

Environment and Health – did you get the memo ?

http://nuigalway.ie/health_from_environment/



Centre for Health from
Environment
Ionad Sláinte ó Chomhshaol



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NUI Galway
OÉ Gaillimh

Did The Vulcans Get It Wrong ?



- Live Long and Prosper



Communicating & Caring About The Environment

- **You can't save the planet**



Saving the planet & delusions of grandeur



The planet does not need you



Is this Planet Earth
10 Million Years after before the
first human appears
OR
10 Million years after the last
human died



Why it matters that you can't save the planet

- **Humans are the dominant species**
 - **The Kerry slug isn't**
- **Unless people can see the environment matters to them we lose**



Communicating & Caring About The Environment

- You can't save the planet
- **You can't save people lives by protecting the environment**
 - Life can only be spent



Saving lives, battles with disease and the war on cancer

- Survival is not a victory & death is not a defeat
Everybody dies
 - Death is a good thing
 - Fundamental to sustainability and renewal
- The missing word in discussions of sustainability



Caring About The Environment: The Good News

- Environment supports the three E's :
- Extend life, Enhance life and Ease dying



Why this message matters

- How we construct our objective influences priorities & what we measure
 - “saving lives” makes survival the measure of success
 - death becomes failure



Temptation /Necessity

frame our message

- in familiar terms

- accepted terms of reference (how much is bee worth in cash money ?)



The scientific evidence to support what I have said so far



Communicating about science health & environment is hard

- But its all we have to work with
- So my job is communicating about antimicrobial resistance AKA “superbugs”
 - The latest one is CPE



Roscommon Court House



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á Forbairt

What is CPE; Carbapenemase Producing Enterobacterales

Starting with the last letter E

E: = Enterobacterales = normal gut bugs

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

Best know example is *E. coli*

Sometimes E bacteria cause infection when they escape from the gut: into blood (blood stream infection/septicaemia), into urine (cystitis/pyelonephritis), other places



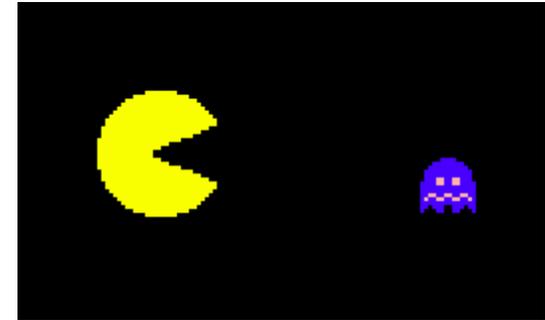
What is **CPE**; Carbapenemase Producing Enterobacterales

Now for the **C – Carbapenemase**

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

The best know carbapenem is “meropenem”

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



What is **CPE**; Carbapenemase Producing Enterobacteriaceae

And now for the **P = Producing**

C = Carbapenemase (destroys carbapenems)



P = Producing



E = Gut bugs

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



There are different kinds of **CPE**
Let's say they come in Different Colours Like Sweets



The 3 Kinds Most Common
`Kinds of CPE In Ireland
Are

OXA

KPC

NDM



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What Makes an ordinary E bacteria Become A CPE?

It has a new piece of genetic code
(DNA)



What Makes an ordinary E bacteria Become A CPE?

Code for making Carbapenemase

“Bull Bars”



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CPE In A Wider Context

A Relatively New Example within a broader phenomenon - antibiotic resistance



Carbapenemase Producing *Enterobacterales*

Ireland

2013 41 People Were Identified as Carrying
Carbapenemase Producing *Enterobacterales*

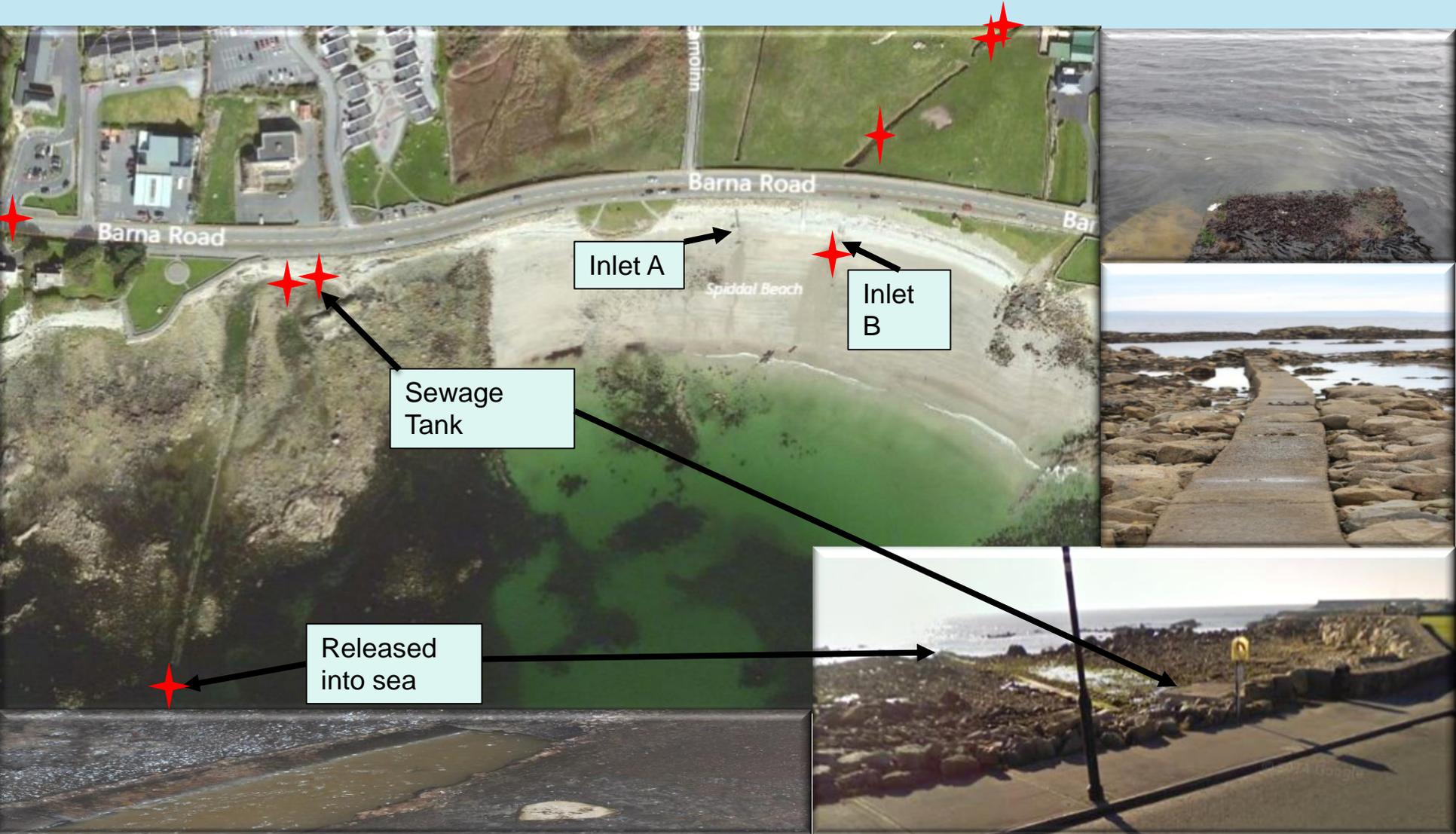
2017 2013 433 People Were Identified as Carrying
Carbapenemase Producing *Enterobacterales*

2018 year to date 330 People





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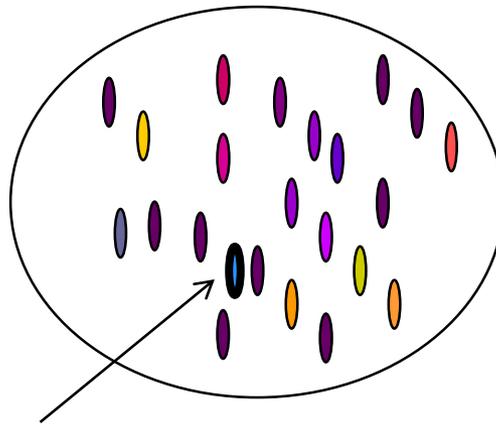
Why is antibiotic resistance happening ?

Benzylopenicillin

- Introduced into clinical practice about 1944
- All *Staphylococcus aureus* were naturally inhibited/killed
- All *E. coli* were naturally resistant (**intrinsic resistance**)
- Now **95% of *Staphylococcus aureus*** are able to destroy benzylopenicillin (staphylococcal penicillinase)



Staphylococcus aureus in a Patient in 1943 : Before penicillin

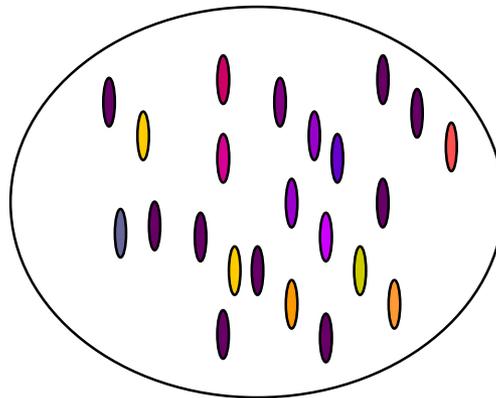


This *S. aureus* has a genetic change that makes it resistant to penicillin.
So ! Nothing happens



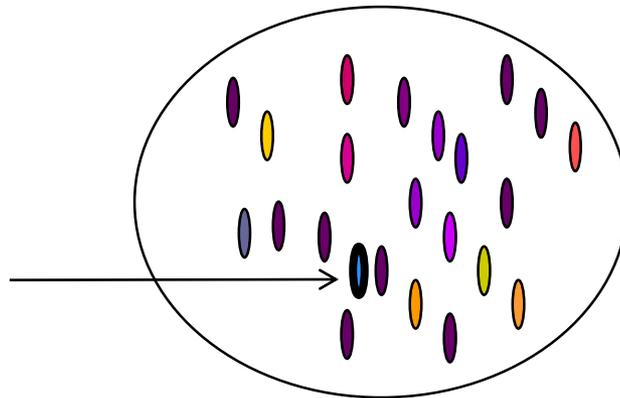
Staphylococcus aureus in our first ever patient in 1944: Now we have penicillin

No funny *S. aureus* here



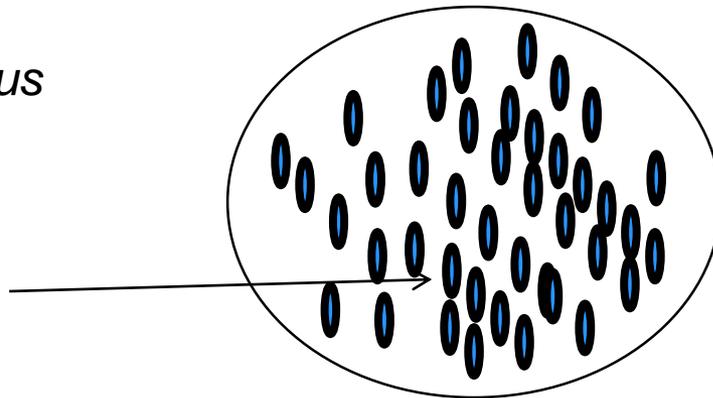
Staphylococcus aureus in another patient in May 7 1945

This *S. aureus* has a genetic change that makes it resistant to penicillin (like the 1943 one).
So ! Now it is king of the castle



Staphylococcus aureus our patient on May 8 1945

One strange *S. aureus*
becomes millions
overnight



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Bull Bars

Mostly Useless Maybe Increase Fuel Consumption
Except When



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Summary So Far

Bacteria become resistant to antibiotics by chance because that is the nature of bacteria

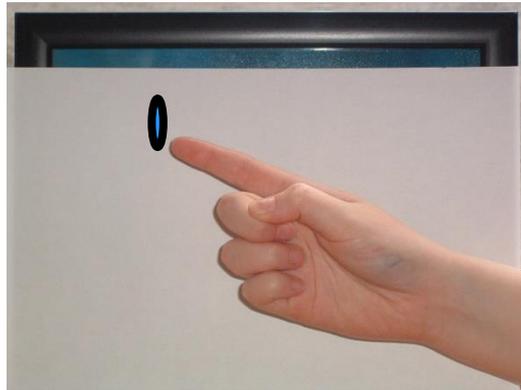
CPE is a new one of these resistant bacteria

Bacteria resistant to antibiotics only have an advantage in an environment where there is antibiotic

People use approximately 150 000 tonnes of antibiotics per year



How bacteria spread : mostly they are carried from place to place on hands and stuff



What Have I Said So Far About Antibiotics

Facts
Definitions
Explanations/Theories

(plus an unfinished story about Roscommon)



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Is there Impact of Antimicrobial Resistance Environment & Human Health

“25 000 Deaths Per Year in the EU Related to AMR”

How Do We Know That ?

How many of them died in Ireland

What were their names

Now we are using estimates (that suit us)

Facts /Definitions/ Explanations/Theories

Estimates

How well do we communicating about uncertainty

How honest are we about bias



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What happens to CPE and AMR more generally in the future ?

On the on previous experience and with the world as it is CPE and AMR more generally is likely to become more common in Ireland



We have Moved On

From
Facts /Definitions/ Explanations/Theories
Estimates

To

Predictions / Projections

But

“It's tough to **make predictions**, especially about the future”.

Yogi Berra

How we communicate about prediction and uncertainty ?



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A Little Poetry

**“There is, it seems to us,
At best, only a limited value
In the knowledge derived from experience.
The knowledge imposes a pattern, and falsifies,
For the pattern is new in every moment**



CPE environment and simple questions ? Can I bring the kids for a swim ?



Sure you'll be grand
says the doctor in the
gown and gloves !



Communicating relative risk and context specific risk



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CPE & AMR – an environmental perspective

ARMO are Invasive Life forms



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How rational is our environmental regulation ?

GMOs & GisMOs

Genetically Modified Organisms. *E. coli* with a synthetically modified genome is tightly regulated even if the change makes it more fragile

Genetically Self Modified Organisms. *E. coli* that modified but are amplified by human activity

Synthetic modification of microbial genomes is largely harmless
Amplification of noxious traits by selection is a big concern

Which one do we have more regulation about ?

We have Moved On

From
Facts /Definitions/ Explanations/Theories
Through estimates
Through Predictions / Projections

To
Values based perspectives and arguments



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Should we do something about AMR ?

What does the science tell us ?



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Should we do something about AMR ?

Science and reason cannot be the deciding factors

Democracy is not scientocracy

Emotion, identity and lived experience are generally more influential than evidence

What is valued by everyone who expresses those values as a vote has equal weight

What I think about communication and science: The Limits

Questions of science,
Science and progress,
Do not speak as loud as my heart

Cold Play. The Scientist



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If we decide that we value pre-industrial microbial biodiversity is there science to tell us what is likely to work: Yes

1. Use Less Antibiotics (everywhere “One Health”)
2. Get Better at Stopping the Resistant Bacteria From Spreading
(hand hygiene and sanitation and other things)

Wrapping up on communication about and science, health and environment

If I don't get your attention you won't remember anything I said (and even if I do you won't remember much)

If I don't really like to explain it/ talk/write the science it won't work (practice, practice, practice)

If it doesn't seem like I am interested why should you ?



Wrapping up on communication about and science, health and environment

Are we always honest about what we are about ?

Impartial Communication of Information or Persuasion

Are we clear on fact, estimate, prediction and
uncertainty

Do we see and explain our bias



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The Limits of Our Communication

“Just because I don’t care doesn’t mean I don’t understand”

“I do care a bit but”

I’m hungry, I am overdrawn at the bank, I have to pay the mortgage,

I don’t feel that what I do makes a difference

People won’t vote for that

That won’t sell papers

I don’t feel that what I do makes a difference



Scientocracy Is Not a System of Government or Law



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Scientocracy Is Not a System of Government or Law

EU court: Vaccines can be blamed for illnesses without proof

By ASSOCIATED PRESS / JUNE 21, 2017



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Did The Vulcans Get It Wrong ?



- Live well, die gently & leave little harm

