Mr Ben Harris

Honorary Lecturer
University of Otago

A/Professor David Holland

Clinical Head of the Infectious Diseases Service
Middlemore Hospital

Professor Jack Heinemann

Genetics and Molecular Biology
School of Biological Sciences
University of Canterbury

A/Professor Siouxsie Wiles

Microbiologist
Head of the Bioluminescent Superbugs Lab
University of Auckland

Dr Bryan Betty

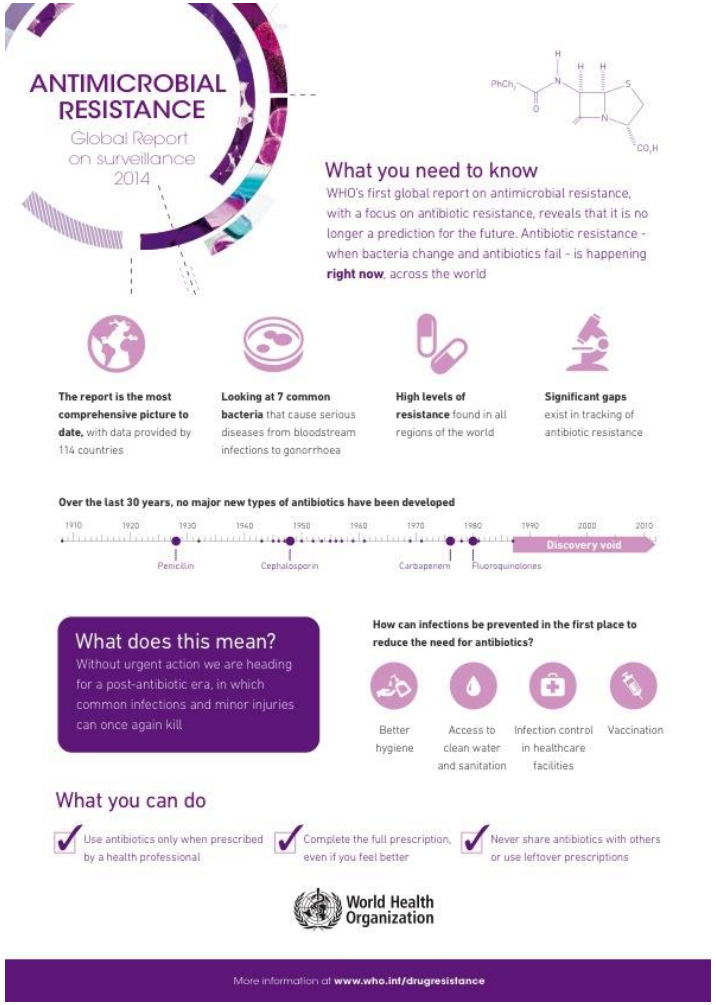
General Practitioner
Wellington

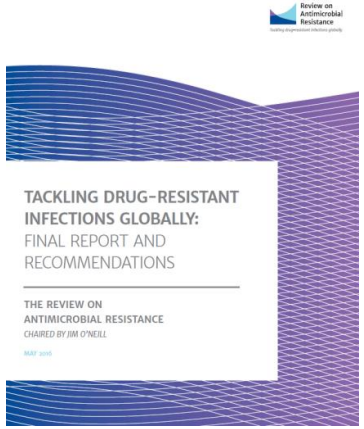
Sunday, August 11, 2019 (Room 9)

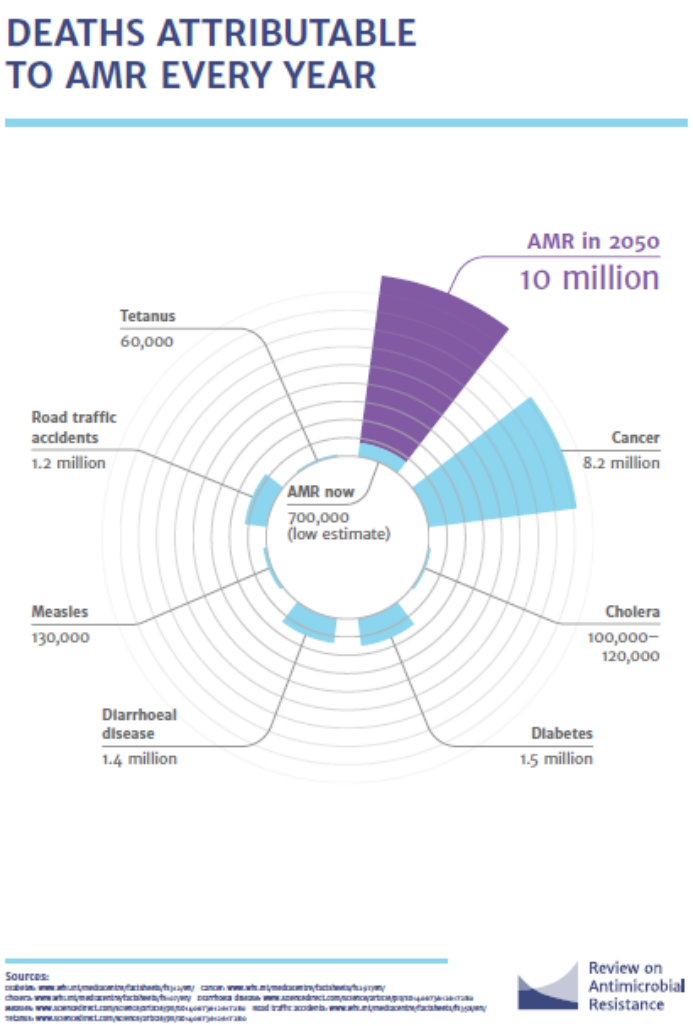
8:30 - 10:30 WS #147: Pharmac Session: Antimicrobial Resistance - Global Threat or Myth? (120mins, not repeated)

Antimicrobial Resistance (AMR): <u>It's here. How bad can it get?</u>

David Holland



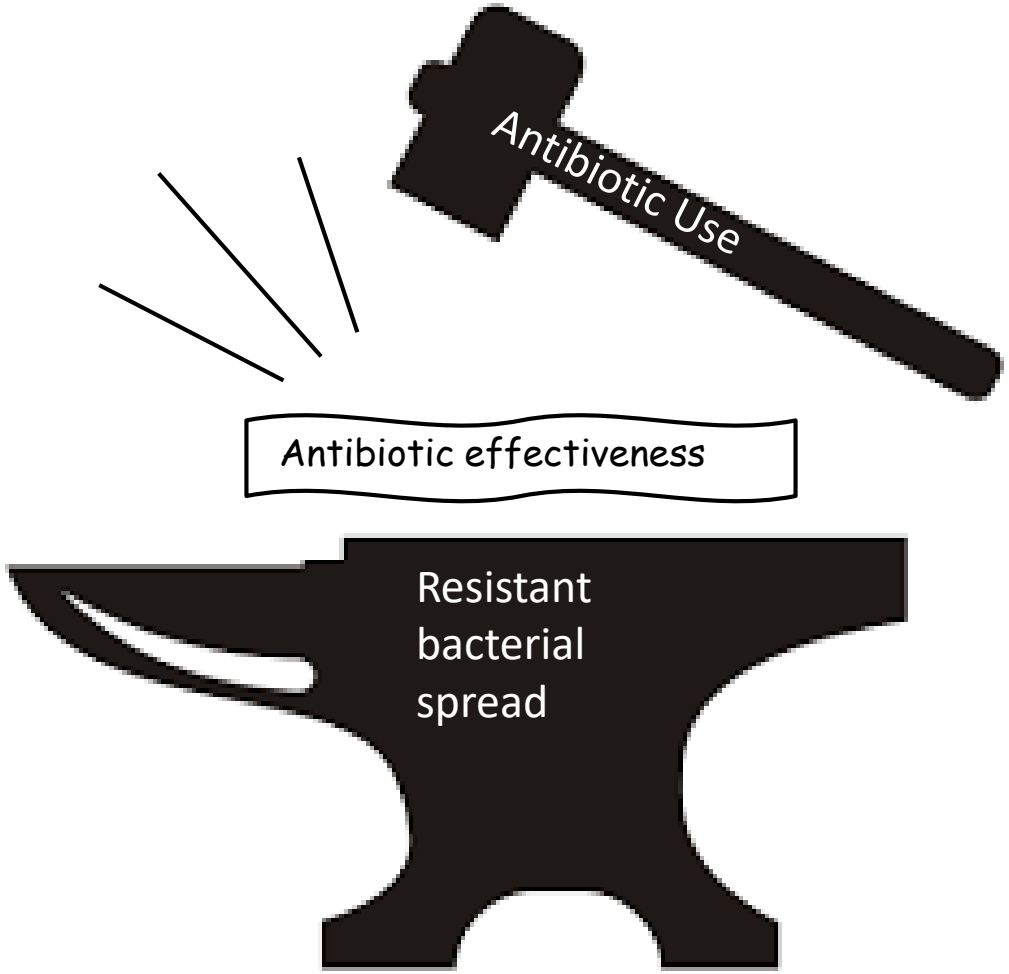




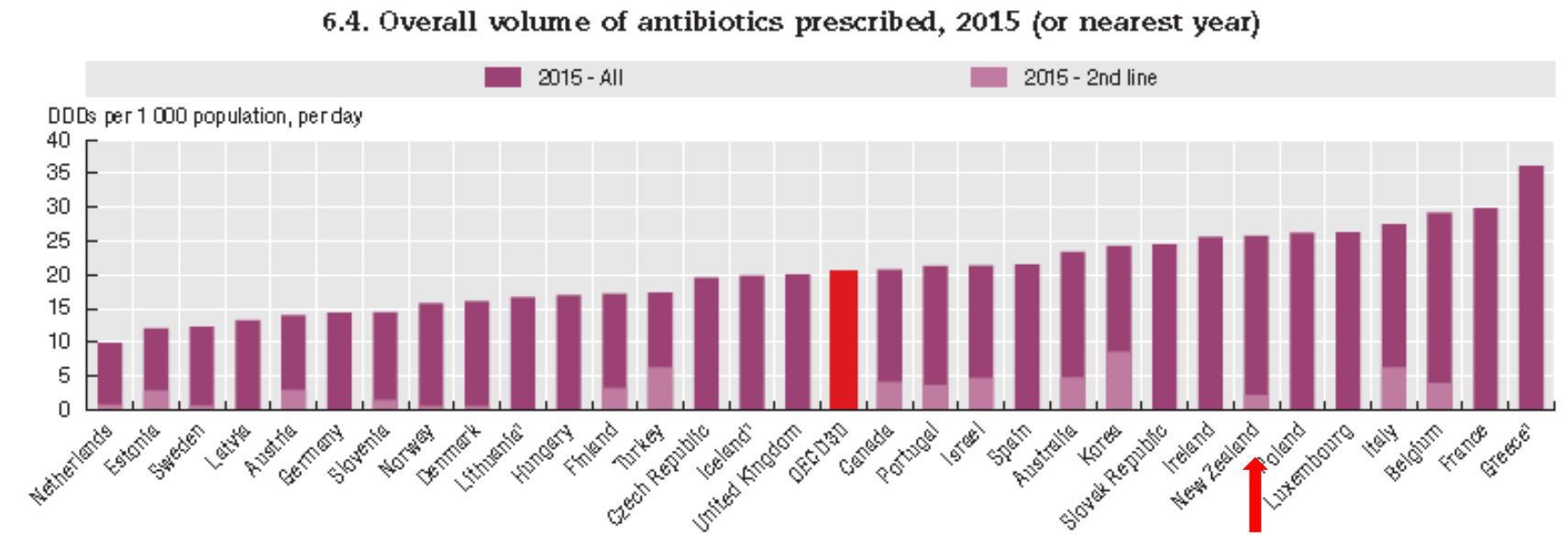
Several major reports in recent years and media interest…

Development of AMR:

- Selective pressure
- Survival of the fittest → spread



The hammer: Antibiotic prescribing



1. Data refer to all sectors (not only primary care).

Source: European Centre for Disease Prevention and Control and OECD Health Statistics 2017.

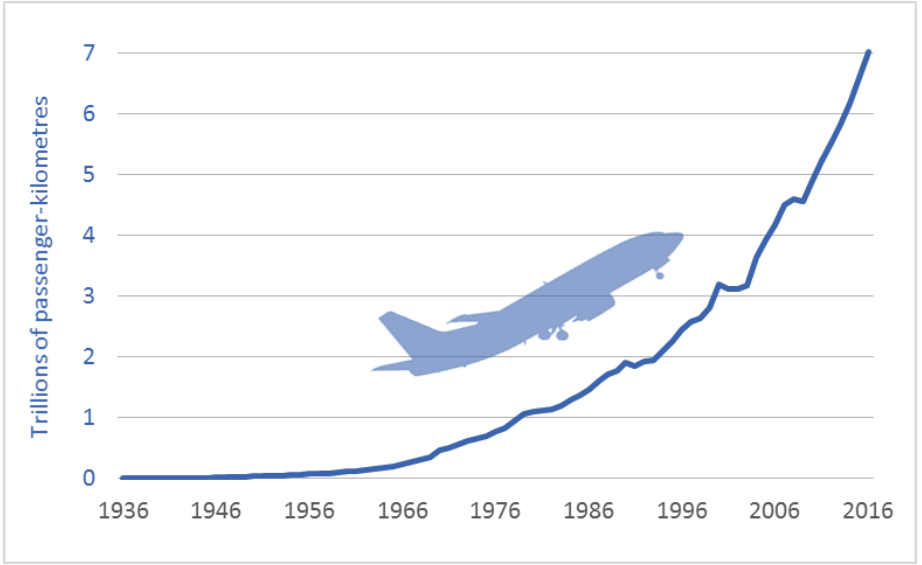
StatLink http://dx.doi.org/10.1787/888933603412

In NZ about 85-90% human antibiotics prescribed in the community and 10-15% in hospital

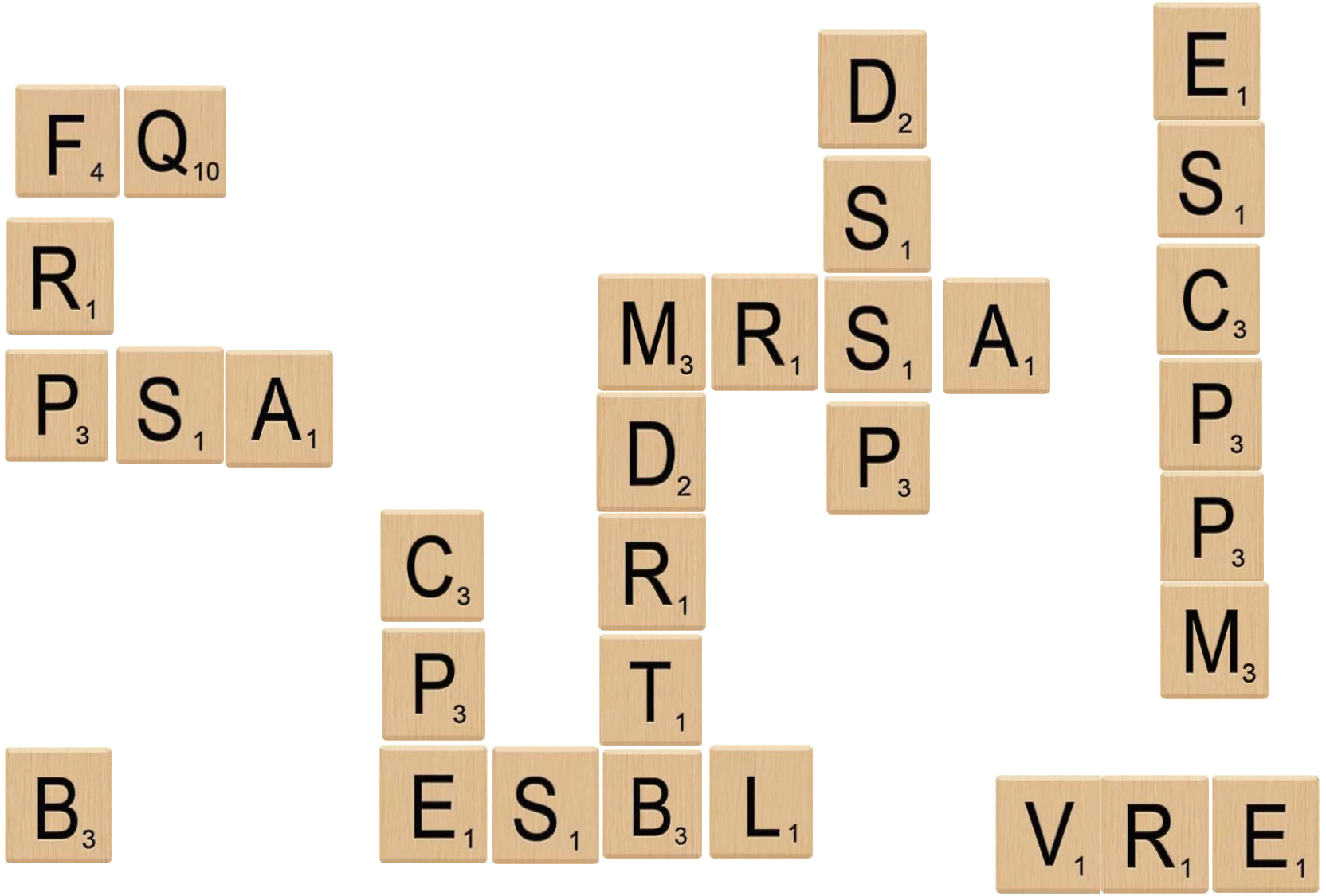
Inappropriate antibiotic prescribing ± 50% in both settings

The Anvil: Spread of resistant organisms

- Introduction from elsewhere ‘pre-packaged’ eg. Carbapenem-resistant organisms
- Travel/medical tourism
- Hospitals/LTCF

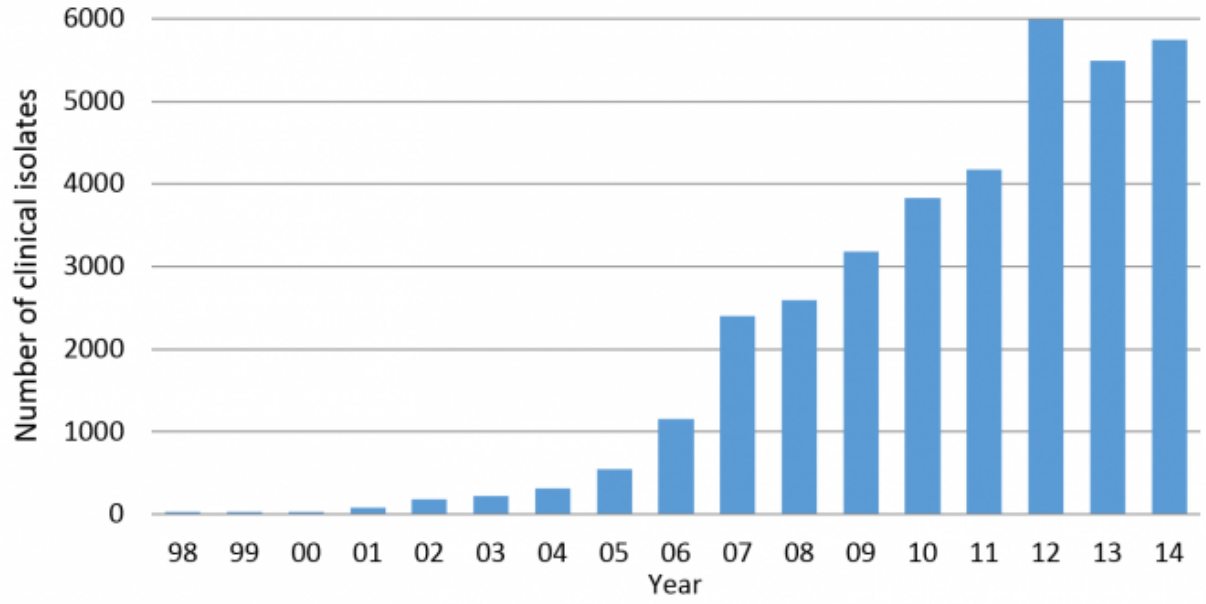


Antimicrobial Resistance



Rise of ESBLs in NZ

Figure 2: ESBL-PE in New Zealand 1998–2014.



1. Data from http://surv.esr.cri.nz/antimicrobial/esbl.php. Excludes isolates from faeces during

Community-Onset Genitourinary Tract Infection due to CTX-M-15–Producing *Escherichia coli* among Travelers to the Indian Subcontinent in New Zealand

Joshua T. Freeman,[1] Stephen J. McBride,[1] Helen Heffernan,[3] Tracy Bathgate,[1] Chris Pope,[3] and Roderick B. Ellis-Pegler[2]

Table 1. Demographic and clinical characteristics of patients with community-onset urinary tract infection (UTI) due to extended-spectrum β-lactamase producing *Escherichia coli* (ESBL) and Indian subcontinent contact.

Patient	Date of presentation	Age	Sex	Country of birth	Diagnosis	Comorbidity	Treatment before relapse[a]	Contact type	Travel duration[b]	Time since arrival in New Zealand	Prior hospitalization	ESBL type
1	19 April 2004	25	F	India	Pyelonephritis	None	Oral TMP-SMX	I	NA	6 months	None	CTX-M-15
2	6 September 2004	61	M	India	Catheter-associated UTI	Recurrent UTI	None	I	NA	2 months	None	CTX-M-15
3	26 January 2005	29	M	Italy	Pyelonephritis	None	Oral CIP	V	4 months	4 weeks	None	CTX-M-15
4	8 March 2005	65	F	India	Cystitis	COPD	Oral Amox-Clv	R	6 weeks	2 weeks	New Zealand outpatient clinic within 12 months	CTX-M-15
5	3 March 2006	47	F	India	Cystitis	None	Oral CIP	R	Unknown	10 days	None	CTX-M-15
6	5 April 2006	63	M	India	Epididymo-orchitis	AML	IV MER	V	NA	1 day	Multiple Indian outpatient clinics	CTX-M-15
7	10 June 2006	48	M	India	Epididymo-orchitis	None	Oral DOX	I	NA	<6 months	None	CTX-M-15
8	14 August 2006	33	F	India	Cystitis	Previous UTI	None	I	NA	4 years	None	SHV-12
9	24 September 2006	67	M	Bangladesh	Cystitis	Urethral stricture	IV ERT	I	NA	2 months	None	CTX-M-15
10	30 September 2006	53	F	New Zealand	Cystitis	UTI during childhood	CFC, NOR, and IV ERT	R	5 days	10 days	Health care worker in New Zealand hospital	Isolate unavailable

NOTE. AML, acute myeloid leukemia; Amox-Clv, amoxicillin-clavulanate; CFC, cefaclor; CIP, ciprofloxacin; COPD, chronic obstructive pulmonary disease; DOX, doxycycline; ERT, ertapenem; I, immigrated to New Zealand; IV, intravenous; MER, meropenem; NA, not applicable; NOR, norfloxacin; R, returned New Zealand resident; TMP-SMX, trimethoprim-sulfamethoxazole; V, visiting New Zealand.

[a] Required additional antibiotic treatment after the initial treatment.

[b] Travel duration was NA for some patients, because they were previous permanent residents on the Indian subcontinent rather than having traveled to the Indian subcontinent.

Clinical Infectious Diseases 2008; 47:689–92

Extended-spectrum β-lactamase (ESBL)-producing enterobacteria: factors associated with infection in the community setting, Auckland, New Zealand

C.T. Moor [a], S.A. Roberts [b], G. Simmons [a,*], S. Briggs [c], A.J. Morris [d], J. Smith [d], H. Heffernan [e]

Journal of Hospital Infection (2008) **68**, 355—362

Table II Multivariate analysis of statistically significant associations with extended-spectrum β-lactamase-producing enterobacterial infection

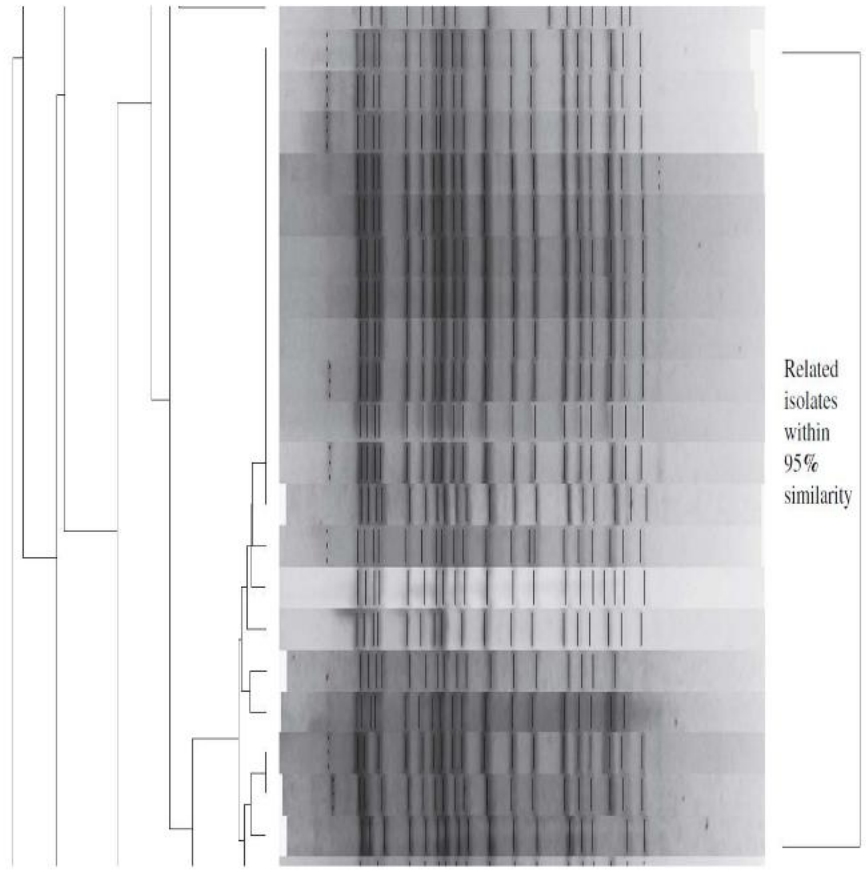
Variable	No. of cases (%)	Odds ratio	95% CI	*P*-value
Residential care facility[a]	42 (45)	6.1	1.6, 23.2	0.008
COPD	13 (14)	10.6	1.04, 107.7	0.046
Age (years)[b]				
20—39	13 (14)	1.7	0.3, 8.5	0.5
40—74 years	31 (33)	1.8	0.4, 7.8	0.5
≥75 years	46 (49)	1.7	0.3, 8.6	0.5
Antibiotics used in the 3 months preceding isolate identification	50 (53)	2.0	0.9, 4.5	0.1
CVD	42 (45)	0.9	0.3, 2.4	0.8
Hospital admission[c]	52 (55)	1.2	0.4, 3.4	0.7
Admission to hospital M[c]	33 (35)	3.6	0.9, 14.3	0.07
Neurological disease	23 (25)	0.6	0.2, 2.5	0.5
Recurrent UTIs	35 (37)	0.8	0.3, 2.0	0.6
Urinary catheter	25 (33)	1.5	0.5, 4.6	0.5

CI, confidence interval; COPD, chronic obstructive pulmonary disease; CVD, cardiovascular disease; UTIs, urinary tract infections.

[a] Place of residence at the time of infection.

[b] Dummy age-group variables have been created with 0—19-year-olds as the reference group.

[c] In the preceding year.



The Evil Progeny…

ESBL

CPE

What are carbapenems? What's the worry?

e.g. Meropenem
Ertapenem

Bare or "Claytons"

meropenem

tazocin

ceftriaxone

Augmentin, cefuroxime

amoxicillin

penicillin

Emergence of plasmid-mediated colistin resistance mechanism MCR-1 in animals and human beings in China: a microbiological and molecular biological study

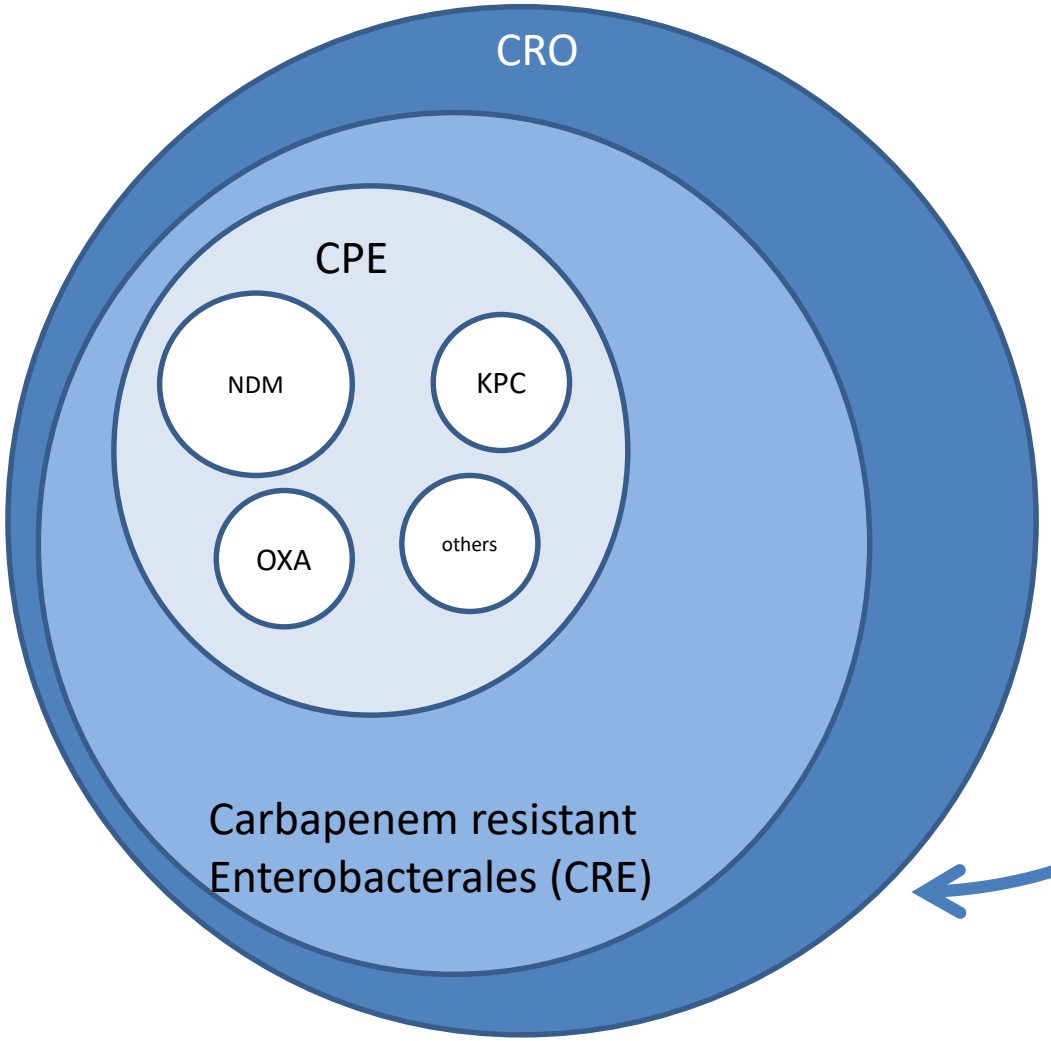
Yi-Yun Liu, Yang Wang*, Timothy R Walsh, Ling-Xian Yi, Rong Zhang, James Spencer, Yohei Doi, Guobao Tian, Baolei Dong, Xianhui Huang, Lin-Feng Yu, Danxia Gu, Hongwei Ren, Xiaojie Chen, Luchao Lv, Dandan He, Hongwei Zhou, Zisen Liang, Jian-Hua Liu, Jianzhong Shen*

Lancet Infect Dis 2016; 16: 161–68

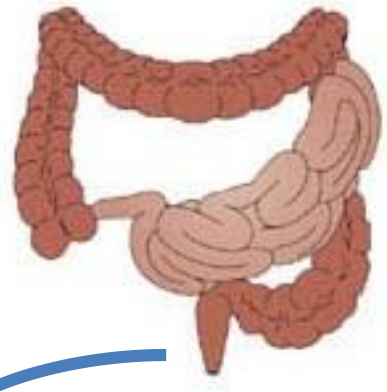
Summary

Background Until now, polymyxin resistance has involved chromosomal mutations but has never been reported via horizontal gene transfer. During a routine surveillance project on antimicrobial resistance in commensal *Escherichia*

Carbapenem Resistant Organisms (CRO): what are they?

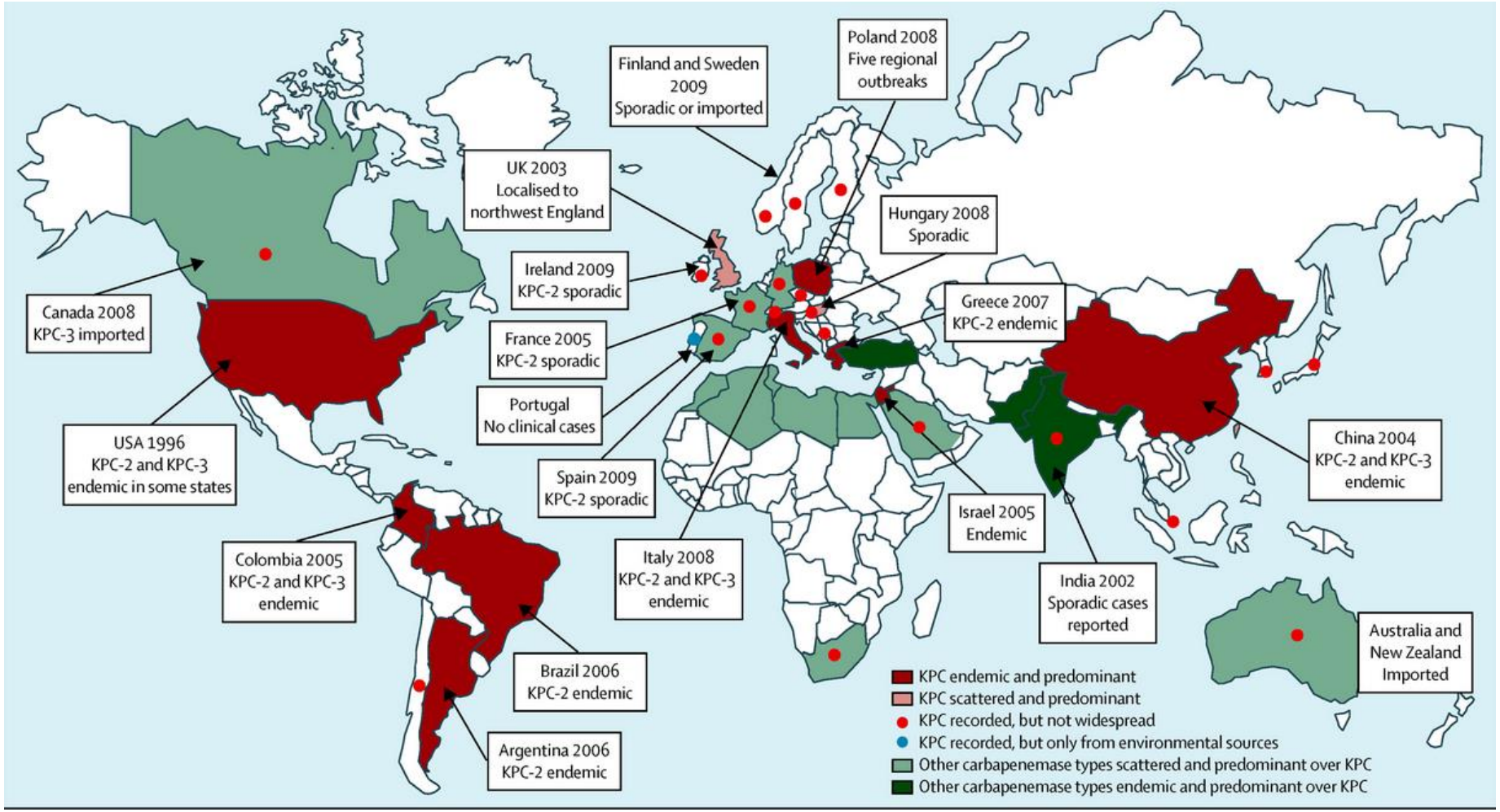


CPE: Carbapenemase Producing Enterobacterales eg *E. coli* *Klebsiella.* Plasmid mediated – easily spread



The Gut: natural habitat

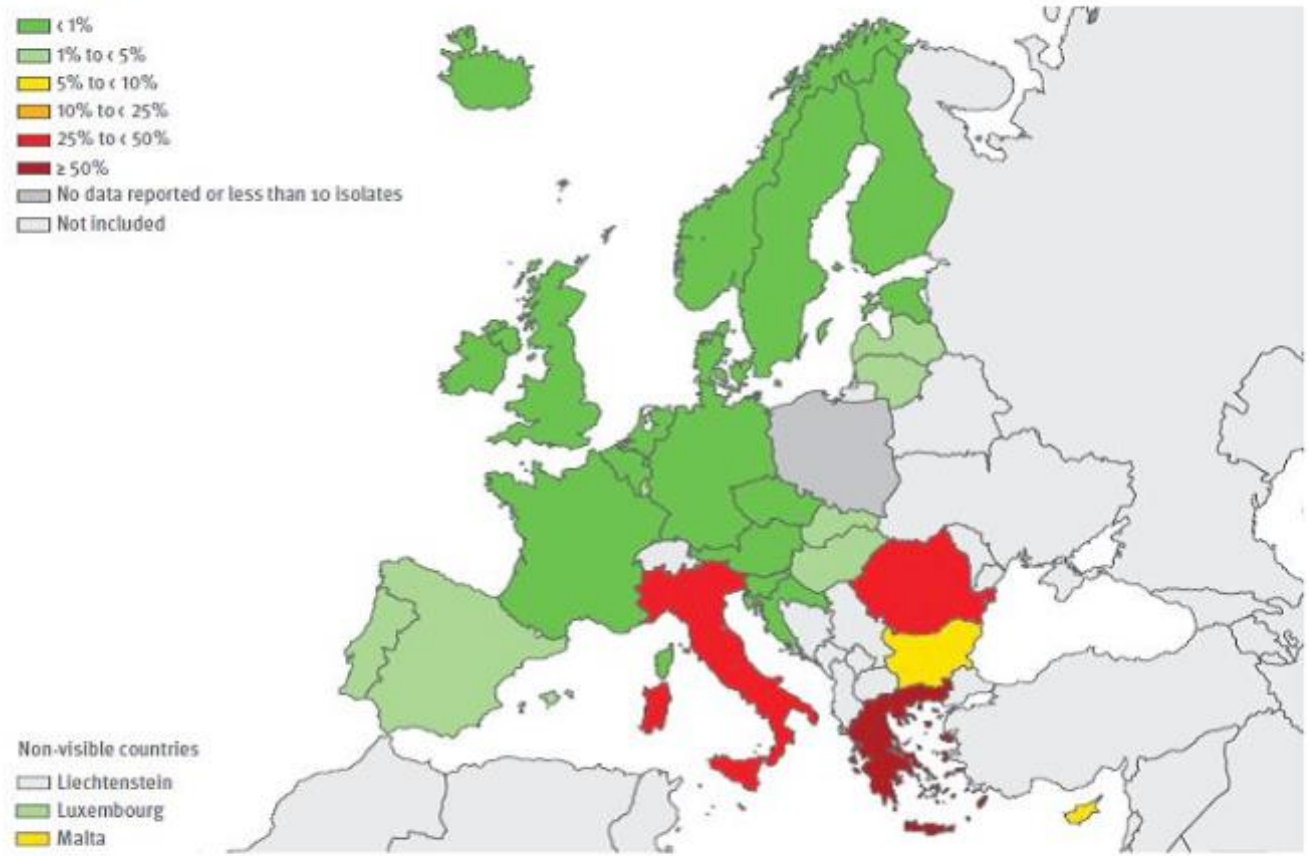
Global carbapenem resistance: Darker is worse



The Lancet Infectious Diseases 2013

Increase in resistance may be rapid

Figure 1. Percentage of invasive *K. pneumoniae* isolates with resistance to carbapenems, EU/EEA, 2014 [5]



Note: EARS-Net data are based on invasive isolates from blood and cerebrospinal fluid only. Bacteria isolated from other sites of infection or colonisation are not included.

Italy moved from green to red in 7 yrs

Global resistance and risk : travellers can acquire

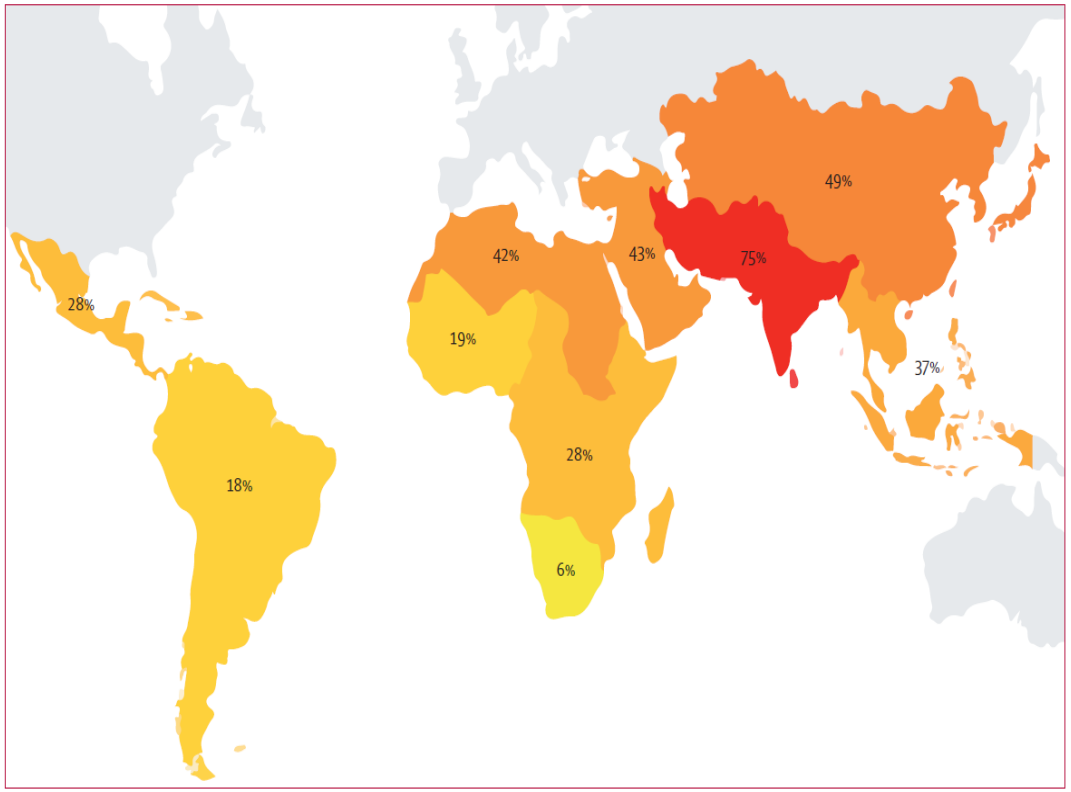


Figure 1: Percentages of travellers that acquired β-lactamase-producing Enterobacteriaceae per subregion, according to the United Nations geoscheme

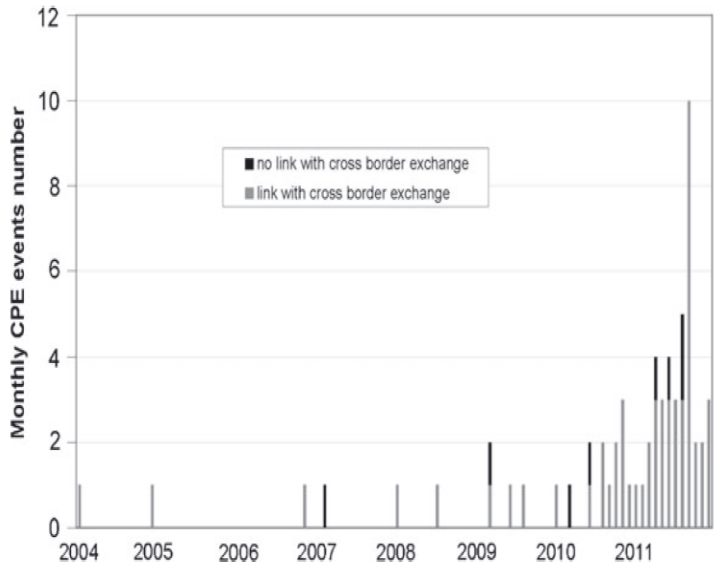


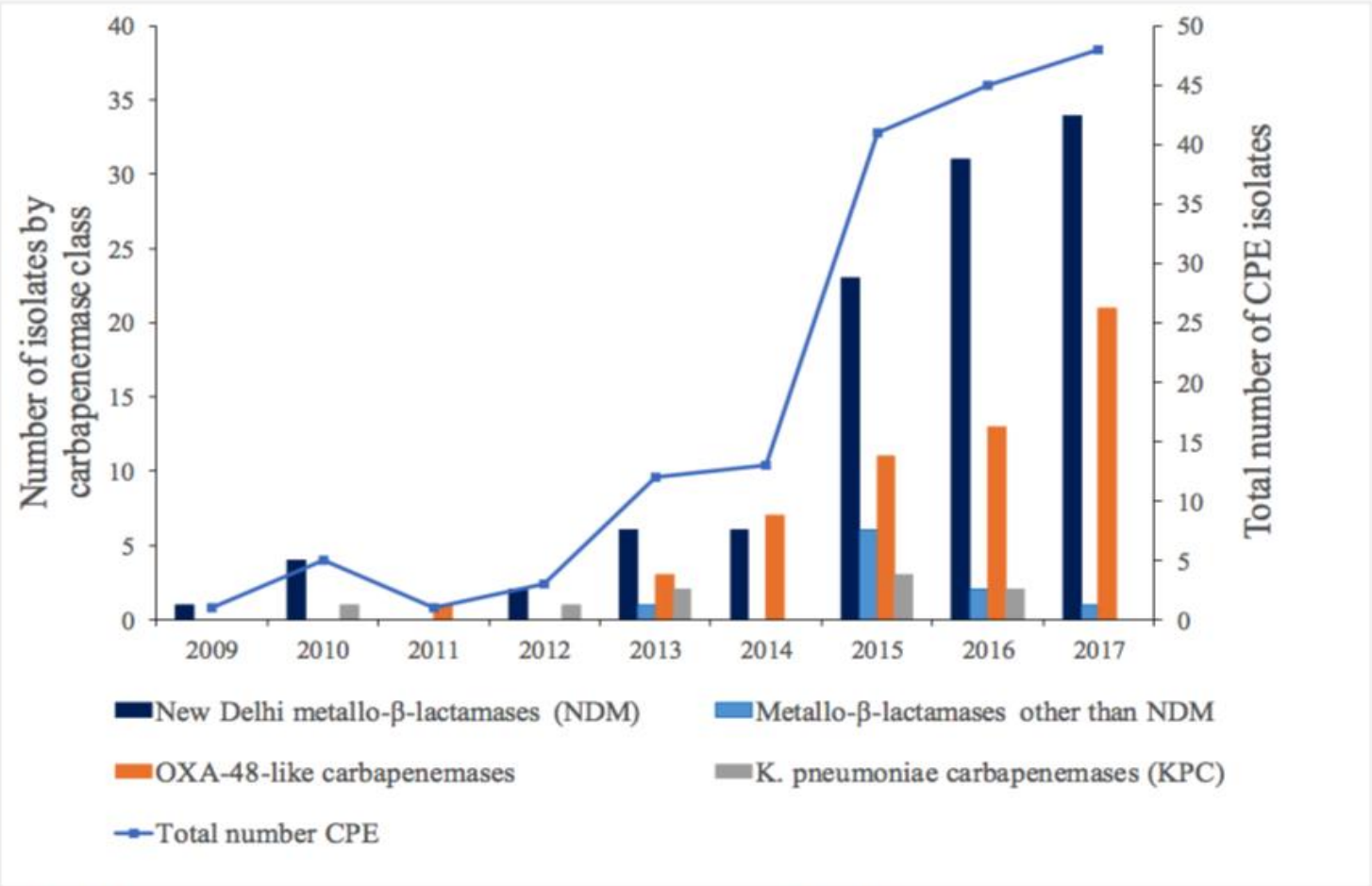
Figure 1 Monthly carbapenemase-producing *Enterobacteria* (CPE) events number in Assistance Publique-Hôpitaux de Paris between 2004 and 2011, with or without link with cross-border exchange.

Arcilla, M. S. *et al.* Import and spread of extended-spectrum beta-lactamase-producing Enterobacteriaceae by international travellers (COMBAT study): a prospective, multicentre cohort study. *Lancet Infect Dis* **17**, 78-85, doi:10.1016/S1473-3099(16)30319-X (2017).

Fournier, S. *et al. J Travel Med* **19**, 320-323, doi:10.1111/j.1708-8305.2012.00641.x (2012).

What's happening in NZ and CMH?

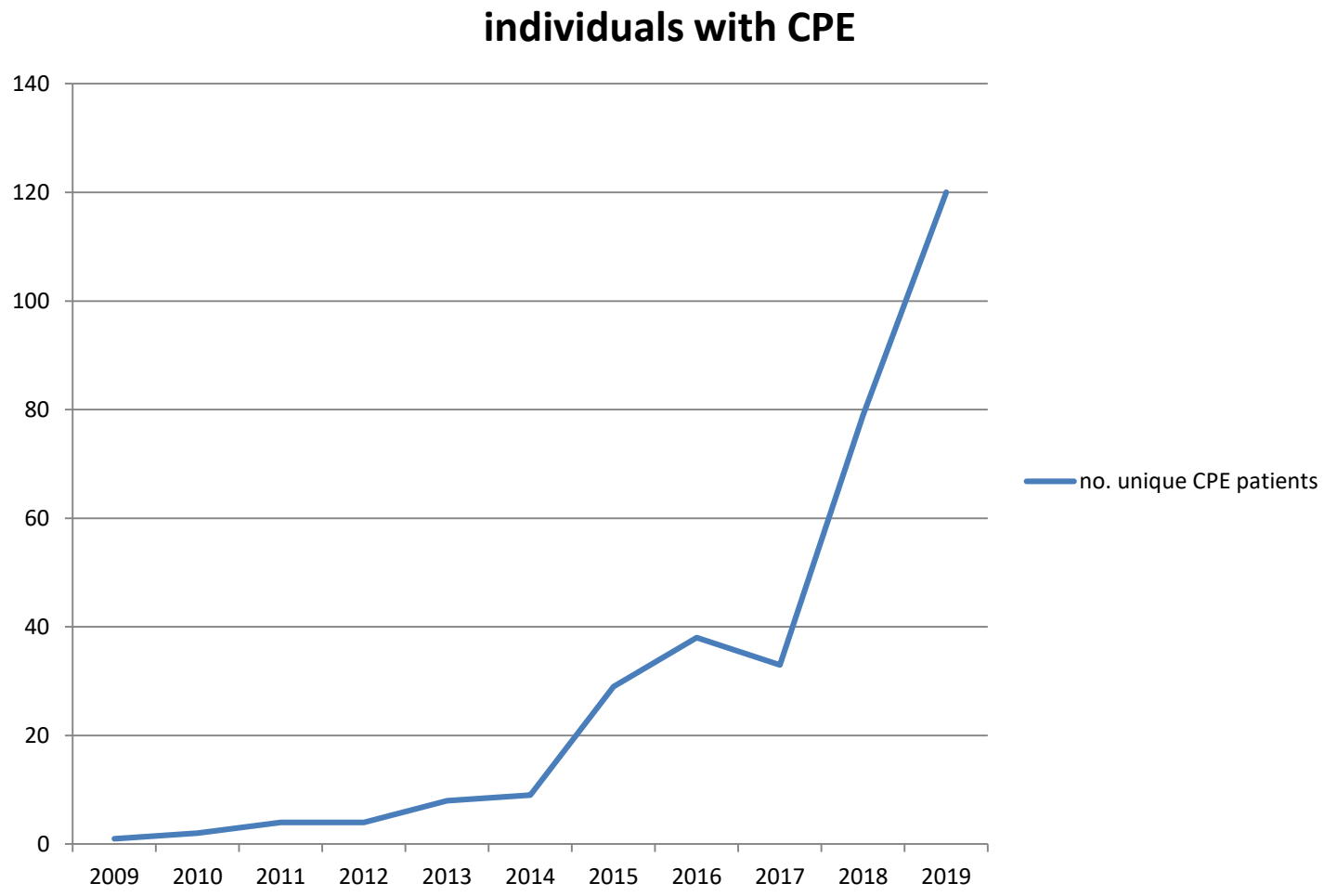
CPE in NZ 2009-2017



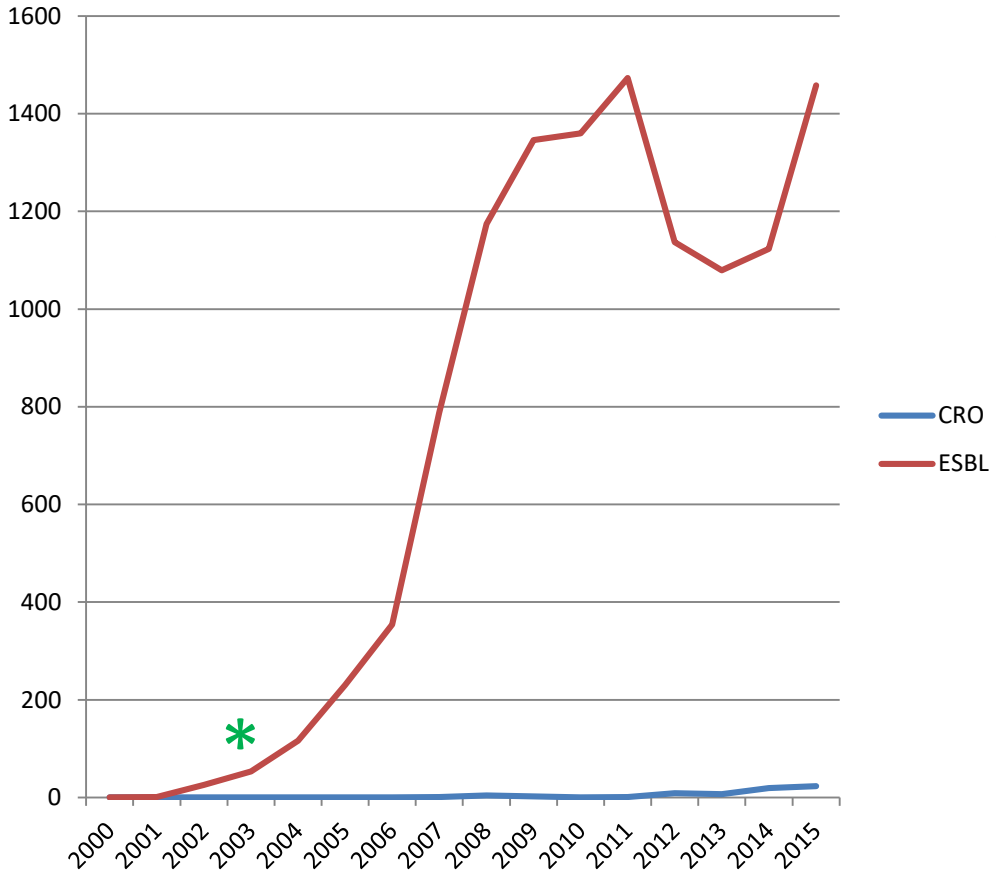
Note: Multiple, distinct CPE isolates from the same patient are included, but duplicate isolates of the same species with the same type(s) of carbapenemase(s) from the same patient are excluded. In 2017, there were eight CPE isolates that carried the genes encoding for both NDM and OXA-48-like carbapenemases. These eight isolates are counted in the number of isolates for both these carbapenemase classes.

Source: ESR surveillance

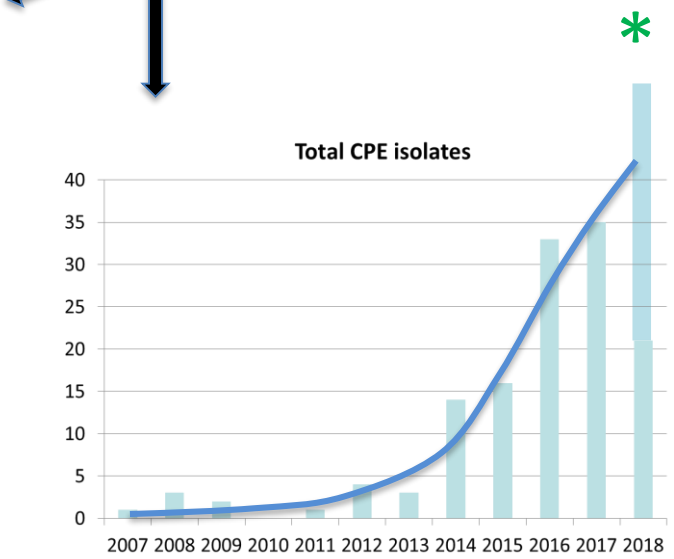
NZ: individuals found to be colonised/infected with CPE



Counties Manukau ESBL and CRO timeline



CROs: Note scale but also only about 15ys behind ESBLs.



Outbreak studies of CRO blood stream infection have reported mortality rates of 40-60%

CPE & Mortality

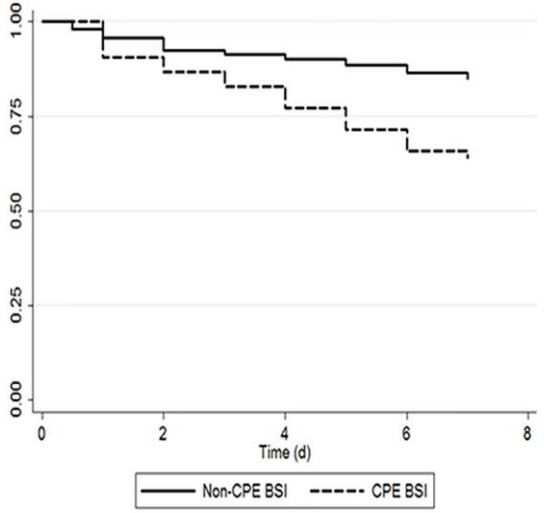


Fig 1. Kaplan-Meier survival estimates at 7 days of patients with carbapenemase-producing *Enterobacteriaceae* (CPE) bloodstream infection (BSI) (dashed line) vs. non-CPE BSI (solid line). $p < 0.001$ (log rank test).

doi:10.1371/journal.pone.0154092.g001

Adjusted Odds Ratioa (95% CI)

4.92 (1.01–24.81)

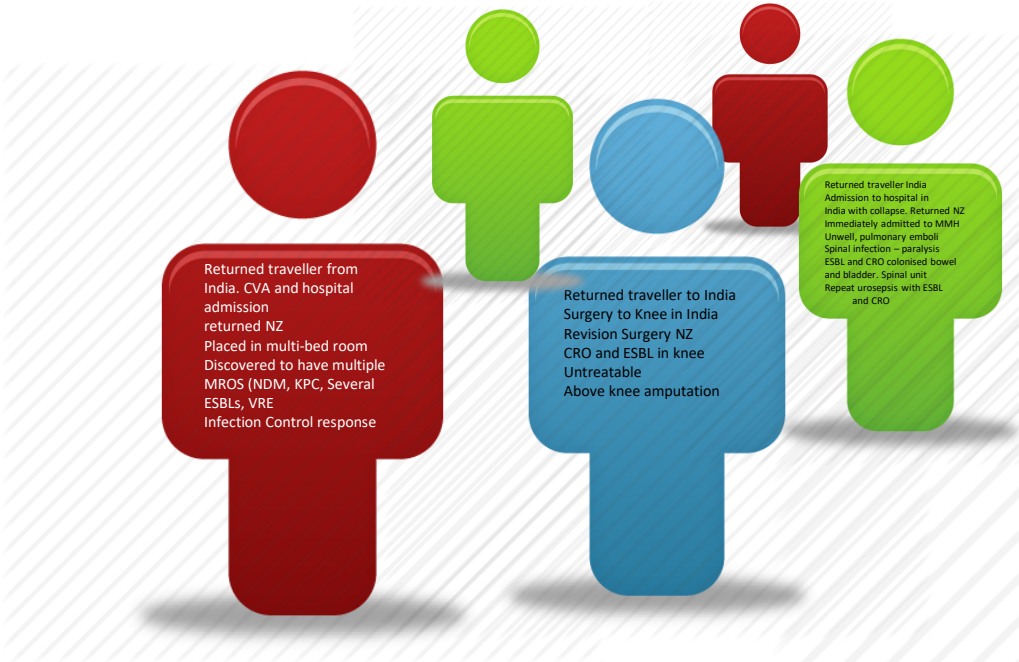
Table 4. Fourteen-Day Mortality for Patients With Carbapenemase-Producing Carbapenem-Resistant *Enterobacteriaceae* (CP-CRE) Compared With non-CP-CRE Bacteremia

Covariate	Odds Ratio (95% CI)	*P* Value	Adjusted Odds Ratioa (95% CI)	*P* Value
Carbapenemase-producing carbapenem-resistant *Enterobacteriaceae* bacteremia	3.20 (1.06–9.61)	.04	4.92 (1.01–24.81)	.05
Pitt bacteremia score ≥4	9.13 (2.39–34.86)	.001	11.89 (2.38–59.30)	.005
Active empiric antibiotic therapy	.79 (0.27–2.29)	.67	2.46 (0.53–11.48)	.25
Active directed antibiotic therapy	.17 (0.04–0.72)	.01	0.10 (0.004–2.22)	.14
Days of combination antibiotic therapy	.89 (0.79–1.00)	.07	0.73 (0.59–0.93)	.01
Polymixin therapy administered	4.61 (1.16–18.3)	.03	5.57 (1.07–28.96)	.04
Diabetes	3.12 (0.99–9.84)	.05	3.42 (0.62–19.07)	.16
Immunocompromised	.45 (0.14–1.40)	.17	–	–
Carbapenem therapy administered	.82 (0.27–2.52)	.74	–	–
Meropenem minimum inhibitory concentration ≥16 μg/mL	1.40 (0.38–5.01)	.61	–	–

Villegas MV et al. PLoS ONE 2016

Tamma et al. Clin Infect Dis 2017

CMH Illustrative cases and incidents



Incident One: burns outbreak: Index Patient

- Patient transferred from Tahiti for further specialized burn care
- Extensive burns
- Clinically septic

On admission:

Blood culture set :
Bottle flagged by BacT/ALERT software

CULTURE :

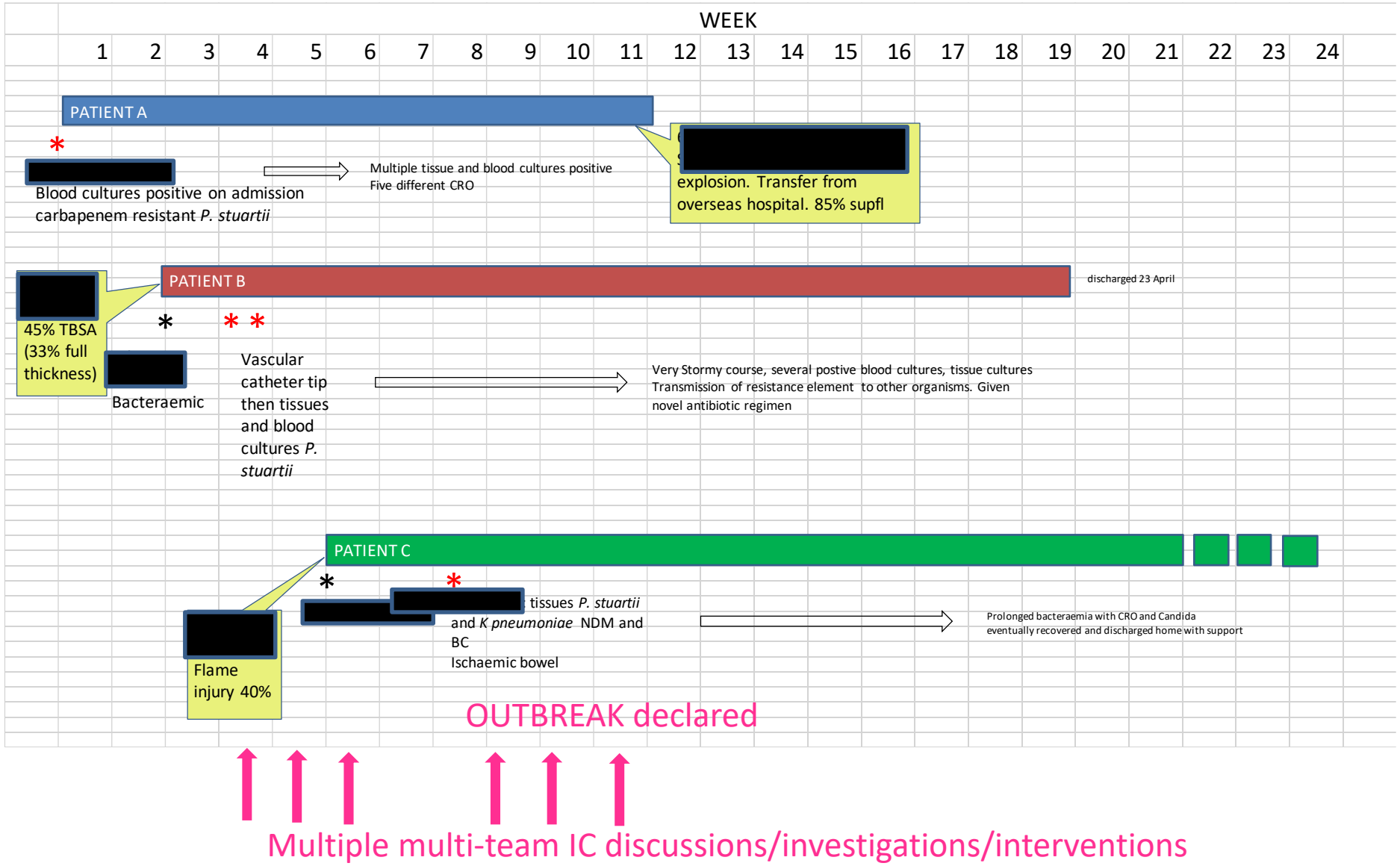
(1) Providencia stuartii isolated
This isolate is positive for a NDM carbapenemase.

	(1)
Amoxycillin	R
Amox/Clav	R
Aztreonam	
Cefuroxime	R
Cefoxitin	R
Gentamicin	R
Cotrimoxazole	R
Ciprofloxacin	I
Ceftazidime	R
Ceftriaxone	R
Cefepime	I
Tazocin	R
Amikacin	S
Meropenem	R
Tigecycline	R
Ertapenem	R

R = Resistant S = Susceptible I = Intermediate

→ Strict infection control and isolation.
Fashioned a treatment

Timeline of Burns patients: a tale of transmission



So what can we do?

Journal of Hospital Infection 93 (2016) 141–144

Available online at www.sciencedirect.com

Journal of Hospital Infection

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

Short report

Prevention and control of carbapenemase-producing organisms at a regional burns centre

L. Teare*, J. Myers, A. Kirkham, T. Tredoux, R. Martin, S. Boasman, A. Wisbey, C. Charlton, P. Dziewulski

St Andrew's Centre for Plastic Surgery and Burns, Chelmsford, UK

Journal of Hospital Infection 93 (2016) 136–140

Available online at www.sciencedirect.com

Journal of Hospital Infection

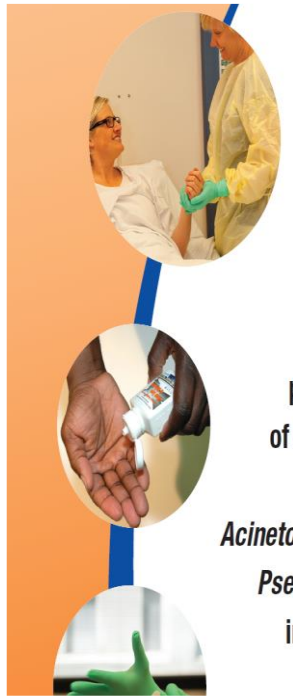
journal homepage: www.elsevierhealth.com/journals/jhin

Short report

Environmental decontamination following occupancy of a burns patient with multiple carbapenemase-producing organisms

M.I. Garvey*, C.W. Bradley, P. Jumaa

University Hospitals Birmingham NHS Foundation Trust, Queen Elizabeth Hospital Birmingham, Edgbaston, Birmingham, UK



World Health Organization

Guidelines f
prevention and
of carbapenem-resistant
Enterobacteriaceae,
Acinetobacter baumannii and
Pseudomonas aeruginosa
in health care facilities

Victorian guideline on carbapenemase-producing Enterobacteriaceae

For health services

Version 2

April 2017

Facility Guidance for Control of Carbapenem-resistant *Enterobacteriaceae* (CRE)

2015 Update - CRE Toolkit

Diseases

Antimicrobial Resistance and Infection Control

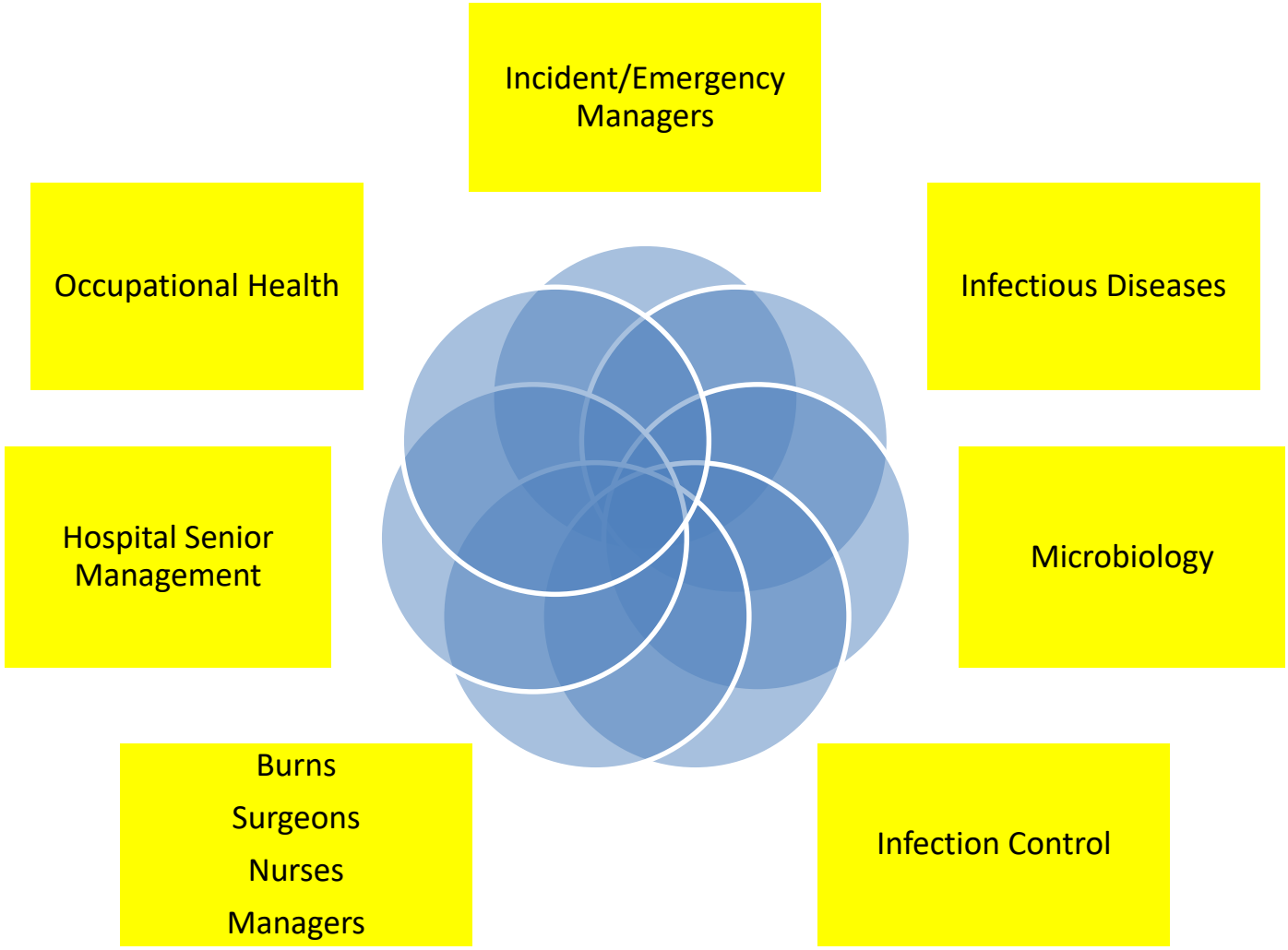
Magiorakos et al. Antimicrobial Resistance and Infection Control (2017) 6:113
DOI 10.1186/s13756-017-0259-z

Open Access

GUIDELINES ARTICLE

Infection prevention and control measures and tools for the prevention of entry of carbapenem-resistant *Enterobacteriaceae* into healthcare settings: guidance from the European Centre for Disease Prevention and Control

Incident Group Planning



How is it spread? Break transmission route

Spread by Contact

⇨ ***Hands***

⇨ ***Shared Equipment***

⇨ ***Environmental/surfaces***

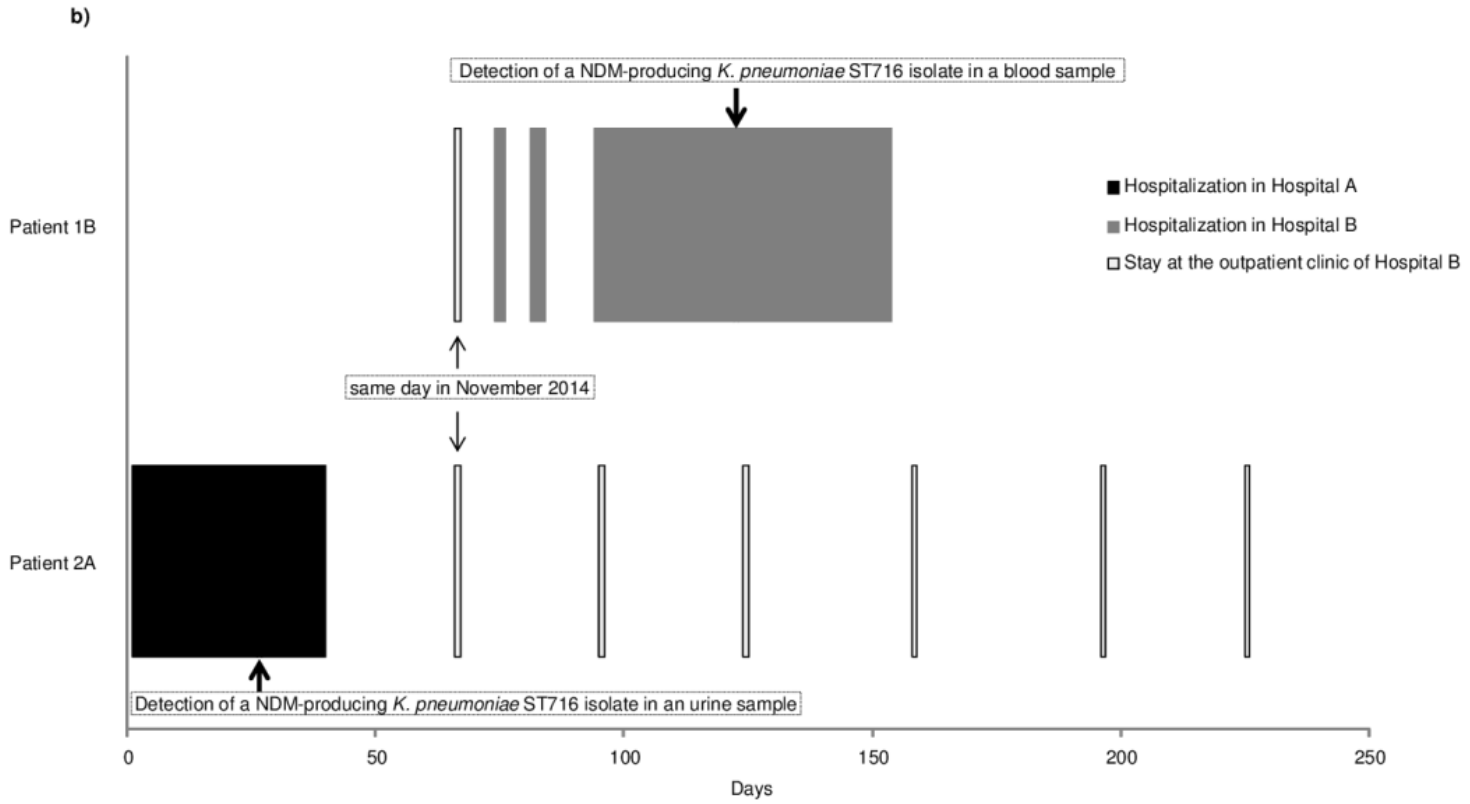
A sting in the tale..

- Another burns patient in the ICU isolation room found to have same CPE 6 months later
- ? Route of acquisition
- Re-investigation
- Surveillance
- None for last year

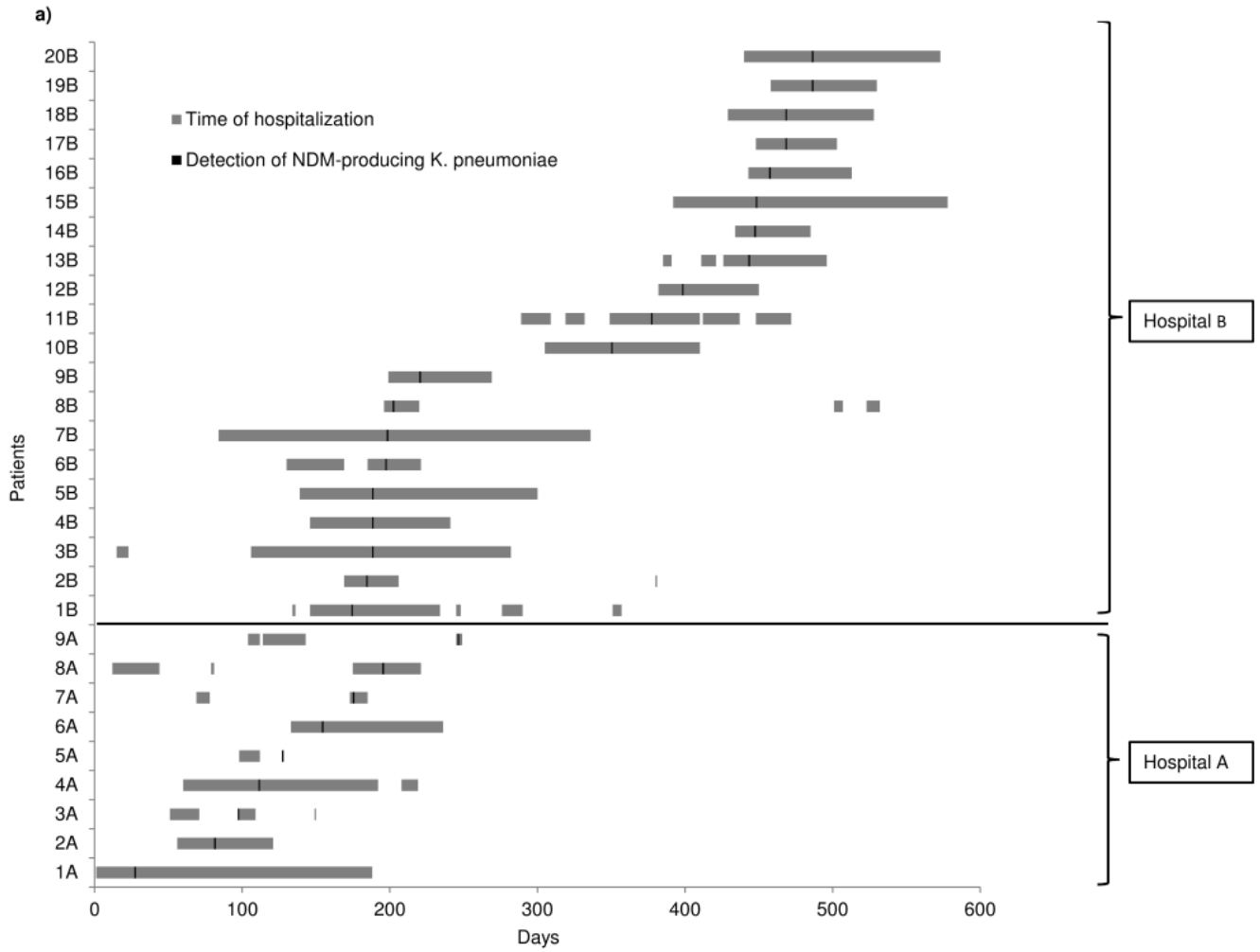
Incident Two: Haematology Day Ward (HDW)

- Patient attends HDW regularly
- Went on holiday to India
- Visited a relative in hospital (20 mins)
- Arrived back in NZ. Continued to attend day ward
- Admitted for unrelated reason to hospital
- Screened and found to be CPE positive.
- Screening of HDW patients undertaken

The role of an Outpatient Clinic: transmission from hospital A to B in outpatient clinic



Outbreaks in 2 separate hospitals with related NDM beta-lactamase *K. pneumoniae*



Infection Prevention & Control and Management of Carbapenemase-producing Enterobacteriaceae (CPE)

Guidelines for health care providers in New Zealand acute and residential care facilities

Published online: 13 November 2018

Summary

Antimicrobial resistance (AMR) is a growing threat globally and to the entire New Zealand population, because it hinders our ability to manage infections. It has been estimated that Carbapenemase-producing Enterobacteriaceae (CPE) have the greatest potential to contribute to the overall problem of antimicrobial resistance.

CPE is the newest in a long line of 'superbugs' and are a particular problem in hospital settings. CPE are (typically) resistant to nearly all known antibiotics; they increase patient morbidity and mortality and have the potential to spread and act as a reservoir of resistant genes for transmission to other organisms.

While CPE are not currently considered to be endemic in either New Zealand healthcare facilities or the wider community, their transmission here is considered to be evolving rapidly, with the window of opportunity to minimise the risk of spread in healthcare facilities likely to be narrow.

In New Zealand, the rate of CPE carriage and infection has increased sharply in recent years, and while until very recently nearly all CPE have been imported from overseas, there is now evidence of secondary spread in the community and in health care facilities. Patients at highest risk would be those most reliant on antibiotics for survival, including those in intensive care units; those undergoing treatment for cancers; those undergoing bone marrow and solid organ transplantation; those with complex urological problems; and those undergoing major surgery.

This Guideline is intended for health care providers. It sets out recommendations, requirements and response actions for the prevention, management, including outbreak response measures and control of health care-associated infections due to CPE in healthcare facilities in New Zealand. Section one of the Guideline includes background information, roles and responsibilities and epidemiology of CPE. Section two provides an operational framework for health care workers managing CPE and outbreak response measures.

Publishing information

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- Infection Prevention & Control and Management of Carbapenemase-producing Enterobacteriaceae (docx, 1.4 MB)
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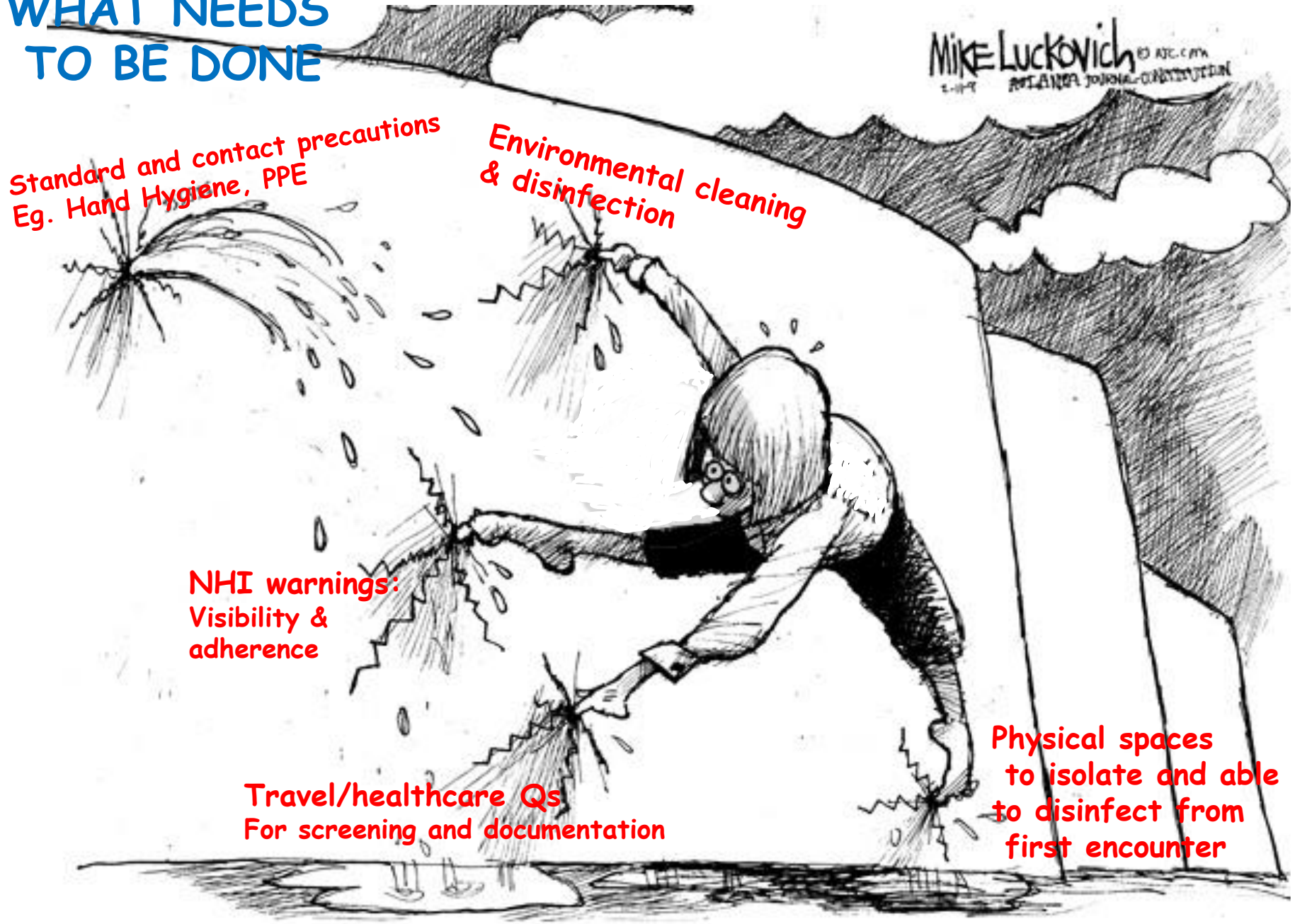
WHAT NEEDS TO BE DONE



Incident 3: TRA (Nov-Dec ‘18)

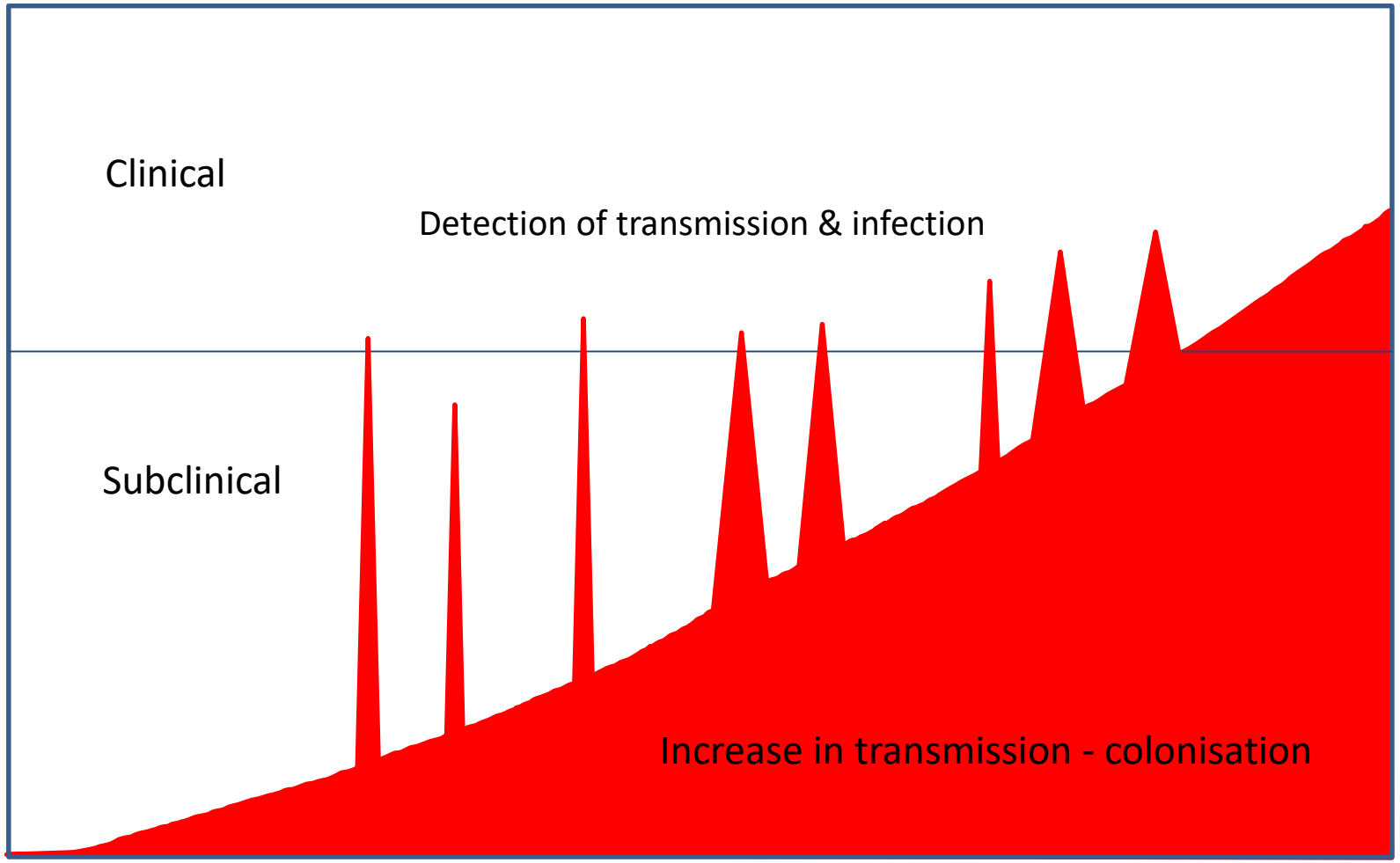
- Child found to be CPE+ on a screen for other reasons –no clear reason/source. Surgical patient
- Within a few weeks and adult found to be also CPE+. Also had been to OT.
- Whole genome sequencing found related to an isolate from a patient admitted from overseas hospital in October
- No established link between the patients
- Widespread screening potential contacts – no further isolate found. No isolate in 7 months

Incident 4: current investigation

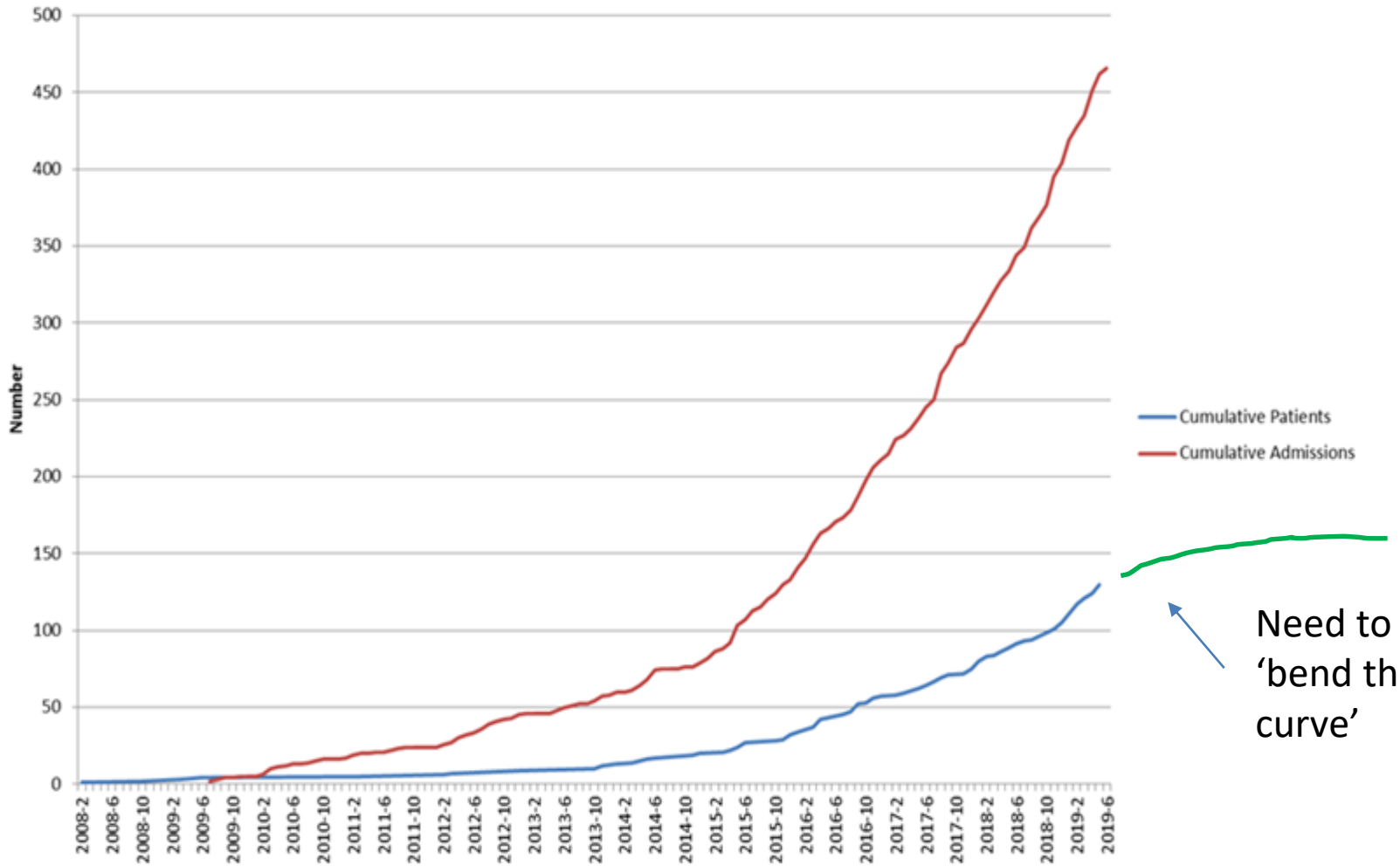
- Elderly patient – screened on admission CPE +
  - Unrelated to any at MMH before on WGS
  - No foreign travel
  - Lives in LTCF
  - Investigation to try and discover where patient could have acquired from…

  - Further patient in LTCF with same WGS
  - Isolate related to patient from another DHB screened from Private Hospital (history of travel to Bali)

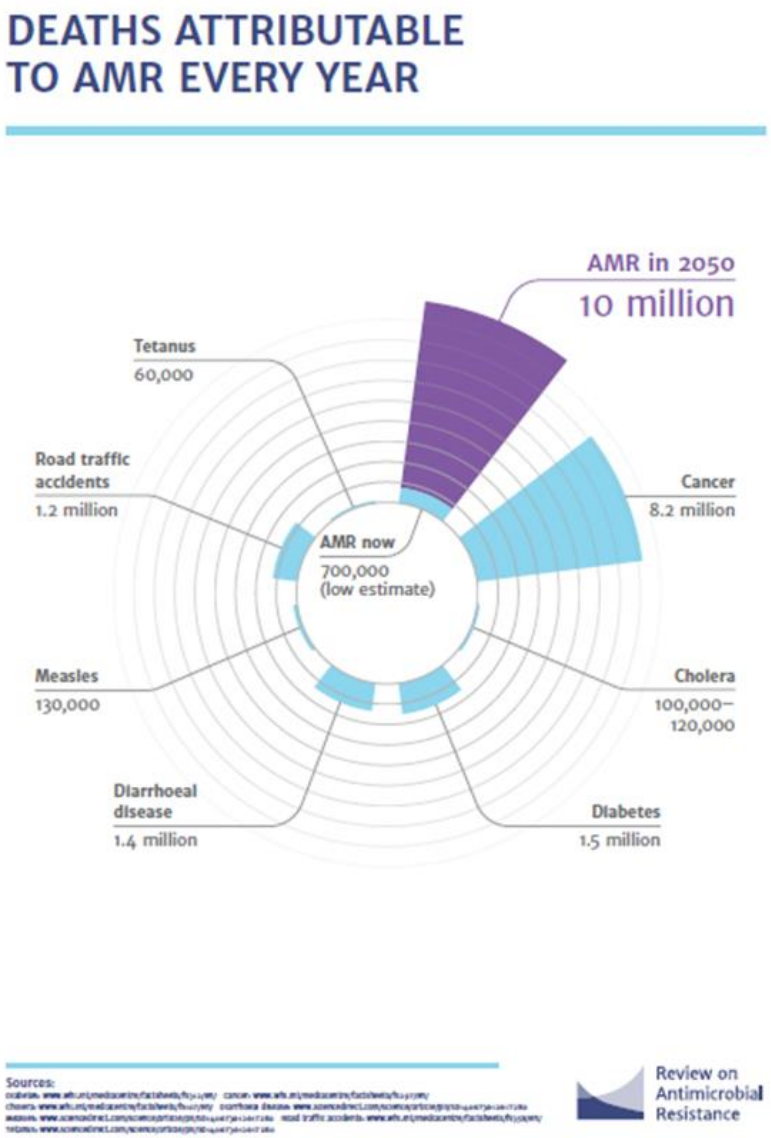
Rising tide


Clinical
Detection of transmission & infection
Subclinical
Increase in transmission - colonisation

CPE: numbers of patients cf. number of admissions at CMDHB



Burden: present and future



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PMCID: PMC5739407
PMID: 29267306

Clinical and economic impact of antibiotic resistance in developing countries: A systematic review and meta-analysis

Raspail Carrel Founou, Conceptualization, Data curation, Formal analysis, Methodology, Software, Visualization, Writing – original draft,[1,2,*] Luria Leslie Founou, Data curation, Formal analysis, Methodology, Software, Visualization, Writing – original draft,[1,3] and Sabiha Yusuf Essack, Conceptualization, Methodology, Supervision, Validation, Writing – review & editing[1]

Patrick Butaye, Editor

Conclusion

ABR is associated with a high mortality risk and increased economic costs with ESKAPE pathogens implicated as the main cause of increased mortality. Patients with non-communicable disease co-morbidities were identified as high-risk populations.

AMR increases health-care costs, length of stay in hospitals, morbidity and mortality in both developed and developing countries. A recent report estimated that 10 million deaths will be attributed to AMR by 2050, and 100 trillion USD of the world's economic outputs will be lost if substantive efforts are not made to contain this threat

Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the EU and the European Economic Area in 2015: a population-level modelling analysis

*Alessandro Cassini, Liselotte Diaz Högberg, Diamantis Plachouras, Annalisa Quattrocchi, Ana Hoxha, Gunnar Skov Simonsen, Mélanie Colomb-Cotinat, Mirjam E Kretzschmar, Brecht Devleesschauwer, Michele Cecchini, Driss Ait Ouakrim, Tiago Cravo Oliveira, Marc J Struelens, Carl Suetens, Dominique L Monnet, and the Burden of AMR Collaborative Group**

Lancet Infect Dis 2019; 19: 56–66

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See Comment page 4

*Members listed at the end of the Article

European Centre for Disease Prevention and Control, Solna, Sweden (A Cassini MD, L D Högberg PhD, D Plachouras PhD, A Quattrocchi PhD, A Hoxha MSc, M J Struelens PhD, C Suetens MD, D L Monnet PhD); Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht, Netherlands (A Cassini, M E Kretzschmar PhD); University Hospital of North Norway, Tromsø, Norway (G S Simonsen PhD); Research Group for Host-Microbe Interaction, Faculty of Health Sciences, UiT The Arctic University of Norway, Tromsø, Norway (G S Simonsen); Santé publique France, Saint-Maurice,

Summary

Background Infections due to antibiotic-resistant bacteria are threatening modern health care. However, estimating their incidence, complications, and attributable mortality is challenging. We aimed to estimate the burden of infections caused by antibiotic-resistant bacteria of public health concern in countries of the EU and European Economic Area (EEA) in 2015, measured in number of cases, attributable deaths, and disability-adjusted life-years (DALYs).

Methods We estimated the incidence of infections with 16 antibiotic resistance–bacterium combinations from European Antimicrobial Resistance Surveillance Network (EARS-Net) 2015 data that was country-corrected for population coverage. We multiplied the number of bloodstream infections (BSIs) by a conversion factor derived from the European Centre for Disease Prevention and Control point prevalence survey of health-care-associated infections in European acute care hospitals in 2011–12 to estimate the number of non-BSIs. We developed disease outcome models for five types of infection on the basis of systematic reviews of the literature.

Findings From EARS-Net data collected between Jan 1, 2015, and Dec 31, 2015, we estimated 671 689 (95% uncertainty interval [UI] 583 148–763 966) infections with antibiotic-resistant bacteria, of which 63·5% (426 277 of 671 689) were associated with health care. These infections accounted for an estimated 33 110 (28 480–38 430) attributable deaths and 874 541 (768 837–989 068) DALYs. The burden for the EU and EEA was highest in infants (aged <1 year) and people aged 65 years or older, had increased since 2007, and was highest in Italy and Greece.

Interpretation Our results present the health burden of five types of infection with antibiotic-resistant bacteria expressed, for the first time, in DALYs. The estimated burden of infections with antibiotic-resistant bacteria in the EU and EEA is substantial compared with that of other infectious diseases, and has increased since 2007. Our burden estimates provide useful information for public health decision-makers prioritising interventions for infectious diseases.

Funding European Centre for Disease Prevention and Control.

The estimated burden of infections with antibiotic-resistant bacteria is substantial compared with that of other infectious diseases and has increased since 2007

Burden of AMR: Europe

Organism/resistance type

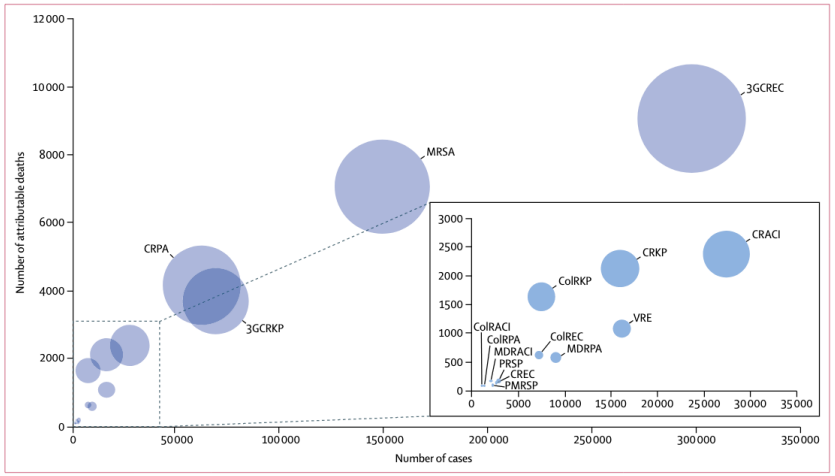


Figure 1: Infections with antibiotic-resistant bacteria, EU and European Economic Area, 2015

Age

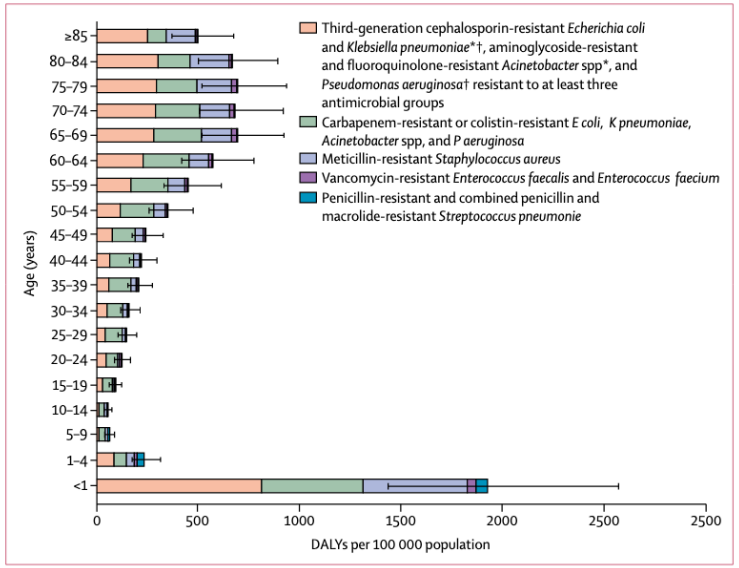


Figure 2: Model estimates of the burden of infections with antibiotic-resistant bacteria of public health importance in DALYs, by age group, EU and European Economic Area, 2015

Deaths by organism and country

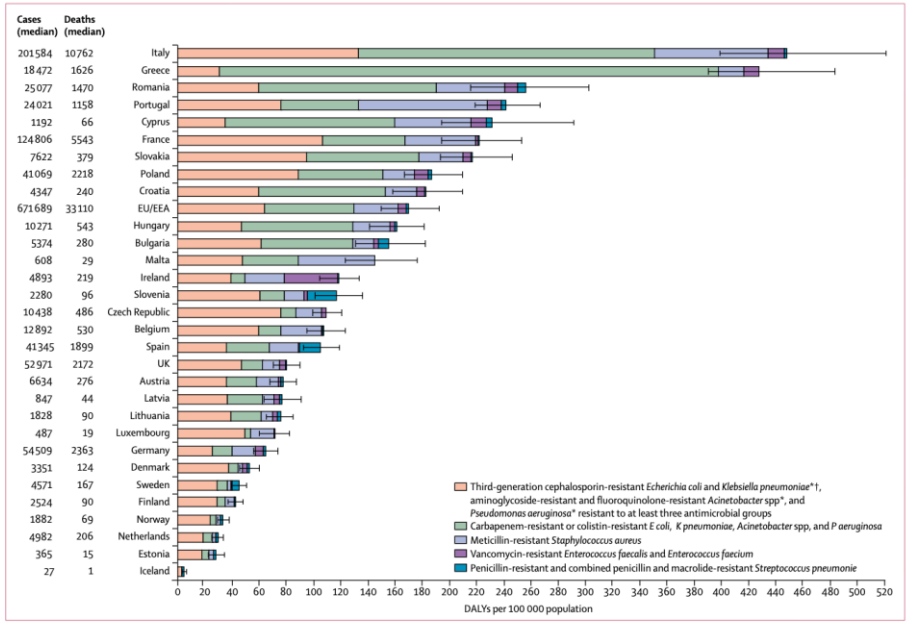


Figure 3: Burden of infections with antibiotic-resistant bacteria in DALYs, EU and European Economic Area, 2015

Total DALYs By country

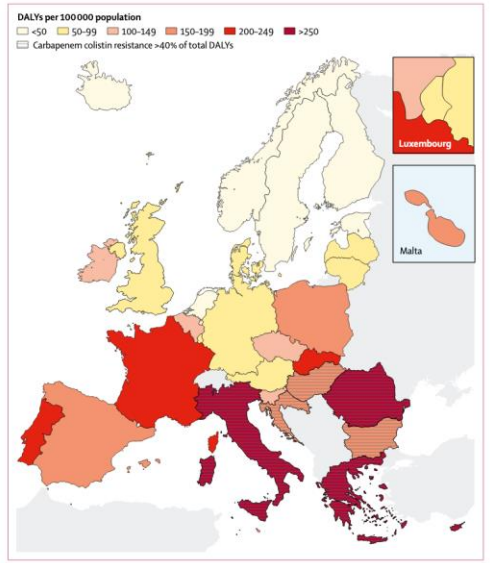


Figure 4: Model estimates of the burden of infections with selected antibiotic-resistant bacteria of public health importance in DALYs per 100 000 population, EU and European Economic Area, 2015

Potential burden of antibiotic resistance on surgery and cancer chemotherapy antibiotic prophylaxis in the USA: a literature review and modelling study

Aude Teillant, Sumanth Gandra, Devra Barter, Daniel J Morgan, Ramanan Laxminarayan

Lancet Infect Dis 2015; 15: 1429–37

Published Online October 16, 2015

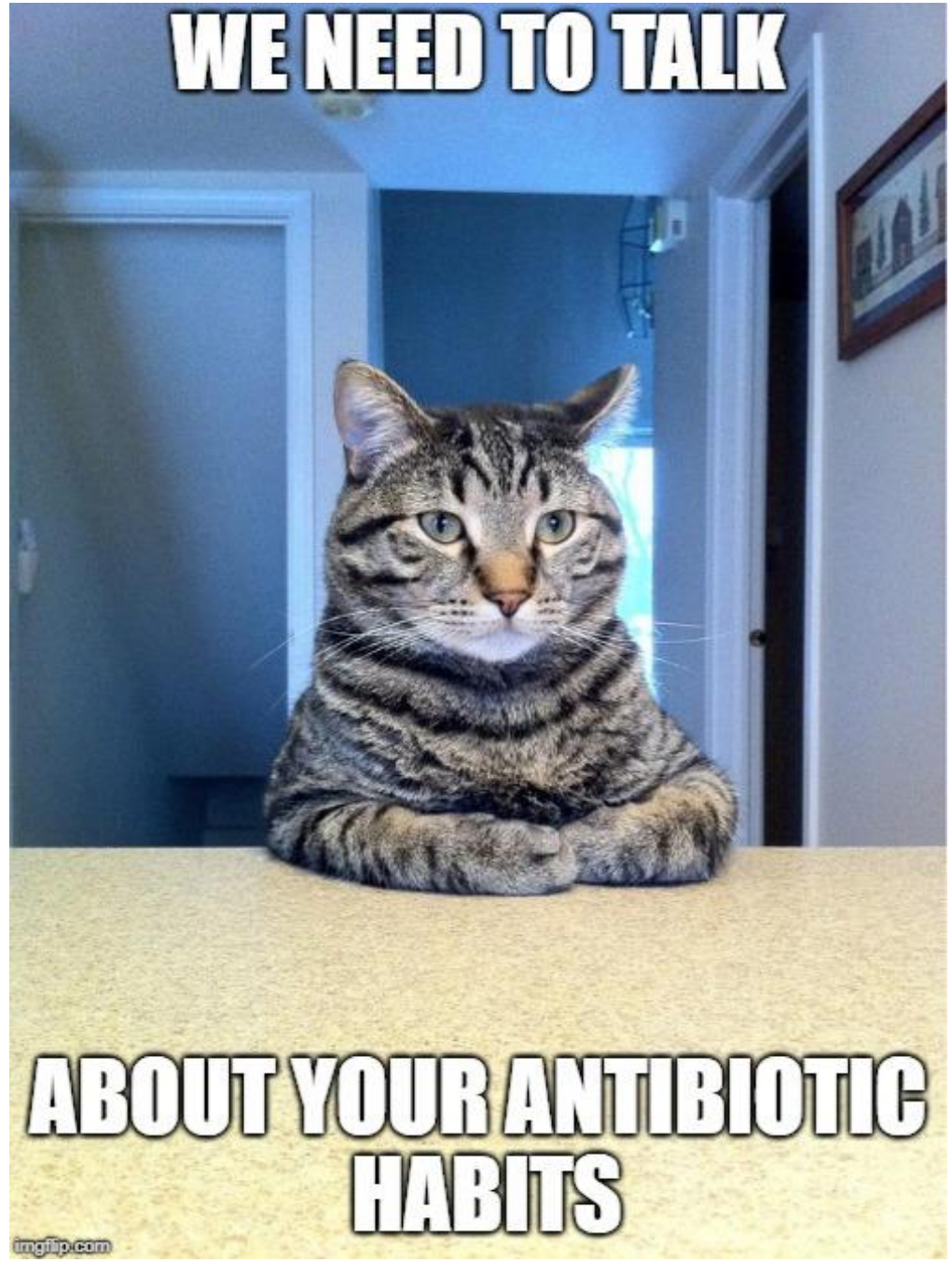
Summary

Background The declining efficacy of existing antibiotics potentially jeopardises outcomes in patients undergoing medical procedures. We investigated the potential consequences of increases in antibiotic resistance on the ten most common surgical procedures and immunosuppressing [illegible] that rely on antibiotic prophylaxis in the USA.

Findings We estimate that between 38·7[illegible] fections and 26·8% of pathogens causing infections after ch[illegible] tics in the USA. A 30% reduction in the efficacy of a[illegible] 0 000 additional surgical site infections and infe[illegible] 000 for a 10% reduction in efficacy to 280 000 [illegible] e: 2100 for a 10% reduction in efficacy, to 15[illegible] (42%) after prostate biopsy are attributab[illegible]

Interpretation Increasing an[illegible] ures and immunosuppressing chemo[illegible] ndations should be modified in the c[illegible]

antibiotic resistance potentially threatens the safety and efficacy of surgical procedures and chemotherapy


WE NEED TO TALK
ABOUT YOUR ANTIBIOTIC HABITS
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Prudent Prescribing Guidelines:

NHS
National Institute for Health and Clinical Excellence

Respiratory tract infections – antibiotic prescribing

Prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care

"A **no antibiotic prescribing strategy or a delayed antibiotic** prescribing strategy should be agreed for patients with the following conditions:"

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Antibiotics for asymptomatic bacteriuria

Cochrane Systematic Review - **Intervention** | Version published: 08 April 2015 see what's new

https://doi.org/10.1002/14651858.CD009534.pub2

Am score 51 View article information

Anca Zalmanovici Trestioreanu | Adi Lador | May-Tal Sauerbrun-Cutler | Leonard Leibovici

View authors' declarations of interest

"There was **no clinical benefit** from treating asymptomatic bacteriuria in the studies included in this review".

Cochrane Database of Systematic Reviews

Antibiotics and antiseptics for venous leg ulcers

Cochrane Systematic Review - **Intervention** | Version published: 10 January 2014 see what's new

https://doi.org/10.1002/14651858.CD003557.pub5

New search | Conclusions changed | Am score 58 | **Used in 4 guidelines** | View article information

Susan O'Meara | Deyaa Al-Kurdi | Yemisi Ologun | Liza G Ovington | Marrissa Martyn-St James | Rachel Richardson

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*"In light of the increasing problem of bacterial resistance to antibiotics, current prescribing guidelines recommend that antibacterial preparations should be used **only in cases of clinical infection, not for bacterial colonisation**".*

NZ

Released August 2017 on MoH website

Objectives and priority areas for action

There are five objectives that address priority areas for action on AMR.

1. **Awareness and understanding**: Improve awareness and understanding of antimicrobial resistance through effective communication, education and training.
2. **Surveillance and research:** Strengthen the knowledge and evidence base about antimicrobial resistance through surveillance and research.
3. **Infection prevention and control:** Improve infection prevention and control measures across human health and animal care settings to prevent infection and the transmission of micro-organisms.
4. **Antimicrobial stewardship:** Optimise the use of antimicrobial medicines in human health, animal health and agriculture, including by maintaining and enhancing the regulation of animal and agriculture antimicrobials.
5. **Governance, collaboration and investment:** Establish and support clear governance, collaboration and investment arrangements for a sustainable approach to countering antimicrobial resistance.

Mycoplasma bovis: the cost of an emergency in primary industry

Pithy key take home messages (?):

- **Awareness of AMR: the threat to modern medicine**
- **Awareness of risk factors:**
  - healthcare/hospitalization/overseas travel/antibiotic exposure
- **Implementation and adherence of IP&C measures**
  - in to practice, LTCF
- **Antimicrobial stewardship:**
  - guidelines for prescribing (common areas: RTI, ASB, chronic leg ulcers)

Discussion