



Antimicrobial resistance: Current and emerging threats

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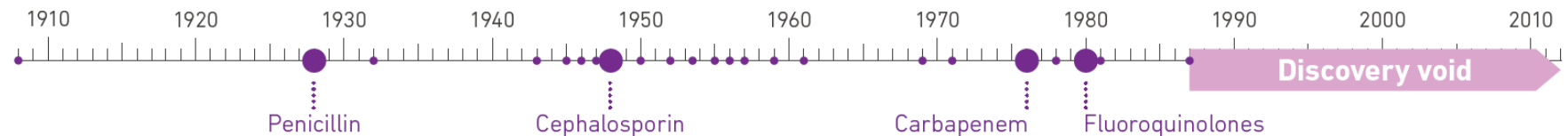


Overview

- Combating AMR in Australia and NZ
- Current and emerging AMR threats in NZ

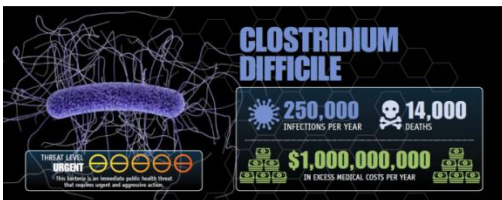
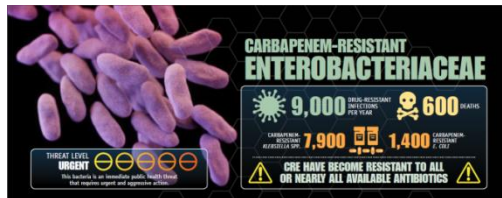
- Threatens the effective prevention and treatment of a wide range of infections caused by bacteria, parasites, viruses, fungi
- Higher morbidity, mortality, healthcare costs
- Critical threat to global public health

Over the last 30 years, no major new types of antibiotics have been developed

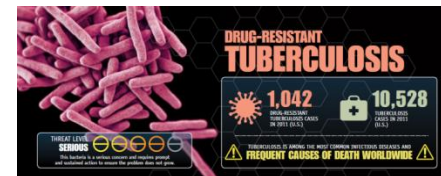
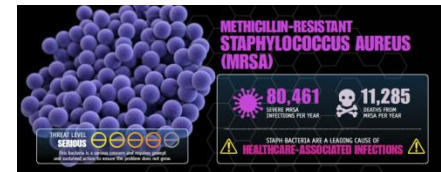


CDC Threat Levels

Urgent



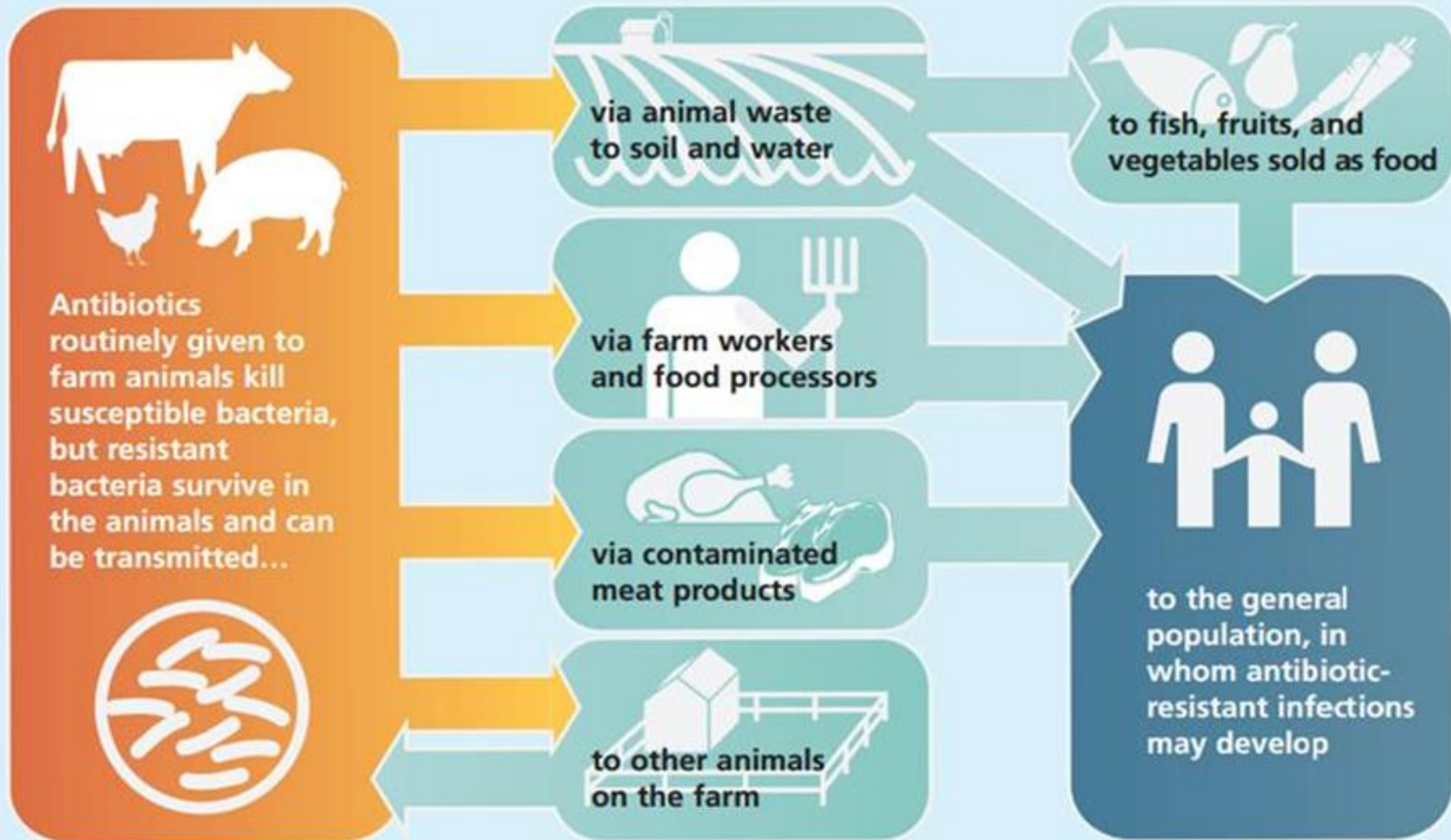
Serious



**U.S. Department of
Health and Human Services**
Centers for Disease
Control and Prevention

others

One Health Issue



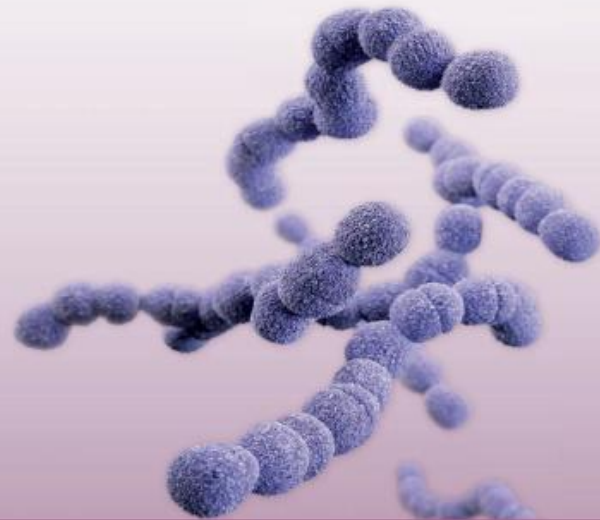
Source: GAO Report *Antibiotic Resistance*, 2011



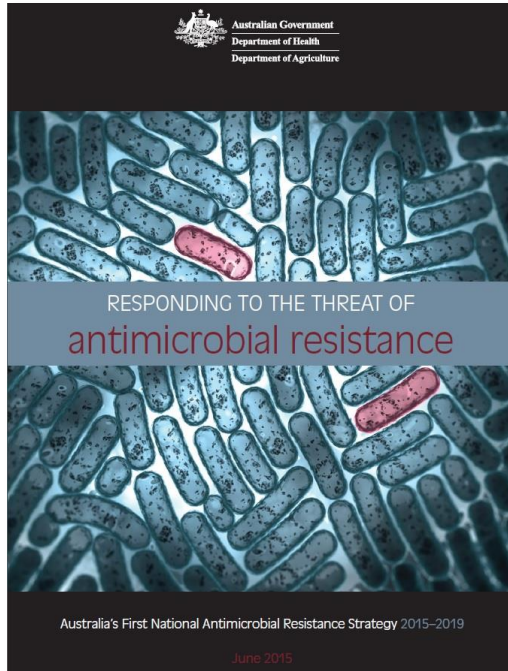
GLOBAL ACTION PLAN
ON ANTIMICROBIAL
RESISTANCE



Action Agenda for
Antimicrobial Resistance
in the Western Pacific Region



Australian Response



Objective One

Increase awareness and understanding of antimicrobial resistance, its implications and actions to combat it, through effective communication, education, and training

Objective Two

Implement effective antimicrobial stewardship practices across human health and animal care settings to ensure the appropriate and judicious prescribing, dispensing and administering of antimicrobials

Objective Three

Develop nationally coordinated One Health surveillance of antimicrobial resistance and antimicrobial usage

Objective Four

Improve infection prevention and control measures across human health and animal care settings to help prevent infections and the spread of resistance

Objective Five

Agree a national research agenda and promote investment in the discovery and development of new products and approaches to prevent, detect and contain antimicrobial resistance

Objective Six

Strengthen international partnerships and collaboration on regional and global efforts to respond to antimicrobial resistance

Objective Seven

Establish and support clear governance arrangements at the local, jurisdictional, national and international levels to ensure leadership, engagement and accountability for actions to combat antimicrobial resistance

National Alert System for Critical Antimicrobial Resistances

Species	Critical Resistance (as at September 2015)
<i>Enterobacteriaceae</i>	Carbapenemase-producing strains Ribosomal methylases-producing strains
<i>Enterococcus</i> species	Linezolid non-susceptible
<i>Mycobacterium tuberculosis</i>	MDR (rifampicin resistant) strains
<i>Neisseria gonorrhoeae</i>	Ceftriaxone non-susceptible strains
<i>Salmonella</i> species	Ceftriaxone non-susceptible strains
<i>Shigella</i> species	MDR strains
<i>Staphylococcus aureus</i>	Vancomycin, linezolid or daptomycin non-susceptible
<i>Streptococcus pyogenes</i>	Penicillin reduced susceptibility

Draft Victorian Guidelines on
Carbapenemase-producing
Enterobacteriaceae

For Health Services
November 2015

- Routine genomics for characterisation of new CRE isolates in Victoria
- Will contribute to decisions regarding determination of risk status and interventions


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Antimicrobial resistance

Strategic Action Plan
Development Group

Carbapenem Resistant
Enterobacteriaceae

Antimicrobial resistance

Antimicrobial resistance is a global threat to health.

Antimicrobial resistance is the broader term for resistance in different types of microorganisms, and encompasses resistance to antibacterial, antiviral, antiparasitic and antifungal drugs.

When microorganisms become resistant to most antimicrobials, they are often referred to as superbugs.

This is a major concern because a resistant infection may kill, can spread to others, and imposes huge costs to individuals and society. Medical

Advice for the public

> [Antibiotic resistance](#)

Related publications

> [Guidelines for the Control of Multidrug-resistant Organisms in New Zealand](#)

> [Guidelines for the Control of Methicillin-resistant Staphylococcus Aureus in New Zealand](#)



Antimicrobial Resistance

Tuesday 31st January 2017

SITE CONTENTS

- ▶ [Home](#)
- ▶ [Public Health Surveillance](#)
- ▶ [Surveillance Reports](#)
- ▶ [EpiSurv](#)
- ▶ [LabSurv](#)
- ▶ **Antimicrobial Resistance**
 - ▶ [Acquired carbapenemases in Enterobacteriaceae](#)
 - ▶ [Campylobacter](#)
 - ▶ [ESBLs in Enterobacteriaceae](#)
 - ▶ [General antimicrobial susceptibility data](#)
 - ▶ [Group A streptococci](#)
 - ▶ [Haemophilus influenzae from invasive disease](#)
 - ▶ [MRSA: Annual Reports](#)
 - ▶ [MRSA: Weekly Reports](#)
 - ▶ [Neisseria](#)

The Antibiotic Reference Laboratory at ESR is responsible for the national surveillance of antimicrobial resistance among human pathogens. Data from various surveillance systems and sources is used to compile national antimicrobial resistance data:

- Antimicrobial susceptibility data generated from routine diagnostic susceptibility testing in hospital and community laboratories is collected and analysed.
- The antimicrobial susceptibility of bacterial isolates referred to ESR for further investigation, such as epidemiological typing, is monitored. This surveillance includes *Salmonella*, and invasive isolates of *Streptococcus pneumoniae*, *Neisseria meningitidis* and *Haemophilus influenzae*.
- Periodic point-prevalence surveys of antimicrobial susceptibility among a specific organism using a purpose-collected sample of isolates from throughout the country are conducted.
- Rare and emerging resistant bacteria are monitored by requesting hospital and community laboratories to refer all such isolates to ESR. Currently this surveillance includes bacteria, especially Enterobacteriaceae, with acquired carbapenemases, vancomycin-resistant Enterococci and vancomycin non-susceptible *Staphylococcus aureus*.

Data from this surveillance is routinely published on this website.

SEARCH

GO



Email us at survqueries@esr.cri.nz to be notified when reports are published. Please specify the reports you are interested in:

- NZ Public Health Surveillance Report
- Monthly Surveillance Report
- Annual Surveillance Summary
- Annual Summary of Outbreaks
- Annual STI Report
- Quarterly STI Clinic Report
- Quarterly STI Lab Report

For the Weekly Influenza Update report please check [here](#) each Thursday.

Specific AMR threats in NZ

'Global'

- Carbapenem-resistant Enterobacteriaceae
- ESBL-producing Enterobacteriaceae
- Resistant *Neisseria gonorrhoeae*
- MDR-TB / XDR-TB

'Home-grown'

- *Staphylococcus aureus* and topical antimicrobial resistance
- Co-resistant *Campylobacter jejuni*
- Livestock-associated MRSA

Specific AMR threats in NZ

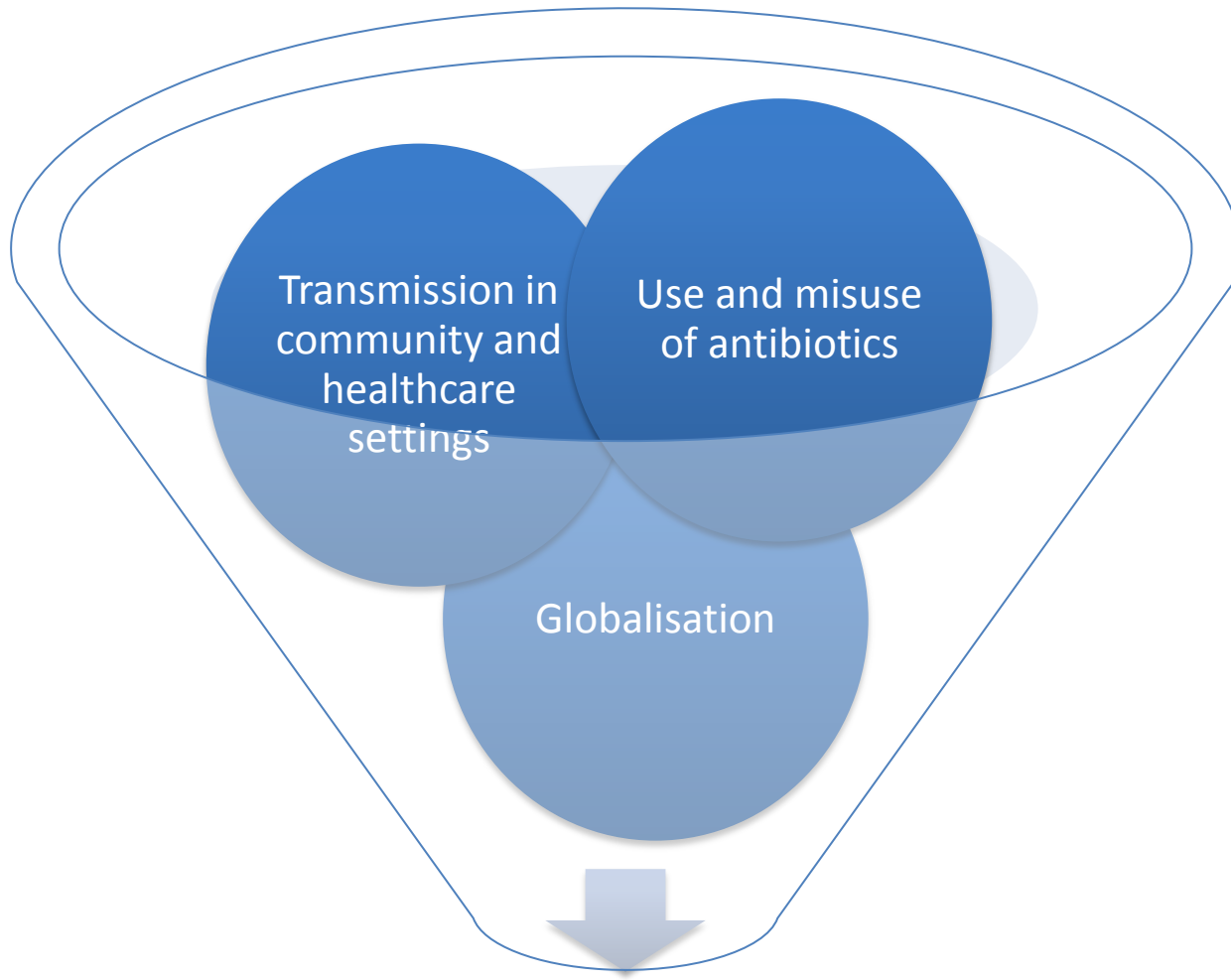
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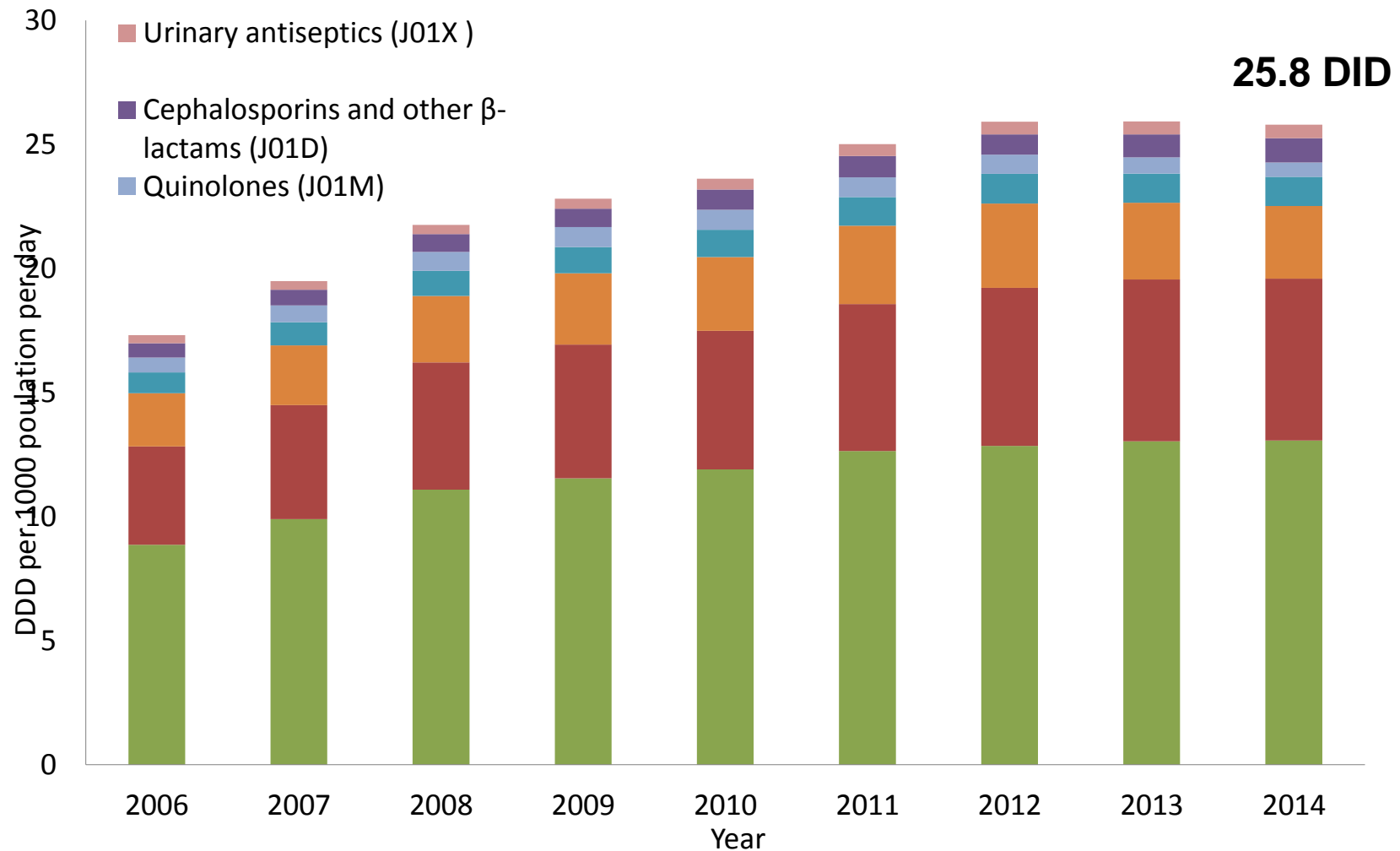
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Antimicrobial resistance in New Zealand

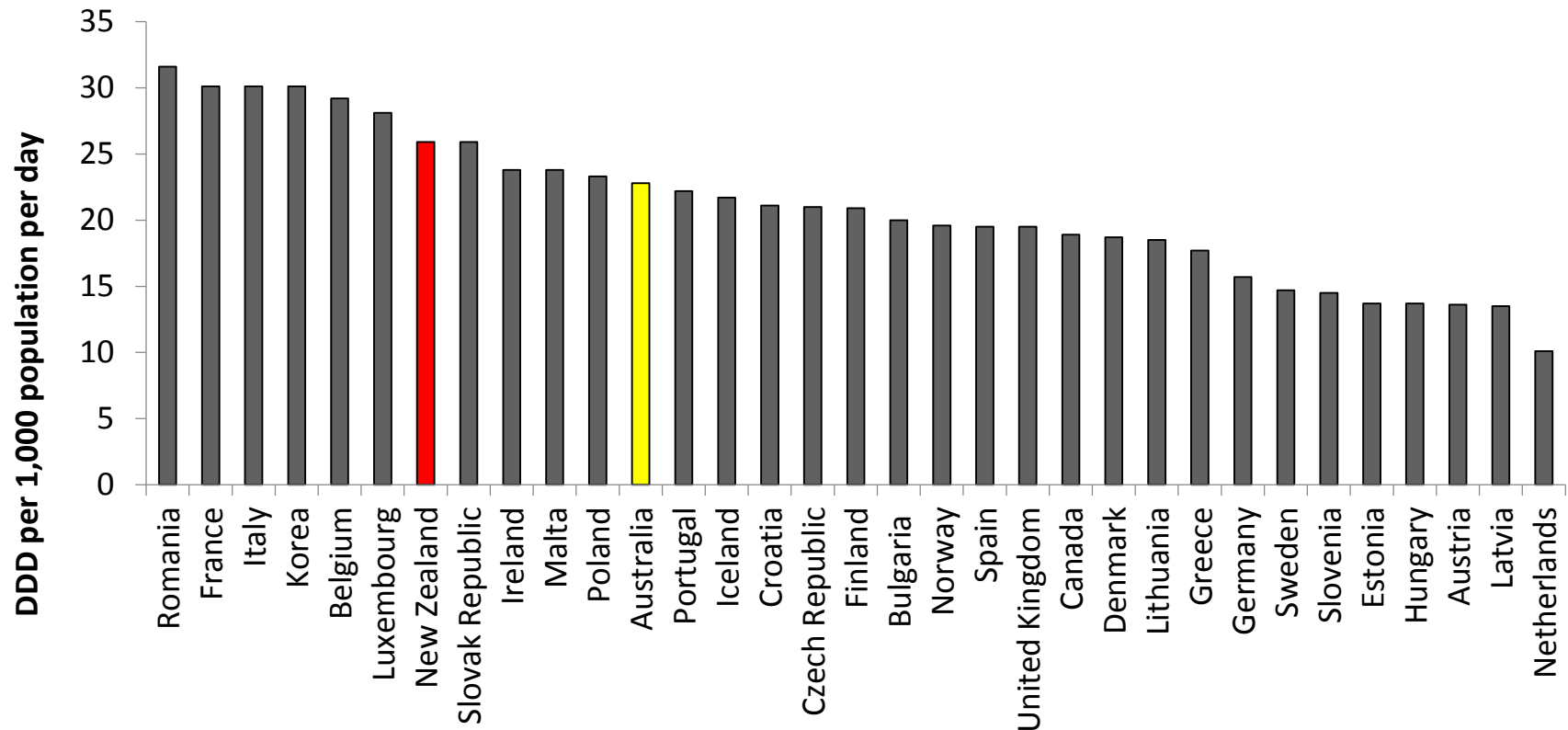


Antimicrobial resistance

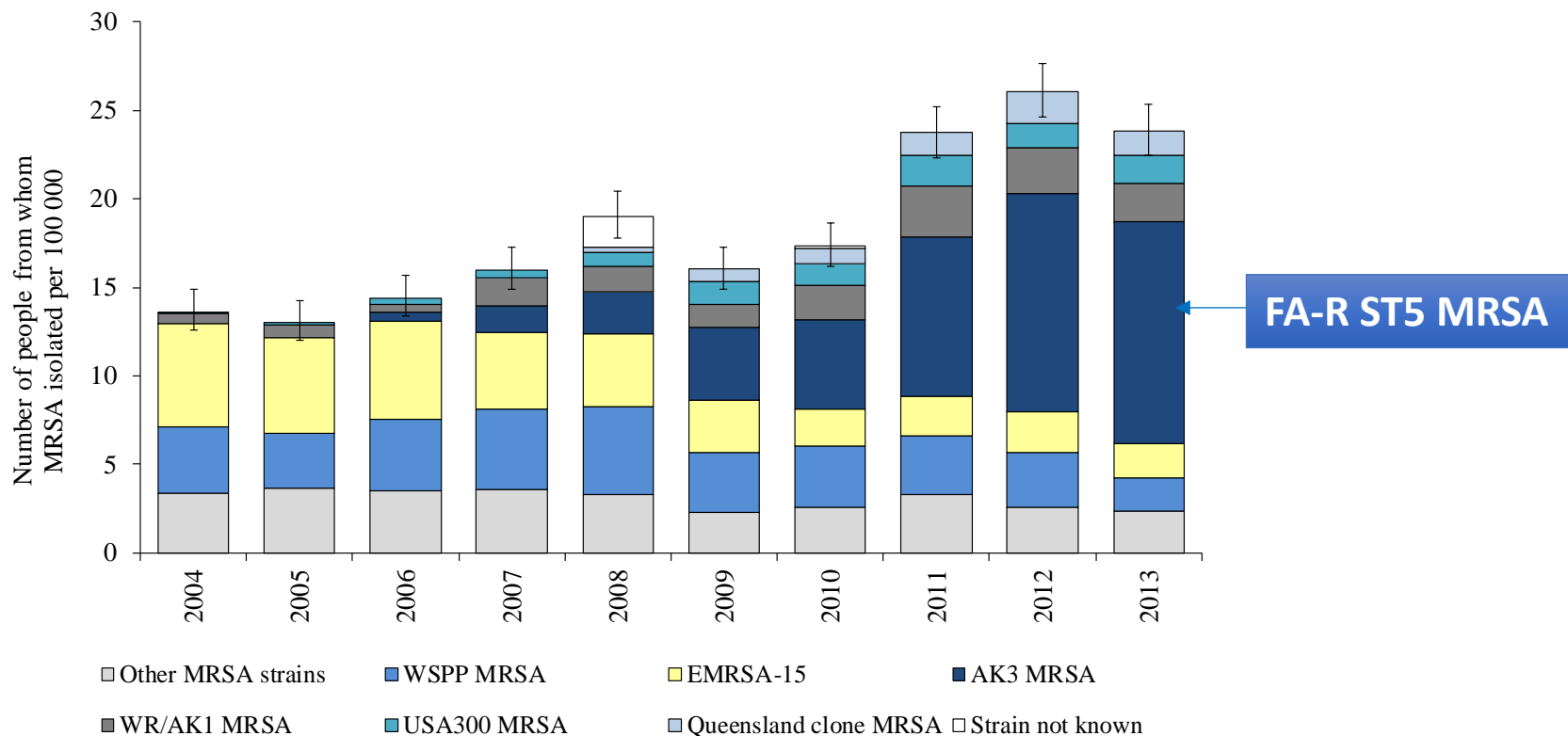
Total antibiotic consumption (J01) in the NZ community



Comparison of antibiotic consumption with EU and OECD countries



A fusidic acid-resistant ST5 clone has emerged as the dominant MRSA clone in New Zealand



Kids' skin cream spawns superbug

STACEY KIRK AND DONNA-LEE BIDDLE

Last updated 06:23, March 18 2015



The treatment of childhood skin infections with antibiotic ointment is driving the spread of hospital superbugs, putting lives at risk, infectious disease experts warn.

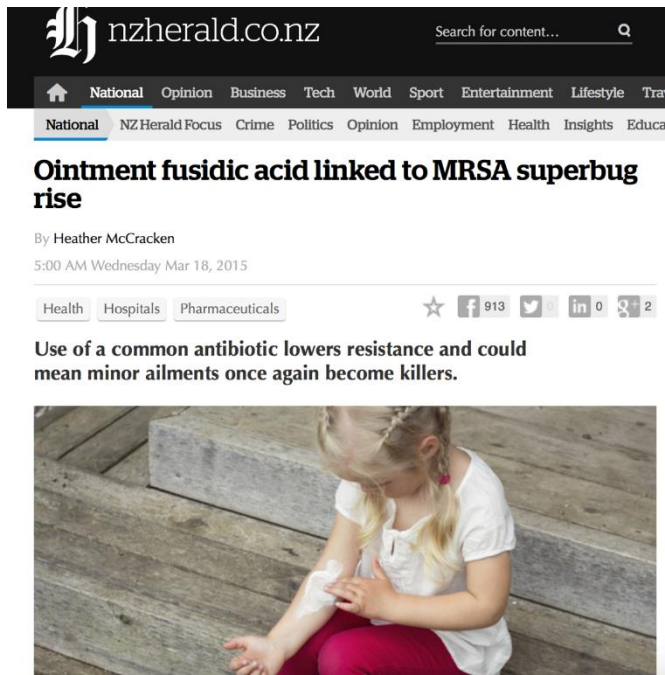
Doctors are calling for urgent action to regulate

its use, amid new research which shows children are being over-prescribed antibiotic cream, leading to a "home grown" strain of the deadly bug MRSA.

"Our current use of topical antibiotics is endangering our antibiotic supply and putting lives at risk," said clinical microbiologist and lead researcher Deborah Williamson, from the University of Otago.

"We need to halt its unregulated use immediately before it's too late."

MRSA is a multi-drug-resistant strain of the common infection staphylococcus aureus. It's what is known as a "superbug", which can make minor infections and injuries deadly, because the antibiotics used to treat it no longer work.




Ointment fusidic acid linked to MRSA superbug rise

By Heather McCracken
5:00 AM Wednesday Mar 18, 2015

Health Hospitals Pharmaceuticals

Use of a common antibiotic lowers resistance and could mean minor ailments once again become killers.





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Skin antibiotic use linked to superbug spread

11:19 am on 18 March 2015

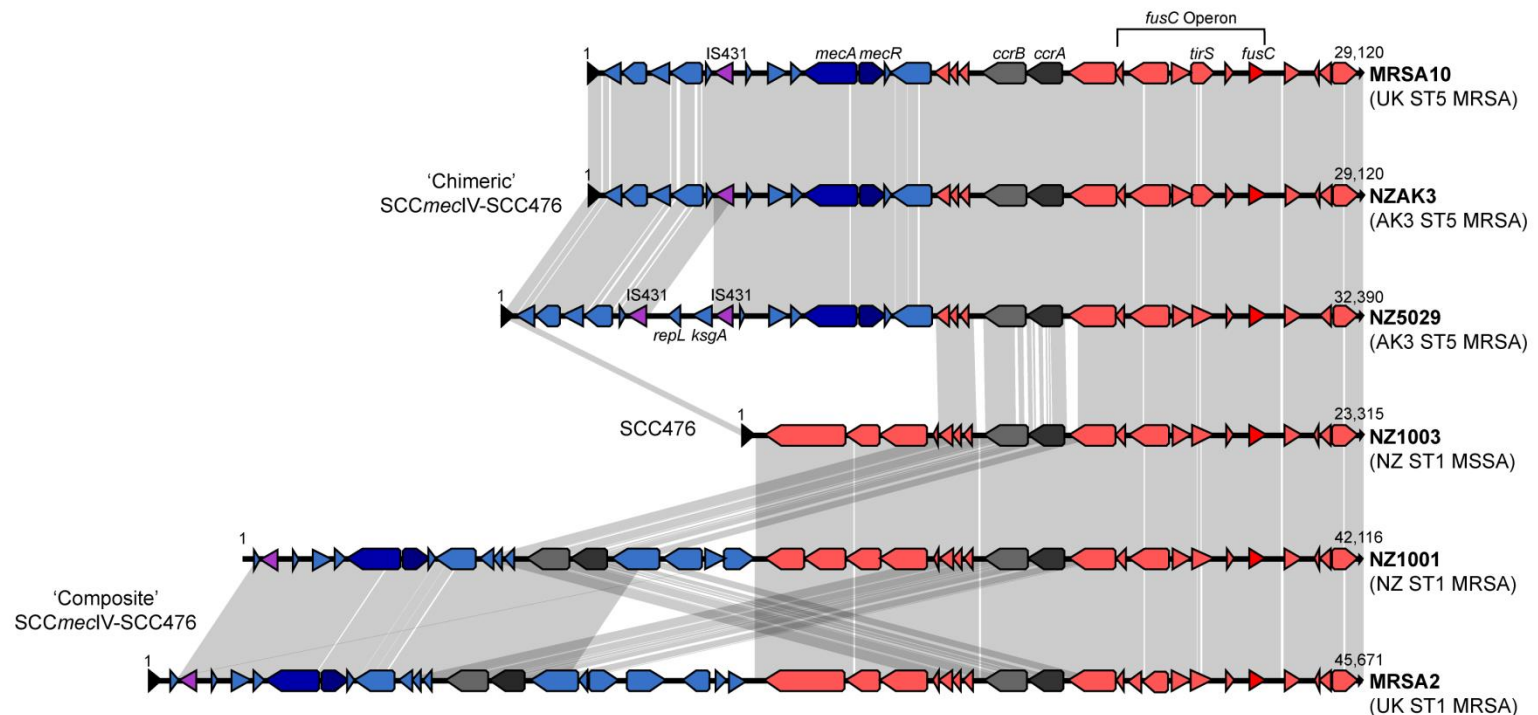
There are warnings the treatment of children's skin infections with antibiotic ointment is driving the spread of hospital superbugs and putting lives at risk.

Research sounding the alarm over the use of the ointment, called fusidic acid, has been presented to scientists attending the annual Australasian Society for Infectious Diseases meeting in Auckland today.

New Zealand has one of the highest incidences in the developed world of Staphylococcus Aureus, which causes the superbug, MRSA.

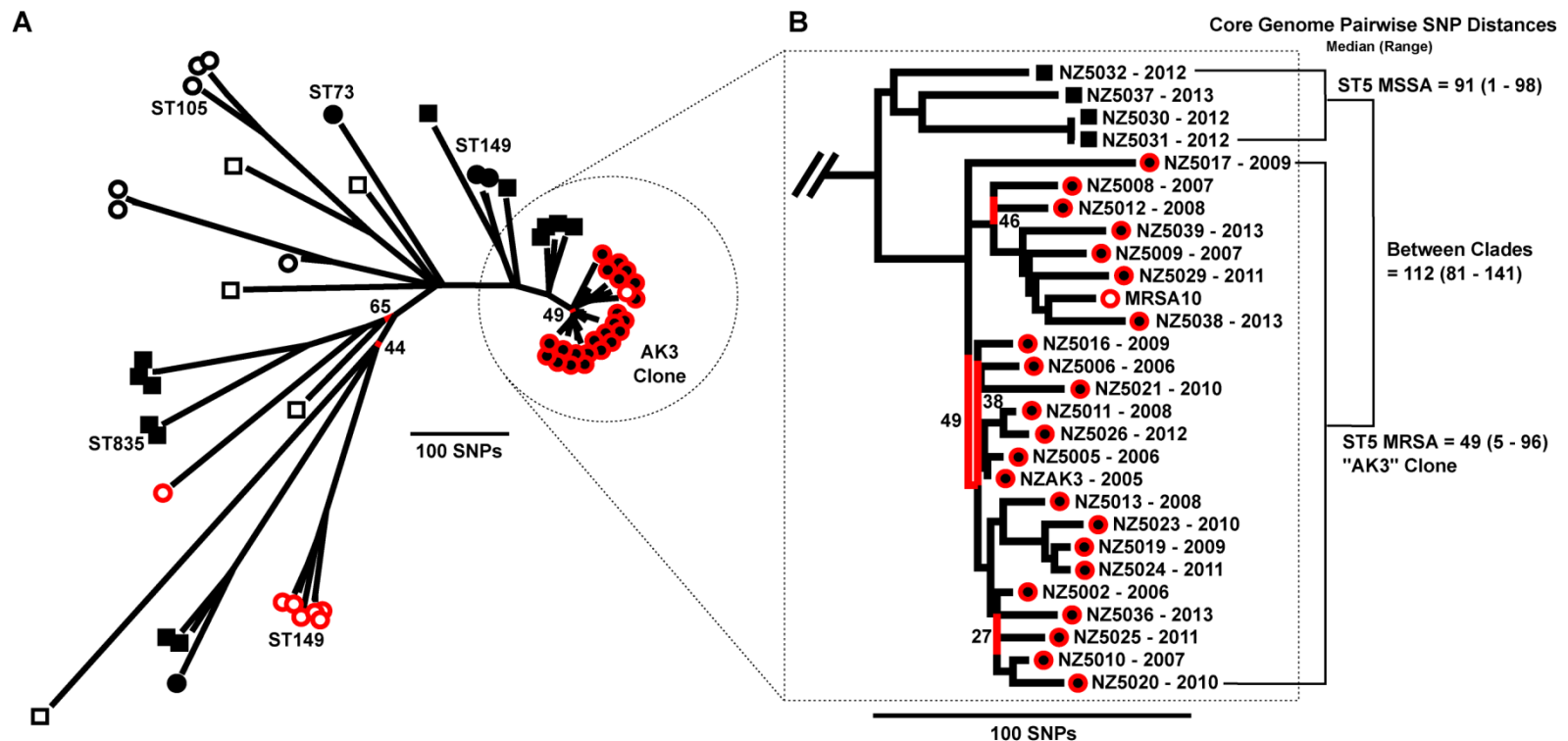
It presents in children as school sores, boils and crusty ulcers which doctors commonly treated with the ointment.

fusC is invariably contained within SCC elements

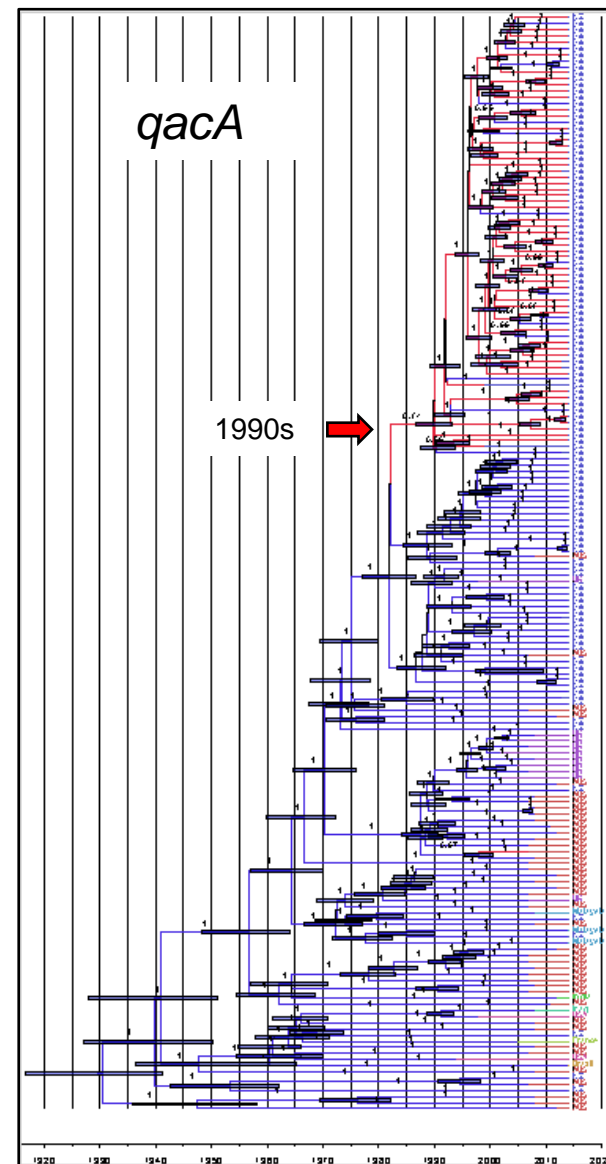
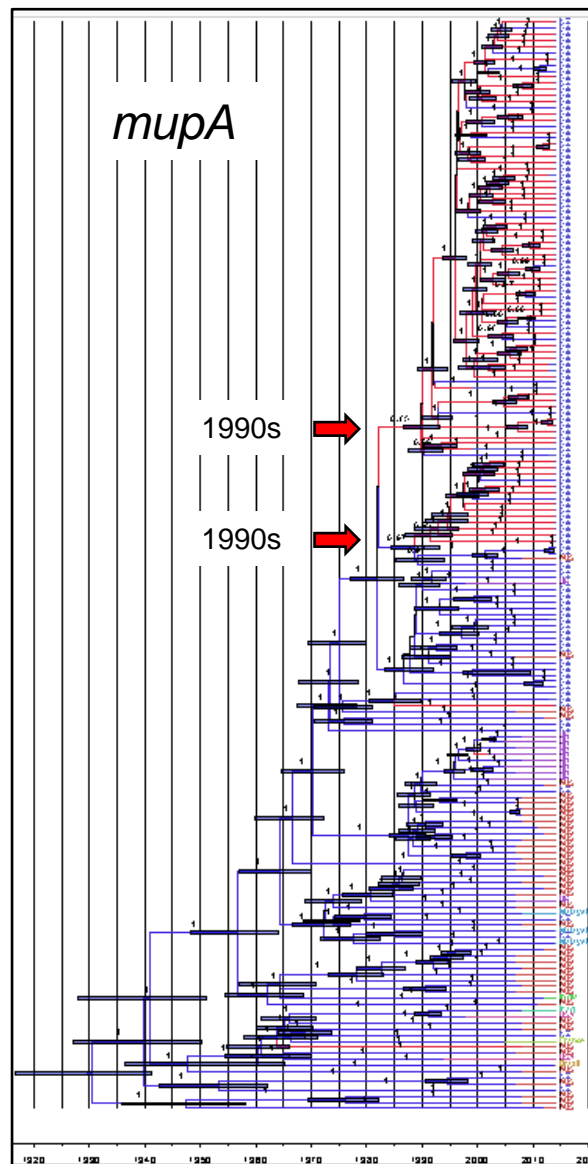
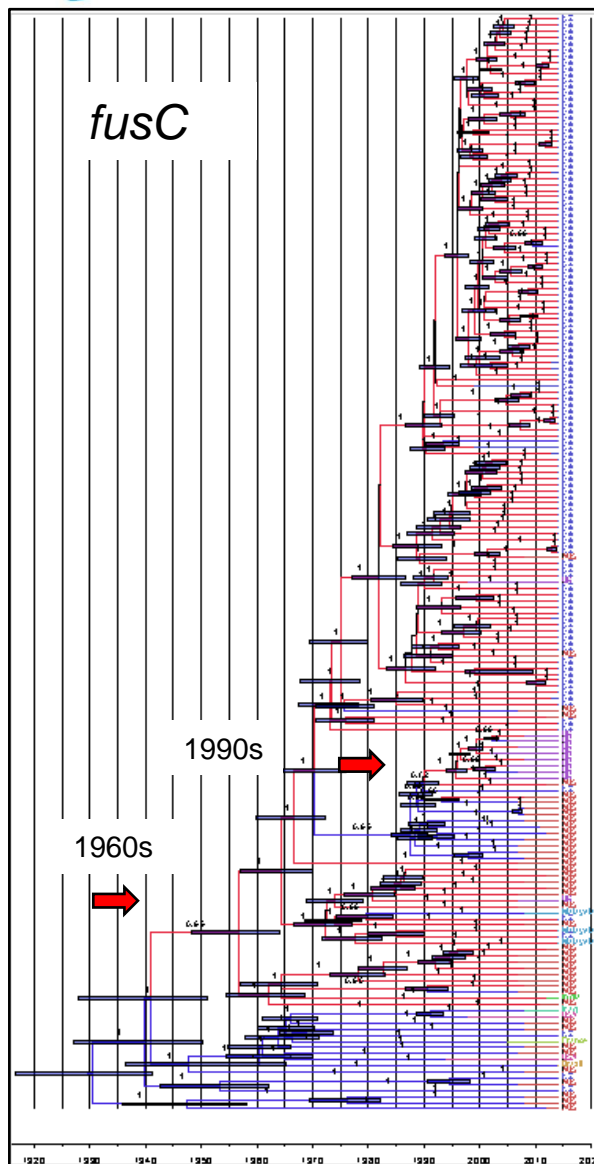


- Likely reason for why FA seems to be driving the emergence of MRSA
 - Co-selection of *fusC* and *mecA*

Population Structure of FA^R CC5 Isolates



Closely related to ST5 MSSA isolates
FA^R clone possibly emerged from locally circulating MSSA



Conclusions

- AMR is one of the biggest public health threats of the modern age
- It is almost exclusively a 'man-made' problem
- There are AMR issues 'unique' to NZ which are preventable and reducable
- Local, national and international collaboration is key