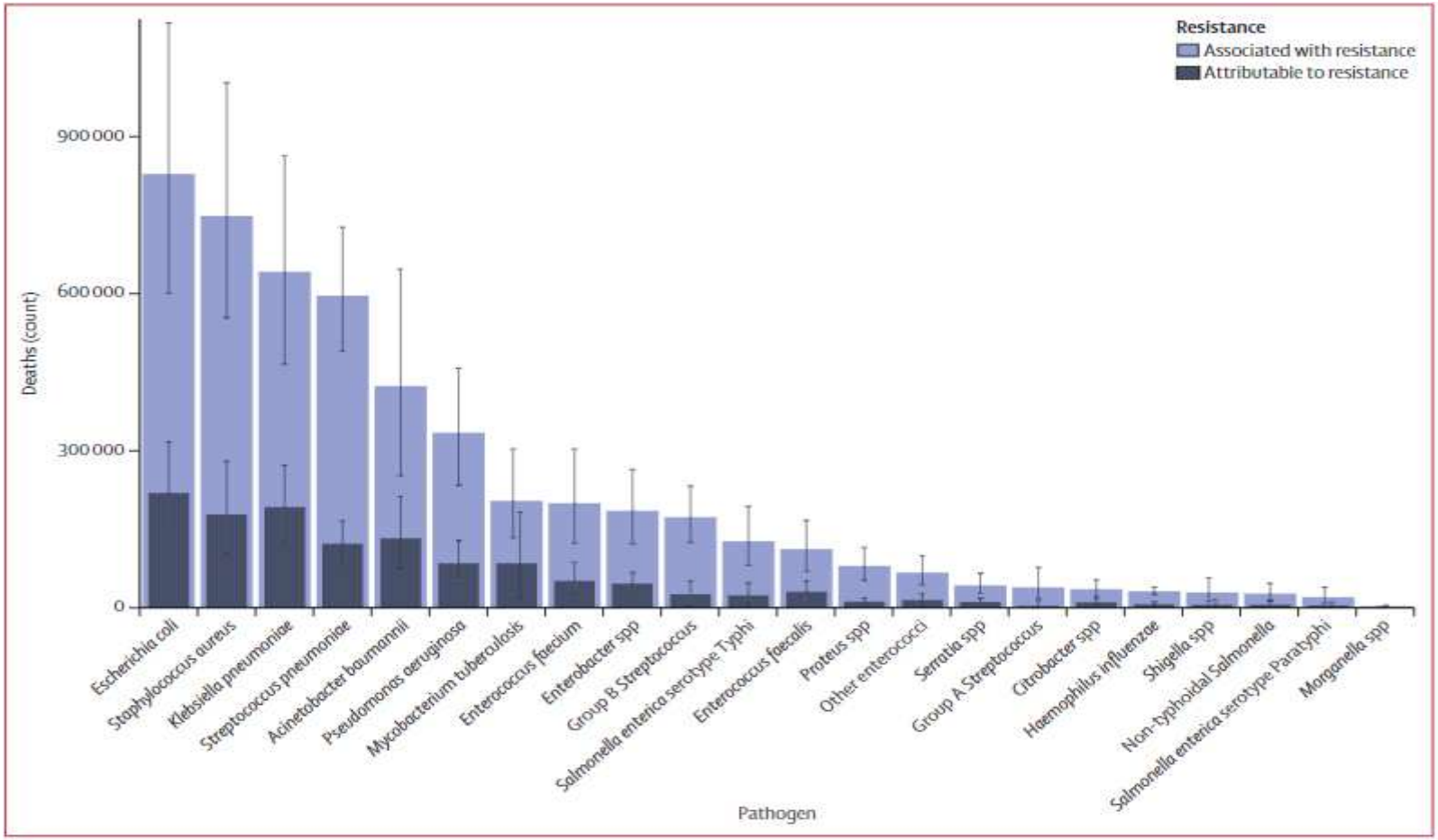

Figure 4: **Global deaths (counts) attributable to and associated with bacterial antimicrobial resistance by pathogen, 2019**
Estimates were aggregated across drugs, accounting for the co-occurrence of resistance to multiple drugs. Error bars show 95% uncertainty intervals.

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Par continents

Lancet : V322 p629 (2022)

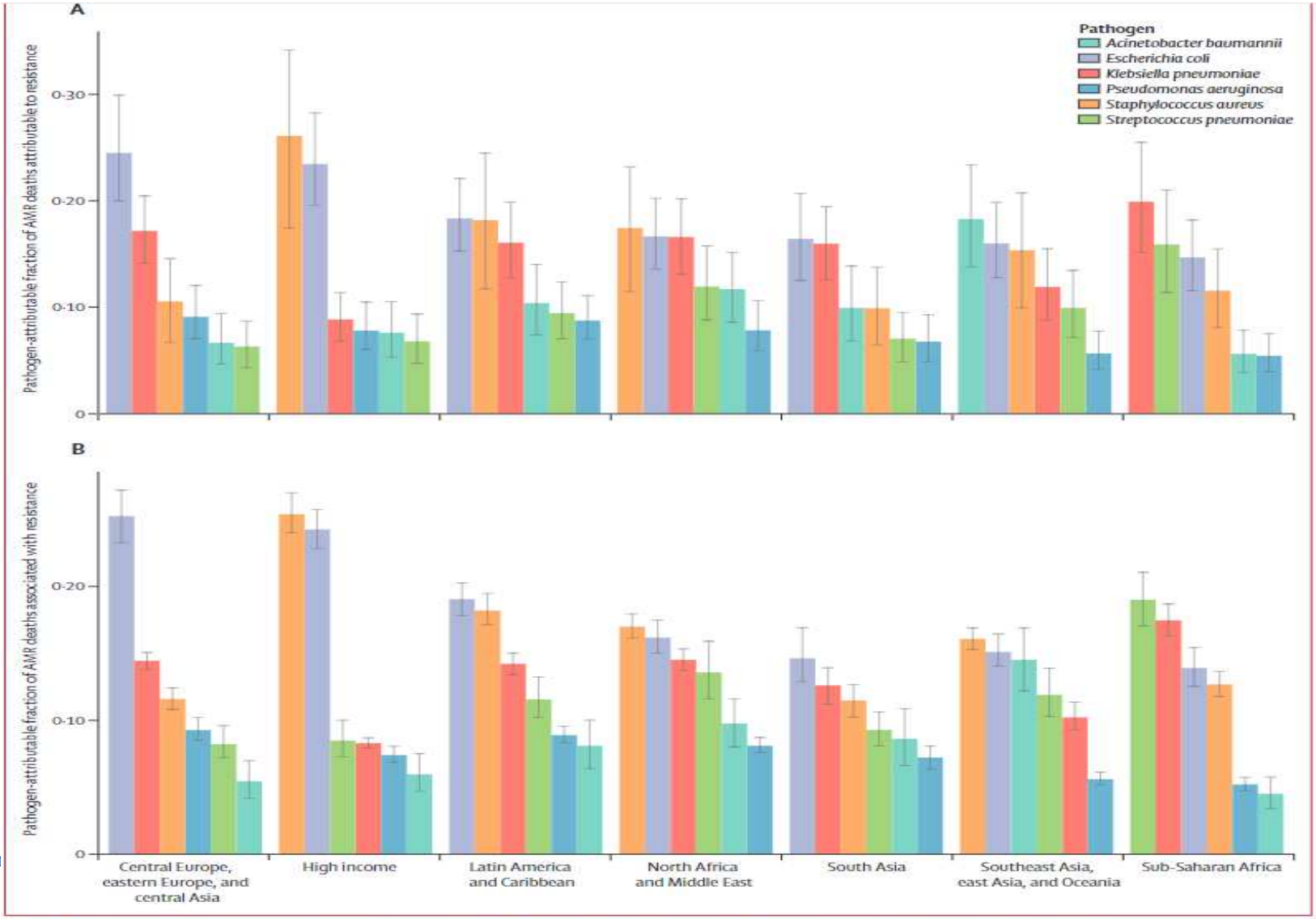
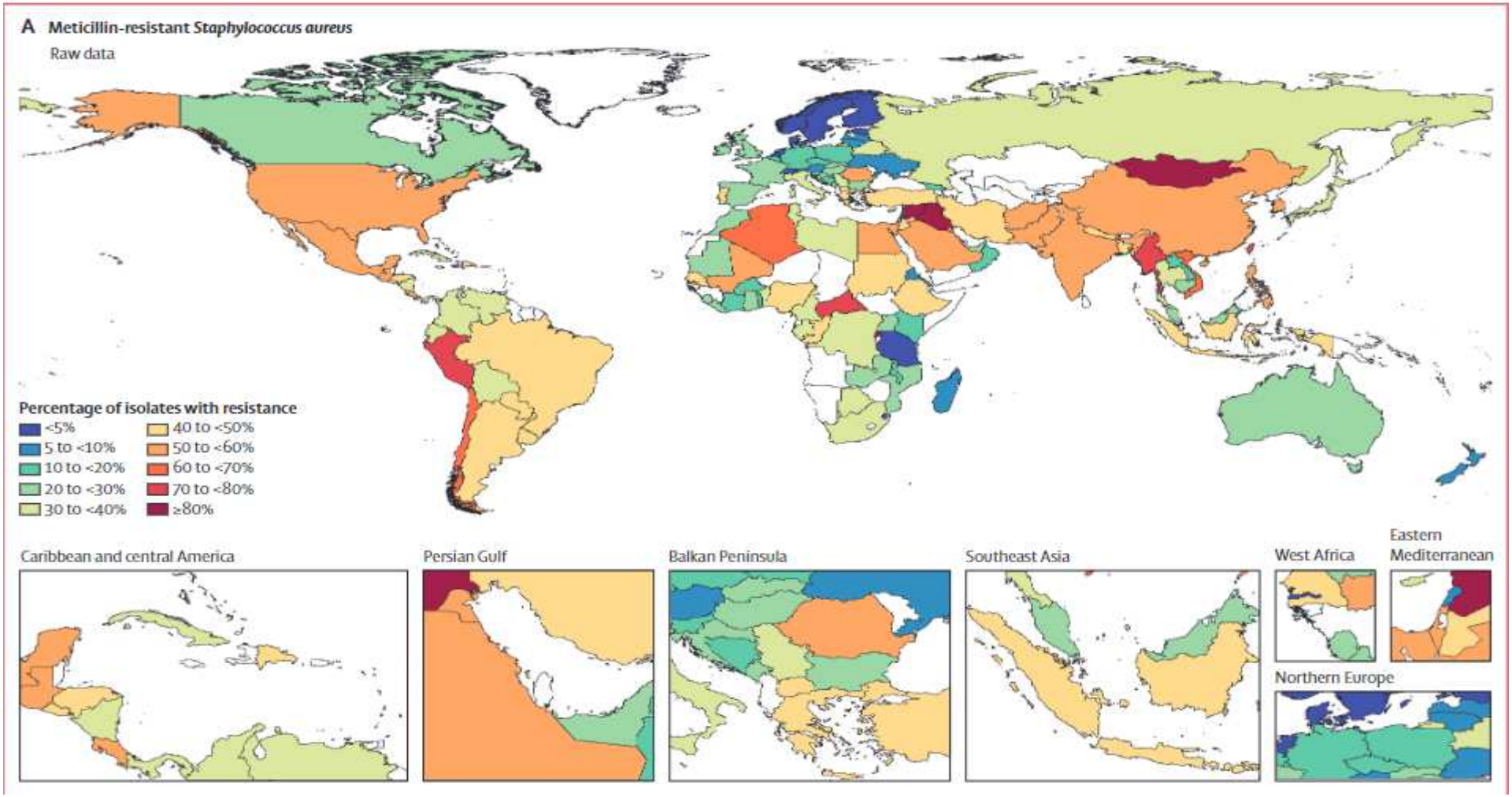
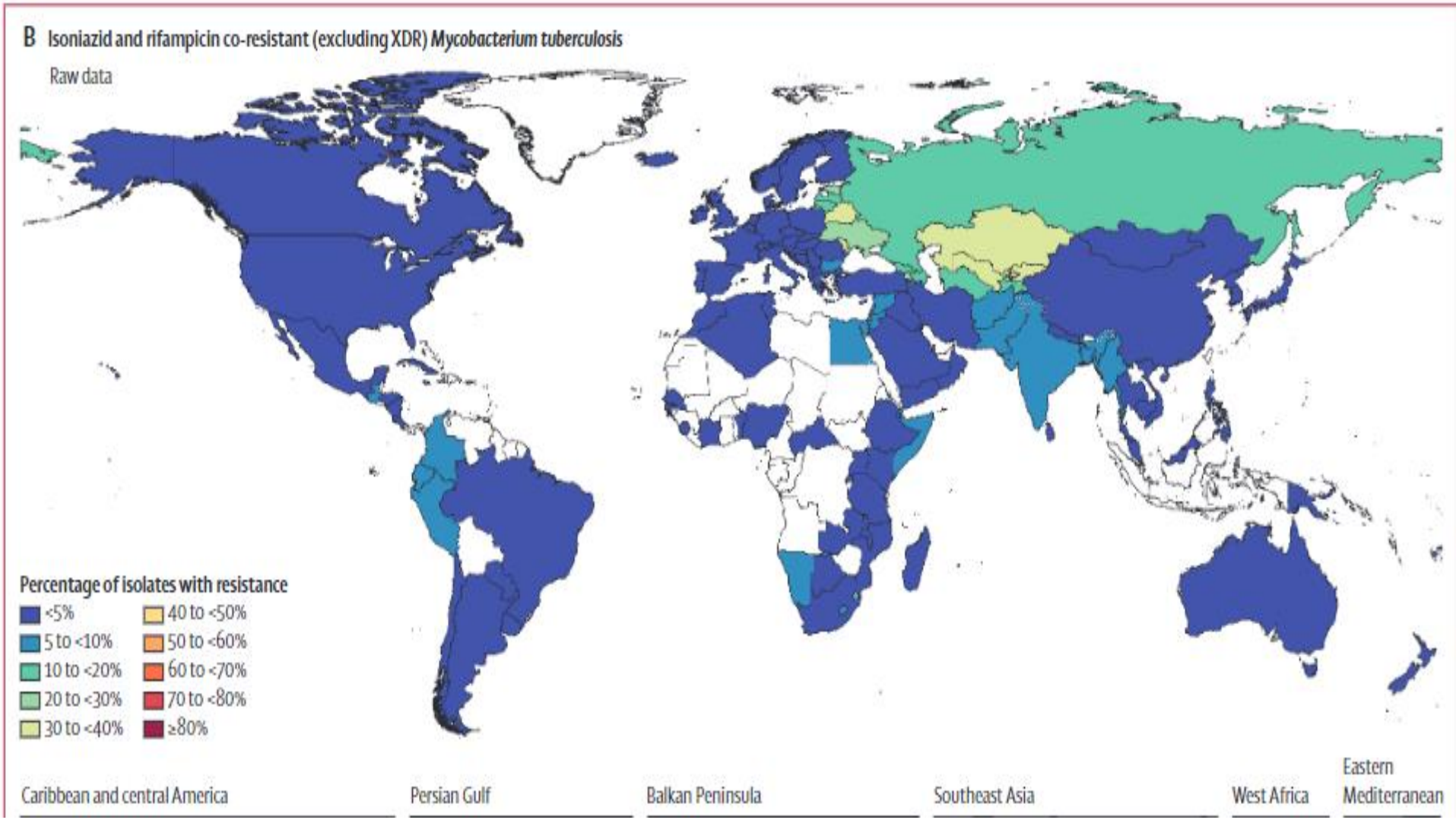


Figure 5: Pathogen-attributable fraction of deaths attributable to (A) and associated with (B) bacterial AMR for the six leading pathogens by GBD super-region, 2019

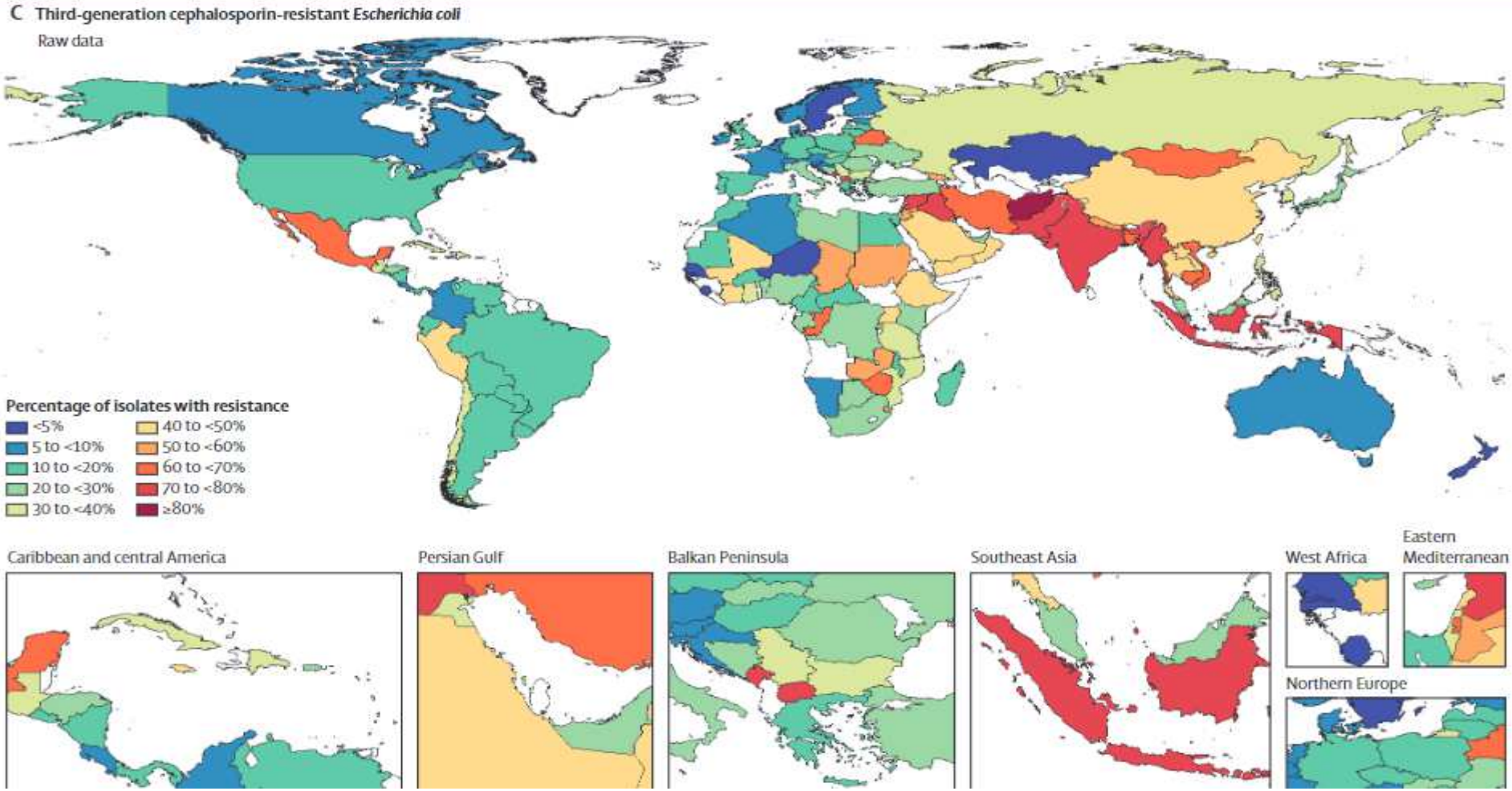
SARM


A Meticillin-resistant Staphylococcus aureus
Raw data
Percentage of isolates with resistance
<5%
5 to <10%
10 to <20%
20 to <30%
30 to <40%
40 to <50%
50 to <60%
60 to <70%
70 to <80%
≥80%
Caribbean and central America
Persian Gulf
Balkan Peninsula
Southeast Asia
West Africa
Eastern Mediterranean
Northern Europe

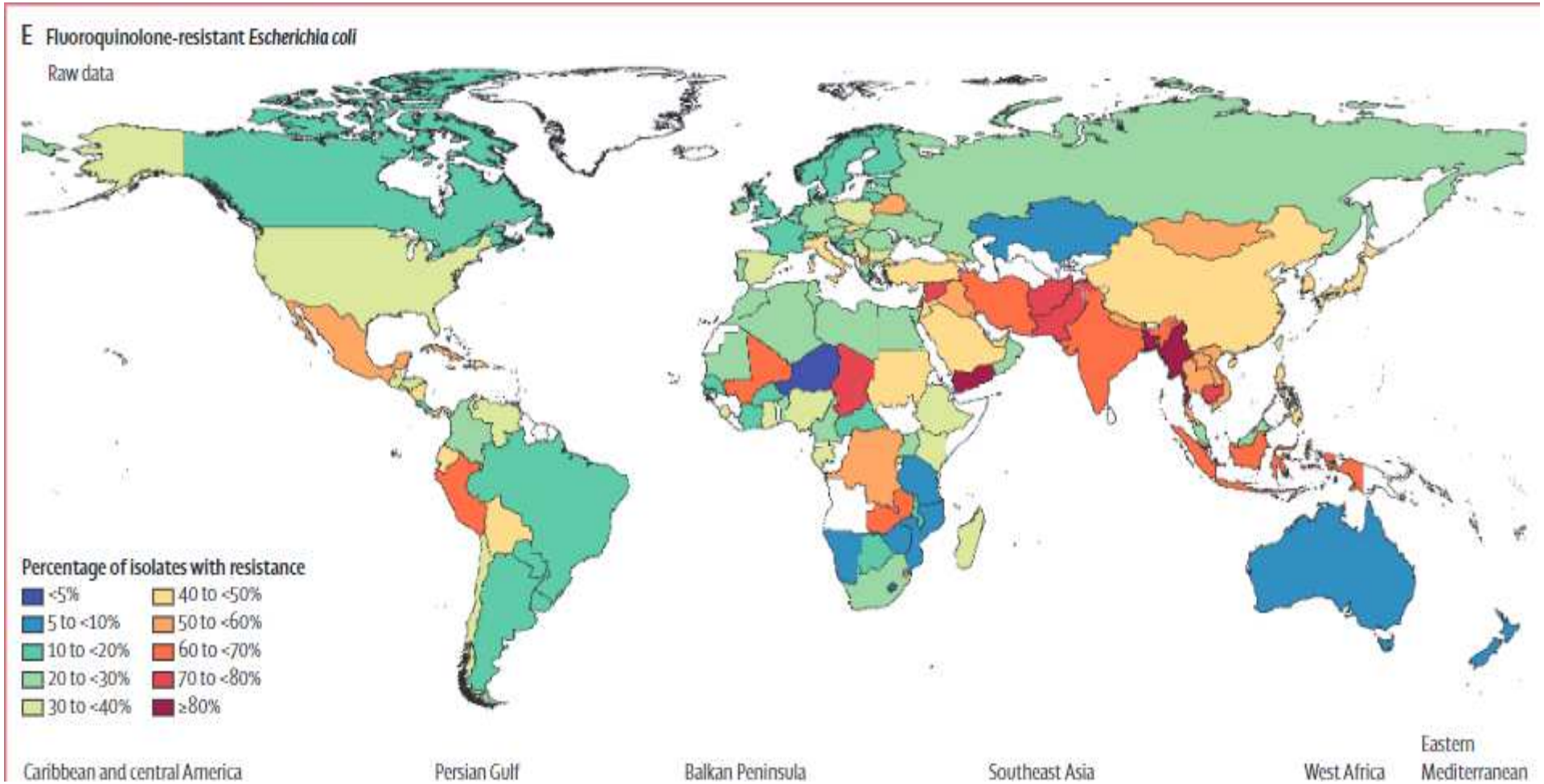
TB


B Isoniazid and rifampicin co-resistant (excluding XDR) Mycobacterium tuberculosis
Raw data
Percentage of isolates with resistance
<5%
5 to <10%
10 to <20%
20 to <30%
30 to <40%
40 to <50%
50 to <60%
60 to <70%
70 to <80%
≥80%
Caribbean and central America
Persian Gulf
Balkan Peninsula
Southeast Asia
West Africa
Eastern Mediterranean

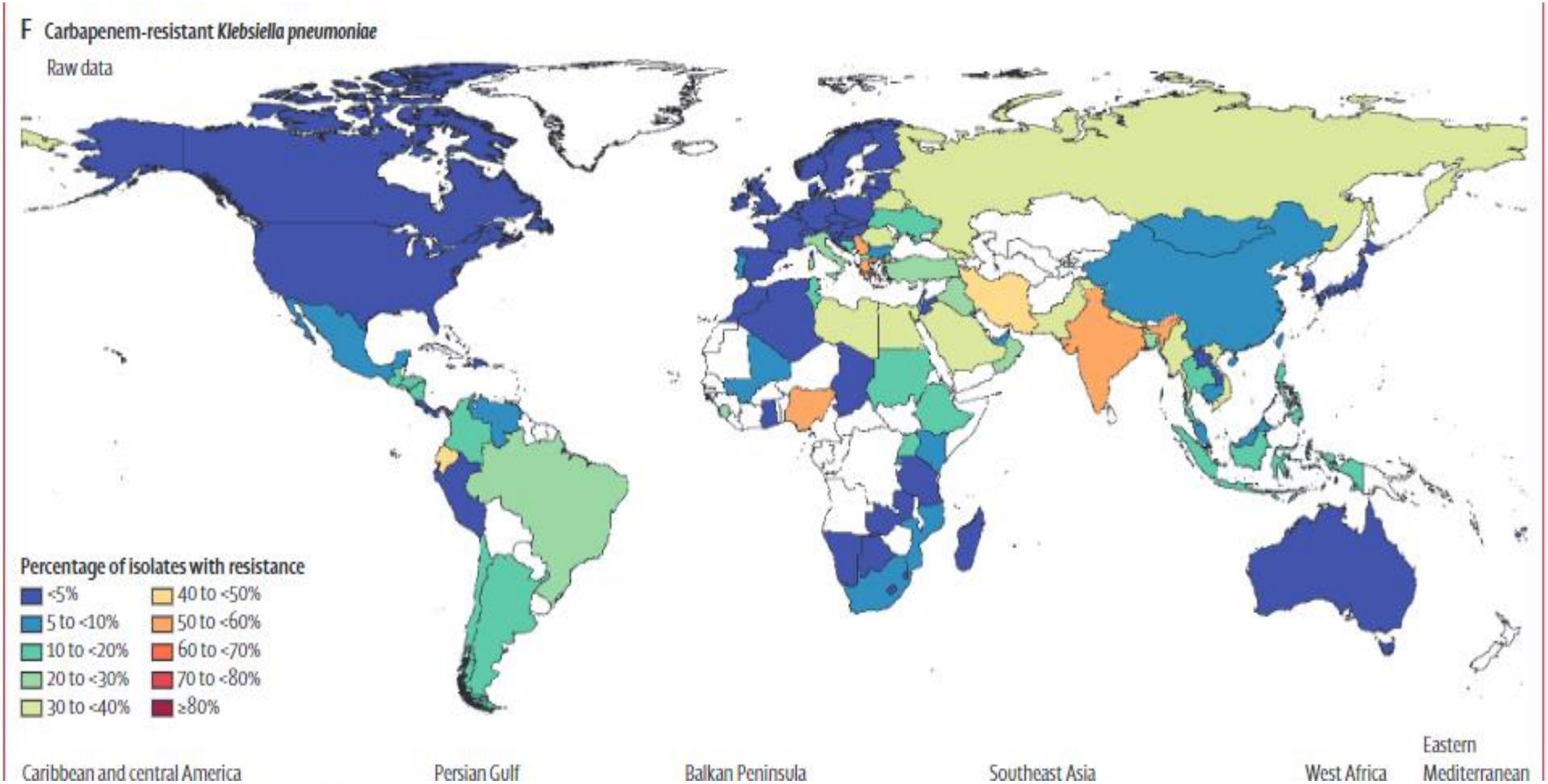
E.Coli – ESBL (R -3 ème génération)



E.Coli / Fluoroquinolones



KPC


F Carbapenem-resistant Klebsiella pneumoniae
Raw data
Percentage of isolates with resistance
<5%
5 to <10%
10 to <20%
20 to <30%
30 to <40%
40 to <50%
50 to <60%
60 to <70%
70 to <80%
≥80%
Caribbean and central America
Persian Gulf
Balkan Peninsula
Southeast Asia
West Africa
Eastern Mediterranean

Antibiotic Resistance Spreads Easily Across the Globe

Resistant bacteria and fungi can spread across countries and continents through people, animals, and goods.

One billion people cross through international borders each year. This includes 350 million travelers arriving in the United States through more than 300 points of entry.

A resistant threat anywhere can quickly become a threat at home.
Global capacity is needed to slow development and prevent spread of antibiotic resistance.

Detect Resistant Threats

Prevent & Contain Resistant Germs

Improve Antibiotic Use

CDC

U.S. Departmen
Health and Hum
Centers for Disea

Effet de la pandémie (USA – CDC)

Because of pandemic impacts, 2020 data are delayed or unavailable for 9 of the 18 antimicrobial resistance threats.

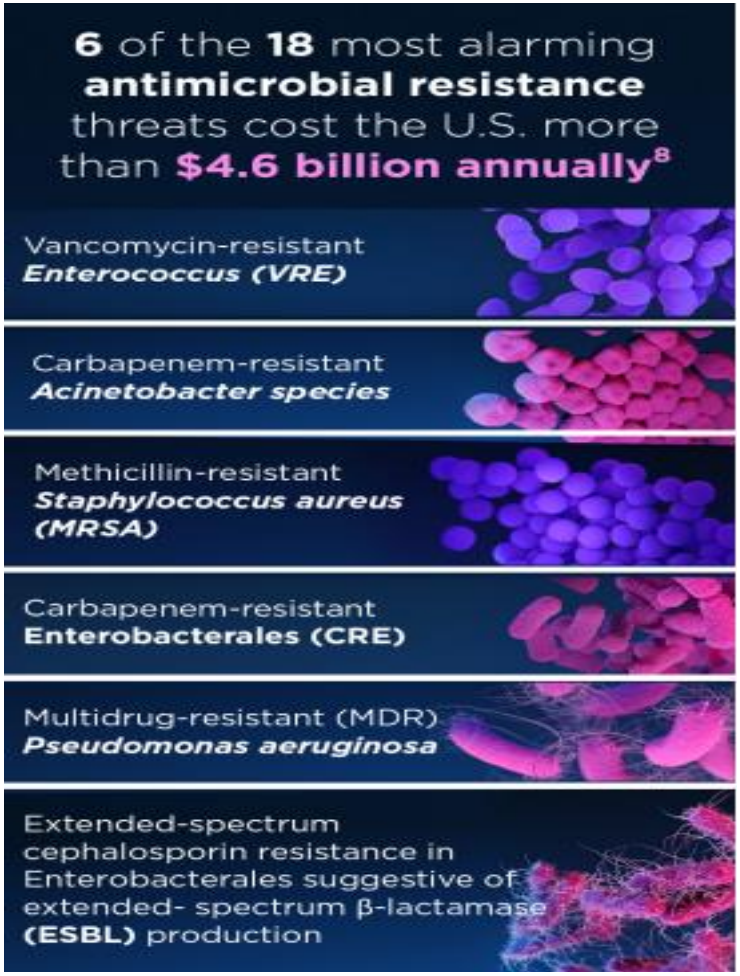
- *Clostridioides difficile (C. diff)*
- Drug-resistant *Neisseria gonorrhoeae*
- Drug-resistant *Campylobacter*
- Drug-resistant nontyphoidal *Salmonella*
- Drug-resistant *Salmonella* serotype Typhi
- Drug-resistant *Shigella*
- Drug-resistant *Streptococcus pneumoniae*
- Erythromycin-resistant group A *Streptococcus*
- Clindamycin-resistant group B *Streptococcus*

Available data show an alarming increase in resistant infections starting during hospitalization, growing at least 15% from 2019 to 2020.

- Carbapenem-resistant *Acinetobacter* (↑78%)
- Antifungal-resistant *Candida auris* (↑60%)*
- Carbapenem-resistant Enterobacterales (↑35%)
- Antifungal-resistant *Candida* (↑26%)
- ESBL-producing Enterobacterales (↑32%)
- Vancomycin-resistant Enterococcus (↑14%)
- Multidrug-resistant *P. aeruginosa* (↑32%)
- Methicillin-resistant *Staphylococcus aureus* (↑13%)

**Candida auris* was not included in the hospital-onset rate calculation of 15%. See Data Table and Methods for more information on this pathogen.

CDC : USA



Preventing infections is one of the greatest tools for combating antimicrobial resistance—saving lives and reducing healthcare costs.

Rapport 2022 : Impact de la CoVid

https://www.cdc.gov/drugresistance/pdf/covid19-impact-report-508.pdf

- En 2017 la PCI a contribué à réduire la mortalité par les microorganismes antibiorésistants de 18 % , incluant 30 % dans les hôpitaux.

- En 2020, le CDC a noté une augmentation de 15 % des infections nosocomiales avec des taux d'incidence augmenté de 4/6 principales infections nosocomiales

- 2020/21 :
  - 80 % des patients atteints de CoVid reçoivent des AB azithromycin / ceftriaxone

C.difficile

***Clostridioides difficile* (*C. diff*)**

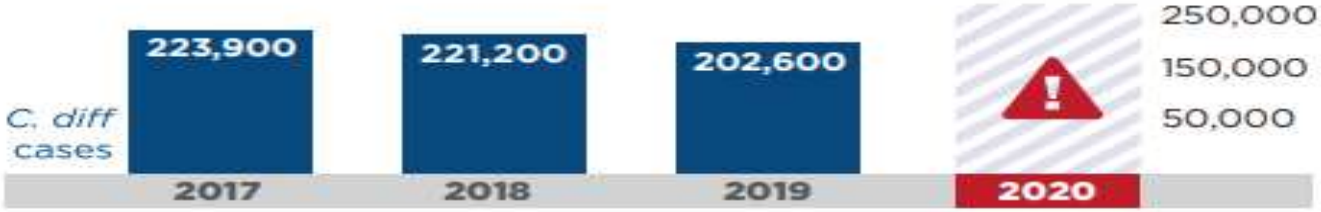
One of the most common healthcare-associated infections, affecting thousands of people every year

Other CDC data suggest a continued decrease for hospitalized *C. diff* infections in 2020 during the COVID-19 pandemic, likely driven in part by changes in healthcare-seeking behavior.

Factors that might have contributed to declines in hospitalized *C. diff* infections through 2019 include:

- Increased emphasis on diagnostic stewardship to reduce inappropriate testing
- Continued adherence to recommended infection prevention and control measures
- Continued implementation of inpatient antibiotic stewardship programs

The number of patients hospitalized with *C. diff* infections continues to decrease, building on nationwide declines since 2017. However, 2020 data were delayed by the pandemic.



SARM

The rate of hospital-onset cases increased 13% in 2020 compared to 2019.

Data from 2018–2020 are preliminary.

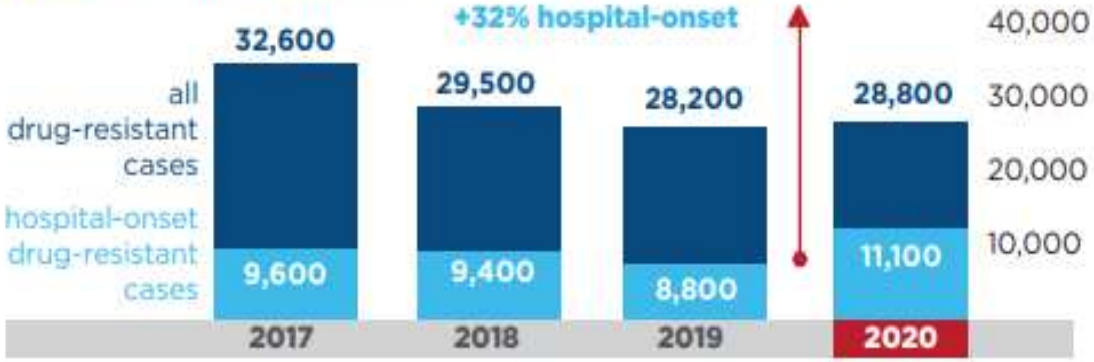
ERV : augmentation de 16 %

This increase warrants further monitoring to assess if cases will continue to increase and to identify potential underlying causes, such as new dominant strains of VRE.

Data from 2018–2020 are preliminary.

P. Aeruginosa MDR : Augmentation de 32 %

The increase in 2020 was driven by hospital-onset cases potentially due to longer hospitalizations and secondary bacterial infections (e.g., pneumonia) associated with COVID-19 infections.



Data from 2018–2020 are preliminary.

COVID-19: U.S. Impact on Antimicrobial Resistance, Special Report 2022

CRE - EPC

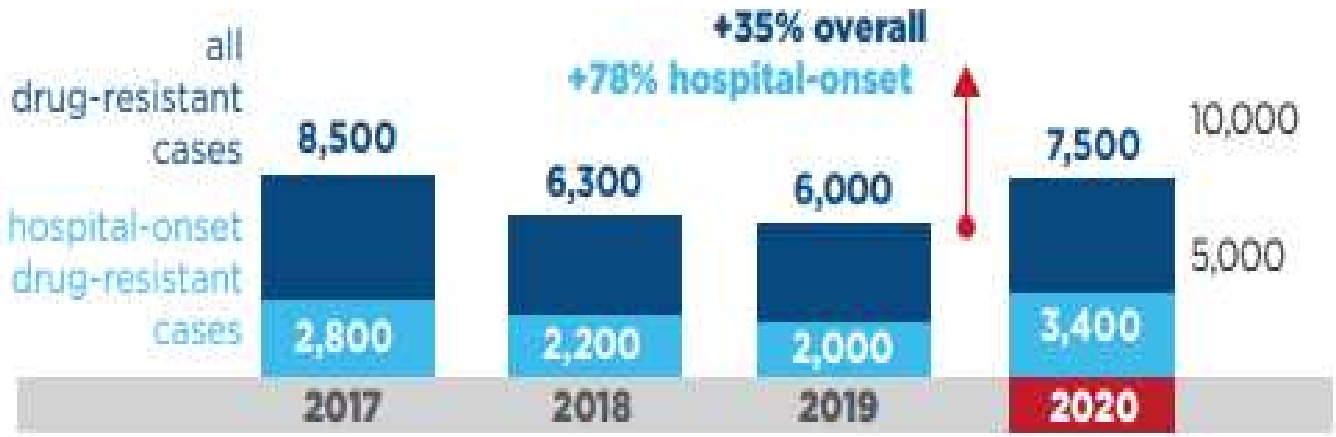
The rate of CRE cases declined significantly from 2017 to 2018, but began to rise again in 2019 and continued into 2020.

Data from 2018–2020 are preliminary.

COVID-19: U.S. Impact on Antimicrobial Resistance, Special Report 2022

Acinetobacter sp

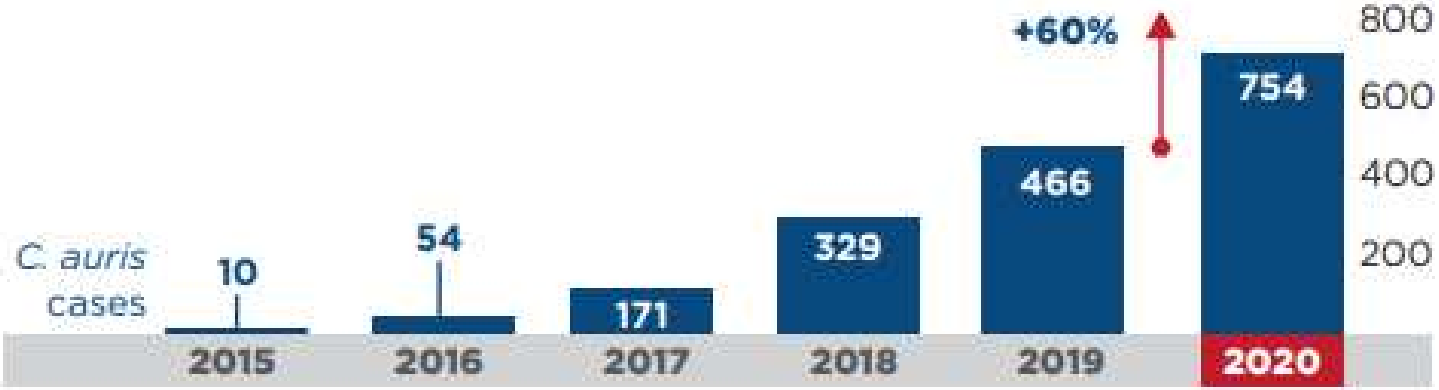
The rates of hospital-onset carbapenem-resistant *Acinetobacter* cases decreased 2012-2017, began to plateau, then increased 78% in 2020.



Data from 2018-2020 are preliminary.

C.auris

C. auris clinical cases have steadily increased since 2015 and significantly increased in 2020. The increase in 2020 could be a result of staffing and supply shortages, an increased number of sicker patients, and changes in infection prevention and control practices (e.g., re-use or extended use of gowns and gloves).



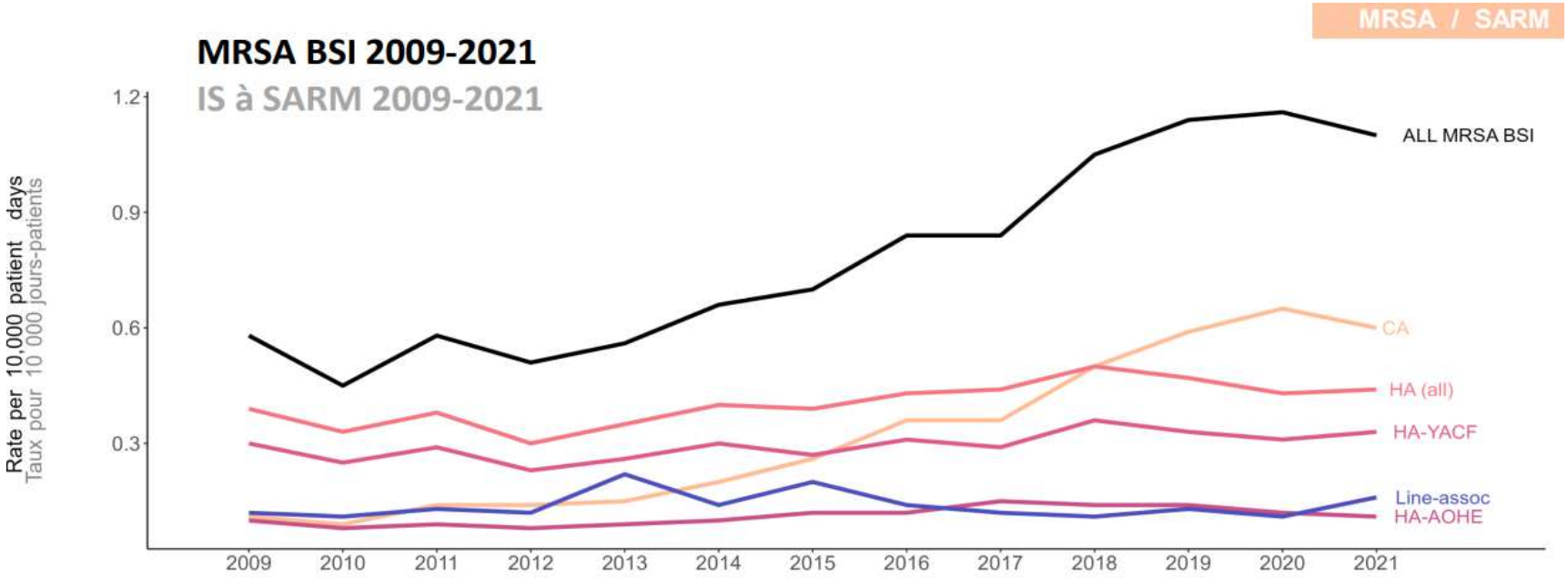
COVID-19: U.S. Impact on Antimicrobial Resistance, Special Report 2022

Comment prévient on émergence de résistance ? 1950-90 = PCI

- 1958 :
  - AHA mandate tous les CH de faire une surveillance des IN
  - Avoir un programme PCI
- 1970: CDC recommande MD + Infirmière responsable de la PCI
- Jusqu'en 1990 la PCI responsable de la R
- 2000 : émergence des programmes de restrictions des AB
  - Limitation de l'usage
    - *Indications*
    - *ID specialiste*
  - Gains au niveau des couts
  - Contrôle de la Rx pour certains AB
  - Spectre + étroit
  - Diminution de la R
- Outils:
  - Approbation téléphonique
  - Prescriptionspécifique
  - Automatic stop

Situation Canadienne : SARM - PCSIN

PCSIN : réseau volontaire de 88 CH au Canada , largement universitaire



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
ALL MRSA BSI	0.58	0.45	0.58	0.51	0.56	0.66	0.70	0.84	0.84	1.05	1.14	1.16	1.10
CA	0.11	0.09	0.14	0.14	0.15	0.20	0.26	0.36	0.36	0.50	0.59	0.65	0.60
HA (all)	0.39	0.33	0.38	0.30	0.35	0.40	0.39	0.43	0.44	0.50	0.47	0.43	0.44
HA-YACF	0.30	0.25	0.29	0.23	0.26	0.30	0.27	0.31	0.29	0.36	0.33	0.31	0.33
HA-AOHE	0.10	0.08	0.09	0.08	0.09	0.10	0.12	0.12	0.15	0.14	0.14	0.12	0.11
Line-assoc	0.12	0.11	0.13	0.12	0.22	0.14	0.20	0.14	0.12	0.11	0.13	0.11	0.16

2021 data are preliminary / Les données de 2021 sont préliminaires

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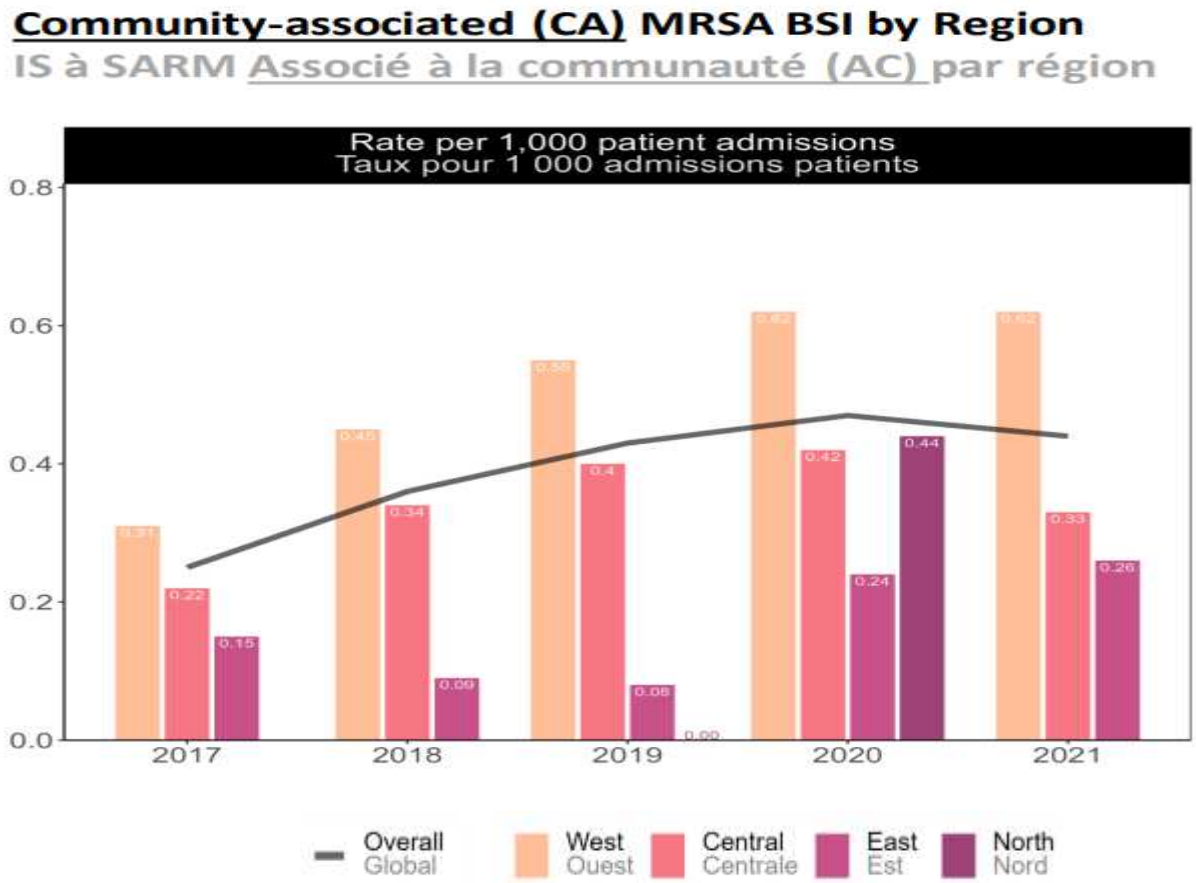
SARM - PCSIN



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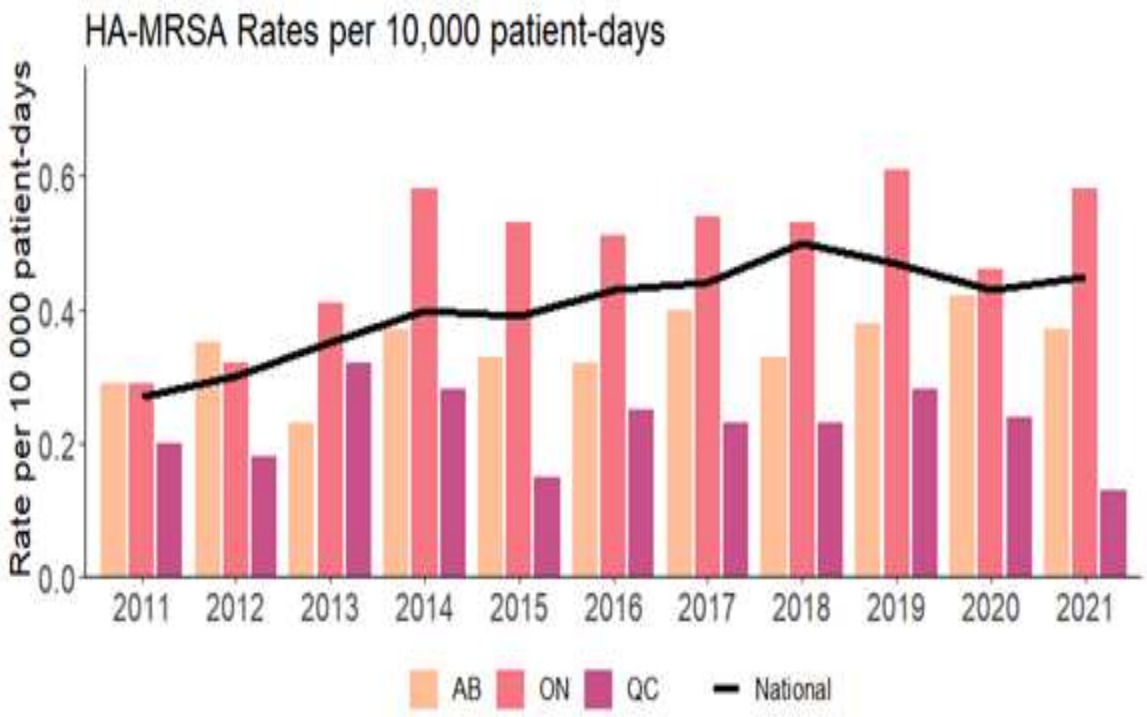
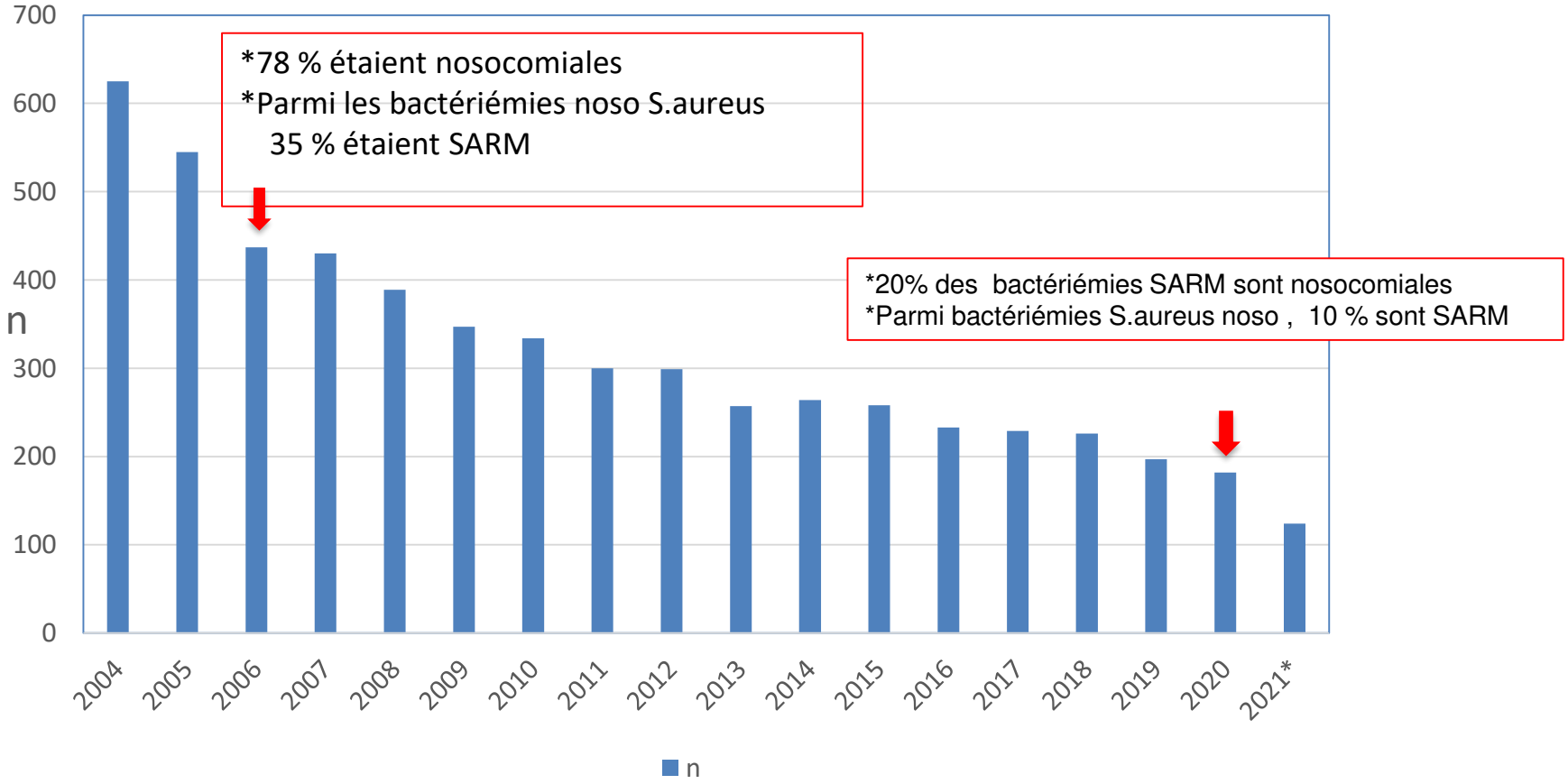
Bactériémie Nosocomiales S.aureus



QUEBEC: SPIN – SARM
Nombre de bactériémies SARM totale



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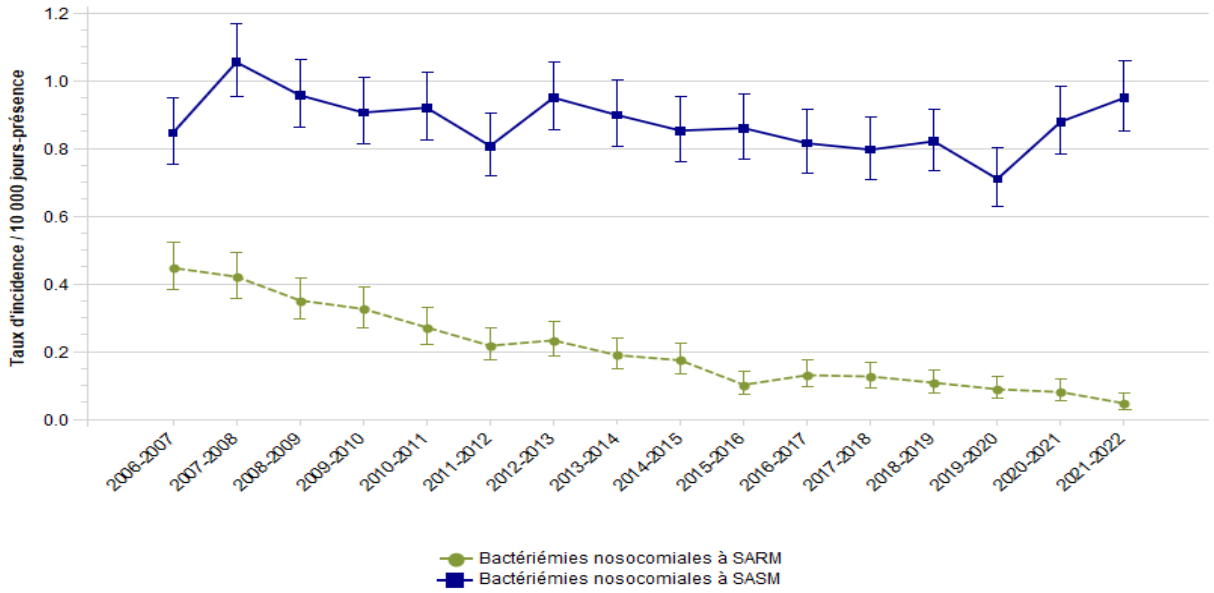
QUEBEC: SPIN – SARM

Figure 1 – Évolution des taux d'incidence des bactériémies nosocomiales à *S. aureus* rési méthicilline (SASM) (catégories 1a et 1b) pour les installations participantes (N = 62)[1], ense 10 000 jours-présence [I.C. à 95 %])



Notes

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Comment avons nous atteint cet objectif ?

- Lignes Directrices provinciales
  - Première : 1996 (AMMIQ)
  - Surveillance
  - Éditer 2004, révision 2009 (CINQ)
  - Surveillance
  - Addition de ressources en PCI dans le réseau.
- Dépistage et Précautions
  - Basé sur facteurs de risque
  - Précautions pour porteurs et infectés
  - Tendance vers dépistage universelle avec augmentation SARM communautaire

Dépistage au Québec

Tableau 14 – Moyenne des tests de dépistage pour le SARM par admission, selon le

Regroupement d'installations	2019-2020	2020-2021	2021-2022
Non universitaire < 110 lits (N = 31)	1,33	1,32	1,30
Non universitaire >= 110 lits (N = 34)	1,35	1,03	1,16
Universitaire (N = 22)	1,46	1,35	1,32
Pédiatrique (N = 2)	0,26	0,28	0,21
Total (N = 89)	**1,37**	**1,19**	**1,22**

Tableau 11 – Nombre et taux d'acquisition des nouveaux porteurs de SARM (catégories 1a et 1b) pour les installations participant

Regroupement d'installations	2019-2020		2020-2021		2021-2022	
	N	Taux	N	Taux	N	Taux
Non universitaire < 110 lits (N = 31)	136	3,11 [2,63 ; 3,68]	102	2,84 [2,34 ; 3,45]	80	2,22 [1,78 ; 2,76]
Non universitaire >= 110 lits (N = 34)	712	3,41 [3,17 ; 3,67]	392	2,22 [2,01 ; 2,46]	326	1,74 [1,56 ; 1,94]
Universitaire (N = 22)	487	2,19 [2,00 ; 2,39]	361	1,80 [1,62 ; 1,99]	368	1,78 [1,61 ; 1,97]
Pédiatrique (N = 2)	34	2,67 [1,91 ; 3,74]	36	3,11 [2,25 ; 4,32]	39	3,12 [2,28 ; 4,27]
Total (N = 89)	**1 369**	**2,80 [2,66 ; 2,96]**	**891**	**2,10 [1,97 ; 2,24]**	**813**	**1,83 [1,71 ; 1,96]**

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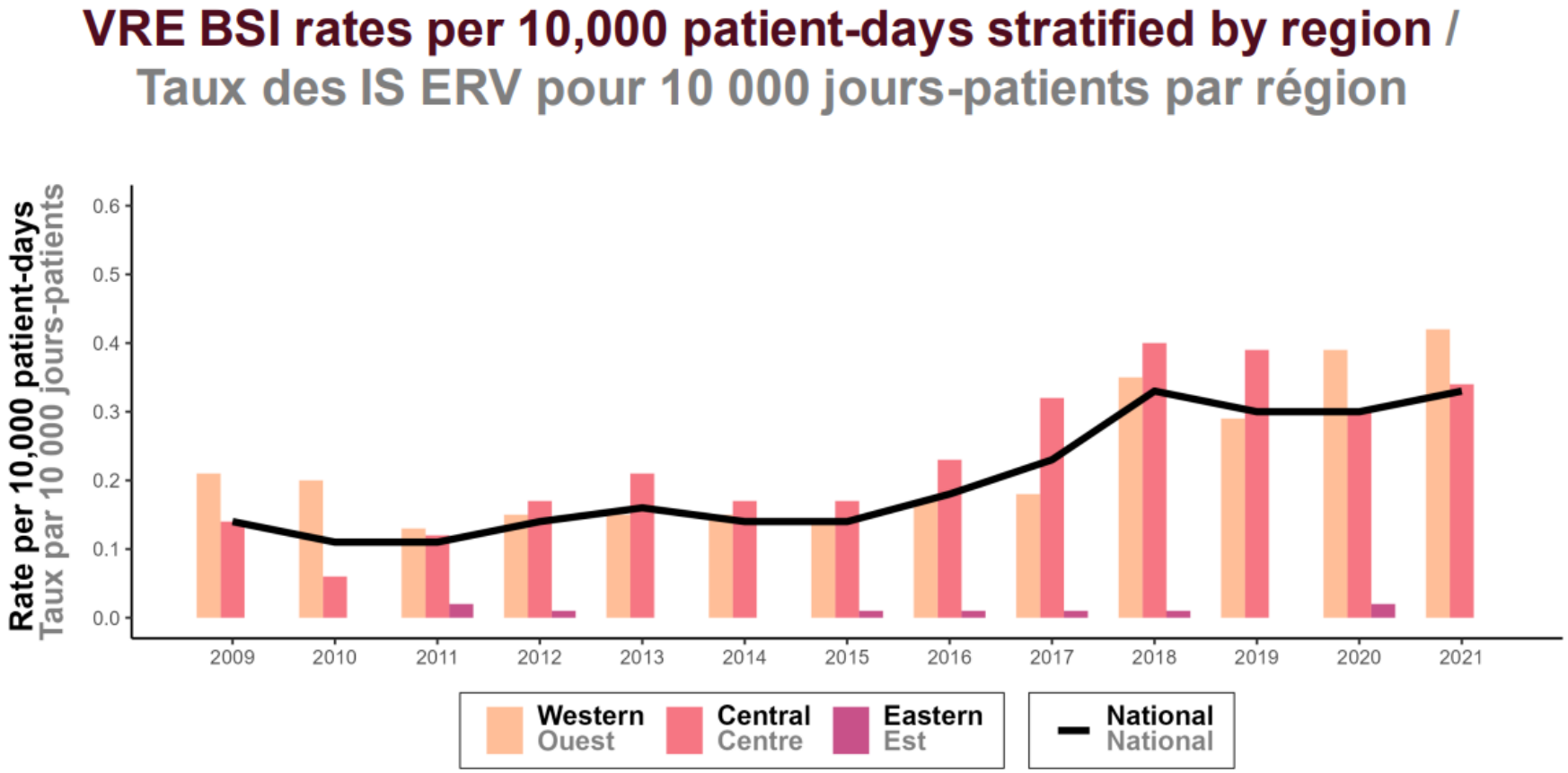
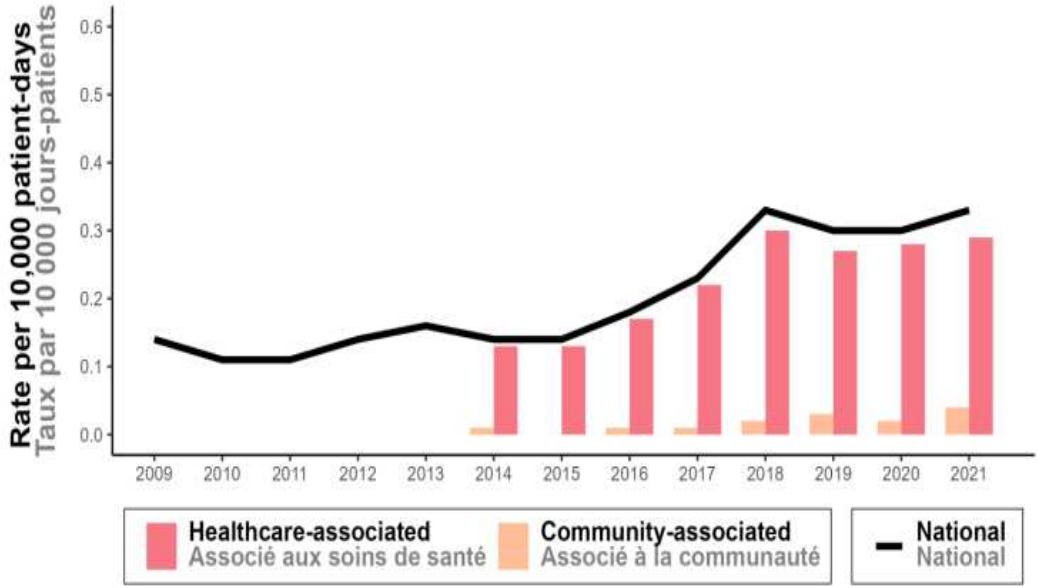
VRE – PCSIN – Controversé...



PCSIN : taux de bactériémies ERV mortalité 33 %

VRE BSI rates per 10,000 patient-days stratified by acquisition sour

Taux des IS ERV pour 10 000 jours-patients par source d'acquisiti

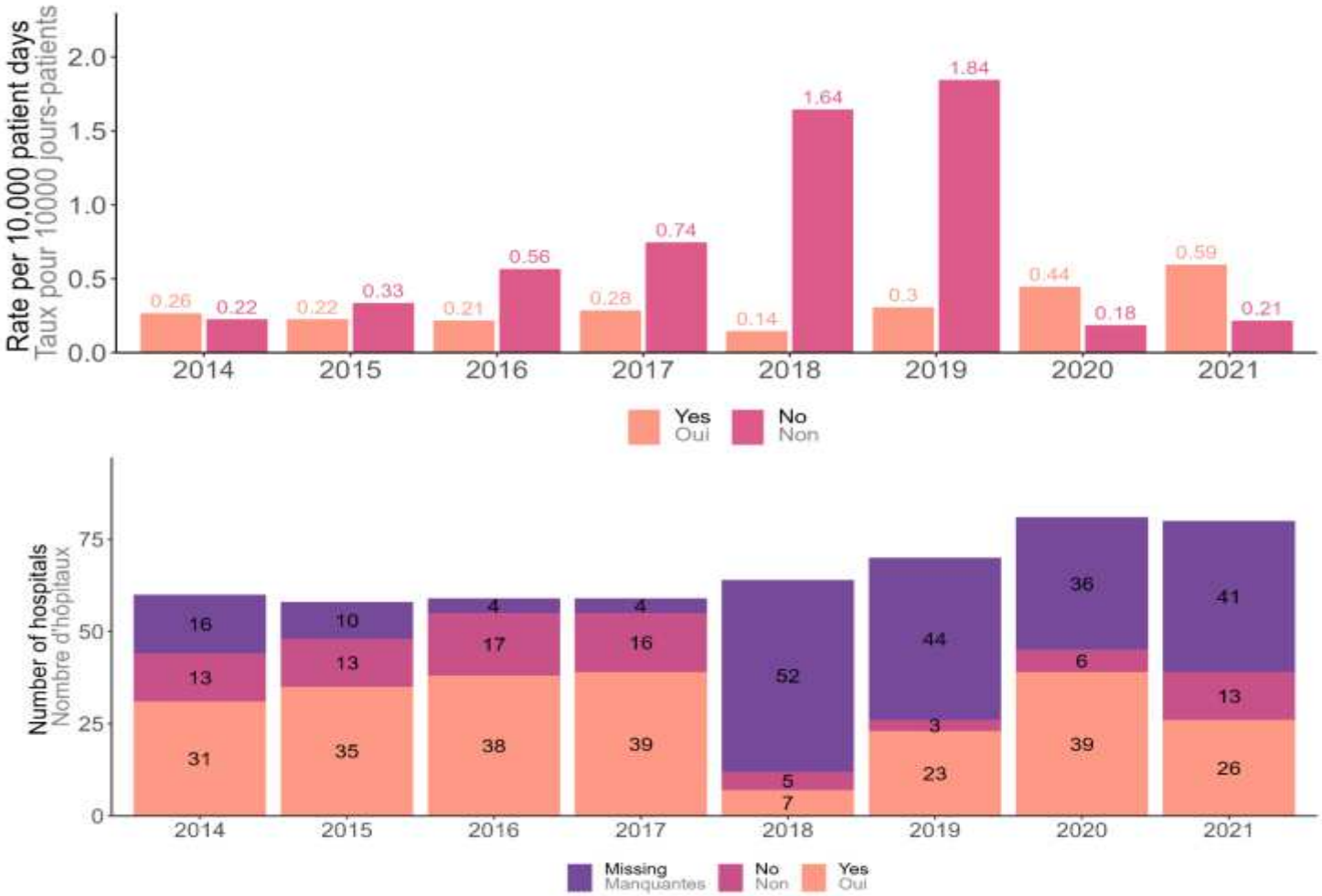


CA data /
Données AC

surveillance_year	count
2014	5
2015	1
2016	7
2017	4
2018	15
2019	25
2020	14
2021	30

Started collecting source of acquisition data in 2014 /
Début de la collecte des sources de données d'acquisition en 2014

PCSIN
Dépistage ERV et bactériémie



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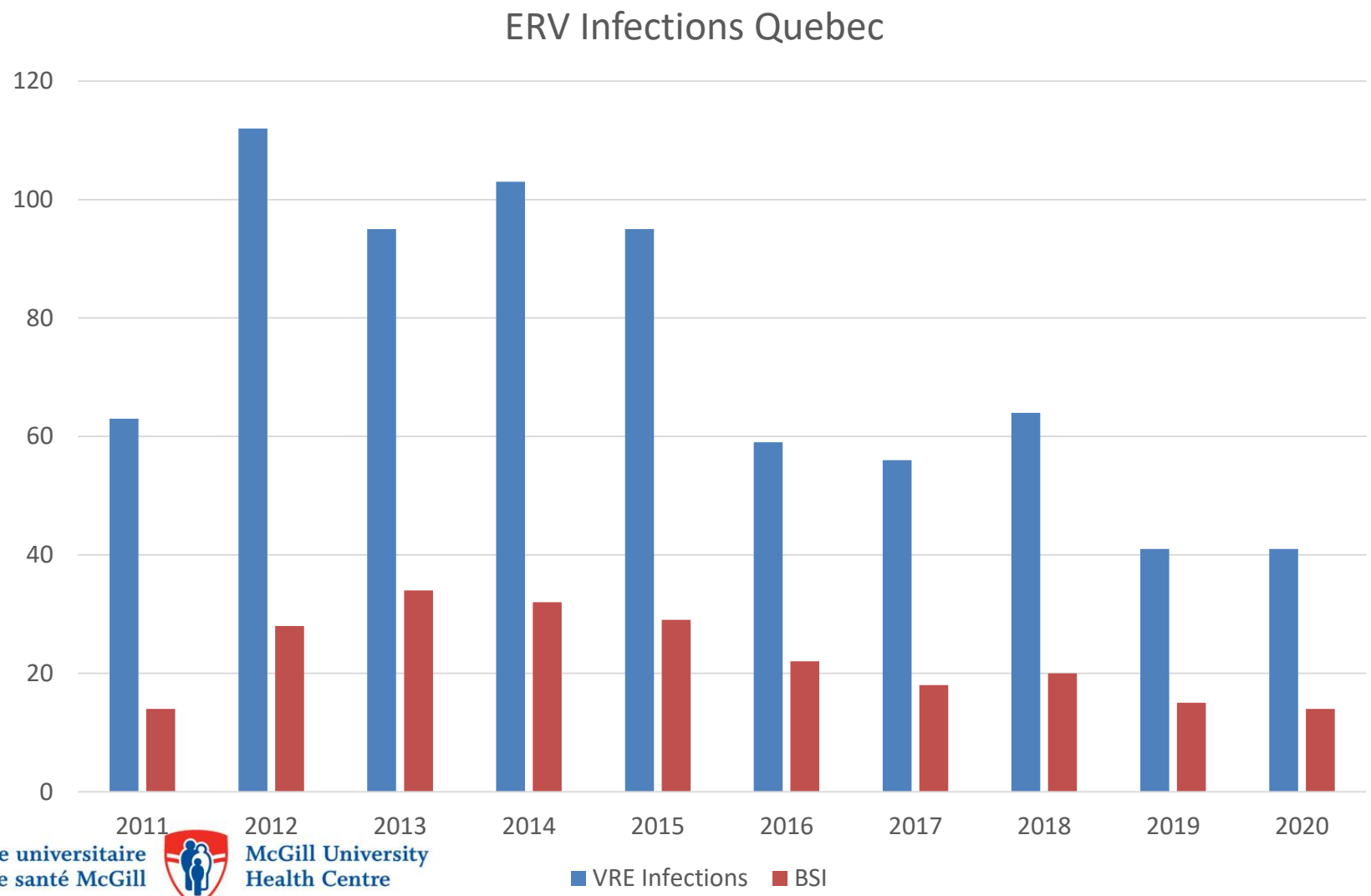
SPIN-ERV Bactériémies



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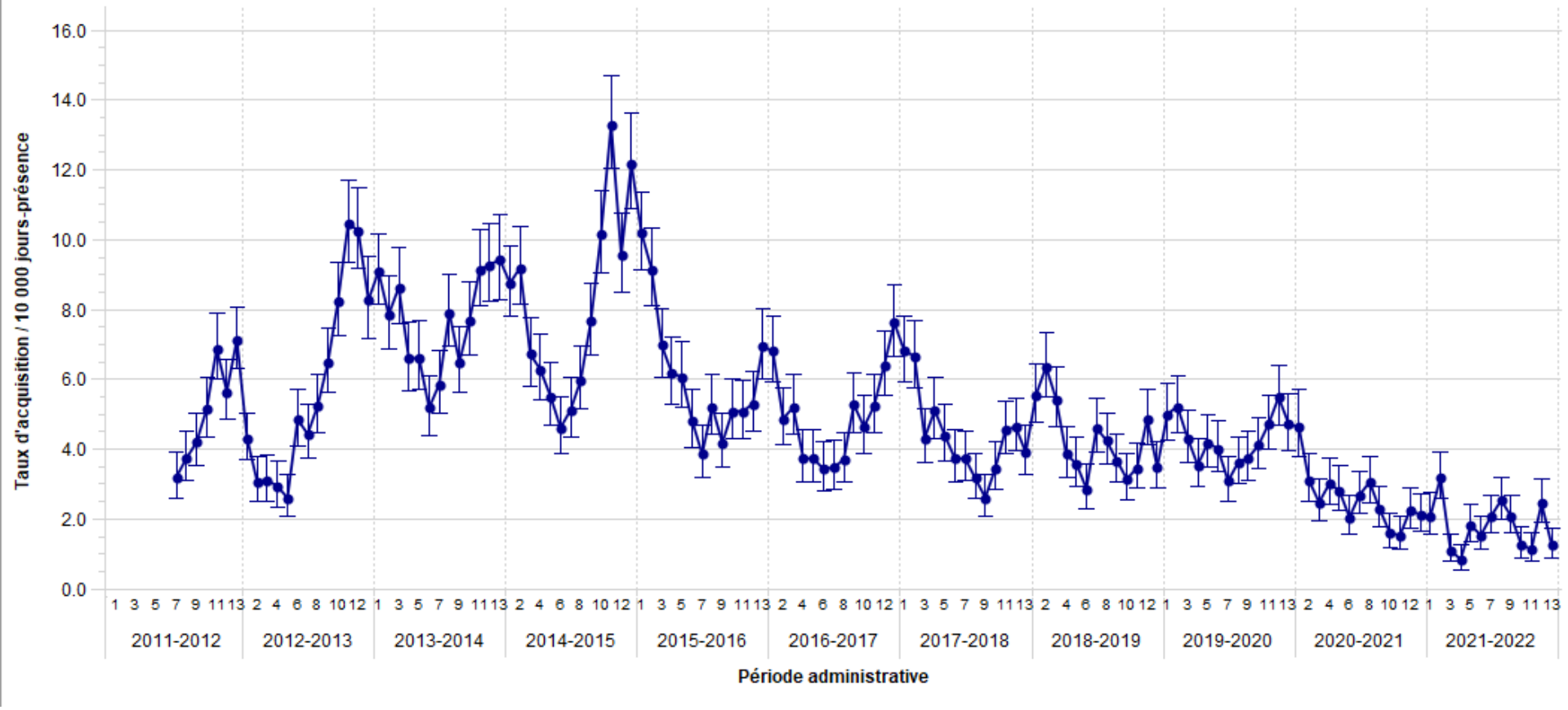
SPIN ERV
VRE Colonisation nosocomiale

Figure 3 – Évolution des taux d'acquisition des colonisations nosocomiales à ERV (catégories 1a et 1b) pour les in



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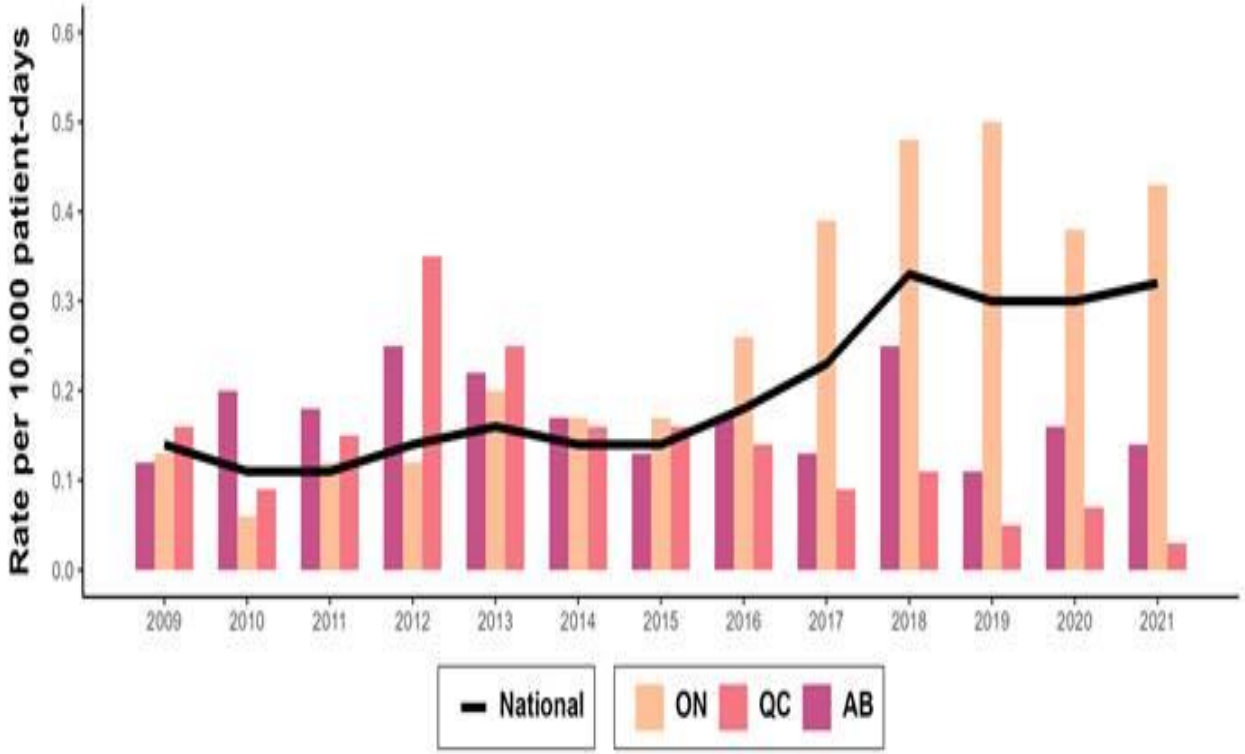
Bactériémies ERV
Qc vs Ontario vs Alberta



Comment ?

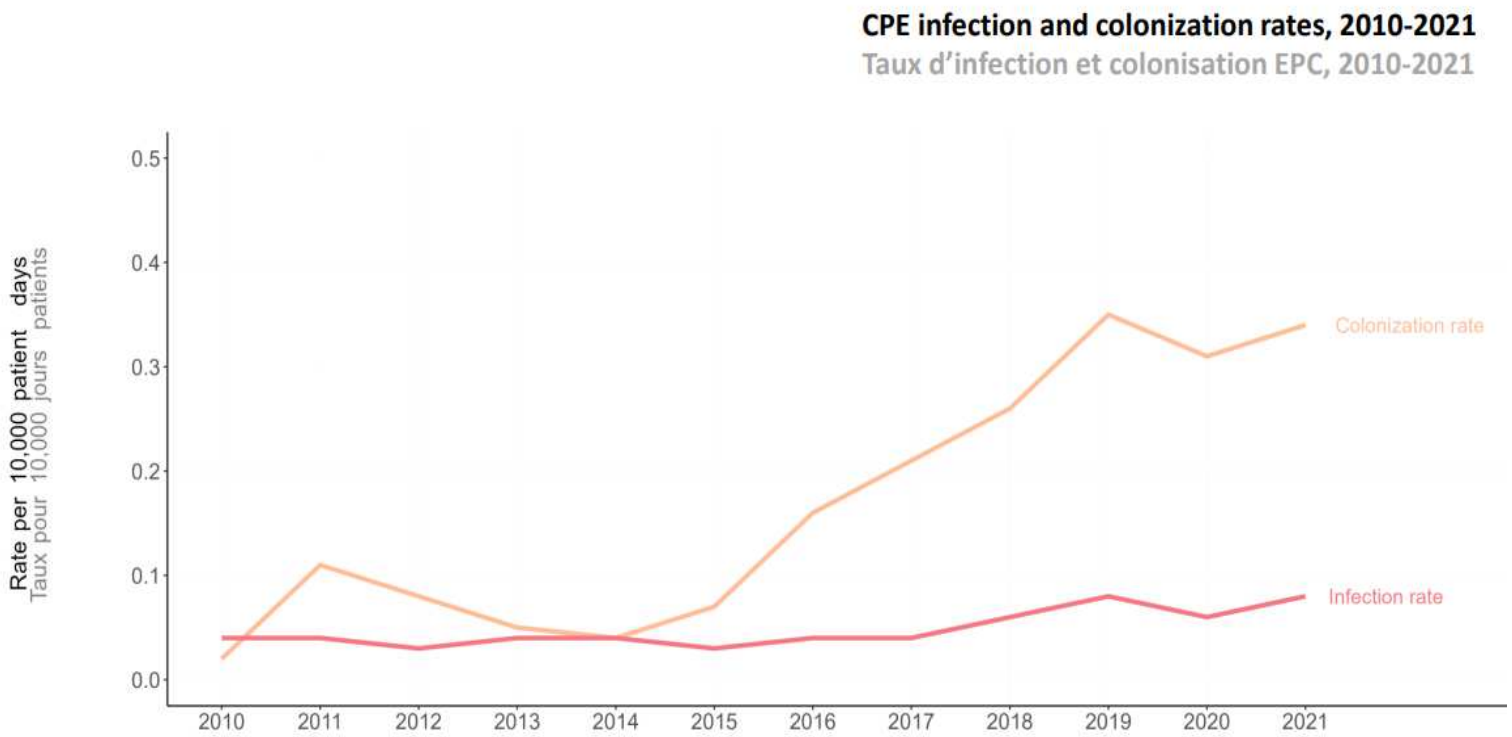
Tableau 11 – Évolution de la moyenne des tests de dépistage pour l'ERV par admission selon le regroupement d'installations, ensemble du Québec, 2017-2018 à 2021-2022

Regroupement d'installations	Mission de l'installation	Moyenne des tests de dépistage				
		2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Installations de la région de Montréal	Non universitaire (N = 6)	1,12	1,36	1,53	0,66	0,75
Installations de la région de Montréal	Universitaire (N = 11)	1,26	1,29	1,29	0,92	1,13
Installations à l'extérieur de la région de Montréal	Non universitaire (N = 50)	1,01	0,98	0,99	0,83	0,86
Installations à l'extérieur de la région de Montréal	Universitaire (N = 12)	0,92	0,91	0,94	0,96	0,81
Total	**Total (N = 79)**	**1,05**	**1,06**	**1,07**	**0,88**	**0,89**

Carbapenemasse producing Enterobacterales

CPE – CNISP

60-80 particpating hospitals , mostly tertiary academic hospitals



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
No. infections	11	14	12	19	22	17	20	21	36	50	36	53
No. colonizations	6	37	27	24	24	37	89	119	148	223	193	222

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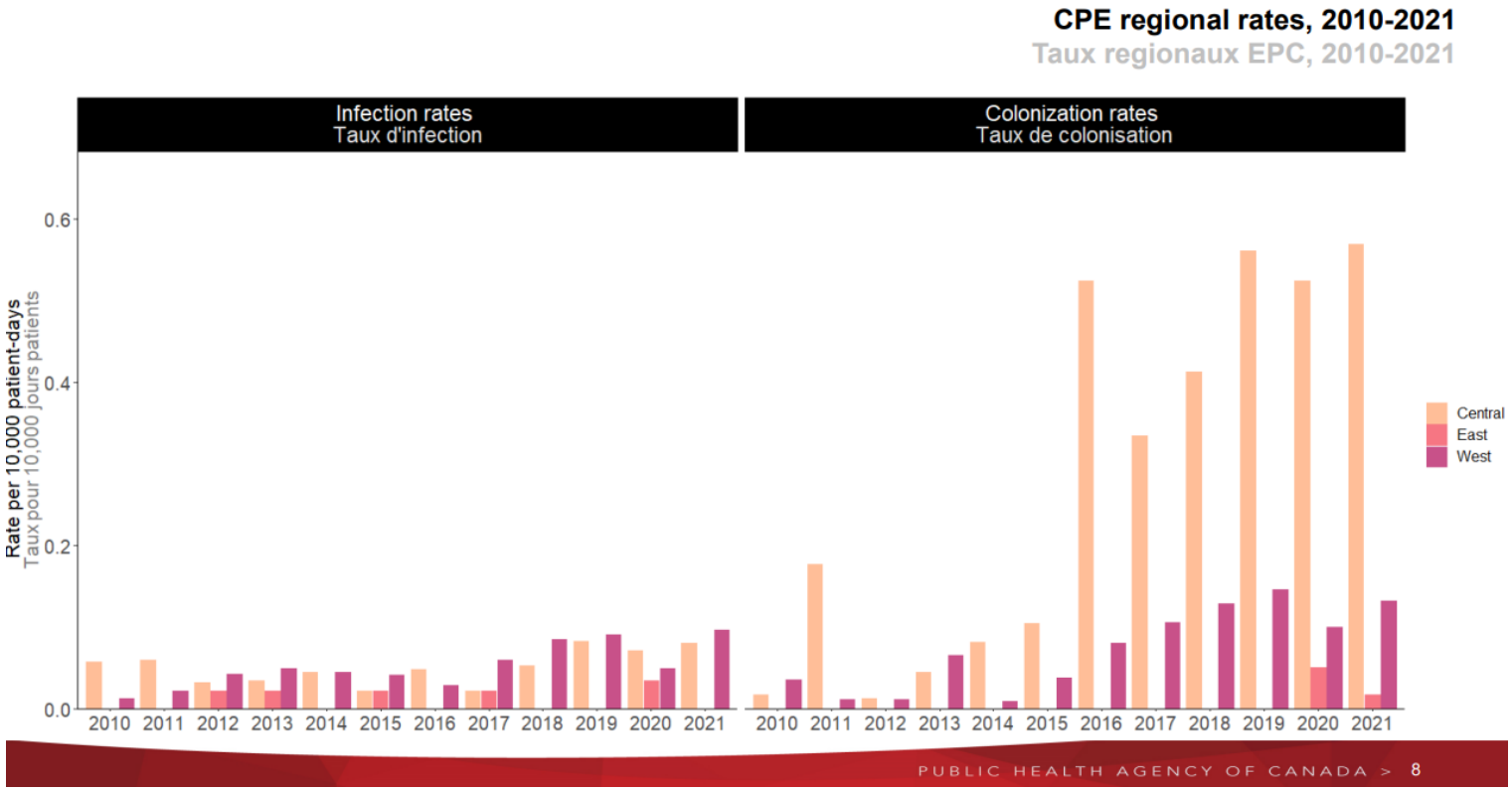
CPE By Region



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Conclusion : Bénéfices de la surveillance

- SARM :
  - Augmentation de la prévalence en communauté : Ouest >Central>East
  - Diminution significative de SARM noso au Québec
- C.difficile :
  - Diminution depuis éclosion en 2004
  - Associé avec usage des FQ
- ERV :
  - Augmentation au Canada suite à arrêt de dépistage dans certaines régions
  - Dimution concomitante au Québec
- CPE :
  - Problème en émergence

vOACIS

File Patient List Summary Chart Order Results Plan References Reports User Help

Microbiology Details

Previous Next

RAPPORT CORRIGÉ/
AMENDED REPORT

Croissance de Escherichia coli résistant aux carbapénèmes
-
Carbapenem-resistant Escherichia coli isolated New Delhi metallo =positive
-
Résultats téléphonés à / Results called to: icu michele v
2015/05/02 09:41:22
LSPQ-No.de référence et rapport d'analyse: / LSPQ-Result and reference number: A402432

1 Escherichia coli (EC)
2 Escherichia coli (EC)

Sensitivity / MIC (mg/L):

Organism / Antibiotic	1 (EC)	2 (EC)								
Amikacine	R									
Tobramycine	R									
Trimethoprim/Sulfamétho...	R									
Piperacilline/Tazobactam	R									
Méropénème	R	R								
Imipénème	R									
Gentamicine	R									
Ciprofloxacine	R									
Ceftriaxone	R									
Ampicilline	R									
Amoxicilline/Clavulanate	R									
Ertapénème	R	R								

Source: Cerner Gen. Lab/Micro/Path. - MB-15-080835 - SID: 287916199

User: Frenette, Charles – MD | Term. Facility : MGH | Term. Location : | Term. ID: MUHC-MJPCNMB027

9:41 AM

Test:	SPUTUM BACTERIAL CULTURE	Accession #:	MB-23-065925
Type:	Microbiology	Ordered By:	DECKELBAUM, DAN LEON ELAZAR
Collect:	Mar 21, 2023 09:21 - Due D/T	Order comment:	
Received:	Mar 21, 2023 14:32		
Resulted:	Mar 24, 2023 11:47		

Report:

Gram	>25 Globules blancs / champ (faible grossissement) ** >25 White blood cells / LPF <10 cellules épithéliales / champ (faible grossissement) ** <10 Epithelial cells / LPF 3+ Cocci Gram Positif / Gram Positive Cocci 2+ Bacille Gram Négatif / Gram Negative Rod
Rapport Final / Final Report	3+ Pseudomonas aeruginosa 3+ Acinetobacter baumannii Germe multi-résistant isolé. SVP consulter la Prévention des infections. / Multi-resistant organism isolated. Please consult Infection Control. . 2+ Serratia marcescens
Verified by:	Timm Caroline
Acinetobacter baumannii - Méropénème	Les résultats pour méropénème ne permettent pas de prédire l'utilité d□ertanénème pour les infections causées par l'Acinétobacter. / Meropenem

Sensitivity / MIC (mg/L):

Organism Antibiotic.....	1 (PA)	2 (Acibau)	3 (Sermar)						
Amikacine		R							
Tobramycine	S	R	S						
Trimethoprim/Sulfamétho...		R	S						
Piperacilline/Tazobactam	S	R							
Méropénème	R	R	S						
Gentamicine	S	R							
Ciprofloxacine	S	R	S						
Ceftriaxone		R	S						
Ceftazidime	S	R	S						
Cefixime			S						
Amoxicilline/Clavulanate			R						

Contrôle de la résistance: Antibiogouvernance

ID resident

Surgery resident

Antibiogouvernance : Surveillance qualitative

- Revoir AB prescrit :
  - Indication
  - Choix
  - Voie
  - Dose
  - Duration

Quoi surveiller ?

- Ciblé certains Antibiotiques
  - Les plus chers?.... À l'année
  - Les plus fréquents?.... Périodique
- Ciblé certaines unités
  - Soins Intensifs?
  - Unités avec taux C.difficile élevés ?
- Selon Indications
  - Infections urinaires
  - IVR
- Selon service/départment

Microbiologiste et Pharmacien

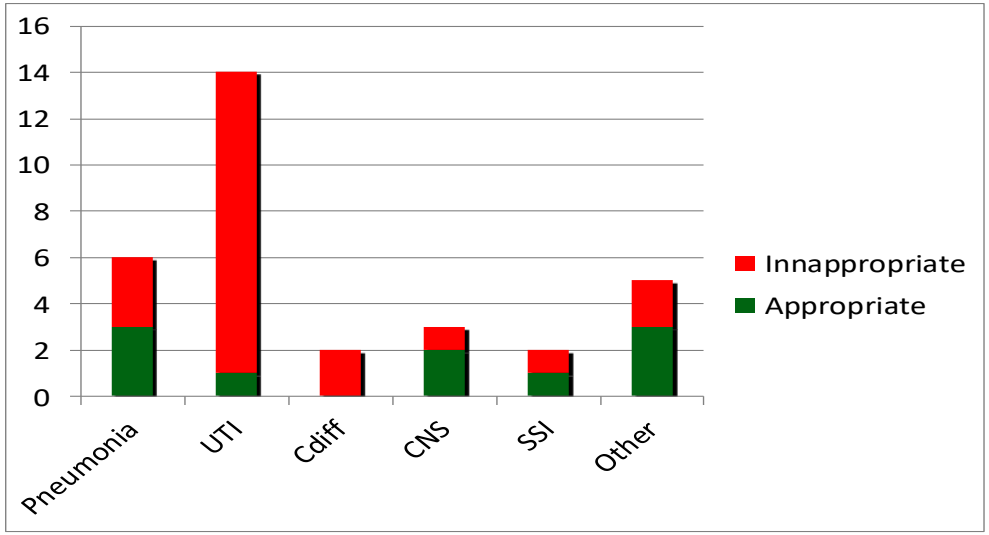
Audit : Processus

- Revoir tous les dossiers avec une prescription d'AB prévalente
  - +/- prophylaxie
  - Collecte de données
    - *Indication , choix , dose , durée, voie*
    - *Correspond aux lignes directrices locales?*
- N suffisant pour avoir signification statistique
  - 30-50 cases

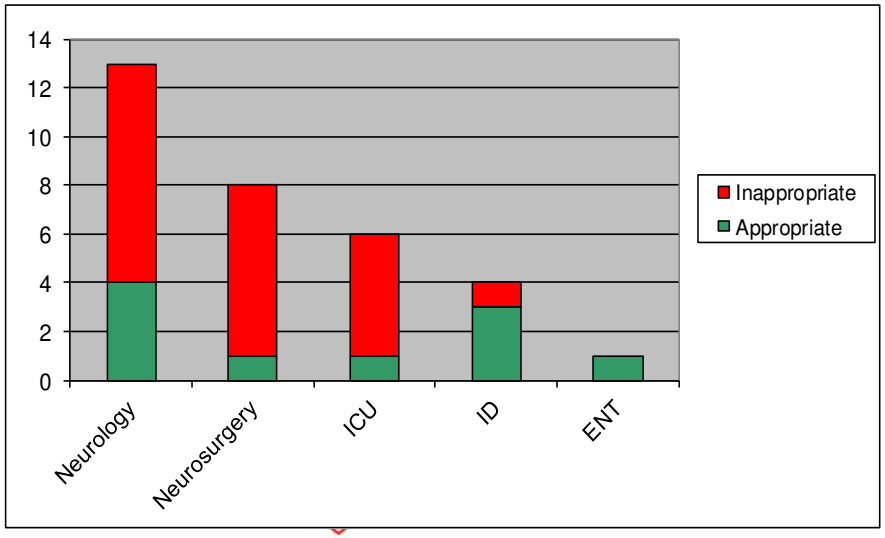
Feedback aux Md…

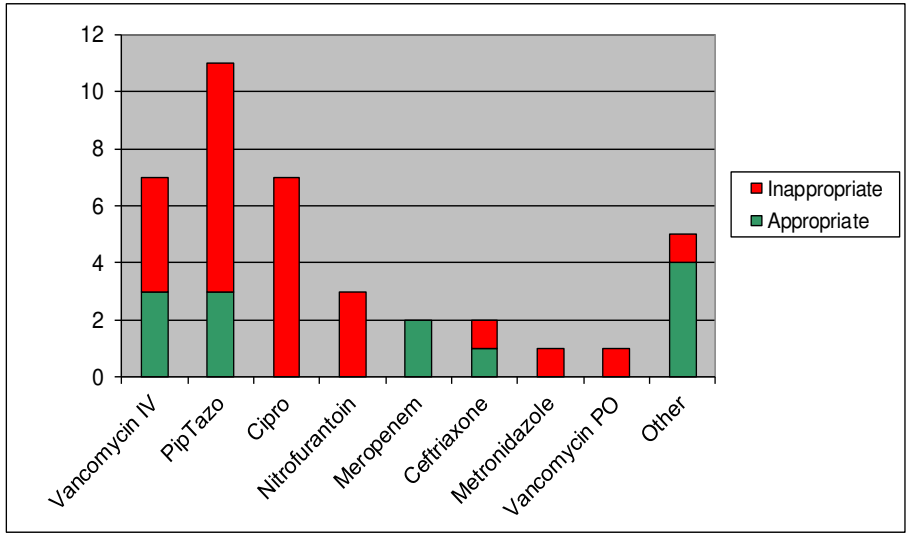
- 3 axis
  - Indications
  - Antibiotiques
  - Individuel / Service/ département
    - *Écrit , oral ,powerpoint*

Unité de neurologie (2011)
Usage appropriate : 10/32= 31 %



Raisons:
Indication n = 12
Choix n = 15
Dose n = 6
Voie n = 0
Durée n = 4





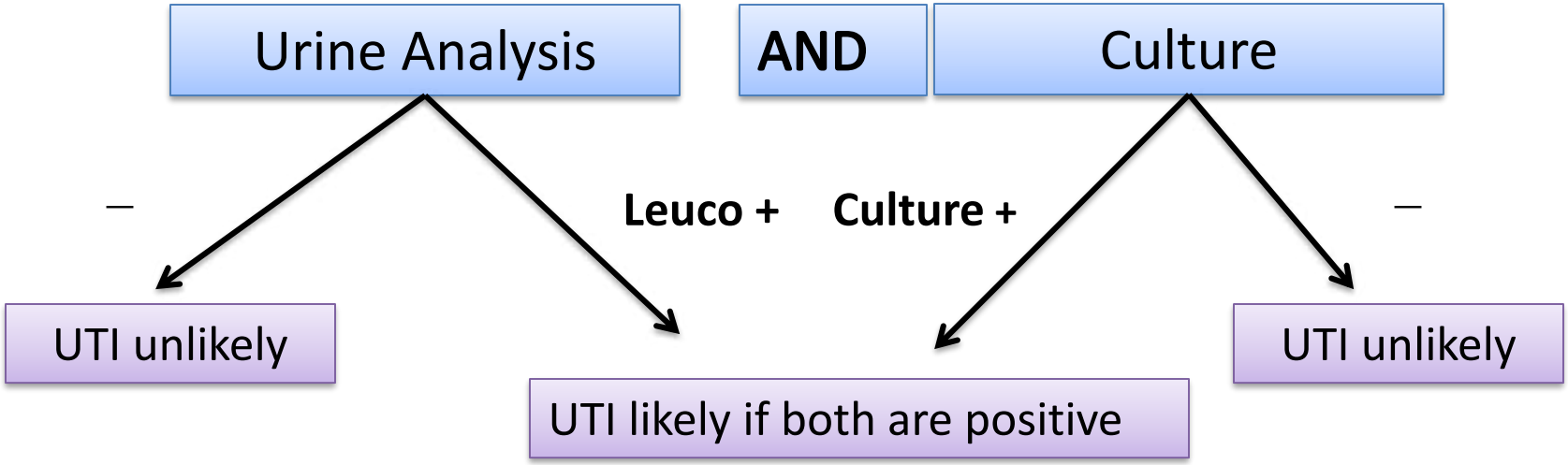
UTI

Infection urinaire - Diagnostic

- Présence de symptômes focalisés
- Besoin: Analyse et Culture d'urine
  - interprétation
- Distingué contaminants des pathogènes
  - Coag Neg Staph, S.viridans,Corynebacterium,Lactobacillus
- Besoin de leukocyturie:
  - Au moins > 10 WBC
- Besoin >10^8 colonies / litre

Diagnosis of UTI

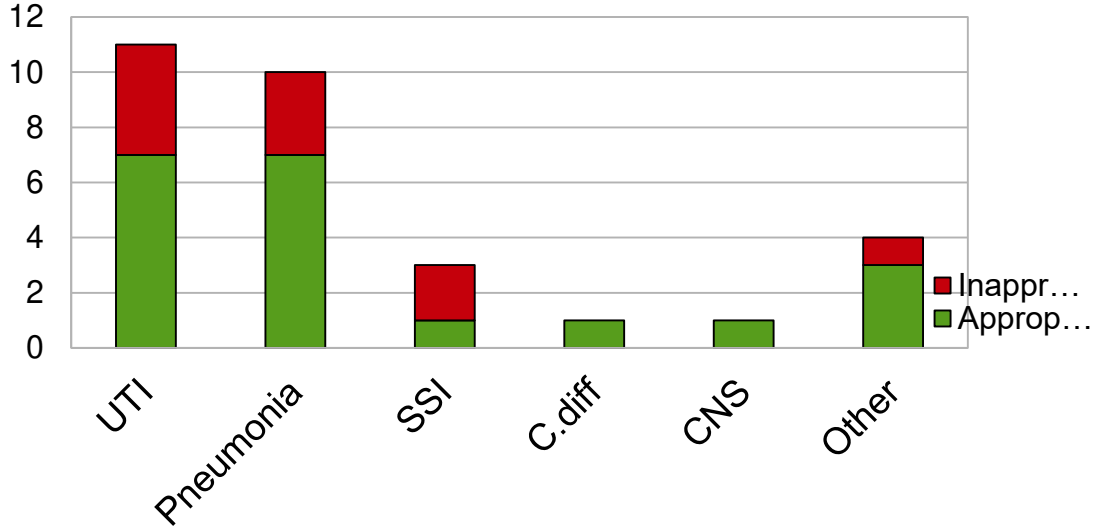
Presence of: Urgency
Frequency
Suprapubic pain, tenderness
Flanck pain
Fever and/or sepsis
Unexplained confusion ?

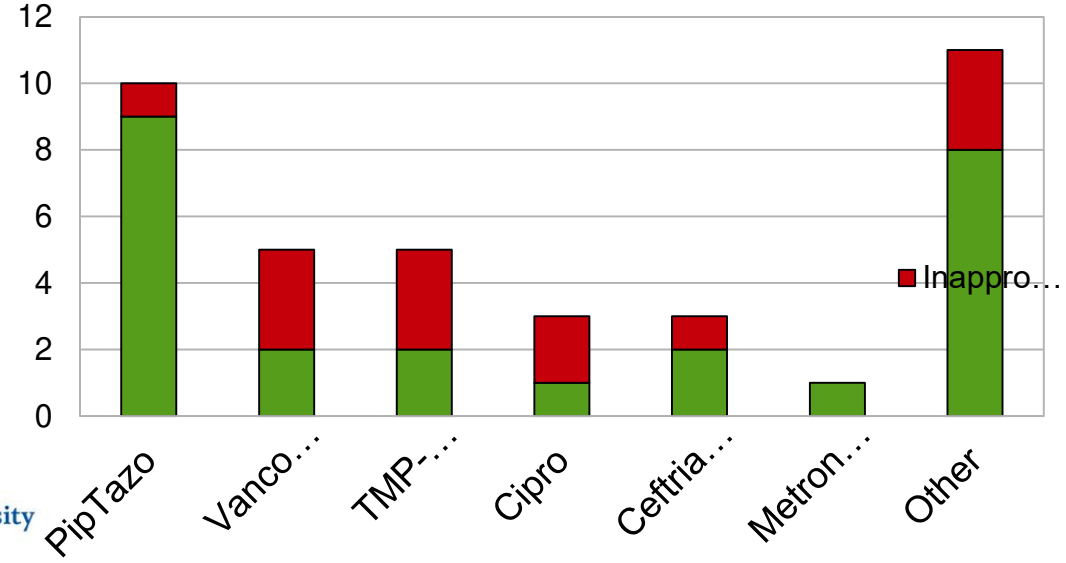


Bacteurie asymptomatique:

- Ne pas faire d'analyse ou d'investigation si urine Trouble , Odeur nauséabone, Incontinence / Retention ,
- Traité bactéurie asymptomatique si
  - Femme enceinte
  - Procédure/Chirurgie urologique
- Tous les autres : on ne traite pas
  - Si sone : d/c sonde

Unité Neurologique
Audit après feedback (N = 30 patients , 38 AB)





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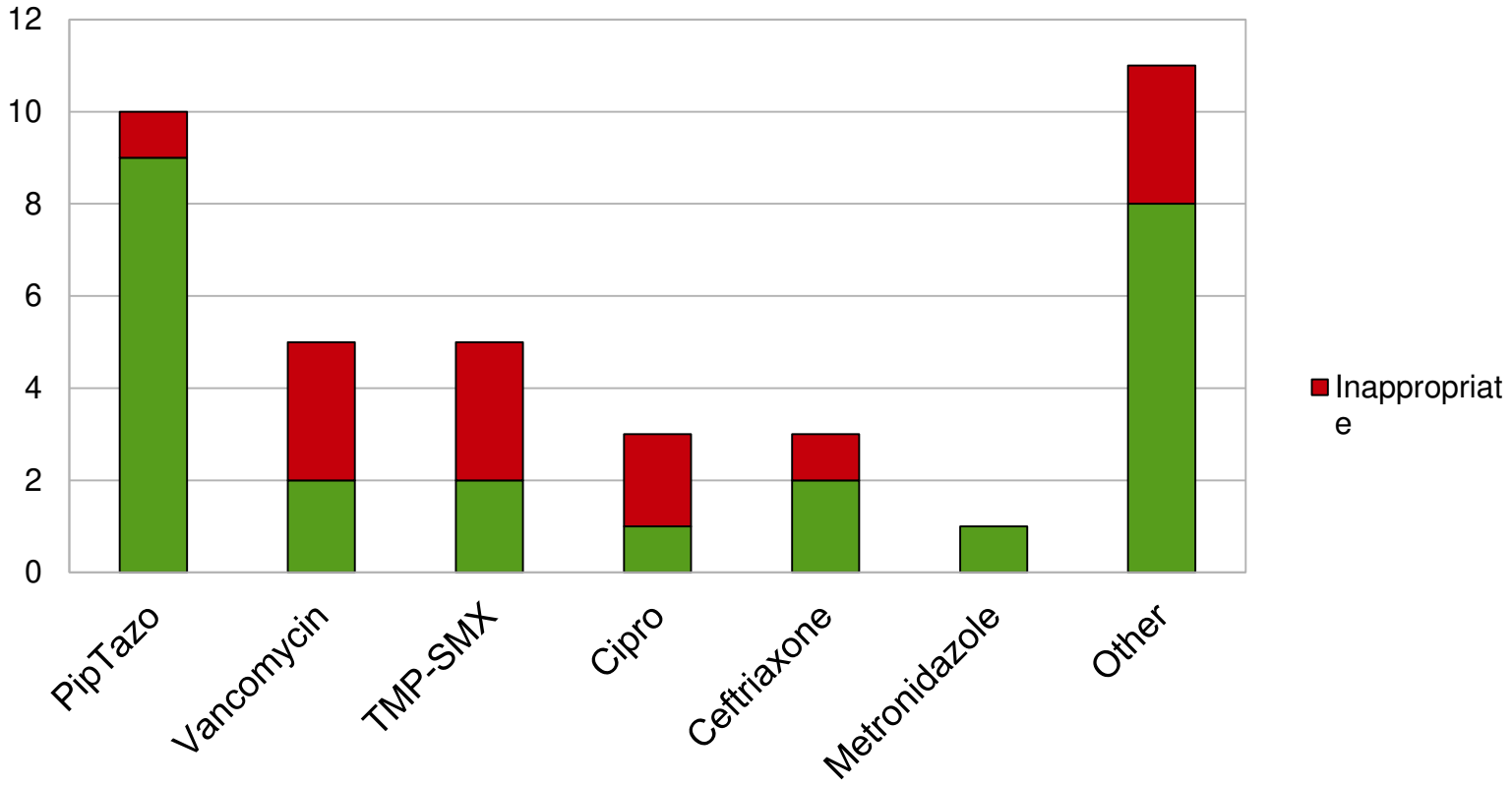
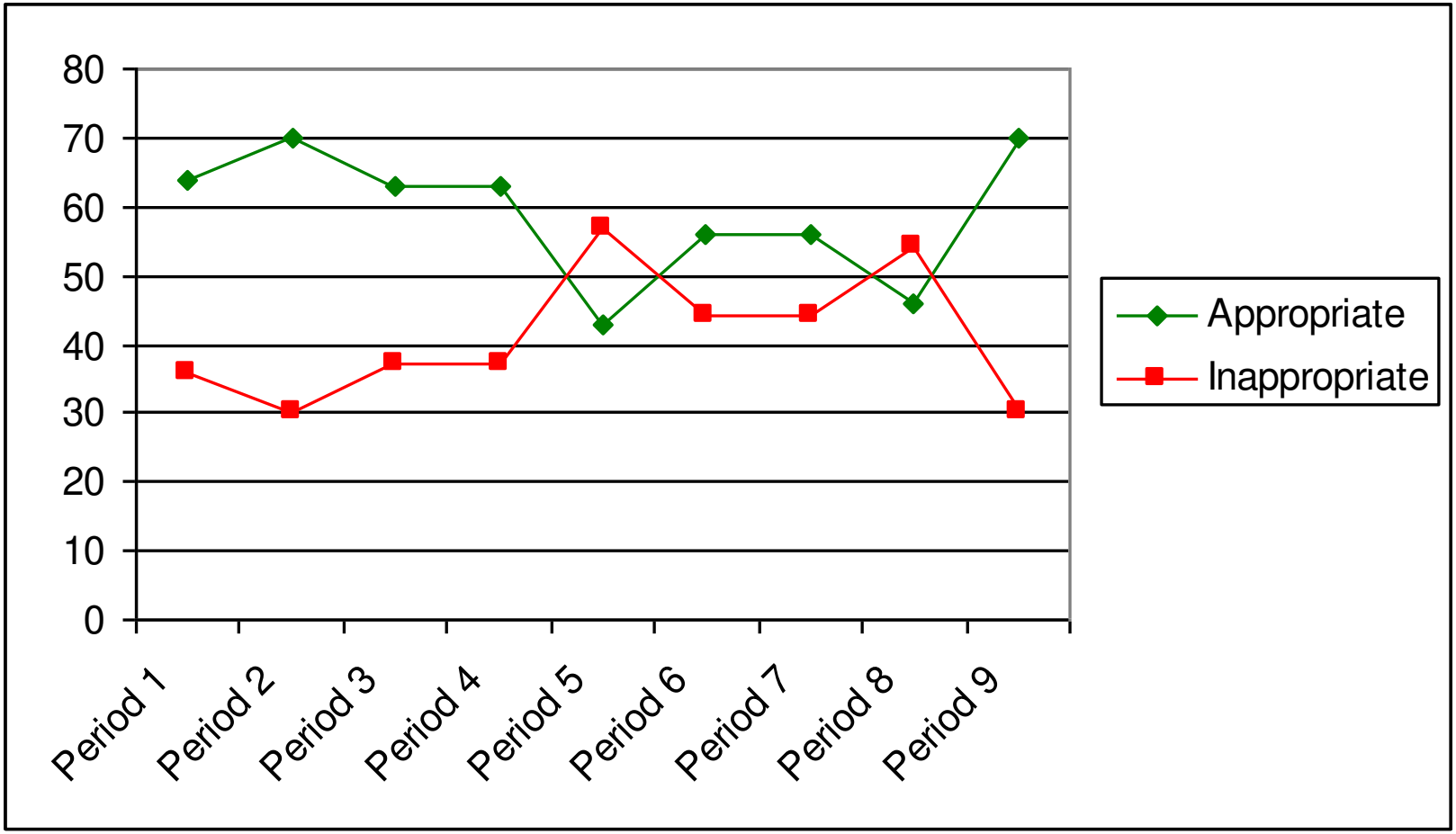
Appropriate use according to antibiotic (N = 38)



ATB Stewardship MNH 2012

Appropriate versus Inappropriate use of antimicrobials per period

Dr Dal Briedis



Un CHSLD au Québec : problématique observée*

- Beaucoup de bactériurie asymptomatique traité avec AB
  - Ciprofloxacin souvent prescrite
  - Diagnostic sur analyse d'urine
  - Débute le Tx sans attendre la culture
- Changement état mental ou d'aspect ou odeurs des urines principaux Symptomes

Données : Pierre-Jean Maziade

Constats – 3 CHSLD / 403 lits

- 333 cultures d'urine demandées
  - 50% positives
  - E.coli : 51% résistance Cipro (n=89)
  - Incidence de E.coli multi R = 20/89
    - *(R à ≥ 3 classes d'ATB)*
- DDD Cipro = 8,2 par 1000 jp

Solutions

- Présentation faite aux MD et infirmières sur bactériurie et UTI chez patients âgés (2012).
  - Bactériurie Asx fréquente > 65 ans (ad 50%)
  - Changement d'état mental et aspect des urines = facteurs confondants
  - Besoin d'avoir d'autres Sx:
    - *fièvre, frissons, Sx urinaires bas*
    - *Critères de McGeer (ICHE 2012)*

TABLE 5. Surveillance Definitions for Urinary Tract Infections (UTIs)

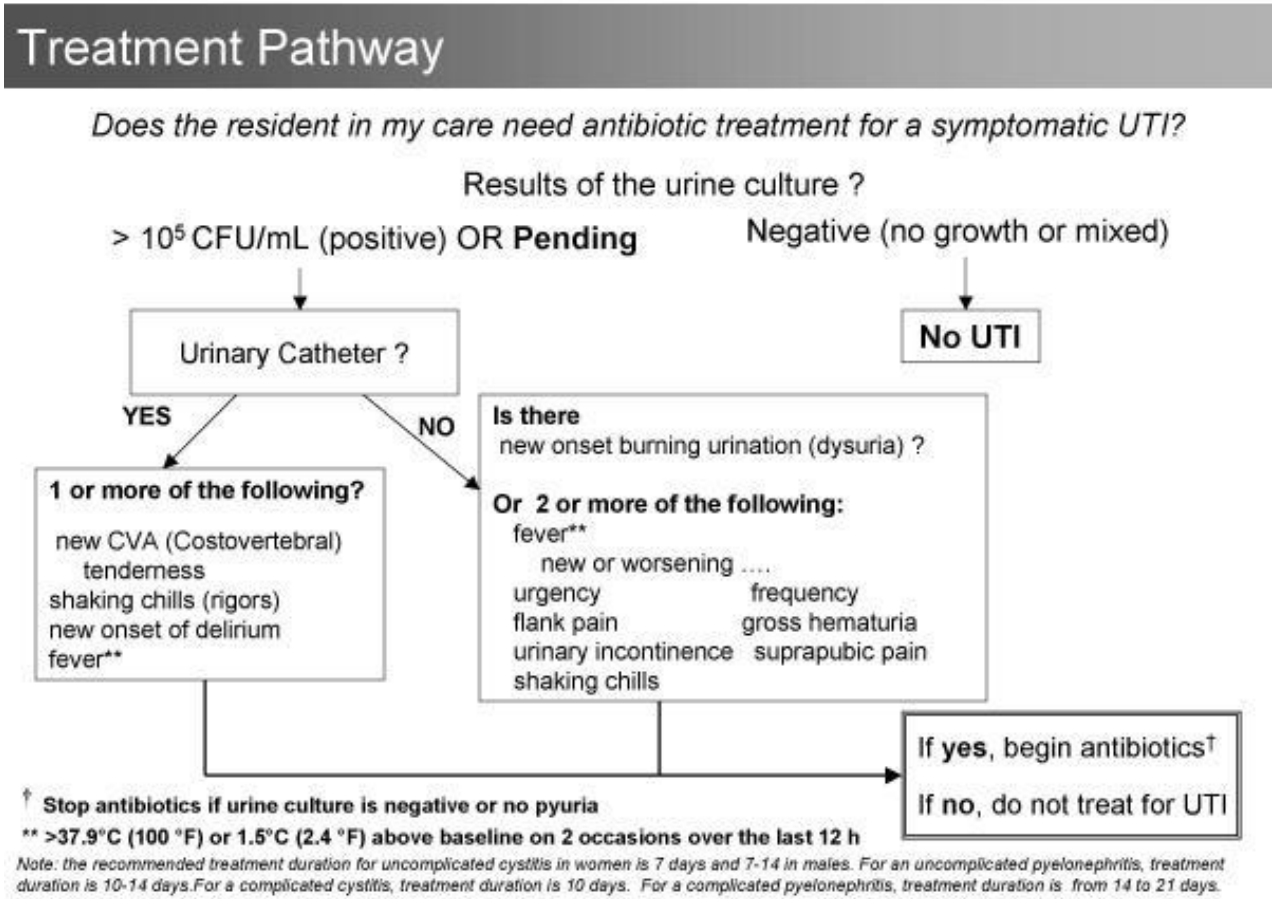
Criteria	Comments
A. For residents without an indwelling catheter (both criteria 1 and 2 must be present) 1. At least 1 of the following sign or symptom subcriteria a. Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate b. Fever or leukocytosis (see Table 2) and at least 1 of the following localizing urinary tract subcriteria i. Acute costovertebral angle pain or tenderness ii. Suprapubic pain iii. Gross hematuria iv. New or marked increase in incontinence v. New or marked increase in urgency vi. New or marked increase in frequency c. In the absence of fever or leukocytosis, then 2 or more of the following localizing urinary tract subcriteria i. Suprapubic pain ii. Gross hematuria iii. New or marked increase in incontinence iv. New or marked increase in urgency v. New or marked increase in frequency	UTI should be diagnosed when there are localizing genitourinary signs and symptoms and a positive urine culture result. A diagnosis of UTI can be made without localizing symptoms if a blood culture isolate is the same as the organism isolated from the urine and there is no alternate site of infection. In the absence of a clear alternate source of infection, fever or rigors with a positive urine culture result in the noncatheterized resident or acute confusion in the catheterized resident will often be treated as UTI. However, evidence suggests that most of these episodes are likely not due to infection of a urinary source.
2. One of the following microbiologic subcriteria a. At least 10^5 cfu/mL of no more than 2 species of microorganisms in a voided urine sample b. At least 10^2 cfu/mL of any number of organisms in a specimen collected by in-and-out catheter	Urine specimens for culture should be processed as soon as possible, preferably within 1–2 h. If urine specimens cannot be processed within 30 min of collection, they should be refrigerated. Refrigerated specimens should be cultured within 24 h.
B. For residents with an indwelling catheter (both criteria 1 and 2 must be present) 1. At least 1 of the following sign or symptom subcriteria a. Fever, rigors, or new-onset hypotension, with no alternate site of infection b. Either acute change in mental status or acute functional decline, with no alternate diagnosis and leukocytosis c. New-onset suprapubic pain or costovertebral angle pain or tenderness d. Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate	Recent catheter trauma, catheter obstruction, or new-onset hematuria are useful localizing signs that are consistent with UTI but are not necessary for diagnosis.
2. Urinary catheter specimen culture with at least 10^5 cfu/mL of any organism(s)	Urinary catheter specimens for culture should be collected following replacement of the catheter (if current catheter has been in place for >14 d).

NOTE. Pyuria does not differentiate symptomatic UTI from asymptomatic bacteriuria. Absence of pyuria in diagnostic tests excludes symptomatic UTI in residents of long-term care facilities. cfu, colony-forming units.

Solution (suite)

- Analyse urine
  - Pyurie et nitrite = bonne Valeur prédictive négative
  - Mauvaise Valeur positive prédictive
- Attendre la culture d'urine et antibiogramme avant de Tx
- Aucun avantage de Traiter bactériurie asymptomatique (aurait un effet protecteur contre récidive)
- Si Tx considéré Nitrofurantoine/TMP-Sxt

Solutions (suite)



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Algorhytme décisionnel : M Loeb BMJ 2055

Suivi

- Liste d'antibiotiques en CHSLD 5 jours/semaine
  - Microbiologiste / pharmacien
- Si Cipro prescrite:
  - Vérification laboratoire
  - Appel fait au médecin ou infirmière pour vérifier la clinique
  - Décision commune prise:
    - *arrêt, changement, poursuite de la Cipro*

Résultats (2011 vs 2015)

- 333 à 418 cultures d'urine :
  - 89 vs 97 E.coli
- Résistance à la Cipro de 51% à 23% (↓ 55%)
  - DDD x 1000 jp de 8,2 à 4,5 (↓ 45%)
- Incidence de E.coli multiR de 20 à 5 nouveaux cas (↓ 75%)

Question : Est-ce que tous ces cas étaient des infections urinaires nosocomiales ?

ROLE PCI #1

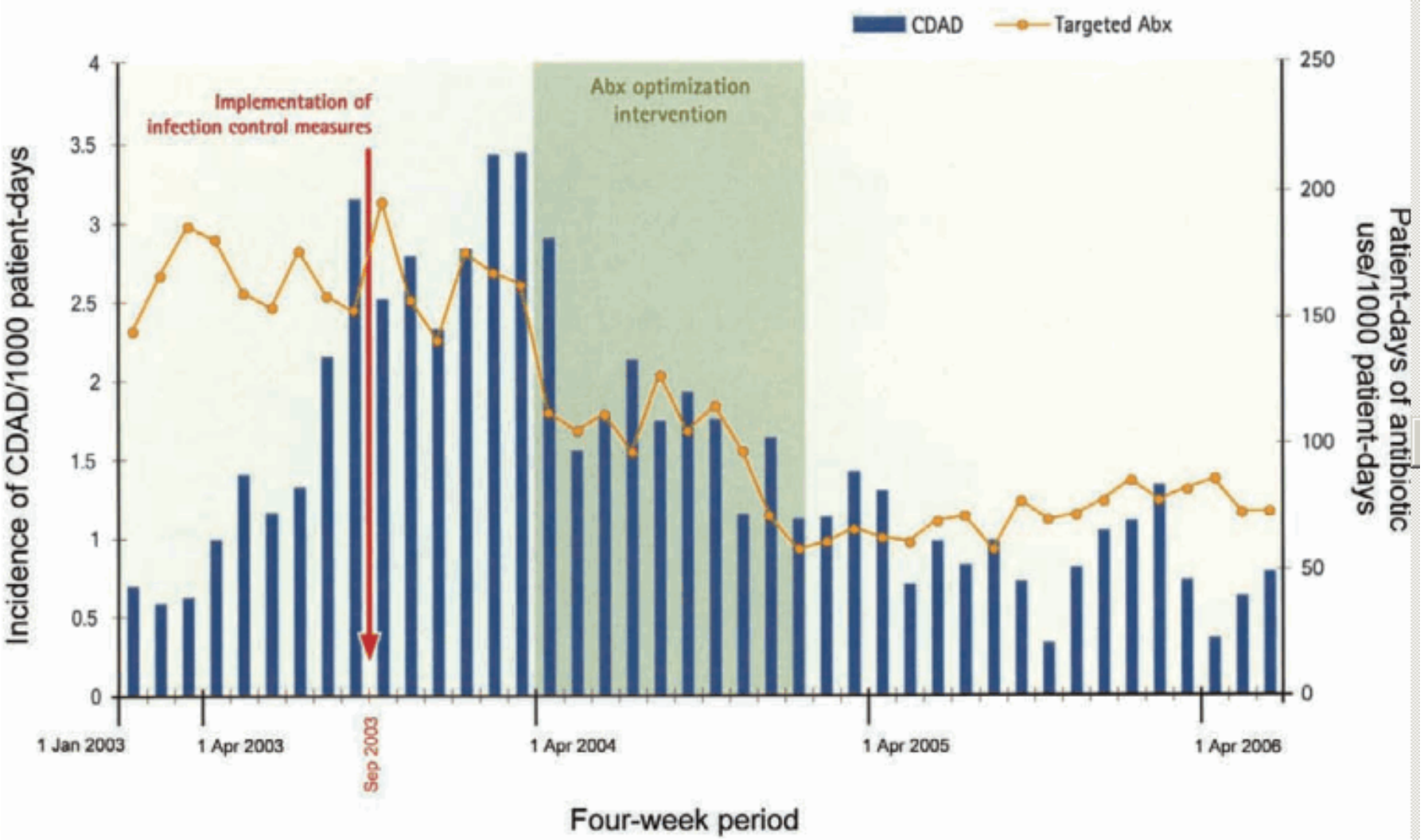
Role Antibiogouvernance en PCI : #2 prophylaxie chirurgicale

- Tous les cas de C.difficle.
  - Quel AB prescrit avant ?
  - Indications? Choix adéquat?

Unnecessary Antimicrobial Use in Patients with Current or Recent Clostridium difficile Infection

Shaughnessy, Infection control and hospital epidemiology, February 2013, vol. 34, no. 2

- Of 246 patients with new-onset CDI, 445 antimicrobial courses.
  - 77 % at least 1 unnecessary antimicrobial dose
  - 26% of patients received **only** unnecessary antimicrobials
  - 45% of total non-CDI antimicrobial days included unnecessary antimicrobials.
- The leading indications for unnecessary antimicrobial use were :
  - urinary tract infection
  - pneumonia.
- **Conclusions. Twenty-six percent of patients with recent CDI received only unnecessary (and therefore potentially avoidable) antimicrobials**

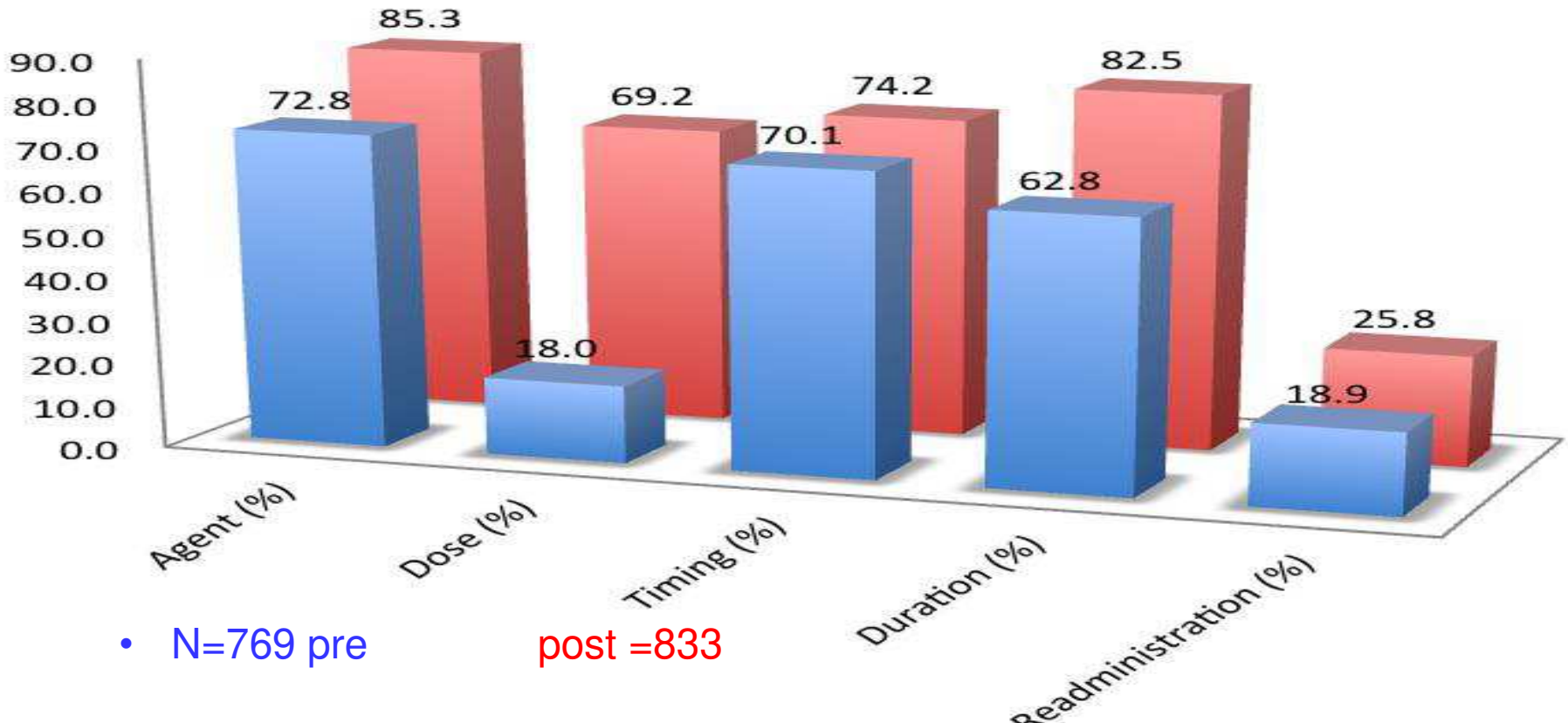


de santé McGill Health Centre

Valiquette et al, CID 2007 45 S2 p112

Role Antibiogouvernance (2) :

- Pour tous les cas d'ISO est que l'antibioprophylaxie fut adéquate ?



- N=769 pre post =833

Role antibiogouvernace (3)
Infection des voies respiratoires

- Y a t- il vraiment une pneumonie ?
- Si c'est un virus (CoVid, Influenza) , est ce que des AB sont nécessaires ?
- Utilité de la PCT (procalcitonin)

Brief Report

Evaluating the impact of the multiplex respiratory virus panel polymerase chain reaction test on the clinical management of suspected respiratory viral infections in adult patients in a hospital setting

Colin Yee MD [a], Eva Suarthana MD, PhD [b,*], Nandini Dendukuri PhD [b], Ioana Nicolau MSc [b], Makeda Semret MD [a], Charles Frenette MD [a]

[a] *Division of Infectious Disease, McGill University Health Centre, Montreal, QC, Canada*
[b] *Technology Assessment Unit, McGill University Health Centre, Montreal, QC, Canada*

D PROOF

Am.J Infection Control - accepted

Impact sur usage Antiviraux / AB

Table 2
Distribution of clinical management before and after the MRVP test in patients in the ward

		Antiviral treatment			Antibiotic treatment		
			Postresult treatment			Postresult treatment	
Test results	n	Empirically treated*	Continued†	Discontinued†	Empirically treated*	Continued†	Discontinued†
Hospitalized patients							
Negative	62	15 (24.2)	5 (33.3)	10 (66.7)	41 (66.1)	35 (85.4)	6 (14.6)
Positive noninfluenza	10	4 (40.0)	0 (0)	4 (100)	7 (70.0)	5 (71.4)	2 (28.6)
Positive influenza	17	7 (41.2)	7 (100)	0 (0)	12 (70.6)	9 (75.0)	3 (25.0)
Patients diagnosed in the emergency room							
Negative	31	8 (25.8)	1 (12.5)	7 (87.5)	22 (70.9)	17 (77.2)	5 (22.7)
Positive noninfluenza	22	7 (31.8)	2 (28.6)	5 (71.4)	11 (50.0)	7 (63.6)	4 (36.4)
Positive influenza	44	16 (36.4)	14 (87.5)	2 (12.5)	19 (43.2)	13 (68.4)	6 (31.6)

Evaluating the impact of the multiplex respiratory virus panel polymerase chain reaction test on the clinical management of suspected respiratory viral infections in adult patients in a hospital setting Colin Yee MD a , Eva Suarthana MD, PhD b, *, Nandini Dendukuri PhD b , Ioana Nicolau MSc b , Makeda Semret MD, MSc, FRCP(C) a,c , Charles Frenette MD . Division of Infectious Disease, McGill University Health Centre, Montreal, QC, Canada, Am J Inf.Control 2016

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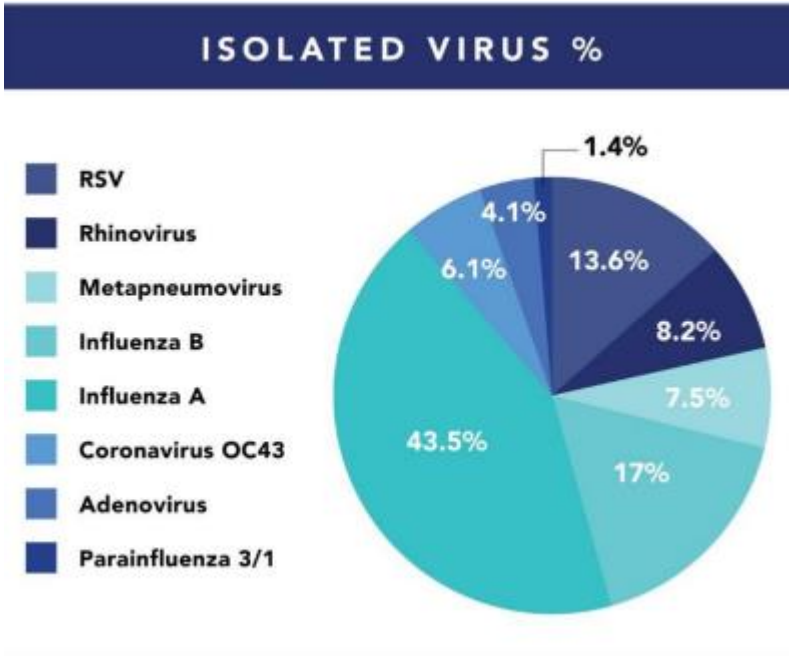
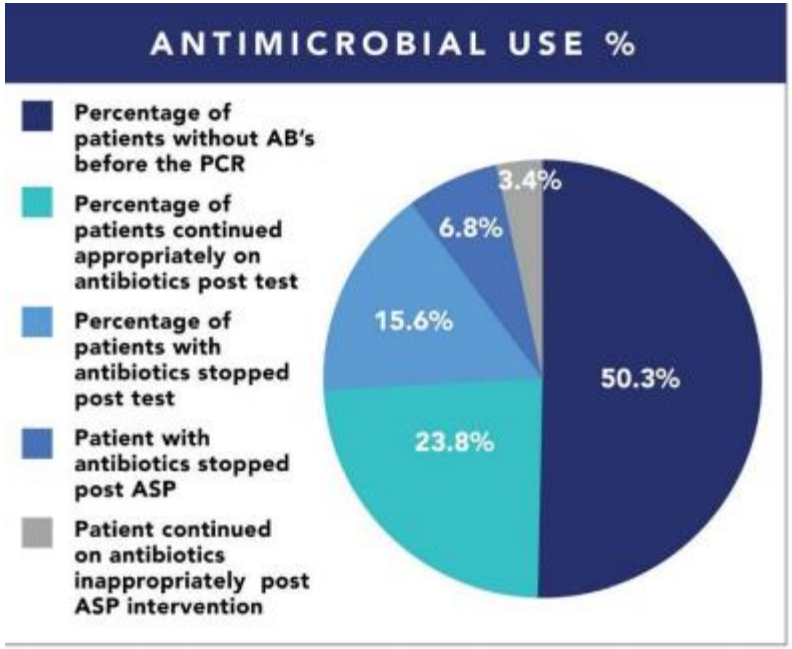
Assess reasons for continuing antibiotics in persons with positive respiratory viruses PCR in the emergency room
Kassar.R , FrenetteC.,Dendukuri N. Yao,M., Troquet JM
In submission

147 patients avec Virus + dans multiplex respiratoire :





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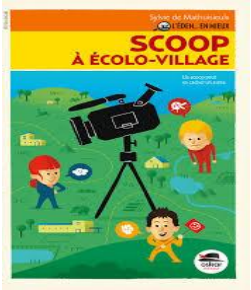
Who is the black sheep ?

Qui est le mouton noir ?

Conclusions :

- La résistance est un phénomène mondial inévitable
  - Plus on utilise d'AB , plus il y a de R
- La PCI a démontré sa capacité à contrôler la résistance en milieu hospitalier (SARM , ERV, DACD) pour les pathogènes noso
- L'antibiogouvernance et la PCI vont de paire car tous les deux font appel à un changement de comportement humain.

Plan d'action ministériel 2023-2028 sur la lutte contre la résistance aux antibiotiques*



- Sous la responsabilité de la Direction de la prévention et du contrôle des maladies infectieuses (DPCMI) à la Direction générale de Santé publique (DGSP) du MSSS

- La réalisation sera inscrite dans le prochain plan d'action ministériel PCI (PAMPCI)
- Le contenue sera développé dans le plan d'action ministériel ABR pour éviter de dédoubler

- Les grands jalons et échéancier:
  - Révision des axes et objectifs et élaboration des indicateurs et des cibles (presque terminé)
  - Consultations avec sondage Delphi : mai
  - Rédaction: juin-juillet
  - Approbation et lancement : automne 2023

* Une proposition d'élargir la portée du plan à tous les antimicrobiens est actuellement à l'étude

Source : Caroline Authier

An idea that is developed and put into action is more important than an idea that exists only as an idea" -- Buddha

Plus facile de changer le cour d'une rivière que de changer le comportement humain…

Antibiorésistance fait partie de tous nos enjeux sociaux