



# Carbapenemase Producing Enterobacteriaceae (CPE)

## Understanding The Public Health Emergency

Professor Martin Cormican *HSE National Lead for  
Health Care Associated Infection and Antimicrobial Resistance*

*[hcaional.lead@hse.ie](mailto:hcaional.lead@hse.ie)*

***People with CPE (or  
any other organism)  
Have Equal Rights to  
treatment and  
services***



# CPE – The Latest Wave of Antimicrobial Resistance

21 September 2016

New York

## Secretary-General's remarks to High-Level Meeting on Antimicrobial Resistance [as delivered]

I am pleased to join you to address this important topic.

Antimicrobial resistance poses a fundamental, long-term threat to human health, sustainable food production and development.

It is not that it may happen in the future.

It is a very present reality – in all parts of the world, in developing and developed countries; in rural and urban areas; in hospitals; on farms and in communities.

We are losing our ability to protect both people and animals from life-threatening infections.



Building a  
Better Health  
Service

Seirbhís Sláinte  
Níos Fearr  
á Forbairt

# Antimicrobial Resistance & CPE

## A story about people not a story about bugs

### People who miss out on:

- Christmas/ Eid al Fitr/ Hannukah/Diwali/ Solstice
- The 21st birthdays/the daughters/sons wedding

This is not a “potential” threat and it is not “in the future”. It is here this year and last year and for quite a while now



## A story about people not a story about bugs

A patient in his early 60's with a serious but NOW treatable condition.

He needs a bone marrow transplant which means some weeks of very great vulnerability to infection.

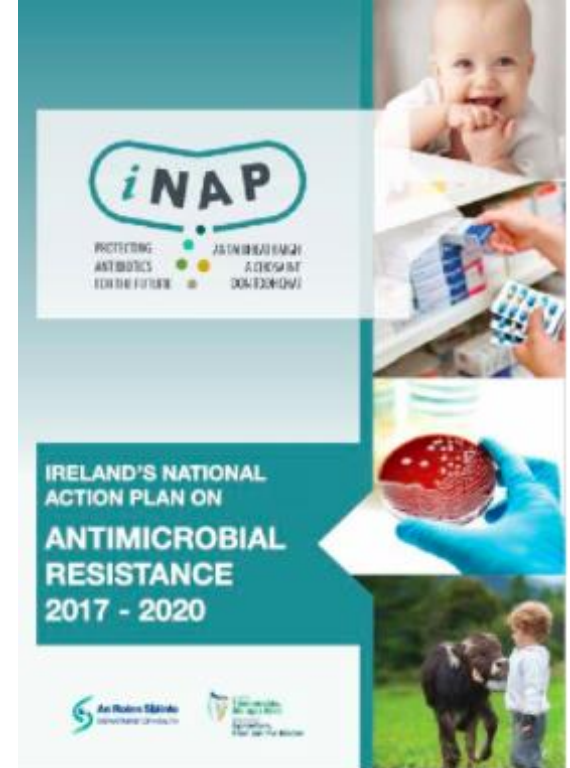
He now has CPE in his gut; there are only two antibiotics left that work – neither is ideal

Do we have the antibiotics to get him through the transplant?

## CPE- An Irish Public Health Emergency

October 25<sup>th</sup> 201; Minister Harris

“We have seen a rapid and worrying increase in the incidence of CPE in Ireland, with a significant increase in numbers of cases of CPE in recent years. Known outbreaks have occurred in eight healthcare facilities in Ireland resulting in high costs and bed closures. International experience indicates that CPE and Antimicrobial Resistance (AMR) need to be tackled at national level. That is why I am now convening the National Public Health Emergency Team and activating the National Public Health Emergency Plan.”

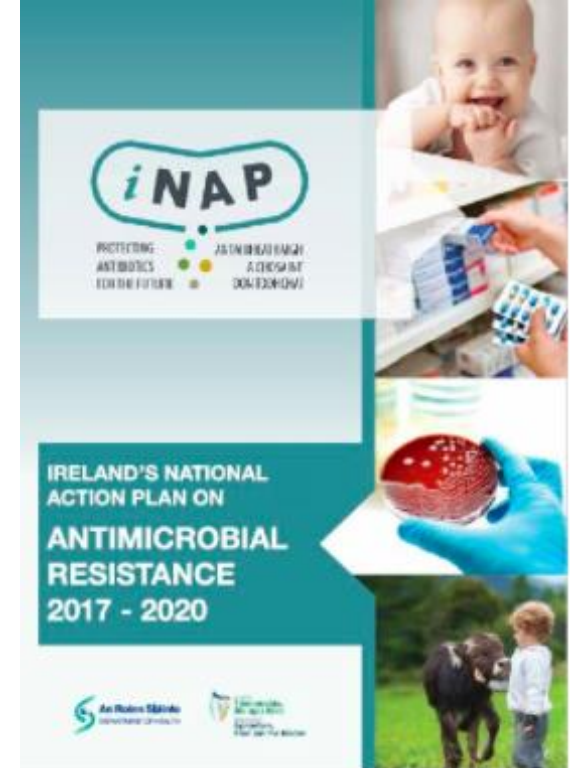


# CPE- An Irish Public Health Emergency

October 25<sup>th</sup> 2017

The Chief Medical Officer, Department of Health

“I have examined this issue, in conjunction with the National Patient Safety Office, and concluded that the patient safety issues are so important that this CPE public health emergency requires a co-ordinated whole system response.”



# So What is CPE; Carbapenemase Producing Enterobacteriaceae?

Start with the last letter **E**

**E: = Enterobacteriaceae = normal gut bugs**

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

**But sometimes they escape:** into blood (blood stream infection/septicaemia), into urine (cystitis/pyelonephritis), other places



# So What is CPE; Carbapenemase Producing Enterobacteriaceae?

## Now for the **C – Carbapenemase**

C = Carbapenem”ase” – something that breaks up carbapenems

Carbapenems = one of the most important groups of antibiotics for killing gut bugs when they escape from the gut and cause infection

The best known carbapenem is “meropenem”

# So What is CPE; Carbapenemase Producing Enterobacteriaceae?

And now for the P = Producing

C = Carbapenemase (destroys carbapenems)



P = Producing



E = Gut bugs

(The term CRE means more or less the same thing most of the time)

# Why are CPE able to destroy carbapenems ?

**CPE – Gut bugs that have downloaded an “Update”**

**The “update” is a piece of genetic code [ Plasmid ] with a recipe for making carbapenemase**

**Any bug with the update becomes a CPE**

**Gut bugs can down load the “update” from any CPE**

# There are different kinds of CPE Updates; lets say they come in different colours

## The 3 Kinds of CPE Update Most Common In Ireland

OXA

KPC

NDM



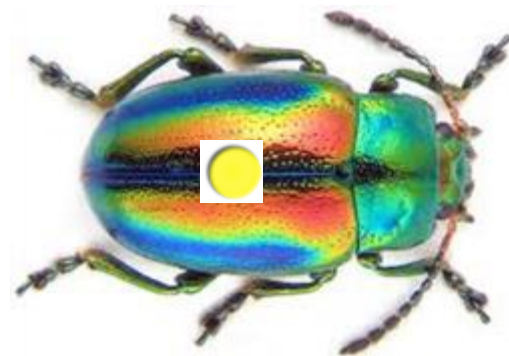
Thanks to Maria Boyle For Image

# An old style outbreak/epidemic/pandemic playing by the rules

**All the patients have the same bug  
The patient gets sick when they get the bug**



## CPE Outbreaks break the rules; different Bugs but they all have the same 'Genetic Update'



## CPE Outbreaks breaking the rules;

- Most patients who carry CPE never get sick
- Those who carry CPE and who get sick look and react the same as if they had an ordinary gut bug infection (but they are more likely to become seriously ill or die)
- So you only know you have a CPE problem if you look for it (the turnstone)

# CPE: How Does it Spread?

If you did this today you probably got poo on your hands.  
Do you know how to get it off?





# CPE: How Does it Spread?



You catch CPE by swallowing tiny traces of someone else's faeces (we all do this a lot)

Faeces is brown sticky stuff; it is primed to stick to hands and surfaces

CPE are very small: it takes 10 million to make a pin head

Things that look clean can carry thousands of CPE

# Healthcare Associated Infections (HCAI)



**Acute Hospitals: A Perfect Storm for the spread of healthcare acquired infection**

Many patients in hospitals/nursing homes are very vulnerable to infection

Many patients are already carrying antibiotic resistant bugs

Many patients are taking antibiotics

The same staff are taking care of vulnerable and colonised/infected patients

Vulnerable and colonised/infected patients can be in the same room often using same toilet

# Finding CPE in hospitals

**Diagnostic:** growing bugs from people with infection and checking what you grow to see if they are CPE find some CPE but most people with CPE will not be found

**Screening:** laboratory testing of rectal swabs from people who have no infection finds most people with CPE



# Reasons to find patients who carry CPE in hospitals

CPE comes out in poo whether sick or not

Anyone who swallows a trace of that poo can catch CPE and then pass it on

If you want to contain CPE in a hospital you need to find people who carry CPE and take special care of them

# **CPE & the temptation not to look for it**

**So many patients carry CPE & very few are sick from CPE**

**So many trolleys in ED**

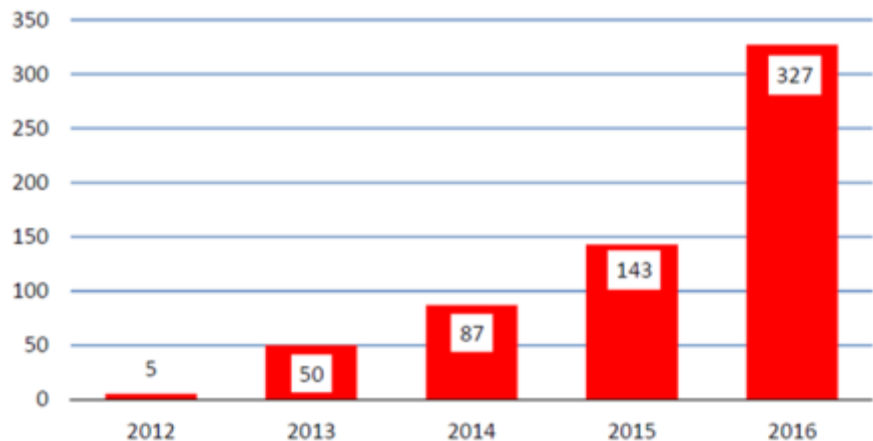
**Long waiting lists**

**Not enough single rooms & not enough staff**

**Not enough money**

# CPE: the scale of what we know about in Ireland

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



282 people newly identified with CPE in Ireland in 2016

More than 400 in the first 11 months of 2017

Almost certainly many more we do not know about

All records to date show more than 25 people with CPE Blood Stream Infection

# CPE: when is it too early to call the fire brigade?



# CPE: where does continuing business as usual take us?

Figure 3.11. *Klebsiella pneumoniae*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2016



More than half of *Klebsiella pneumoniae* blood stream infections in Greece are now CPE

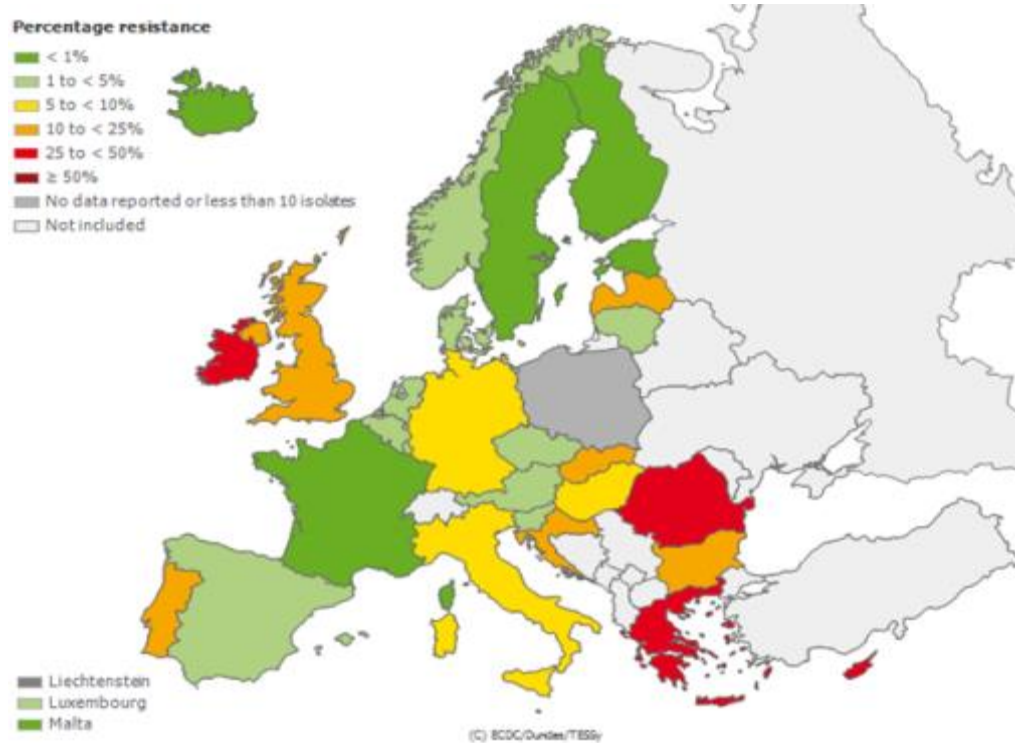
More than a quarter of *Klebsiella pneumoniae* blood stream infections in Italy are now CPE



# We have been down this road before with other bugs



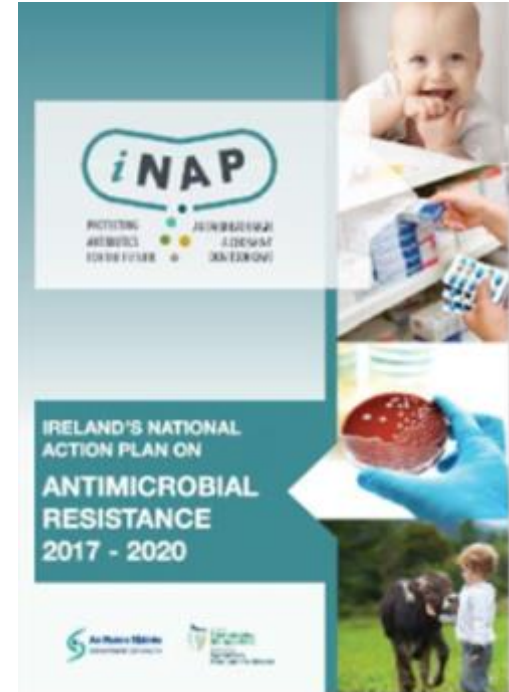
# *This is a PHE where we can lose; we failed with VRE (VRE Ireland 2016)*



# Doing Better on AMR; we now have a National Action Plan “OneHealth”

1. Use less antibiotics  
(everywhere)

2. Get better at stopping  
the resistant bacteria from  
spreading  
Hand hygiene sanitation



# CPE; Lessons to be learnt from Killarney National Park



CPE is an Invasive Species

Once it gets a grip  
we will never get rid of it

## CPE; What can I do?

**Depends on your role but here is what we can all do**

- **Use less antibiotics**
- Eat well & keep active, you get less infection & use less antibiotics
- Use and promote [www.undertheweather.ie](http://www.undertheweather.ie)
- Use and promote vaccines – less infection – means less demand for antibiotics
- Spread the word-antibiotics you don't need do more harm than good
  
- **Preventing bugs from spreading**
- Hand hygiene – know how to perform it and promote it
- Keep stuff clean
- Standard precautions: standard measures with all patients to stop the spread of infection

## CPE; What can I do?



Log onto the new information resource for staff and patients  
[www.hse.ie/hcai](http://www.hse.ie/hcai)

Learn and share the knowledge