

# **AURA 2019:**

**Third Australian report  
on antimicrobial use  
and resistance in  
human health**

**Consumer  
Summary**



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# Introduction

The World Health Organization has stated that antimicrobial resistance is one of the greatest threats to human health.

Resistance to antimicrobials occurs when bacteria change to protect themselves from these drugs. When this happens, infections that could once be treated or prevented with antimicrobials can become life-threatening once more.

Antibiotics are the most commonly prescribed type of antimicrobial – so improving the way we use antibiotics helps fight antimicrobial resistance.

Reducing antimicrobial resistance will help keep us healthy, and ensures these precious drugs will be useful for future generations.

In Australia, a National Antimicrobial Resistance Strategy was released in 2015 to respond to the challenges presented by antimicrobial resistance.

## Why is AURA important?

Stopping antimicrobial resistance requires a coordinated national effort supported by data and evidence.

To do this, we need to know how people are using antimicrobials and what bacteria are developing resistance. We also need to monitor our current strategies to understand what is working and what isn't working.

**Antimicrobial Use and Resistance in Australia (AURA)**, is a national surveillance system put in place by the Australian Commission on Safety and Quality in Health Care (the Commission) to gather and analyse this information.

The data collected by AURA is being used to help doctors, health professionals, and governments take the right action to reduce antimicrobial resistance in Australia.

This brochure explains the problems of antimicrobial resistance, how and why it occurs, and what we can do about it.



# An overview of Antimicrobial resistance

## What is antimicrobial resistance?

Antimicrobial resistance occurs when microorganisms such as bacteria become resistant to antimicrobial medicines such as antibiotics.

Resistance means that medications are no longer as effective at curing the infections caused by these bacteria. Some bacteria are now so resistant that there are no medications available to treat infections caused by them.

Sometimes bacteria can develop resistance to a range of different antimicrobials. These are called multidrug-resistant bacteria – sometimes called ‘superbugs’.

Resistant bacteria can spread easily between people in the community, hospitals and other health services. Aged care homes are especially at risk because residents live in close proximity and there are high levels of prescribing, resulting in people being more exposed to antimicrobial resistant bacteria.

The main cause of antimicrobial resistance is using antibiotics, so reducing our use of antibiotics is important. However, it is also important to take a range of actions to slow the spread of resistant bacteria, like having good hand hygiene and cleaning thoroughly.

## What are microbes and antimicrobials?

**Microbes**, sometimes known as germs, include bacteria, parasites, viruses, fungi and other microorganisms. Bacteria live on our body surfaces (known as colonisation), including our skin, and in our nose, throat and gut.

Almost all these bacteria are beneficial to our health, but some can cause us to become ill if given the opportunity, such as *Escherichia coli* – the bacterium that causes many urinary tract infections. Other bacteria that do not live on us can also cause infections, such as *Clostridium tetani* – the cause of tetanus.

**Antimicrobials** are medicines designed to treat or prevent infections caused by bacteria, parasites, viruses or fungi.

They kill microbes, or stop them from multiplying. Antimicrobials include antibiotics (antibacterials), antiparasitics, antivirals and antifungals.

## What are antibiotics used for?

Antibiotics are valuable and useful medications that treat some bacterial infections. Used in the right way, they save lives. But if antibiotics are used when they’re not needed or if they are not used in the right way, they contribute to drug-resistant infections or antimicrobial resistance.

In Australia, we use antibiotics more than many other developed countries and sometimes they’re prescribed when they’re not really needed, which means more bacteria develop resistance.

It is important to remember that antibiotics kill not only the bad bacteria that make you sick, but they also kill the good bacteria that keep you healthy. When these good bacteria are killed, it gives other types of bacteria room to grow, possibly leading to other infections.

## Types of antibiotics

There are different types of antibiotics. Each is designed to work on specific bacteria or a specific range of bacteria.

If the antibiotic kills (or stops from multiplying) a small number of different types of bacteria, it is called ‘narrow spectrum’. If the antibiotic kills many different types of bacteria at once, it is called ‘broad spectrum’. Broad spectrum antibiotics are more likely to cause antimicrobial resistance. Antibiotics do not fight infections caused by viruses, such as:

- Colds and flu
- Most coughs and bronchitis
- Most sore throats.

Taking antibiotics for these infections won’t help – but it will increase the risks of antimicrobial resistance or other side effects, such as thrush and nausea.

If you are prescribed an antibiotic, it is important that you follow your doctor’s instructions on how to take the antibiotic and how long to take it.

**If you have a cold or flu, antibiotics won’t help you**

## Why is antimicrobial resistance important?

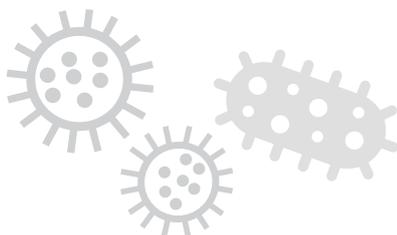
Antimicrobial resistance puts people at risk of infections that we may not be able to treat.

Unless we can slow down antimicrobial resistance and develop new antimicrobials, the effects and cost of antimicrobial resistance will continue to increase – more people will be sicker for longer with infections and complications which are harder to treat.

Antimicrobial resistance is a risk to people's health because:

- It reduces the number of antimicrobials that doctors can use to treat infections
- It increases illness and deaths caused by infections from multidrug-resistant microbes
- Infections may require broad-spectrum rather than narrow-spectrum antimicrobials, or the use of antimicrobials which may have more side effects
- Medical procedures such as organ transplantation, cancer chemotherapy and major surgery become more risky because you might develop an infection afterwards that can't be treated with common antibiotics
- You may need to be treated in hospital with intravenous antibiotics, because the bacteria causing your infection are resistant to all the medicines that can be given by mouth
- It can increase the length of hospital stay
- If you pick up and carry a resistant organism, you may spread it to your family or other people close to you. This may have drastic consequences, especially if they have a compromised immune system.

**Working to combat antimicrobial resistance is a priority for our health system due to its serious and growing impact on human health.**



## Types of resistant bacteria in Australia

Twelve bacteria, or bacterial families, have been identified as the most important for monitoring in Australia.

Some of these bacteria are important to monitor because they commonly cause infection or spread easily, while others are important to monitor because they can have a significant impact on a person's health when they do cause infection.

Resistant bacteria can spread easily between people in the community, hospitals, other health services and aged care homes. The spread of these bacteria often happens quickly and may go unnoticed until an infection has developed. Therefore, it is important that Australia identifies and monitors resistant bacteria so that action can be taken to prevent them from spreading.

Two common bacteria that we monitor are:

### Enterobacterales

This is a large family of bacteria, including *E.coli*, that commonly causes urinary tract infections and may cause infections after surgery or blood infections.

Resistance in these bacteria is increasing. Resistant infections may need to be treated in hospital because of a lack of effective antibiotics that can be taken by mouth outside of hospital.

Bacteria from this family are resistant to many antibiotics, including to a group of broad spectrum antibiotics known as carbapenems. These bacteria are now found in Australia in hospitals and in the community.

### Staphylococcus aureus

This is a common bacterium which lives on the skin of many people. Also known as 'Golden Staph' or MRSA, it causes a wide range of infections, such as boils, impetigo (school sores), wound infections, bone and joint infections, and blood infections (septicaemia).

Resistance to 'Golden Staph' is reducing in hospitals but increasing in the community.

## How do we monitor antibiotic use and the spread of resistant bacteria?

To fight antimicrobial resistance we need to understand the scale of the problem.

We know that the more antimicrobials are used, the more likely it is that resistance will develop. So carefully monitoring antibiotic prescribing and use is essential for informing strategies to prevent and contain antimicrobial resistance in Australia.

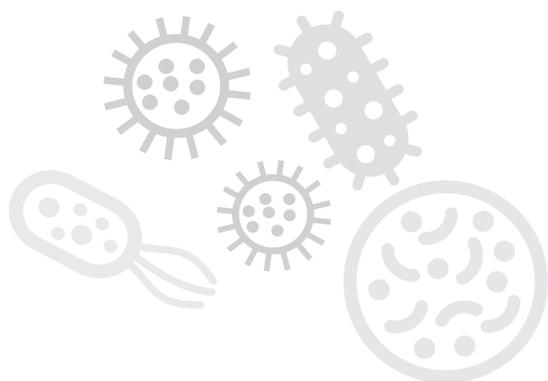
We need to understand:

- Which microbes are becoming resistant and are there differences across Australia
- Which antimicrobials they are resistant to
- How fast this resistance is changing
- How much and how we are using antibiotics.

## What causes antibiotic-resistant bacteria?

The main cause of antimicrobial resistance is using antibiotics.

The more we use antimicrobials, especially when they're not needed, the more bacteria have the chance to change and to resist the medication. It is bacteria, not the human body, that become resistant to the antibiotics designed to kill them.



## About the AURA Surveillance System

The AURA Surveillance System was established by the Commission in 2014, to collect the data that we need to fight antimicrobial resistance.

AURA gathers data on antimicrobial use, appropriateness of use, and antimicrobial resistance from a range of sources including hospitals and community settings like general practice and aged care. The range of data sources (where the information comes from), is gradually increasing to provide an even better picture of the changes in resistant bacteria and prescribing patterns.

Looking at these data collections altogether tells us which antimicrobials are being prescribed unnecessarily, which antimicrobials may be at risk of becoming less effective or ineffective, and which bacteria are particularly threatening to our health.

AURA uses this data to produce a range of reports to support Australia's overall response to the challenge of antimicrobial resistance.

AURA 2019 is the third national report of its type on antimicrobial resistant bacteria and antibiotic use in Australia. It includes:

- Data about organisms that are a priority for Australia
- The volume of antibiotic use
- The appropriateness of antimicrobial prescribing
- Key emerging issues for antimicrobial resistant bacteria
- A comparison of Australia's situation with other countries.

For the full AURA 2019 Report go to <https://www.safetyandquality.gov.au/AURA2019>

# Key findings of AURA 2019

## How much do we use antibiotics in Australia?

Antimicrobial use in the Australian community is high compared with many other developed countries.

In 2017, over 40% of Australians had at least one antibiotic dispensed in the community.

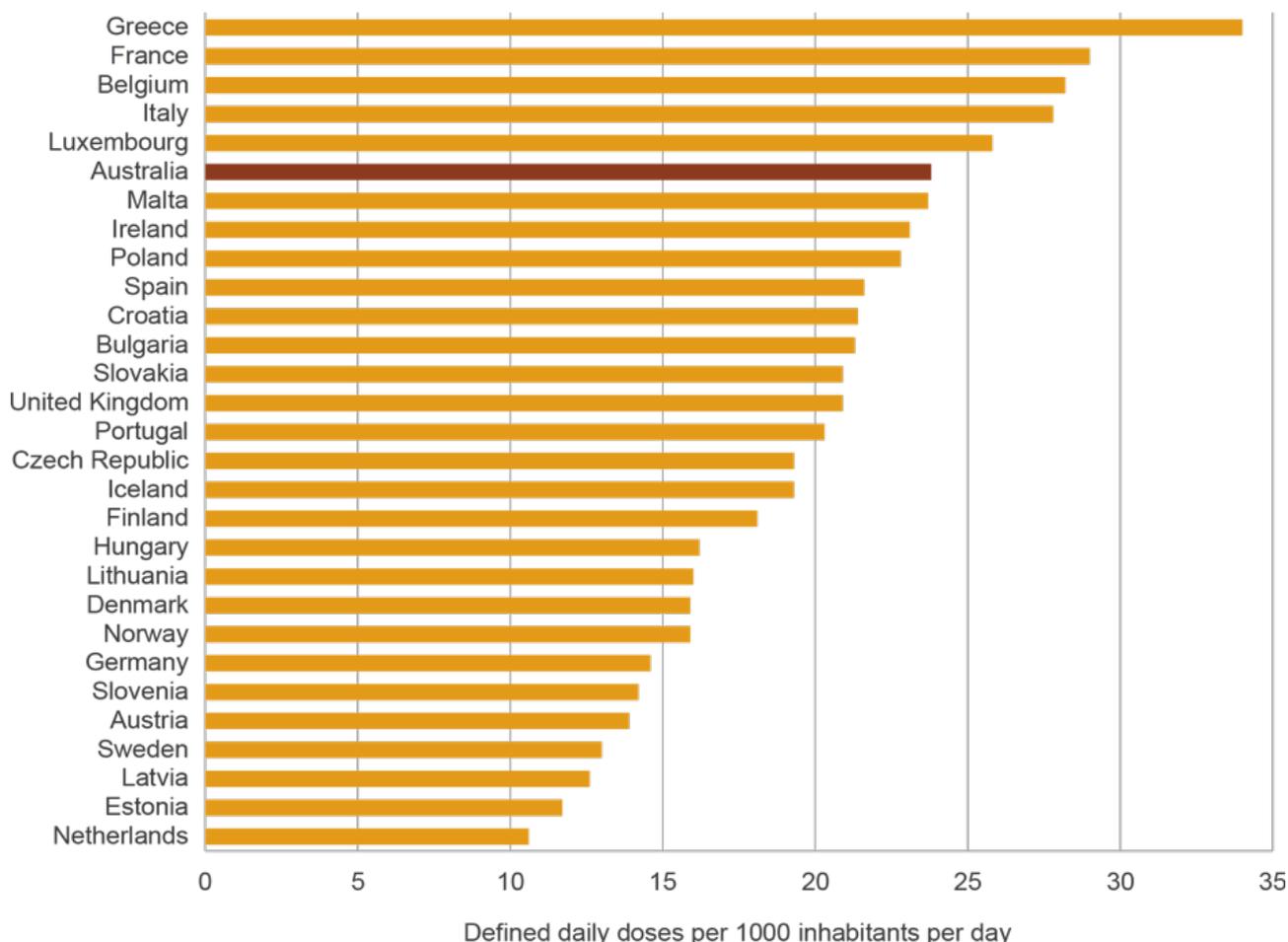
Figure 1 shows that only 5 of these 29 countries have a higher use of antimicrobials than Australia.

Australia has national guidelines called 'Therapeutic Guidelines' to help healthcare professionals make decisions about whether to prescribe antimicrobials, which ones are appropriate, the appropriate dose, and the length of time for use.

Despite these guidelines, antimicrobials are sometimes prescribed inappropriately, for example to treat viral infections (such as colds or flu) where they have no benefit, or when the infection will get better by itself.

Further investigation is needed to understand why this is happening so we can learn how best to act to improve prescribing in Australia.

Figure 1: Antimicrobial use in Australia compared to other countries in 2014



Sources: Pharmaceutical Benefits Scheme (Australia); European Surveillance of Antimicrobial Consumption Network (Europe)

## Antimicrobial use in hospitals

Australia's antimicrobial use in hospitals participating in surveillance has decreased gradually since 2010.

The five most commonly-used antibiotics in hospitals are:

- Amoxicillin–clavulanic acid (Augmentin®)
- Cefazolin
- Flucloxacillin
- Doxycycline
- Amoxicillin.

Reducing inappropriate prescribing of cefalexin and amoxicillin–clavulanic acid, and promoting use of narrower-spectrum antibiotics such as amoxicillin, will reduce broad-spectrum antibiotic use, and help to prevent and contain antimicrobial resistance.

The most common reasons for antibiotics being prescribed in hospitals in 2017 were:

- Preventing infections during surgery or when someone's immune system is compromised
- Community-acquired pneumonia
- Urinary tract infections
- Blood infections.

The three most common reasons for inappropriate prescribing were:

- The illness did not need antibiotics
- Using antimicrobials that were broad-spectrum when narrow-spectrum would have worked
- The dose was incorrect.

### Key points

- Antibiotics are being overprescribed in Australia and not in compliance with the Therapeutic Guidelines
- Antibiotics are being prescribed for acute bronchitis and flu, for which antibiotics are never recommended
- Inappropriate prescribing in hospitals remains a problem, with nearly one-quarter of the prescriptions assessed found to be inappropriate
- The most used antimicrobials are also the ones that have the highest rates of inappropriate prescribing
- Cefalexin and amoxicillin–clavulanic acid had the highest rates of inappropriate prescribing.

### Priorities

#### Chronic obstructive pulmonary disease (COPD)

Prescribing of antimicrobials for respiratory conditions, including bronchitis and chronic obstructive pulmonary disease, is a priority area for improvement as antibiotics are being inappropriately prescribed.

AURA is working with clinical specialist groups to improve appropriate prescribing for these conditions.

#### Amoxicillin–clavulanic acid and cefalexin prescribing

Reducing inappropriate prescribing of these antibiotics and promoting use of narrow-spectrum antibiotics such as amoxicillin, will reduce the volume of broad-spectrum antibiotic use, and help to prevent and contain antimicrobial resistance.



## Antimicrobial use in the community

The good news is that the use of antibiotics is decreasing in the community. Community refers to general practice, specialist outpatient clinics, dental clinics and aged care homes.

For some important resistances in Australia, there have been distinct upward trends in community data since 2006, such as methicillin-resistance in *Staphylococcus aureus* (MRSA). When people go into hospital with a resistant infection they caught in the community it makes their care more complex, so reducing resistance in the community is an important strategy.

However, antibiotics continue to be overprescribed in the community, compared with guideline recommendations:

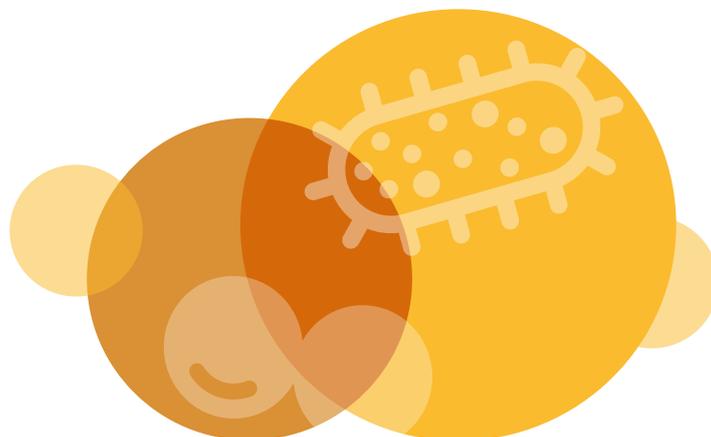
- More than 50% of people with colds and upper respiratory tract infections were prescribed antimicrobials when they are not recommended by current prescribing guidelines
- Some antimicrobials were prescribed much more in winter, which suggests that they are being used to treat colds and flu, for which they have no benefit
- Antimicrobials of the penicillin (e.g. Amoxil®) and cephalosporin (e.g. Keflex®) classes were the most commonly prescribed antimicrobials in the community setting.

### Key points

- There was a decline in antibiotic dispensing in 2016 and a further decline in 2017, the first downward trend since the late 1990s
- The mostly commonly supplied antibiotics are cefalexin, amoxicillin and amoxicillin–clavulanic acid
- In patients aged under 65 years, the highest rate of dispensing was for children aged between two and four years
- Around 50% of all antibiotic prescriptions were ordered with repeats when they may not be needed
- There have been distinct upward trends in some resistant bacteria present in the community.

General practitioners play a crucial role in improving the appropriate use of antimicrobials and supporting the reduction of resistance in the community.

AURA will continue to work with primary care providers to support appropriate reduction in antimicrobial prescribing.



## Antimicrobial use in aged care

Preventing and controlling infections in aged care homes is challenging, making it a high-risk environment for antimicrobial resistance.

Data from AURA show that, for some organisms, rates of antimicrobial resistance in aged care are as high or higher than rates in hospitals. This puts aged care homes at particular risk for growing and spreading antimicrobial-resistant bacteria.

In facilities with frequent and inappropriate antimicrobial use, there is an increased risk for all residents of acquiring an antimicrobial-resistant infection.

Residents of aged care homes can be frail and vulnerable to infections. Their immune systems may not be as strong as younger people. This means a higher rate of infections, higher levels of unnecessary prescribing, and increased potential for antimicrobial-resistant bacteria to spread quickly.

Even those who are not receiving antimicrobial therapy are vulnerable because of the potential for infections to spread among the residents.

Other high-risk factors exclusive to aged care homes include:

- A close living environment and frequent contact with other residents, visitors and staff who may be infected
- Residents moving frequently in and out of hospitals
- Higher use of invasive devices such as urinary tract catheters
- Higher levels of infection and colonisation with multi-drug resistant organisms.

### Key points

- Of the prescriptions assessed, there is a high rate of use of antimicrobials for unconfirmed infections
- Over half of antimicrobial prescriptions were for residents who had no signs or symptoms of infection
- Antimicrobials are being used for conditions where they are not required, such as urinary tract, soft tissue and skin infections.

### Priorities

#### New Aged Care Quality Standards 2019

From July 2019, Commonwealth-subsidised aged care services will be required to comply with new aged care standards. These will include:

- Minimising the risk of infection through infection control
- Promoting appropriate antibiotic prescribing to reduce the risk of antibiotic-resistant infection
- Good clinical governance.

AURA will work with stakeholders to promote these standards and to prioritise interventions that reduce inappropriate prescribing of selected antimicrobials.

**For more information go to <https://agedcare.health.gov.au/quality/single-set-of-aged-care-quality-standards>.**



# What you can do to prevent the spread of resistant infections?

Everybody can be part of preventing antimicrobial resistance, not just health professionals.

As a consumer of health services and antimicrobials, it is important that you know that not all infections require treatment with antimicrobials.

Antibiotics treat some bacterial infections, but for many common conditions, such as colds and flu, they are not effective at all.

For your own personal health, you should only take antibiotics for infections caused by bacteria. Antibiotics will not help if you have a viral infection, and you run the risk of experiencing side effects and contributing to antimicrobial resistance.

**It is also important that you talk to your healthcare provider about the signs and symptoms of your illness, so you both have the information you need to make the best decision about your treatment.**

## 1 You can prevent the spread of germs by:

- Washing your hands after sneezing or touching your eyes, nose or mouth
- Coughing into your elbow instead of your hand
- Staying away from work or school if you are unwell
- Having the vaccinations your doctor recommends for you
- Ensuring your home environment is clean.

## 2 If you do get sick:

- Ask what you can do to feel better and ease your symptoms while your body fights the illness
- Let your doctor know that you are concerned about antibiotic resistance and only want an antibiotic if it is really necessary
- Ask your doctor if a test would identify the cause of your infection.

## 3 If your doctor prescribes an antibiotic:

- Take your antibiotic exactly as your doctor has prescribed
- Never take leftover antibiotics or give them to someone else
- Don't keep any repeats of the prescription 'just in case' of future sickness – always see your doctor each time
- After you are better, return any unused medicine to your pharmacy.



# What AURA is doing to prevent the spread of resistant infections

## Understanding antimicrobial resistance through data collection

The more we understand prescribing patterns, resistance rates and trends over time, the better we can guide improvements in how health services manage infection control and antimicrobial prescribing.

AURA provides an overall picture of patterns and trends in antimicrobial use and resistance rates in Australia through its regular reports.

## Sharing information with health professionals and consumers

AURA helps build the awareness and understanding of consumers, by providing information on the risks of antimicrobial resistant bacteria and what actions you can take as an individual.

Health professionals can use AURA information to better understand which microbes may be developing resistance to antimicrobials in their local area, and which conditions therefore may require a different treatment or medication approach.

Health services and system managers can use AURA information and their own organisational data to identify where they may be using antimicrobials differently to others, and where they may not be prescribing or using antimicrobials consistently with national guidelines. They can review the reasons why and learn how to improve treatment.

## Working with health professionals, hospitals and aged care to improve antimicrobial resistance

Information and data from AURA is used to help health professionals and the community better understand the risk of antimicrobial resistant bacteria and develop response strategies.

The Commission and AURA will work closely with stakeholders on the priority areas over the coming years, and will continue to collaborate with partner organisations such as NPS MedicineWise to ensure communication with healthcare consumers is both useful and meaningful.

### Like to know more?

If you would like more information about an antibiotic you have been prescribed, you can ask your doctor or talk to your local pharmacist.

If you would like more information about AURA go to [www.safetyandquality.gov.au/AURA](http://www.safetyandquality.gov.au/AURA)



A series of information sheets, reports and animations that form part of the Commission's AURA project can be found at:  
[www.safetyandquality.gov.au/AURA](http://www.safetyandquality.gov.au/AURA)

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