Centre for Health from Environment

The Carbapenemase Producing Enterobacteriaceae (CPE) Epidemic
Why it matters ?
What it is ?
What Can You Do About It ?

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CPE: Why It Matters

54 Year Old Man Acute Pancreatitis. CPE acquired in ICU.

3 weeks later blood stream infection with CPE. Multiple antibiotics none of them ideal. He survived.

38 Year old woman. CPE acquired in India. Bladder infection. One kidney. Miserable. Looking a hospital admission for treatment of cystitis (maybe OPAT)

CPE: The Wider Context
Antibiotic/Antimicrobial Resistance

Antibiotic /Antimicrobial Resistance (AMR)

The Growing List of Acronyms: MRSA/ESBL/VRE

Doing Better on AMR
(National Plan Required by WHO)

1. Use Less Antibiotics (everywhere)

2. Get Better at Stopping the Resistant Bacteria From Spreading

Status of AMR in Ireland

Back to CPE: The Main Messages

CPE – faecal oral spread

If someone got CPE they swallowed traces of someone else's faeces

That should happen a lot less often in health care delivery than it does

CPE: What it is
First the E = Enterobacteriaceae

E: = normal gut bugs

E: a group of bacteria that belong normally in the gut (normal colonisation)

But: Can get into urine (cystitis/pyelonephritis), gall bladder (cholecystitis) and blood (blood stream infection/septicaemia)

E (=Gut Bugs) are Harder to Kill

1986 – pretty to easy to kill them when they cause trouble (co-amoxiclav with ceftriaxone as big gun)

1996 – getting harder to kill them **(ESBL)**

(ceftriaxone not so sure meroepenem as big gun)

2017 – sometimes nearly impossible to kill them **(CPE)**

(meropenem not sure – what is next big gun)

Now the C in CPE: What it is

C = Carbapenemase – an enzyme that destroys carbapenem antibiotics

Carbapenems (a family of antibiotics) meropenem is best know example

So CPE: What is it ?

C = Carbapenemase

P = Producing

E = gut bugs

(Term **CRE** widely used means more or less the same thing most of the time)

CPEs Come In Different Colours

(this is not an endorsement of smarties, Nestlé, or any other food high in refined sugar (although I do like smarties I like giant chocolate buttons even more but they are all the same colour so they were not suitable to illustrate this point)

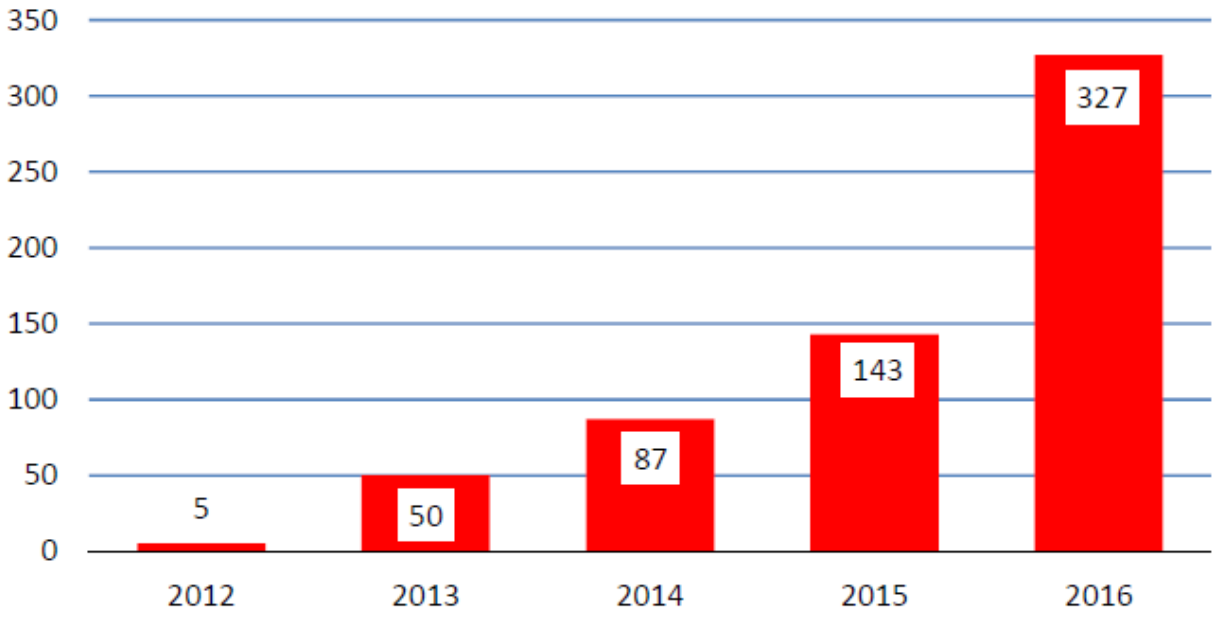
OXA 48

KPC

NDM-1

CPE: The Scale of What We Know About

Figure 1:Carbapenemases - Ireland Sept 2012 to Dec 2016 CRE Ref Lab



CPE: A Different Kind of Pandemic

JM on the top floor has *Escherichia coli* CPE (OXA 48) January 15

MC on the second floor has *Klebsiella pneumoniae* CPE (OXA 48) February 1

PD on the ground floor has *Citrobacater freundii* CPE (OXA 48 February 17)

Three different bugs and no one is sick so what's your problem ?

CPE: A Different Kind of Pandemic What is the Connection ?

JM on top floor has *Escherichia coli* CPE (**OXA 48**) January 15

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PD on ground floor has *Citrobacater freundii* CPE (**OXA 48** February 17)

A piece of DNA (plasmid /transposon) moving so fast between bacteria that the name of the bacteria does not matter

CPE: A Different Kind of Pandemic
How Did It Get from JM to PD ?
Silent Transmission

JM on top floor has *Escherichia coli* CPE (OXA 48) January 15

E. coli – doctor hand – patient X – nurse – bed pan – patient Y - moved to ward 4 on February 6 – newspaper – PD in the next bed – DNA hops into *Citrobacter freundii* living in gut of PD

PD on ground floor has *Citrobacater freundii* CPE (OXA 48 February 17)

CPE: A Different Kind of Pandemic
Why Does It Matter If No One is Sick ?

PD on ground floor has *Citrobacater freundii* CPE (OXA 48 February 17)

March 14 develops a bowel obstruction and is transferred to acute hospital

March 15 urinary catheter in and he has surgery

March 19 doing well post op but now has CPE in his urine

March 21 fever, rigors, rising heart rate, falling blood pressure

If he has CPE in his blood his chances are 50/50

Why Does It Matter If No One is Sick ?
N. meningitis (meningococcus)

Probably less than 1 in 1000 people colonized with *N. meningitidis* gets sick

But we have a vaccination programme and chemoprophylaxis because it kills quite a few of the people who get sick

Summary

CPE is a creeping pandemic that is easy to overlook

You can't see it spread if you are not looking (and we are not looking)

It is already shortening lives and costing misery and big money

We are paying and we will pay more – the choice

Pay now to try to control it

Pay in perpetuity for our failure

Key Points for The Non Acute Sector

1. Screening for CPE in community and nursing homes is NOT recommended
2. Know CPE colonised residents in nursing homes; apply contact precautions in so far as practical consistent with needs of resident
3. Global improvement in applying standard precautions for all residents
4. Global reduction in antibiotic use (e.g. stop testing for and treating bacteria in urine)

Getting the basics right in LTCFs

- Standard precautions- all staff should be trained and competent
- Gloves and aprons for direct personal care and handling body fluids- important these are changed and hand hygiene performed between care of residents/patients
- Antibiotic usage should be questioned and if indicated reviewed timely
- All surfaces in the facility should be cleanable
- Limit as much as possible sharing of equipment

CPE management- key steps

- Important that staff are aware of residents colonised with CPE or been in close contact with someone who has CPE
- Routine screening for CPE is not necessary- liaise with Public Health or IPCN/Microbiologist where possible
- Communication between the hospital a resident is transferred from is very important
- Prioritise a single room en-suite – if not possible a shared space with as few people as possible (2 bedded instead of 6 bedded room etc)

CPE management- key steps

- In larger facilities where there a re a number of CPE colonised residents- cohorting with dedicated staff is advised.
- Toilets should be frequently cleaned and disinfected with regular checks
- Dedicated commodes/bedpan /urinal
- Assistance to perform hand hygiene is important with colonised residents
- Long sleeved gowns are advised when caring for CPE positive residents who have diarrhoea- highest risk of transmission

CPE management- key steps

- Communication with residents and families is essential to ensure they all understand why the additional precautions are in place
- No-one should be refused admission/ transfer to a hospital or nursing home because the have CPE or have been a contact with CPE
- LTCFs do not need to close to admissions unless in exceptional circumstances