Te Tāhū Hauora
Health Quality & Safety Commission

Immunisations for older people and managing multidrug-resistant organisms in aged residential care (ARC)

Jane Aoys, Immunisation Advisory Centre

Brendan Arnold, Infectious Diseases, Te Whatu Ora Southern

19 July 2023

Opening karakia

E te huinga
Whāia te mātauranga, kia mārama
Unuhia te anipā,
te nguha, kia mahea
Kia whai take ngā mahi katoa
Tū māia, tū kaha
Aroha atu, aroha mai
Tātou i a tātou katoa
Hui e tāiki e

For this gathering
seek knowledge, for understanding
draw out the anxiety
and uncertainty, clear it away
have purpose in all that you do
stand tall, be strong
let us show respect
for each other.
It is complete

Agenda

Welcome and introduction Opening karakia	Ruth
Immunisations in ARC	Jane Aoys
Multidrug-resistant organisms in ARC	Brendan Arnold
Closing karakia	Ruth

The Immunisation Advisory Centre

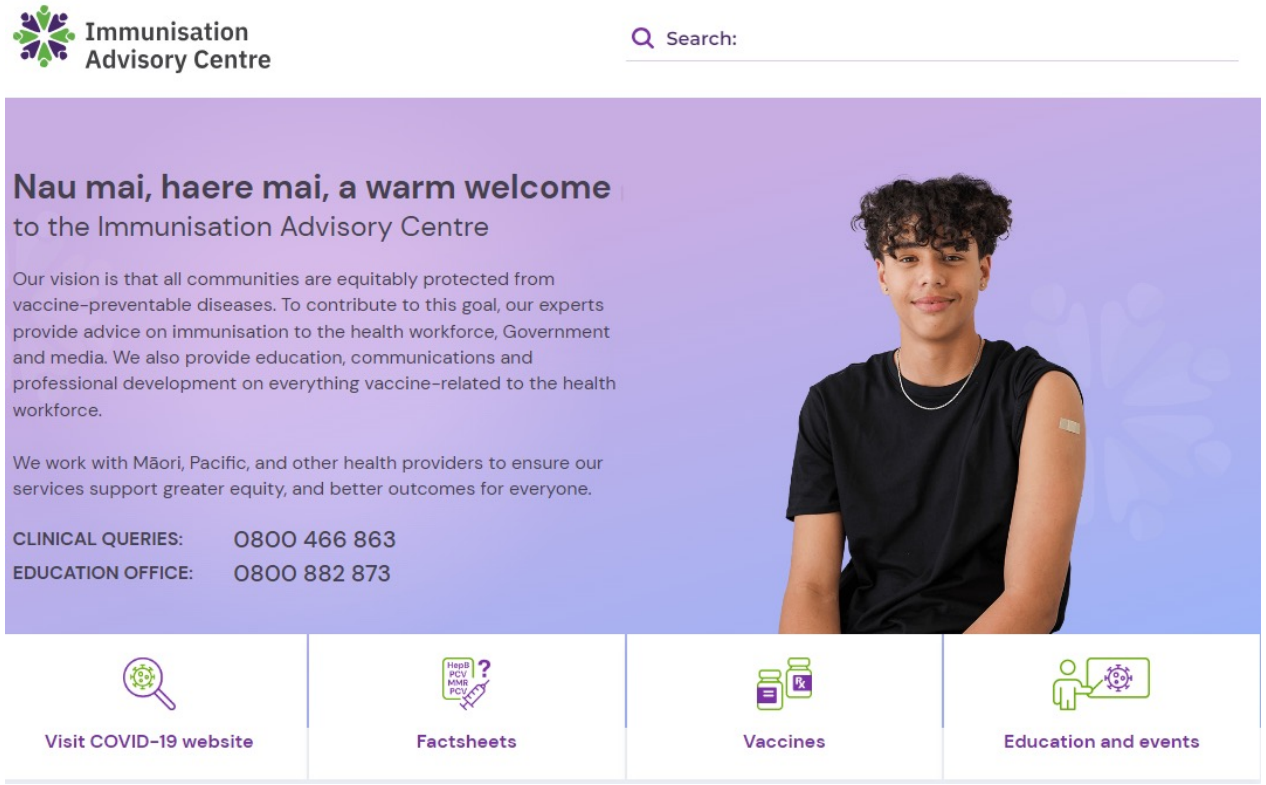
Immunisations in ARC

Jane Aoys

Immunisation education facilitator

Resources

IMAC homepage: www.immune.org.nz



Other useful links

www.influenza.org.nz

Te Aka Whai Ora
Māori Health Authority

Te Whatu Ora
Health New Zealand

www.tewhatuora.govt.nz

www.health.govt.nz/publication/immunisation-handbook-2020

The Immunisation Advisory Centre

Managing a multidrug-resistant organism outbreak in ARC

Dr Brendan Arnold
Infectious disease physician
Dunedin Public Hospital

Acknowledgement

Infection prevention and control (IPC) nurse specialists

Jo Stodart

Susan Dillon

Miriam Vollweiler

Jill Gerken

Adrienne Morgan

Nina Gallego

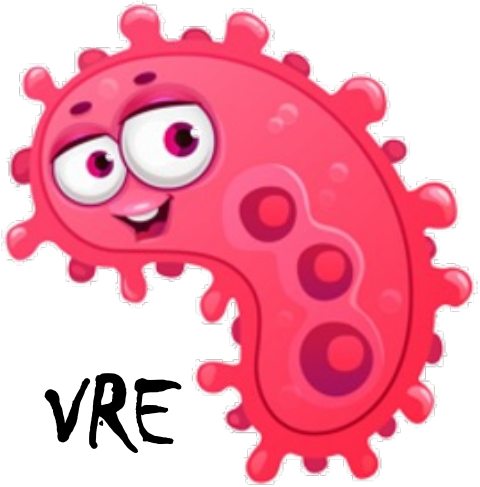
Tina Nemeth

Rachel Pannett

Rebecca Oskam-Schmidt

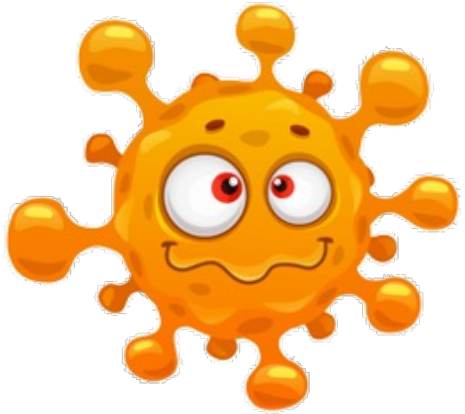
I am just the spokesman presenting the brilliant work of our fantastic IPC specialists.

Bug du jour



VRE

ESBL



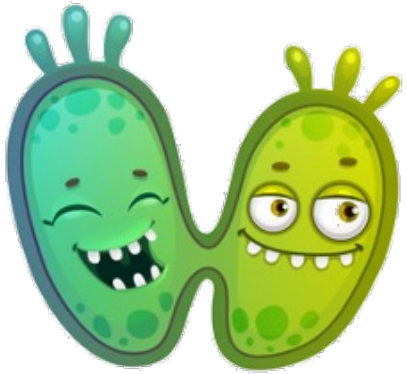
MRSA

Influenza

COVID

Norovirus

Scabies



C. difficile

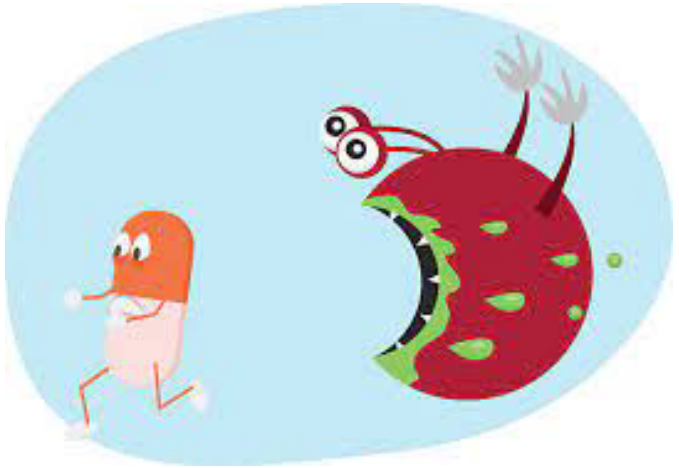
Other respiratory viruses

Carbapenemase-producing organisms (CPOs)

What is a carbapenem?

- Carbapenems are an important *class* of antibiotics.
- Most common example: **meropenem**.
- Given intravenously.
- Typically used in intensive care units or oncology wards.
- Use to treat infections that have not responded to the usual first-line antibiotics.
- Considered a ‘top-shelf’ antibiotic; reserved for the most difficult infections.

What is a carbapenemase?



- Some bacteria produce **an enzyme** that can dissolve a carbapenem antibiotic – making it ineffective.
- The enzyme is called a ‘carbapenemase’.
- A bacteria that can produce this enzyme is called a ‘carbapenemase-producing organism’ and is resistant to this antibiotic class.
- Abbreviated to CPO.

NB: Previously called carbapenem-resistant Enterobacteriaceae.

Where do CPOs come from?

- Increasing problem worldwide, particularly in developing countries.
- However, also found in hospitals in the USA, Greece, Italy, Turkey, Israel and many other countries.
- Most common form is a simple *Escherichia coli* bacteria, like the *E. coli* that we all carry in our gut as part of our normal bowel flora … except this *E. coli* has learnt how to produce a carbapenemase enzyme.
- Rarely found in Aotearoa New Zealand to date – so we are trying to keep it controlled for as long as possible.

Colonisation

When a bacteria is present in or on the body but is not causing any problems or symptoms, ie, ‘silent carriage’.

Infection

When a bacteria causes clinical symptoms, eg, fever, painful urination, etc.

CPOs

- People can carry these bacteria in their gut – it just becomes part of the bowel flora.
- They are silently ‘colonized’ with it, but it won’t necessarily cause any illness.
- **Is no more virulent** than a typical *E. coli* bacteria, ie, no better at causing disease – but if it does, there are fewer antibiotic options to treat it.
- When the bacteria escapes the bowel, it can cause an infection; a urine infection is the most common.

How do people ‘catch’ this bacteria?

- Normal *E. coli* lives in our bowel – it’s in our faeces.
- If a person ingests food or water contaminated with a carbapenem-producing *E. coli,* they may become colonised with it.
- It may live on surfaces and then infect a person by hand-to-mouth contact.
- Carried between patients on the hands of health care workers and on equipment.
- May be acquired through the use of communal toilets and bathrooms.
- More likely to colonise people who are sick or frail, have catheters or chronic ulcers or are taking antibiotics already (disrupted bowel flora).

Scenario

A urine specimen from a resident in a hospital-level care facility unexpectedly returns a growth of:

How do we manage a CPO outbreak in ARC?

URINE

MICROSCOPY
Leucocytes: > 1000 x10 ^6/L Erythrocytes: 10-20 x10 ^6/L
Epithelial Cells: 10-20 x10 ^6/L

CULTURE
>100 x10 ^6 CFU/L of Escherichia coli

The presence of epithelial cells is consistent with contamination.

This organism produces a carbapenemase. Please contact Infection Prevention and Control AND the Clinical Microbiologist or Infectious Disease Physician.

Please consult Infection Prevention and Control Guidelines.

SUSCEPTIBILITIES

Amoxycillin	R
Cefuroxime (Parenteral)	R
Ciprofloxacin	I
Co-amox/Clav(Augmentin)	R
Cotrimoxazole	R
Gentamicin	S
Nitrofurantoin	S
Trimethoprim	R
Ceftriaxone	R
Cephalexin	R
Fosfomycin	S
Mecillinam	S
Meropenem	R

Never let a good crisis go to waste.

Challenging situations inevitably uncover fresh insights and point to opportunities for positive practice improvement.

A problem shared is a problem halved.

Managing an outbreak is a team effort.

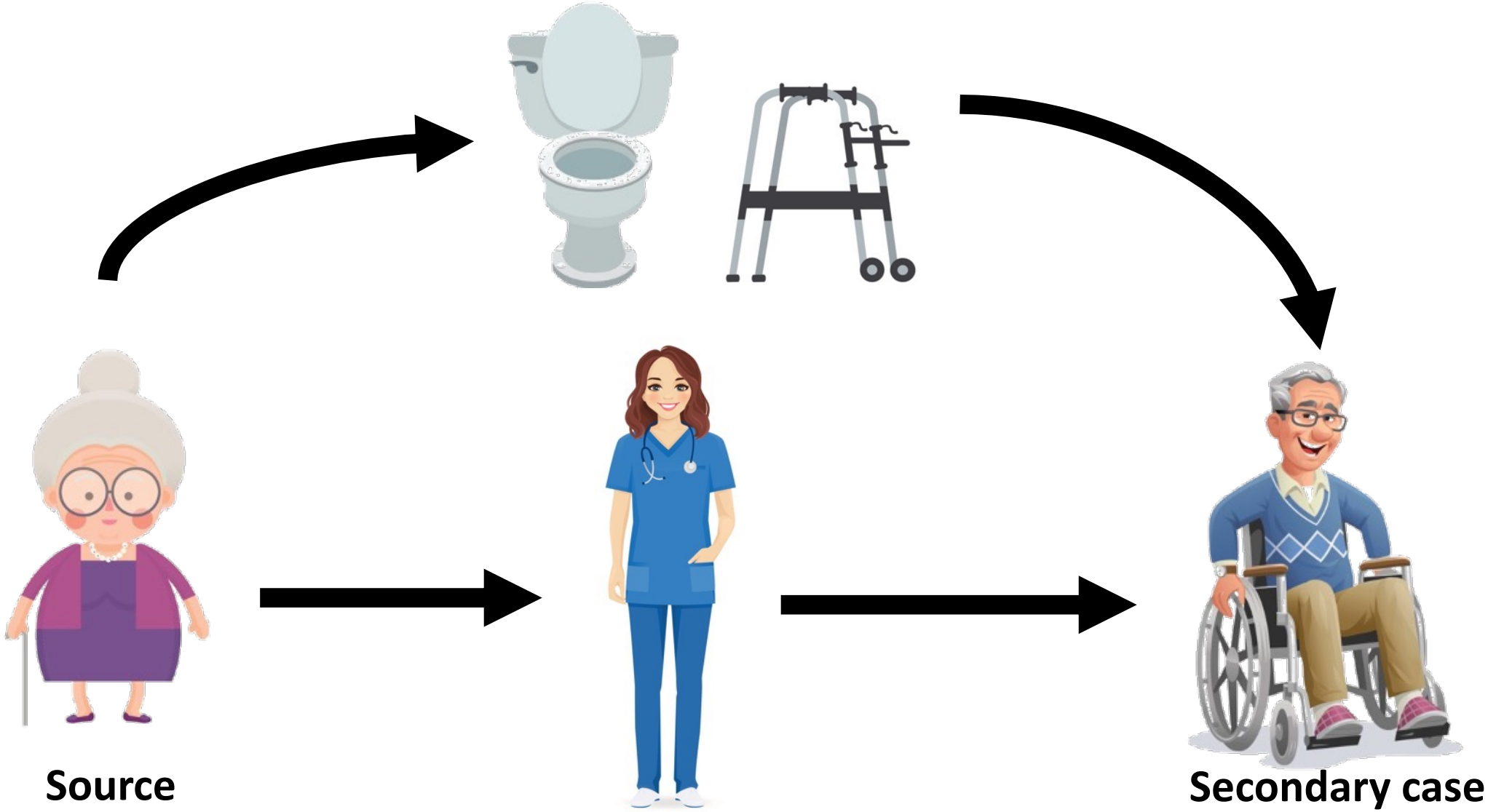
Step 1

Set up an outbreak committee to lead the response

- ARC staff and management
- Executive leadership
- IPC clinical nurse specialists
- Public health
- Clinical microbiologist and lab manager
- Infectious disease physician
- Communication

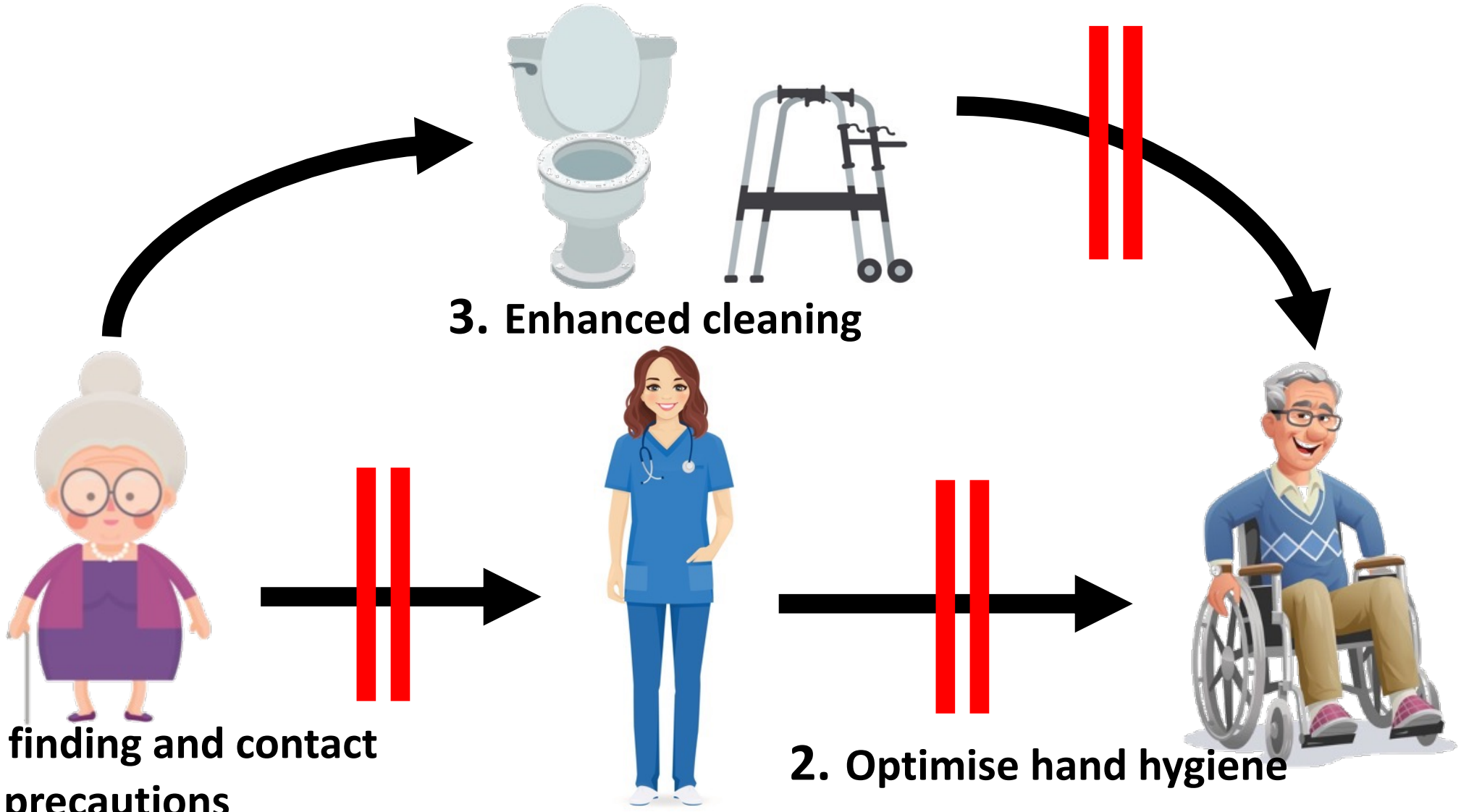
Step 2

Break the chains of transmission



Step 2

Break the chains of transmission



1 Case finding and management	2 Optimise hand hygiene	3 Enhanced cleaning
Multiple rounds of testing required • Faecal specimen or rectal swab • Catheter urine specimens • Chronic wound swabs Contact precautions for cases • Once a case, always a case? • Observe and educate staff • Visitor policy Standard precautions for everyone Dedicated equipment, eg, hoist belts Dedicated toilet/bathroom Cohorting patients? • Toilet/bathroom cohorting Cohorting staff? Linen and laundry handling protocol Close ward to new admissions? Back trace transfers and inform Hospital transfer protocol Treatment plan if infection (eg, UTI)	Staff education +/- simulations Observe workflows and identify areas of opportunity Resident hand hygiene before meals Visitor hand hygiene Assess glove-wearing behaviours Appoint IPC and hand hygiene champions Hand hygiene compliance auditing Posters and pumps *Location* of hand gel pumps Are the sinks accessible?	Engage with cleaning staff: • Who's involved with cleaning? • Cleaners? Health care assistants? • Procedures, practices and products • Disposable cloths? • Cleaning schedules • Orientation? Training? Any auditing? • High-touch surfaces • Observe; identify areas of opportunity Enhance the cleaning schedule Environmental and equipment audit • washable, wipeable and intact Inspect bed pans/commodes/sanitizers/ sluice Environmental sampling? Denture handling/cleaning/storage Maintenance and replacement schedules

Twelve strategies to optimise antimicrobial use in ARC

4. Antimicrobial stewardship

Remove the selection pressure that is promoting spread and acquisition of drug-resistant bacteria

1. Avoid treating asymptomatic bacteriuria

Rationale
Strong evidence from several RCTs demonstrate lack of benefit in the absence of urinary symptoms, even in elderly patients with delirium.

Action
*Urine dipstick should **not** be performed, and urine culture should **not** be collected from an asymptomatic patient.*

Consider a simple trial of increased oral or subcut. fluid rehydration for elderly patients with delirium without obvious cause, and review in 24 hours.

2. Remove Long-term indwelling urinary catheters if possible

Rationale
All chronically catheterised patients have bacteria in their urine. They can become a source of infection.

Catheterised patients are also at higher risk of acquiring bacteria from the environment and other residents.

Action
Discontinue catheter use and promote napkin use with good skin care and barrier creams if possible.

If not possible, then optimise aseptic technique when catheter exchanges are performed.

3. Review patients on long term antibiotics

Rationale
Some patients may have been placed on long term antibiotics for recurrent UTI's or prosthetic joint infections many years ago. This may no longer be appropriate.

Action
Discuss case with ID physician.

4. Avoid treating viral URTI and viral exacerbations of COPD with antibiotics

Rationale
Some COPD exacerbations are non-infective and will settle with just salbutamol and prednisone. Prescribe antibiotics only if marked increase in sputum volume and sputum purulence.

Action
Consider blood tests e.g. FBC, CRP to help differentiate, rather than empiric antibiotics.

Bacterial pneumonia is seldom "wheezy".

Seek approval from SCL microbiologist to perform nasopharyngeal swab for influenza/RSV/COVID rather than empiric antibiotic therapy.

5. Use penicillin-VK (phenoxymethylpenicillin) for lower respiratory tract infections / pneumonia

Rationale
Penicillin is still highly effective for Streptococcus pneumoniae. Even for aspiration pneumonia, penicillin is effective against most oral anaerobes.

Action
e.g. penicillin-VK 500 mg QID x 3 days

6. Preferentially use nitrofurantoin for lower urinary tract infections

Rationale
Nitrofurantoin is entirely absorbed in the proximal small bowel before being excreted into the urine. It therefore provides less selection pressure on the colonic flora.

Action
Nitrofurantoin MR 100 mg PO BD x 5 days

Can be used down to eGFR of 30 mL/min if used as a short course.

Twelve strategies to optimise antimicrobial use in ARC

4. Antimicrobial stewardship

Remove the selection pressure that is promoting spread and acquisition of drug-resistant bacteria

7. Use flucloxacillin for skin infections and ulcers.

Rationale
Flucloxacillin has no activity against E. coli, unlike amoxicillin, Augmentin, cefalexin, and cefaclor.

Don't swab a chronic ulcer unless clearly infected with surrounding erythema, swelling, and pain. If treatment is indicated, use drugs without activity against E. coli initially.

Action
Skin infection: Flucloxacillin 500mg TID x 5 days

Infected Chronic ulcer: flucloxacillin 500mg TID + metronidazole 400mg PO BD x 5 days

Broaden treatment to include Gram negative coverage only if this fails.

8. De-prescribed PPI's (Omeprazole)

Rationale
Omeprazole is associated with an ~70% increase likelihood of acquiring colonic carriage of a drug-resistant organism, due to decreased protection provided by gastric acid.

Many patients can trial off omeprazole without return of GERD symptoms.

Action
Trial omeprazole withdrawal or dose reduction.

9. Restrict the use of ciprofloxacin and norfloxacin.

Rationale
Fluoroquinolones provide strong selection pressure for resistant organisms and have a low barrier to the development of resistance.

Action
Use only if clearly indicated and no other options available e.g. a symptomatic Pseudomonas UTI

10. "De-label" penicillin allergy alerts

Rationale
Studies have shown that patients can be safely rechallenged with an oral penicillin if:

1. *the reaction occurred >5 years ago, and*
2. *was not associated with anaphylaxis and*
3. *did not require medical treatment (e.g. IM adrenaline, ICU admission etc.)*

Action
Penicillin oral challenge e.g. penicillin-VK 250 mg and observe in an appropriate setting for 1 hour for rash or symptoms.

Can discuss case with ID physician for peer support.

11. Avoid antibiotics in patients with life expectancy < 4 weeks

Rationale
Studies have shown minimal or no demonstrable benefit from antibiotics at the end-stages of life.

Action
Review advanced directives / advanced care plans.

12. Reduce length of antibiotic prescriptions

Rationale
Many infections such as lower respiratory tract, urinary tract infection, and skin infections will respond to just 3 - 5 days of antibiotic therapy.

Action
Prescribe just 3 - 5 days initially and then review.

A second course can be given if not improved or relapse.

Language and communication

- Avoid finger pointing and fault finding; it is unhelpful to achieving the goal of outbreak control.
- Staff are not the problem – **they are the solution!**
- Where are the opportunities for quality improvement?
  - **we identify *opportunities* not issues.**
- Staff communication.
- Open disclosure to existing residents, families and new admissions.
- Accept that we may never know the origin of the outbreak. The index case is just the first case identified.

Controversies

Environmental sampling for CPO?

- Thorough cleaning, not sampling, solves the issue.
- Limited role for hard-to-reach/clean sites, eg, sinks, taps, drains.
- Focus on areas that are high-risk transmission points.

Controversies

Staff testing for faecal CPO carriage?

- Minefield of legal and employment issues to consider.
- What do you do with the result?
- Unnecessary if good hand hygiene and standard precautions are followed.

Can health care workers acquire this bacteria from patients?

- Considered uncommon for health care workers to acquire.
- There is no treatment/antibiotic that can remove it from bowel carriage.
- Studies of travelers who acquire it while traveling overseas show that the majority lose the bacteria after ~12 months.
- Most of these travelers would never even know they had been carrying it.
- In healthy people not taking antibiotics, the normal *E. coli* bacteria eventually take over again.
- Even *if* you were to become colonised (unlikely), and then subsequently develop an infection from it (even less likely), there may still be some antibiotic options, eg, nitrofurantoin and gentamicin.

Preventing health care worker acquisition

- With simple hygiene practices, we should not be consuming *E. coli.*
- **Hand hygiene** – hand washing/alcohol-based hand gel
  - before and after touching a patient
  - before and after performing cares or a procedure or if exposed to bodily fluid
  - after touching a patient's surroundings
  - when you come to work and when you leave
  - after using the toilet!
  - before you eat, smoke or vape.

Preventing health care worker acquisition

- Keep food or drink in the tearoom, not at workstations.
- Fresh clothes/uniform each shift, and launder clothes in the normal way.
- Separate staff and patient/resident toilets.
- Standard and contact precautions.

A word about gloves

- Gloves do not provide complete protection against hand contamination.
- Bacteria may gain access to workers' hands via small defects in gloves or during glove removal.
- **Wearing gloves does <u>not</u> replace the need for hand hygiene**
- Hand hygiene before you put gloves on and after you take them off
- Don’t walk between rooms or patients with gloves on; they are essentially unwashed hands!

Questions

Contact information

- IPC webpages for all programmes and projects: hqsc.govt.nz/our-work/infection-prevention-and-control
- General IPC programme enquiries: ipc@hqsc.govt.nz

Karakia whakamutunga

Kua mutu a tātou mahi
Ka tae te wā
mō te whakairi te kete
I te kete kōrero,
I te kete whakaaro
Hei tiki atu anō mā tatou
Tauwhirotia mai mātou katoa
Ō mātou hoa
Ō mātou whānau
Āio ki te Aorangi.
Hui e tāiki e.

Our work has finished
The time has arrived
to gather one’s thoughts in the basket
That contains discussion
and concepts
That we may use it again in the future
Protect us all
Our colleagues
Our families
Peace to the universe.
It is complete.