



Department
of Health

Antimicrobial Resistance

Professor Dame Sally Davies FRS FMedSci
Chief Medical Officer for England and
Chief Scientific Adviser, Department of Health

Presentation at a Foundation for Science and Technology debate

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Annual report of the CMO, Vol 2, 2011



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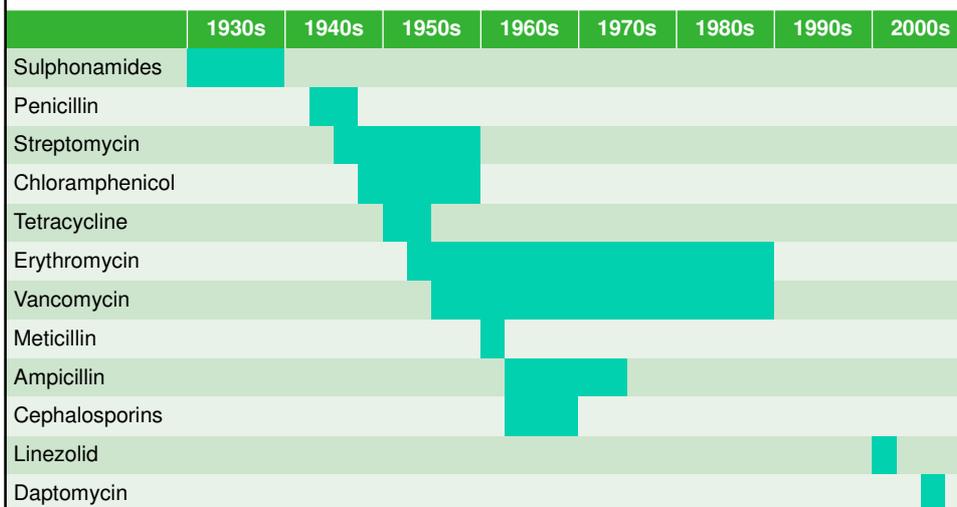


It is not difficult to make microbes resistant to penicillin in the laboratory, and the same has occasionally happened in the body.

Alexander Fleming, 1945
Nobel Prize Acceptance Speech

History of antibiotic resistance

Time from first clinical use of an antibiotic to first clinical resistance



Based on earlier slide developed by Professor Laura Piddock, on data from Clatworthy et al., *Nature Chemical Biology* 3, 541-548 (2007)

Antimicrobial Resistance: A Global Threat

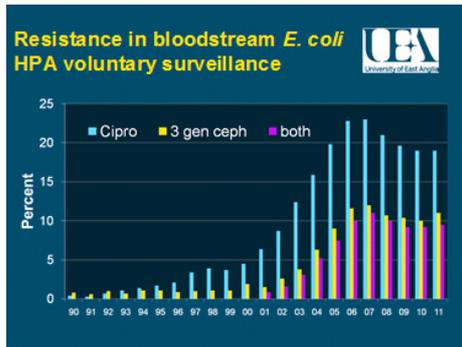
Europe:
Resistance doubles death rate from an infection.



25 000 deaths a year due to AMR.



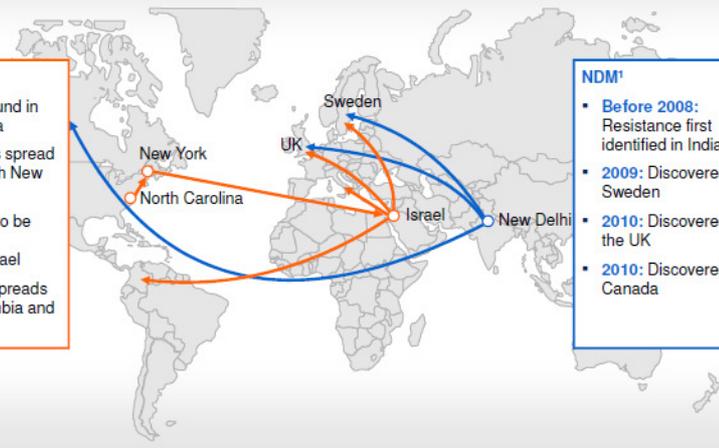
= **€1.5 billion** added to hospital, treatment and societal costs.



Movement of two strains of Carbapenem-resistant *Klebsiella pneumoniae* 2000 - 2008

KPC

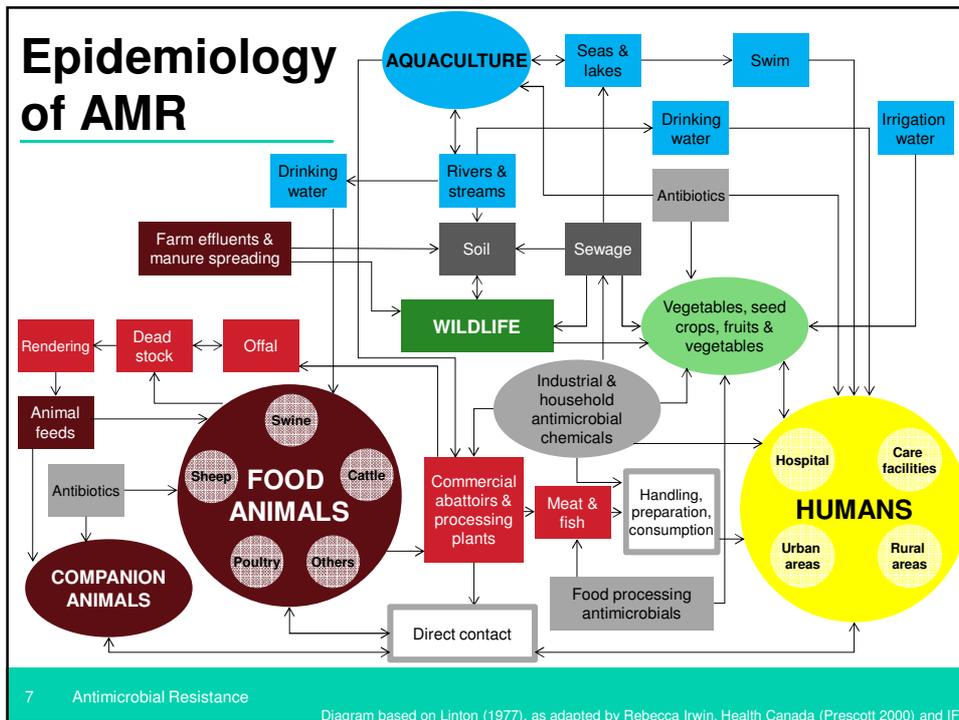
- 2000: First found in North Carolina
- 2003: Isolates spread rapidly through New York
- 2005: Found to be widespread throughout Israel
- After 2005: Spreads to Italy, Colombia and Sweden



NDM¹

- Before 2008: Resistance first identified in India
- 2009: Discovered in Sweden
- 2010: Discovered in the UK
- 2010: Discovered in Canada

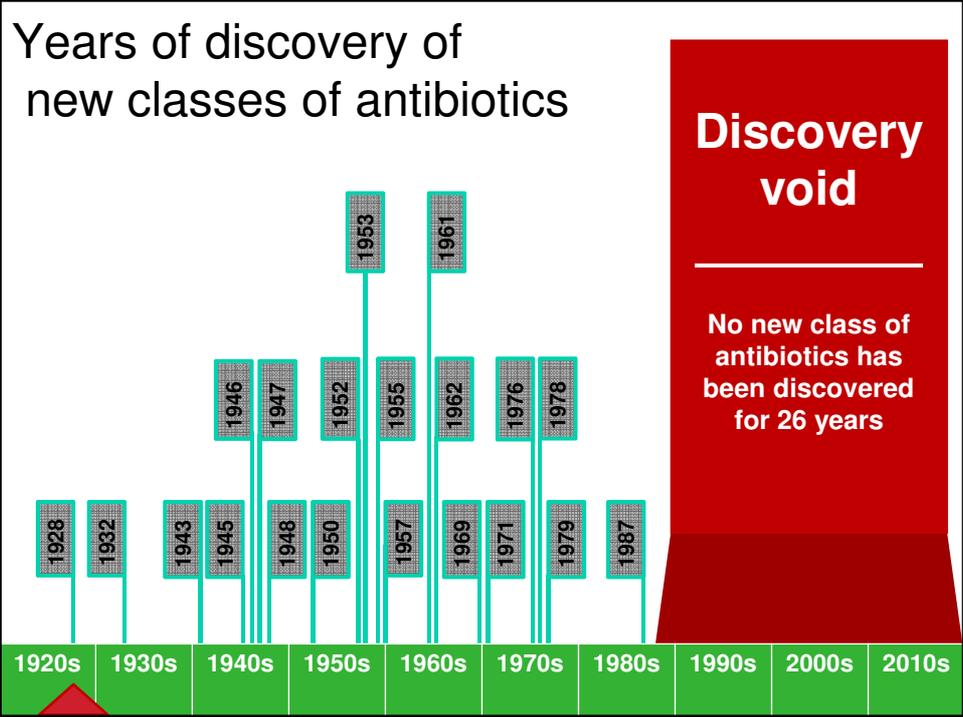
¹ New-Delhi Metallobetalactamase



We have abused antibiotics

- as patients
- as doctors
- in food production





New antibiotic

One short course in a lifetime

New statin (for high cholesterol)

Every single day for many years

Challenges

- Conserve the drugs we have
 - In human medicine **and** veterinary and industrial uses
- Economic
 - How can we make development of new antimicrobials financially worthwhile?
- Global challenge
 - Infectious diseases do not respect international
- Research challenge

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Hygiene and infection control

CATCH IT

Germs spread easily. Always carry tissues and use them to catch your cough or sneeze.



BIN IT

Germs can live for several hours on tissues. Dispose of your tissue as soon as possible.



KILL IT

Hands can transfer germs to every surface you touch. Clean your hands as soon as you can.



**Now Wash
your Hands**

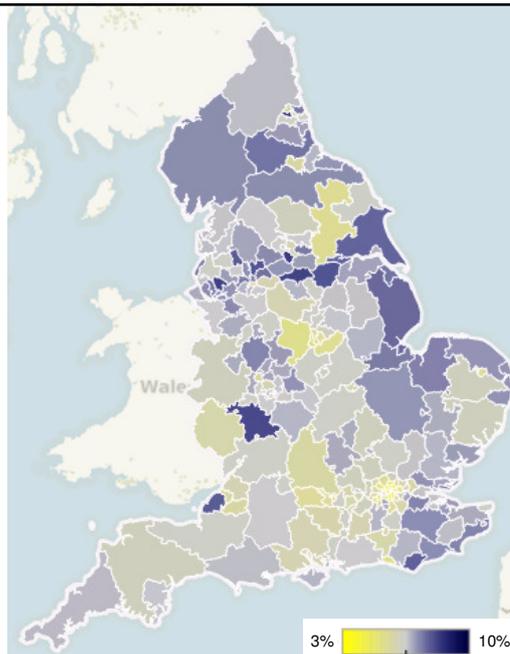
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Variation in use of antibiotics

Map shows incidence of GP antibiotic prescription in England by CCG in 2012

Substantial variation:
8.4% in Newcastle West (highest)
4.0% in Camden (lowest)

National average: 6.4%



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Data compiled by James Ambler of Moor Consulting for *The Guardian*

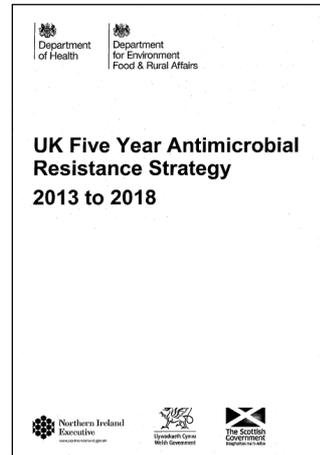
We need to use

- right antibiotic for the bug
- right dose
- right time

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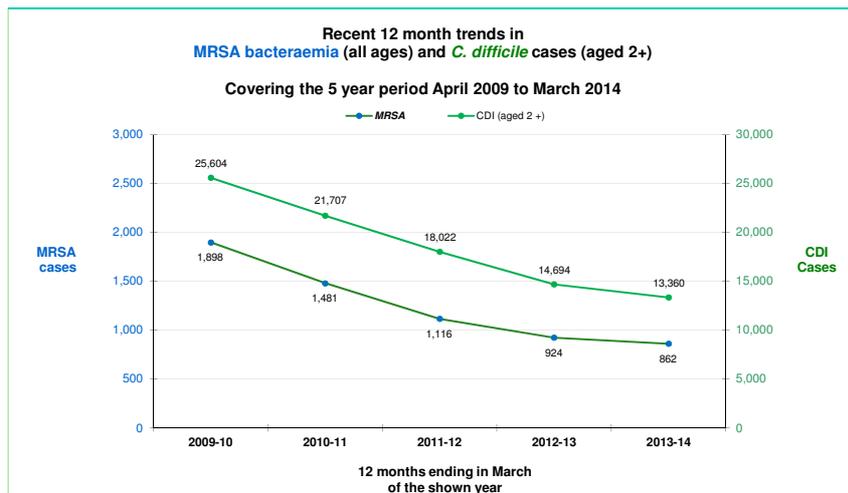
What the UK is doing

1. Improving infection prevention and control practices in human and animal health
2. Optimising prescribing practice
3. Improving professional education, training and public engagement
4. Developing new drugs, treatments and diagnostics
5. Improving use of surveillance data
6. Improving identification and prioritisation of AMR research
7. Strengthening international collaboration



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Can we make a difference?



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What is being done at a global level?

Participating on AMR work in a wide range of international fora including:

- WHA Resolution – May 2014
- Working with WHO and other UN bodies (OIE, FAO, Codex).
- Working with EU Commission on surveillance, research, legislative and drug pipeline issues to tackle AMR.
- Working with the Commonwealth to support improved surveillance and infection prevention and control.
- G7 and G20 meetings.
- International Chatham House round table discussions on AMR.
- European Academies Science Advisory Council (EASAC) discussions.
- WISH Conference – chairing the panel on AMR.

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Research

- The National Institute for Health Research (NIHR) provides strategic co-ordination and support.
- Co-funders of the UKCRC Translational Infections Research initiative and the Health Innovation Challenge Fund.
- The NIHR funds applied health research:
 - running a themed call on AMR across 8 NIHR funding streams,
 - funding two Health Protection Research Units on AMR and HCAI,
 - funds initiatives aimed at supporting new diagnostics
- AMR Research Funders Forum established to align funding decisions, MRC lead.
- International research collaboration (JPU AMR, IMI).

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Rapid diagnostics.

- Rapid diagnostics offer a major and rapidly evolving opportunity to slow the growth and impact of AMR across the world.
- We need:
 - Innovation,
 - Quality routine testing and interpretation of results to improve diagnosis and treatment of infections.

Longitude Prize – a hope for a solution???

**LONGITUDE
PRIZE 2014**

- A shortlist of six challenges which includes AMR – development of a rapid diagnostic
- The BBC, through “Horizon” is facilitating a public vote – closes 25th June, 7:10pm.
- Scientists, entrepreneurs, academics and others will then compete to resolve the chosen challenge by 2020 to win the £10million prize.

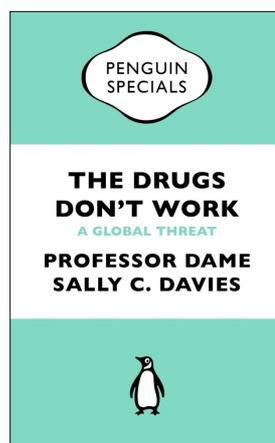
Previous challenge = a solution to the challenge of navigating longitude at sea to support global trade – 2014 is the 300 year anniversary.

We need to get to a point where:

- hygiene, good infection prevention and control measures to help prevent infections occurring in the first place become the norm in all sectors of human and animal health,
- infections can be diagnosed quickly and the right treatment deployed,
- patients and animal keepers fully understand the importance of antibiotic treatment regimens and adhere to them,
- surveillance and monitoring are in place which quickly identifies new threats or changing patterns in resistance, and
- there is a sustainable supply of new, effective antimicrobials for human use.

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Public information and education



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LONGITUDE PRIZE 2014

Anti-microbial resistance is one
of the challenges



Vote at: bbc.co.uk/horizon or text ANTIBIOTICS to 60011

Voting closes: Wednesday 25th June, 7:10pm

Find out more: longitudeprize.org, @longitude_prize

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