

WEBINAR



COVID-19 UPDATE

Wednesday 23 July 2025

6pm – 7pm AEST

Presenter: Prof Gary Grohmann

Moderator: Andrew Minton, PhD



Presenter

Prof Gary Grohmann

Board Member/Director – Immunisation Coalition
Adjunct Professor – University of Sydney
Past Head of Immunology – TGA

Virologist
Consultant – WHO
Consultant – Environmental Pathogens P/L

Key Interest Areas:
Vaccine development, manufacturing and regulatory advice



Disclosures



Board Member and Scientific Advisory Committee Member - Immunisation Coalition

Adjunct Professor – University of Sydney

Consultant Virologist – WHO | Environmental Pathogens P/L

Advisory Roles - CSL/Seqirus (Flu. Covid). Novavax (Covid19 Protein vaccine)

GPN (pneumococcal) CSIRO (JE vaccine)

MSD (pneumococcal) GSK (Meningococcal)

WaterCare (Auckland)

Key Interest Areas:

Virology, Vaccine development, manufacturing and regulatory advice, Environmental public health issues.

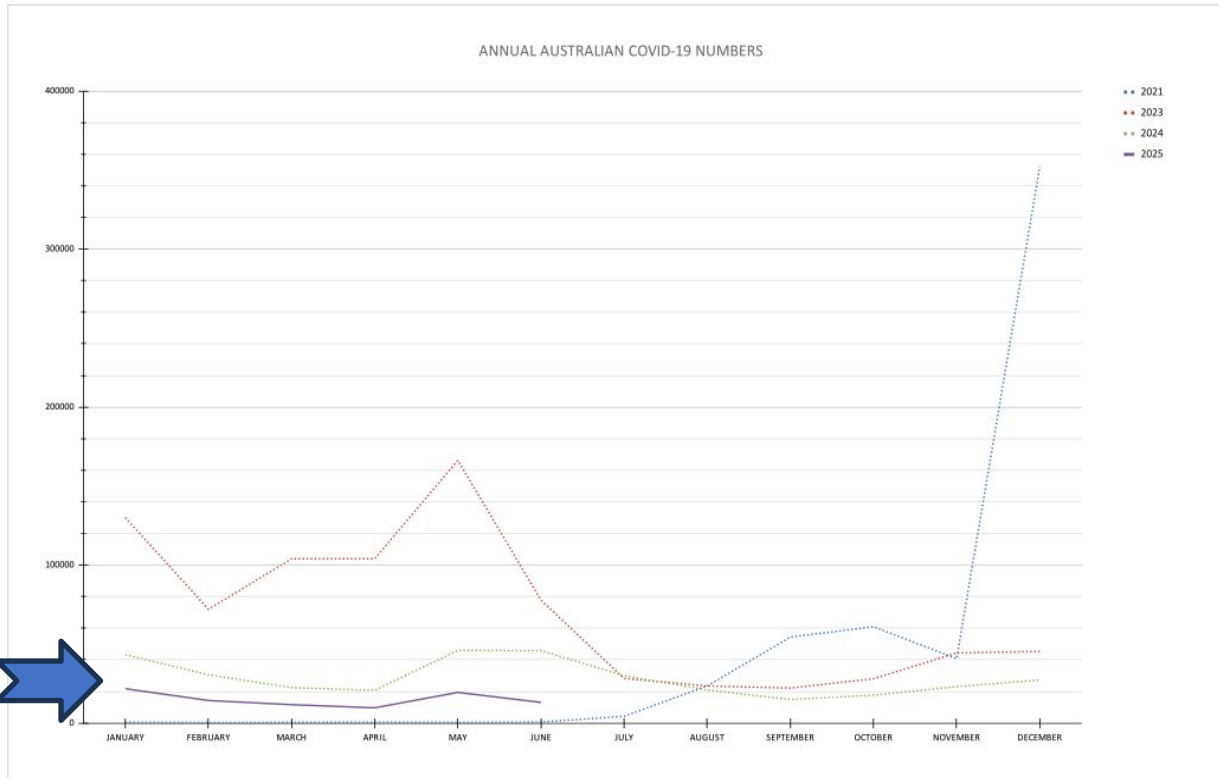
AUSTRALIA: Current COVID-19 Landscape

- As of mid-June 2025, Australia is experiencing an increase in COVID-19 cases (Described as a SURGE!)
- *The emergence of a new subvariants, NB.1.8.1 ; PF.2 ; XFG* (Most changes have little to no impact on the virus's properties)
- NB.1.8.1. variant has become the dominant strain in several regions, but Queensland, has the greatest number of cases
- Between mid-May and early June, 64.2% rise in COVID-19 cases.
- Hospitalisations have also “surged”, with over 320 individuals admitted in the past two weeks, two-thirds of whom are over the age of 65.
- Since January 2025, QLD has recorded over 17,600 cases and approximately 3,000 hospitalisations.



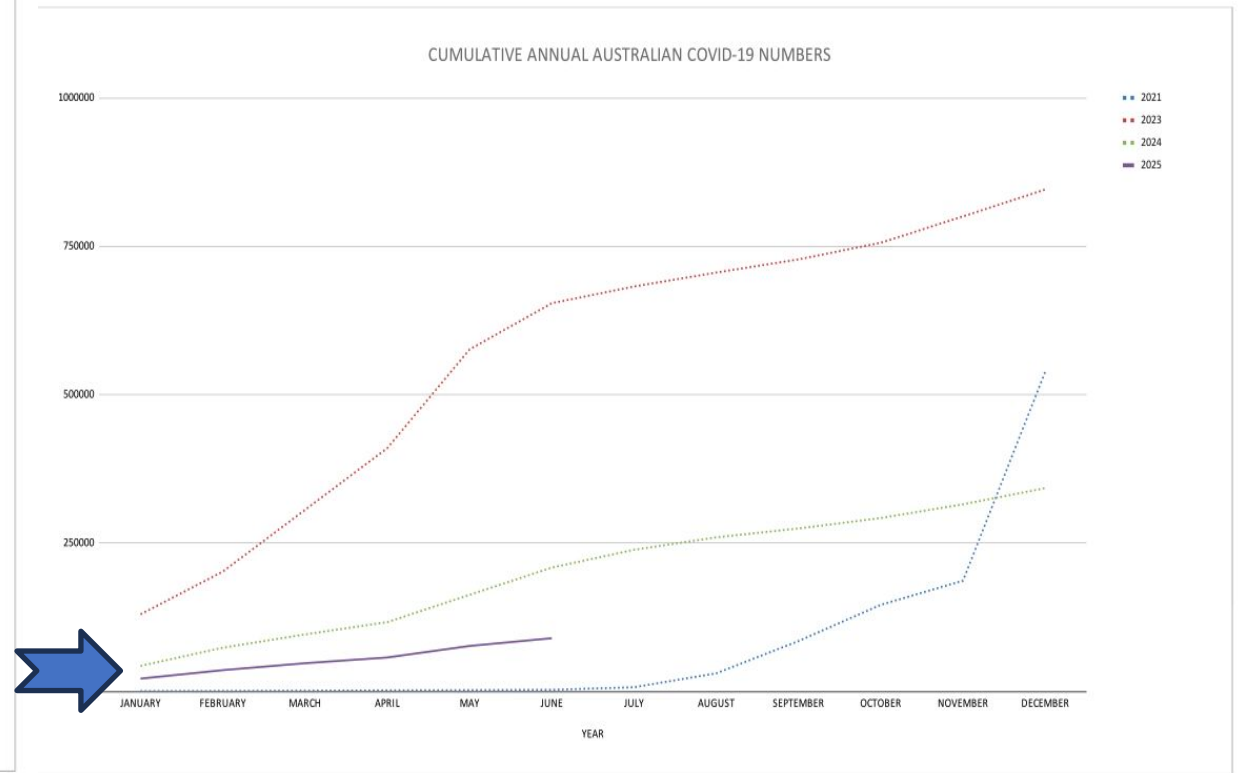
Is there a surge? Total numbers are actually decreasing

Annual Numbers



Reference: These statistics are taken from the Aust Government Department of Health, National Notifiable Diseases Surveillance System

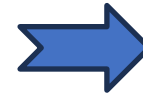
Cumulative Totals



Reference: These statistics are taken from the Aust Government Department of Health, National Notifiable Diseases Surveillance System

Nationally – Current situation

- Nationally, the situation mirrors Queensland's trend.
- The Australian Respiratory Surveillance Report indicates a 64% increase in COVID-19 cases across the country
- As of June 15, 2025, Australia has reported a cumulative total of 12,216,713 confirmed COVID-19 cases and 25,791 Deaths
- Number of vaccines – 71M doses
- Number who have not had a vaccine in the last 6 mo 17,619,300 (suboptimal uptake)



HOSPITALISATIONS

Fri 18 Jul - Current Cases Admitted



STATE	HOSP		ICU	
NSW	61	• 0	0	• 0
Victoria	49	• 0	3	• 0
Queensland	111	• 0	0	• 0
WA	60	• 0	2	• 0
SA	N/A		N/A	
Tasmania	N/A		N/A	
ACT	8	• 0	0	• 0
NT	N/A		N/A	
Australia	289	-	5	• 0

<https://covidlive.com.au>

Co-circulation with Influenza and RSV (and others)



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- The winter season has brought a simultaneous rise in other respiratory illnesses.
- Influenza cases have increased by 65% nationally (>200,000 cases reported)
- Respiratory Syncytial Virus (RSV) cases have risen by 28% nationally

In Queensland:

- a 30% increase compared to the previous year.

RSV Prevention Program launched in April 2024.

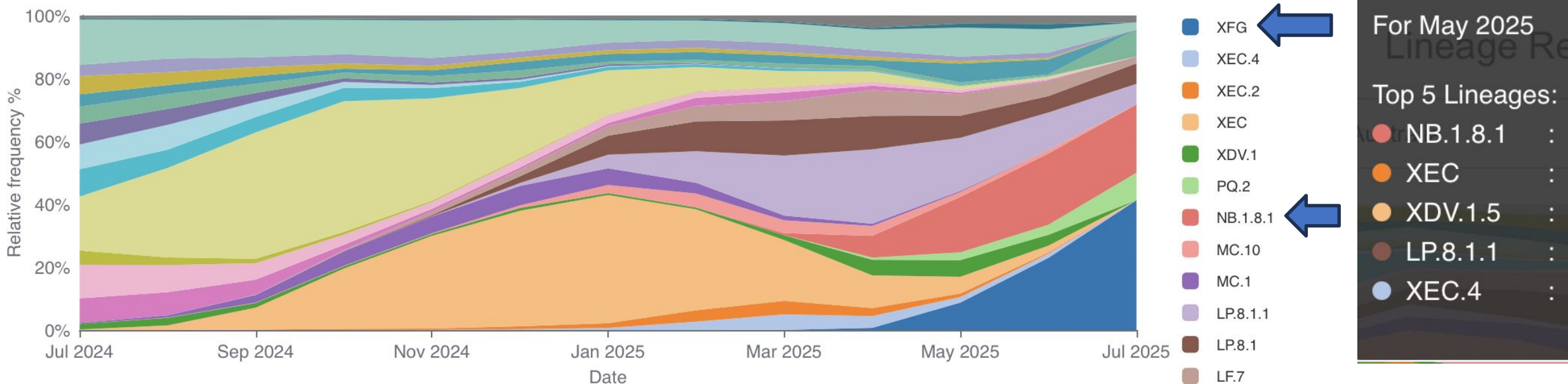
- Since its inception, 57,000 + women and children have been immunised, leading to a 75% reduction in RSV-related hospitalisations among infants under six months.

NB.1.8.1 (Omicron) Subvariant

- The NB.1.8.1 subvariant is characterised by a **broader range of acute symptoms** compared to previous strains.
- It presents with gastrointestinal symptoms
 - nausea, vomiting, diarrhoea, and heartburn,
- Common respiratory symptoms like sore throat, fatigue, and fever.
- No evidence suggesting increased severity
- Current JN1 Covid-19 vaccines effective (WHO)

SARS-CoV-2 Lineages: GLOBAL

NB.1.8.1 was predominating – BUT XFG now emerging

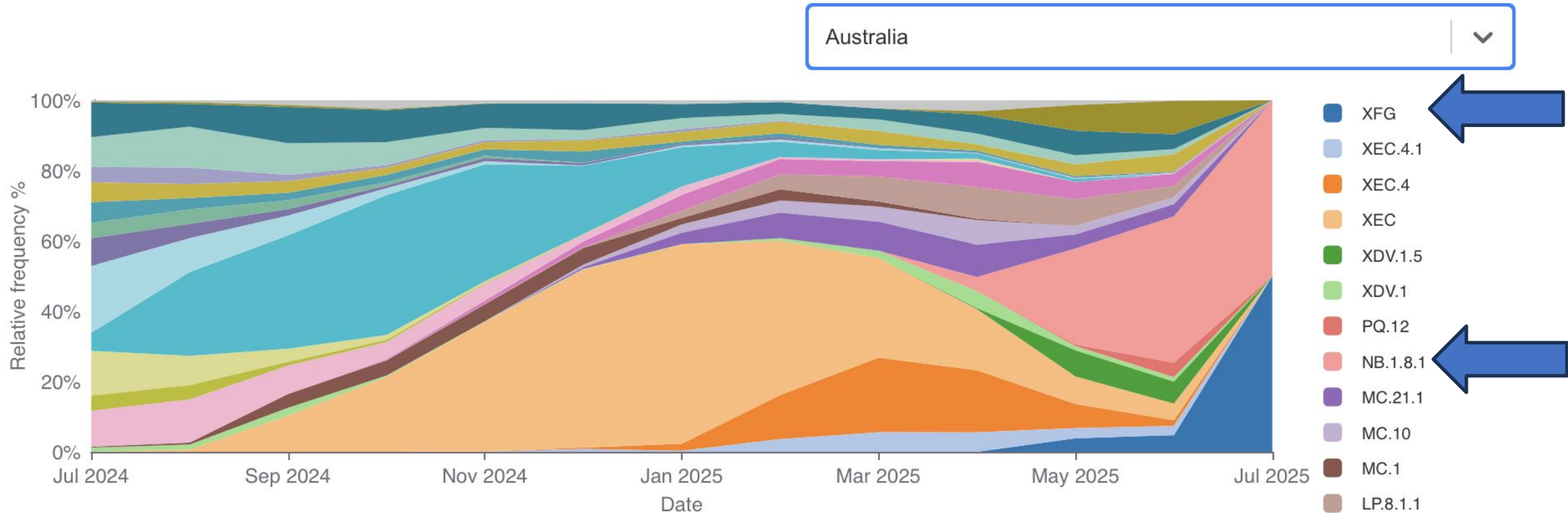


SARS-CoV-2 Lineages: AUSTRALIA



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NB.1.8.1 was predominating – BUT XFG now emerging



ATAGI (The Australian Technical Advisory Group on Immunisation) and ACIP (USA)



COVID-19 vaccinations no longer recommended for healthy children and adolescents under 18

A significant change has been made to the Australian Immunisation Handbook regarding COVID-19 vaccines, updated on 3 June 2025

“COVID-19 vaccine is not recommended for healthy infants, children or adolescents who do not have medical conditions that increase their risk of severe illness.

This is because the risk of severe illness was extremely low in this cohort over the course of the pandemic, and benefits of vaccination are not considered to outweigh the potential harms.”

<https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/covid-19>

ATAGI (The Australian Technical Advisory Group on Immunisation)



- ATAGI recommends a COVID-19 vaccine dose every six months for high-risk groups, including older adults and those with underlying health conditions.
- Despite these recommendations, vaccination rates remain below desired levels, prompting health officials to urge eligible individuals to stay up-to-date with their vaccinations.



ATAGI COVID-19 Vaccine Recommendations

VE against mortality 70-78%. Wanes after 8-12 weeks.

Age	With severe immunocompromise	Without severe immunocompromise
≥ 75 years	Recommended every 6 months	Recommended every 6 months
65-74 years	Recommended every 12 months and can consider a dose every 6 months	Recommended every 12 months and can consider a dose every 6 months
50-74 years	Recommended every 12 months and can consider a dose every 6 months	Can consider a dose every 12 months
5-17 years	Can consider every 12 months	Not recommended
<5 years	Not recommended	Not recommended

<https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/covid-19>

ATAGI COVID-19 Vaccine Recommendations

<https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/covid-19>

Women who are pregnant or breastfeeding

- **Unvaccinated pregnant women are recommended to receive COVID-19 vaccine**

“Unvaccinated pregnant women are at increased risk of severe disease and adverse perinatal outcomes from COVID-19.

Unvaccinated pregnant women are recommended to receive a primary dose of COVID-19 vaccine, which can be given at any time during pregnancy.”

- **Vaccinated pregnant women are not recommended to receive further doses**

“Comirnaty JN.1 vaccines can be used in pregnancy. Although the latest mRNA COVID-19 vaccines have not been formally studied in pregnant women, ATAGI considers them suitable and safe for use.”

- **NIH Study in pregnant women:** “no safety concerns for COVID-19 vaccination during pregnancy”

Medical Conditions where COVID-19 vaccines are recommended

- Any immunocompromising condition
- Cardiac disease
- Chronic respiratory condition
- Chronic neurological condition
- Chronic metabolic condition
- Chronic kidney disease stage 4 and 5
- Haematological disorders
- Chromosomal abnormality
- Obesity
- Diabetes

COVID Vaccine Co-Administration

- COVID-19 vaccines can be co-administered (given on the same day) with any other vaccine for people aged ≥ 5 years.
- All vaccinations must be recorded on the Australian Immunisation Register (AIR).

Vaccines available in Australia (Updated JN1 vaccine)



Pfizer (mRNA)

Comirnaty Omicron JN1 formulations

Paediatric formulations

<5 years

<12 years

Adolescent and Adult formulation **>12 years**

Novavax (Rx Protein formulation)

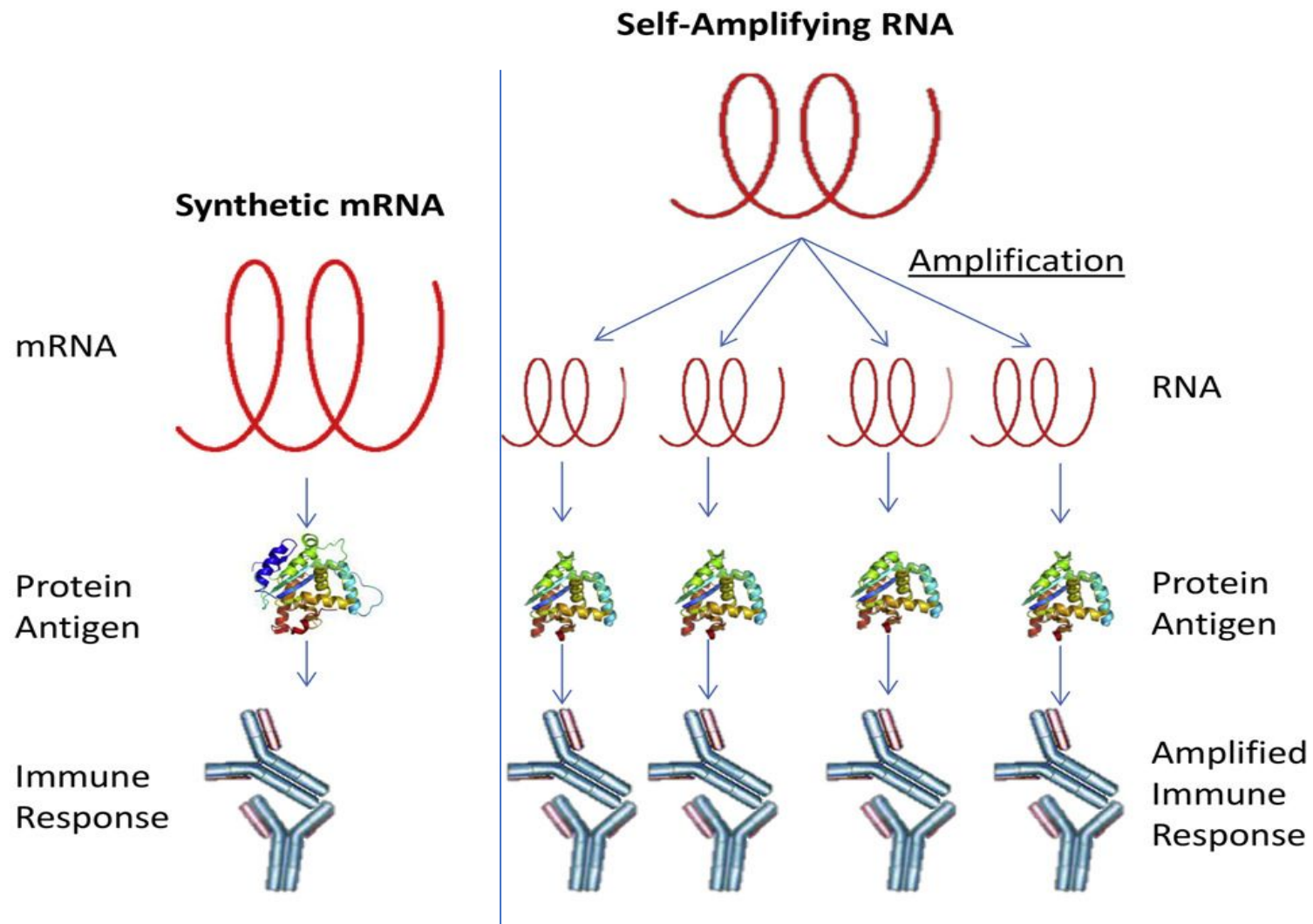
Nuvaxoid JN.1 vaccine

>12 years

(still undergoing registration process)

COVID-19 Vaccine candidates in clinical trials

Platform		Number	Percent %
PS	Protein subunit	59	32
VVnr	Viral Vector (non-replicating)	25	14
DNA	DNA	17	9
IV	Inactivated virus	22	12
RNA	RNA	43	24
VVr	Viral Vector (replicating)	4	2
VLP	Virus like particle	7	4
VVr+APC	VVr + Antigen presenting cell	2	1
LAV	Live attenuated virus	2	1
VVnr=APC	VVnr + Antigen presenting cell	1	1
BacAg-SpV	Bacterial antigen-spore expression vector	1	1



Safety and immunogenicity of intranasal parainfluenza virus type 5 (PIV5)–vectored COVID-19 vaccine in adults and teens; phase 1 trial



- An effective COVID-19 vaccine providing durable immunity with minimal reactogenicity is needed.
- CVXGA1, a PIV5-based intranasal COVID-19 vaccine expressing the Spike (S) protein of SARS-CoV-2,
- CVXGA1 elicited S-specific serum and mucosal antibodies and CD8⁺ cytotoxic T lymphocyte responses in all groups.
- Significantly lower rates of symptomatic COVID-19 infection were reported in groups receiving high-dose CVXGA1 (HD)
- Good safety profile
- No serious reactions
- Serum and mucosal immune responses
- Genetically stable

Covid Vaccine Side effects

Common Side effects

- Headache
- Fever
- Fatigue (tiredness)
- Muscle pain

Serious and **Very Rare** side effects

- **Anaphylaxis,**
- **Guillain-Barré syndrome**
- **myocarditis and pericarditis**

Adverse Events

Comirnaty (&Spikevax) (mRNA)

- Irritability, drowsiness, injection site tenderness, fatigue and fever. Headache, loss of appetite and muscle pain

Anaphylaxis

- around 10 per million doses

Myocarditis and/or pericarditis

- Very rare. The highest incidence has been reported in adolescent males after a second dose of an mRNA vaccine (Comirnaty or Spikevax)

Nuvaxovid (r Protein)

- Injection site tenderness (75%), injection site pain (53%), muscle pain (51%), headache (50%), malaise (41%), joint pain (24%) and nausea or vomiting (15%). Adverse events occurred at a similar frequency in adolescents aged 12-17 years and in adults aged ≥ 18 years.

Anaphylaxis R

- Rate undetermined. <10 per million doses.

Myocarditis and/or pericarditis

- Very rare. Low incidence of myocarditis. pericarditis

Anaphylaxis

- Anaphylaxis after one mRNA COVID-19 vaccine is a contraindication to all other mRNA COVID-19 vaccines
- Comirnaty and Spikevax vaccines would be contraindicated in someone with Anaphylaxis to polyethylene glycol (PEG),
- Nuvaxovid would be contraindicated in someone with Anaphylaxis to polysorbate 80

Effects of mRNA-COVID 19 Vaccines on Corneal Endothelium

Sumer, F., & Subasi, S. (2025). Evaluation of the. *Ophthalmic Epidemiology*, 1–8. <https://doi.org/10.1080/09286586.2025.2522724>

- The study aimed to compare corneal topographic and specular microscopic parameters before and after vaccination with activated (Pfizer-BioNTech (BNT162b2)) SARS-CoV-2 mRNA vaccine.
- The significant change in the topographic evaluation was the post-vaccine increase in central corneal thickness ($p = 0.001$).
- Changes in corneal endothelium occur in the short term after two-doses of the Pfizer-BioNTech (BNT162b2) COVID-19 mRNA vaccine.
- **The endothelium should be closely monitored in those with a low**

Immunisation and COVID-19

- Vaccines have dramatically altered the course of the pandemic, particularly for older adults.
- Clinical trials and real-world studies have demonstrated that mRNA vaccines such as Pfizer-BioNTech (BNT162b2) and Moderna (mRNA-1273), and r protein vaccines such as Nuvaxoid (Novavax) are highly effective in preventing severe disease and death in individuals
 - Even though vaccine efficacy is slightly reduced in older adults compared to younger populations, the benefit remains substantial.
 - AstraZeneca vaccines also very effective

Epidemiology

- Spread by respiratory droplets
- Hand/mouth/eyes/nose/fomites
- $R_0 = 5-6$
- Virus is easily destroyed

- Masks - effective if used properly!
- **Sweden** was less affected than most comparable countries that implemented stricter lockdown measures
- **Hygiene measures and isolation effective**



Excess Deaths per 100,000 during Covid-19

- Russia: 1125.13
- India: 510.52
- USA: 405.81
- UK: 389.91
- **Sweden: 226.03**
- **Australia: 131.91**

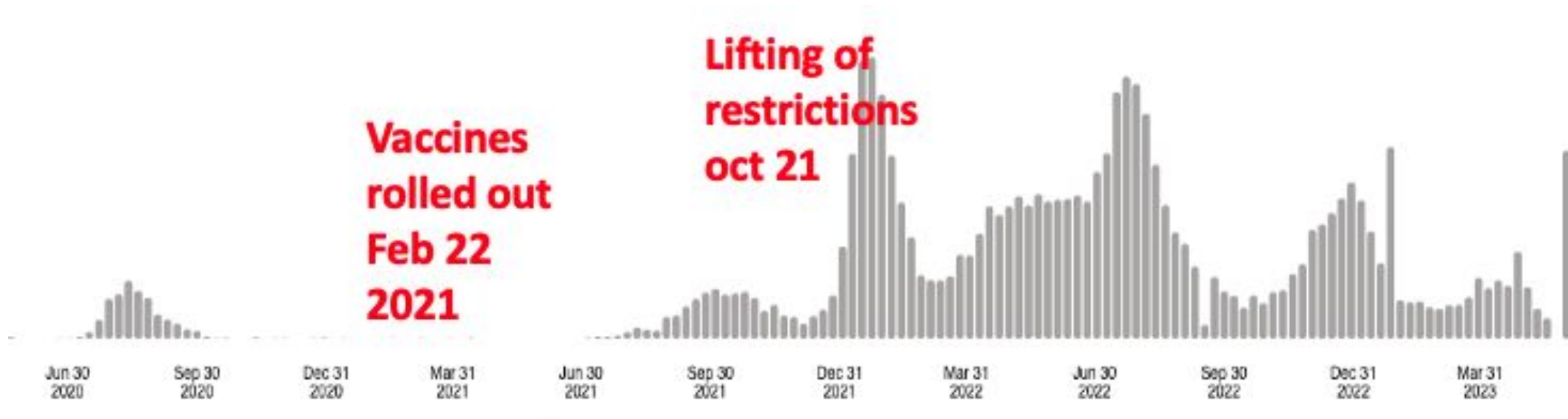
Epidemiology of COVID-19 in Older Adults:a change in 2021

- The Omicron variant caused less severe disease overall but still resulted in significant morbidity and mortality among older populations
 - especially those who were unvaccinated or immunocompromised
- Waning immunity from vaccination over time
- Need for booster doses for those over 50.
 - 2-3 per year?



Hygiene measures and isolation effective

Covid Deaths in Australia (25,791 Deaths)



As of June 15, 2025,
Australia has reported a cumulative total of 12,183,757 confirmed COVID-19 cases and 25,791 Deaths

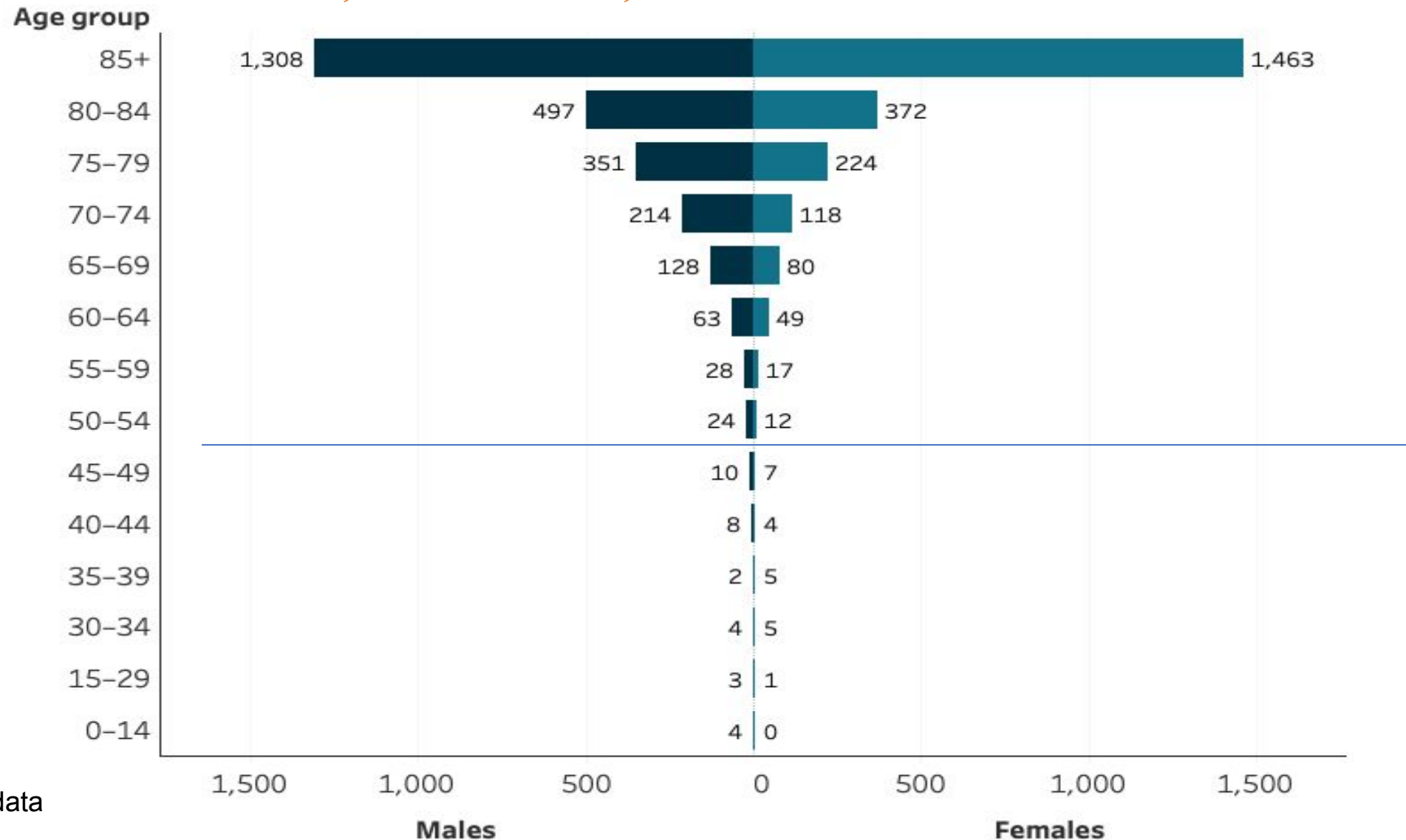
COVID-19 Deaths in People Over 50 in Australia

5001 people died of COVID-19 in 2023

3,724 in 2024, 159 to date in 2025

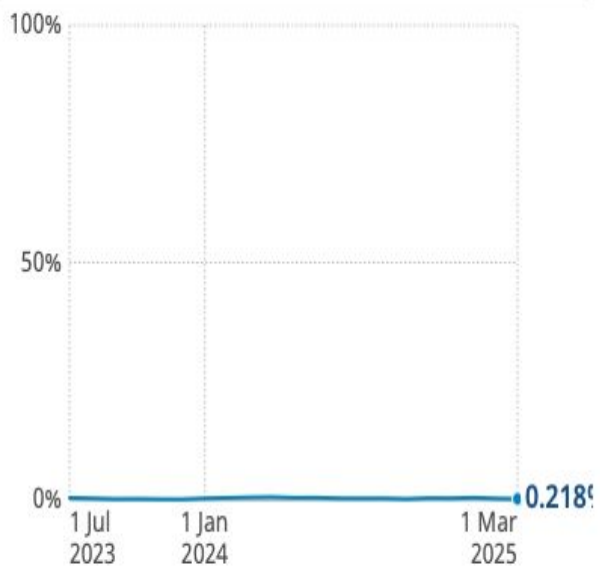


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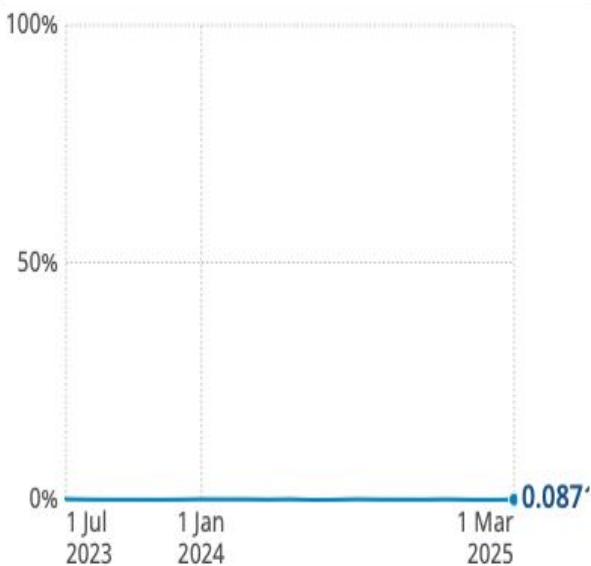


WHO data: Covid-19 Deaths in different age groups

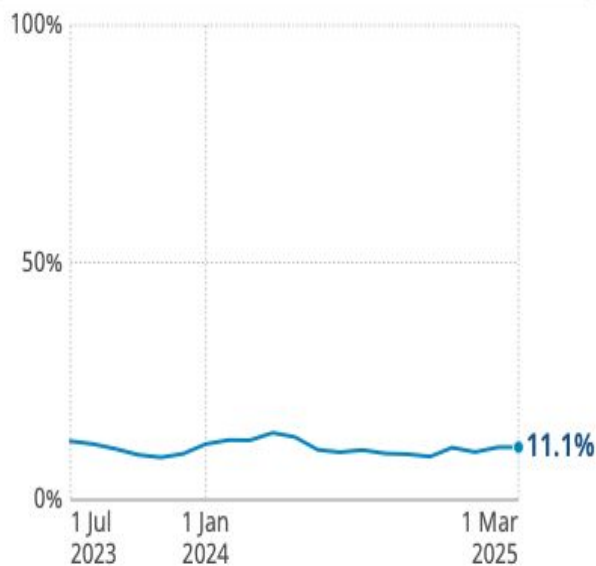
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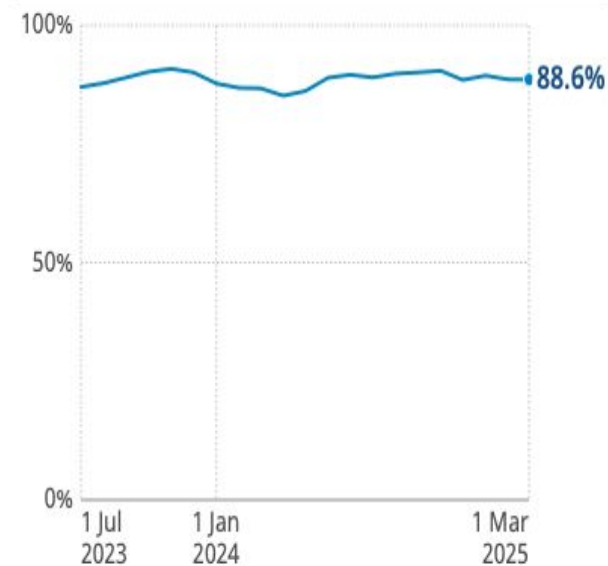
5 - 14



15 - 64



65+



The risk of death from COVID-19 increases markedly with age, particularly after age 50.

- Individuals aged 50–64 are 3 times more likely to die of COVID-19 than those aged 18–29,
- Those aged 65–74 are 6 times more likely.
- The risk of hospitalisation follows a similar pattern, **making age a central element in risk stratification strategies.**

COVID-19 in People Over 50

- COVID-19, has had a disproportionate impact on older adults.
- Immunosenescence
- People over the age of 50 represent a group with heightened vulnerability to both infection and severe outcomes, including hospitalization, intensive care unit (ICU) admission, and death.
- Ageing, and the high prevalence of chronic diseases in older populations, contributes to increased morbidity and mortality.
- Cardiovascular disease, type 2 diabetes, obesity, chronic obstructive pulmonary disease (COPD), and renal impairment are all recognised risk factors that are more prevalent among those over 50

COVID-19 in Australia: Burden Among Older Adults

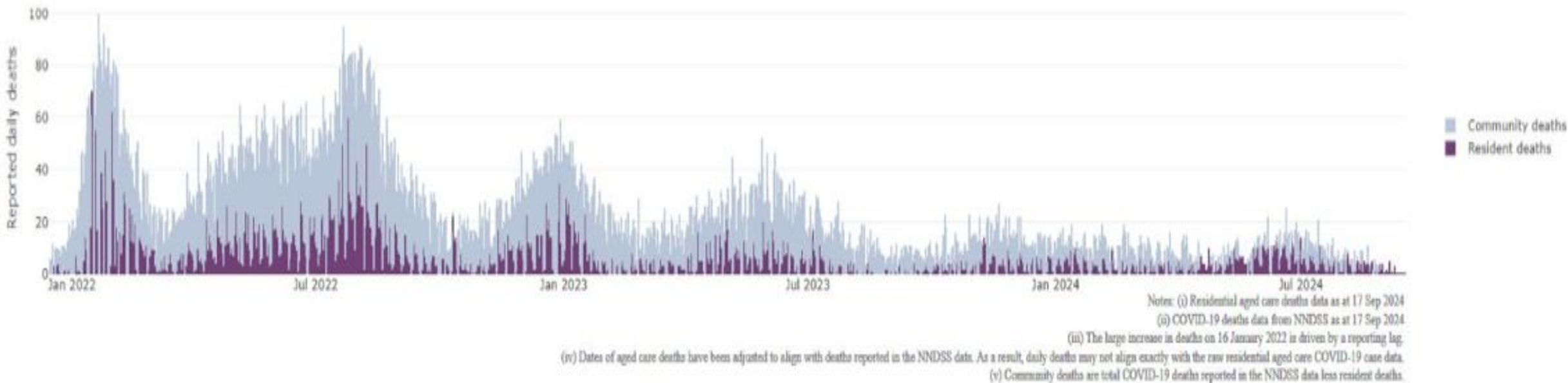
- In aged care settings, COVID-19 outbreaks led to considerable mortality, particularly during the Delta wave in 2021.
- The Royal Commission into Aged Care Quality and Safety highlighted systemic vulnerabilities that amplified the risk to residents, many of whom were over 70 (Royal Commission, 2021).
- Despite high vaccine uptake among older Australians, challenges such as waning immunity and variant escape have necessitated ongoing boosters

Deaths in aged care facilities have hardly changed!

29% of all COVID-19 related deaths in Australia occurring among people living in residential aged care.



More than 200 aged care facilities are facing active COVID-19 outbreaks



Booy and Grohmann. <https://insightplus.mja.com.au/2024/33/covid-19-deaths-in-aged-care-facilities-are-still-too-common/>

<https://www.abc.net.au/news/2025-07-22/aged-care-covid-rates-2025/105547808>



Residential aged care vaccination

Australia's COVID-19
Vaccine Program

Data as at:
11 Jun 2025



138.2k (72.3%)

aged care residents have received a
vaccination in the last 12 months[#]



105.3k (55.1%)

aged care residents have received a
vaccination in the last six months[#]

Aged Care COVID-19 vaccinations

Jurisdiction	Received a vaccination in the last six months	
	Residents vaccinated	% of residents vaccinated
National	83.7k	43.8%
ACT	1.3k	54.7%
NSW	27.4k	44.4%
NT	<200	29.4%
QLD	13.8k	36.0%
SA	7.3k	44.7%
TAS	2.1k	47.6%
VIC	23.9k	48.0%
WA	7.9k	44.2%

Key: m = million k = thousand

[#]Residential aged care populations are fluid and hence an estimate only. There is an administrative lag with the aged care recipient data which is linked to Australian Immunisation Register data. Counts may fluctuate due to enhancements to data over time.

Source: Matched Australian Immunisation Register data of residents in permanent residential aged care homes

Deaths from and with COVID-19 in Aboriginal and Torres Strait Islander people, age-specific death rates per 100,000 persons

Age at death	Indigenous			Non-Indigenous people		
	Males	Females	Persons	Males	Females	Persons
0-44	2.7	2.0	2.4	1.0	0.6	0.8
45-54	21.1	18.1	19.5	5.4	3.7	4.5
55-64	54.1	37.5	45.3	14.2	7.9	11.0
65-74	101.5	97.2	99.2	55.2	28.0	41.2
75+	433.6	479.7	459.7	376.1	277.7	322.3

<https://www.abs.gov.au/articles/covid-19-mortality-australia-deaths-registered-until-31-january-2024>

National Disability Insurance Scheme (NDIS) reported vaccinations

Australia's COVID-19
Vaccine Program

Data as at:
1 Jun 2025

Vaccinations administered to NDIS participants
in the last 12 months (18+ years)



23.0k
(6.6%)

Time since NDIS participants last vaccination by state (18+ years)

State	Vaccinated in the last six months	Vaccinated in the last 12 months
National	2.5k	23.0k
ACT	<200	635
NSW	789	6.8k
NT	<200	<200
QLD	539	4.1k
SA	<200	1.7k
TAS	<200	809
VIC	719	6.7k
WA	<200	2.1k

Includes all participants regardless of residence type.
Counts in underlying data may fluctuate a small amount due to perturbation, data maturity and changes in population size.

Key: m = million k = thousand
Source: Australian Immunisation Register linked to the
Person Level Integrated Data Asset (PLIDA)



Individuals with Culturally and Linguistically Diverse* (CALD) backgrounds

Australia's COVID-19
Vaccine Program

Data as at:
1 Jun 2025

Vaccinations administered in the last 12 months (18+ years)



People who speak a language other than English at home



Time since CALD individuals last vaccination by state (18+ years)

State	Born overseas		Speaks a language other than English at home	
	Vaccinated in the last six months	Vaccinated in the last 12 months	Vaccinated in the last six months	Vaccinated in the last 12 months
National	16.4k	137.4k	10.6k	85.8k
ACT	348	4.6k	220	3.0k
NSW	5.7k	46.5k	3.9k	30.4k
NT	<200	625	<200	383
QLD	2.9k	19.9k	1.8k	11.2k
SA	807	8.2k	467	4.9k
TAS	322	2.8k	<200	1.3k
VIC	4.9k	40.8k	3.4k	27.8k
WA	1.2k	13.9k	574	6.9k

*Individuals with culturally and linguistically diverse (CALD) backgrounds are as reported in the 2021 Census and do not include Aboriginal and Torres Strait Islander peoples. The Born Overseas cohort excludes those born in the United Kingdom, Ireland and New Zealand. The data excludes those who have since departed Australia and deceased persons since the 2021 Census. There is an overlap across CALD cohorts where individuals may have reported they had more than one CALD characteristic in the 2021 Census. Counts in underlying data may fluctuate a small amount due to perturbation, data maturity and changes in population size.

Key: m = million k = thousand

Source: Australian Immunisation Register linked to the Person Level Integrated Data Asset (PLIDA)

Higher risk settings and groups

Higher-risk settings

- residential aged care facilities
- disability care services
- in-home aged, health and disability care
- hospitals and other healthcare settings.
- First Nation
- CALD

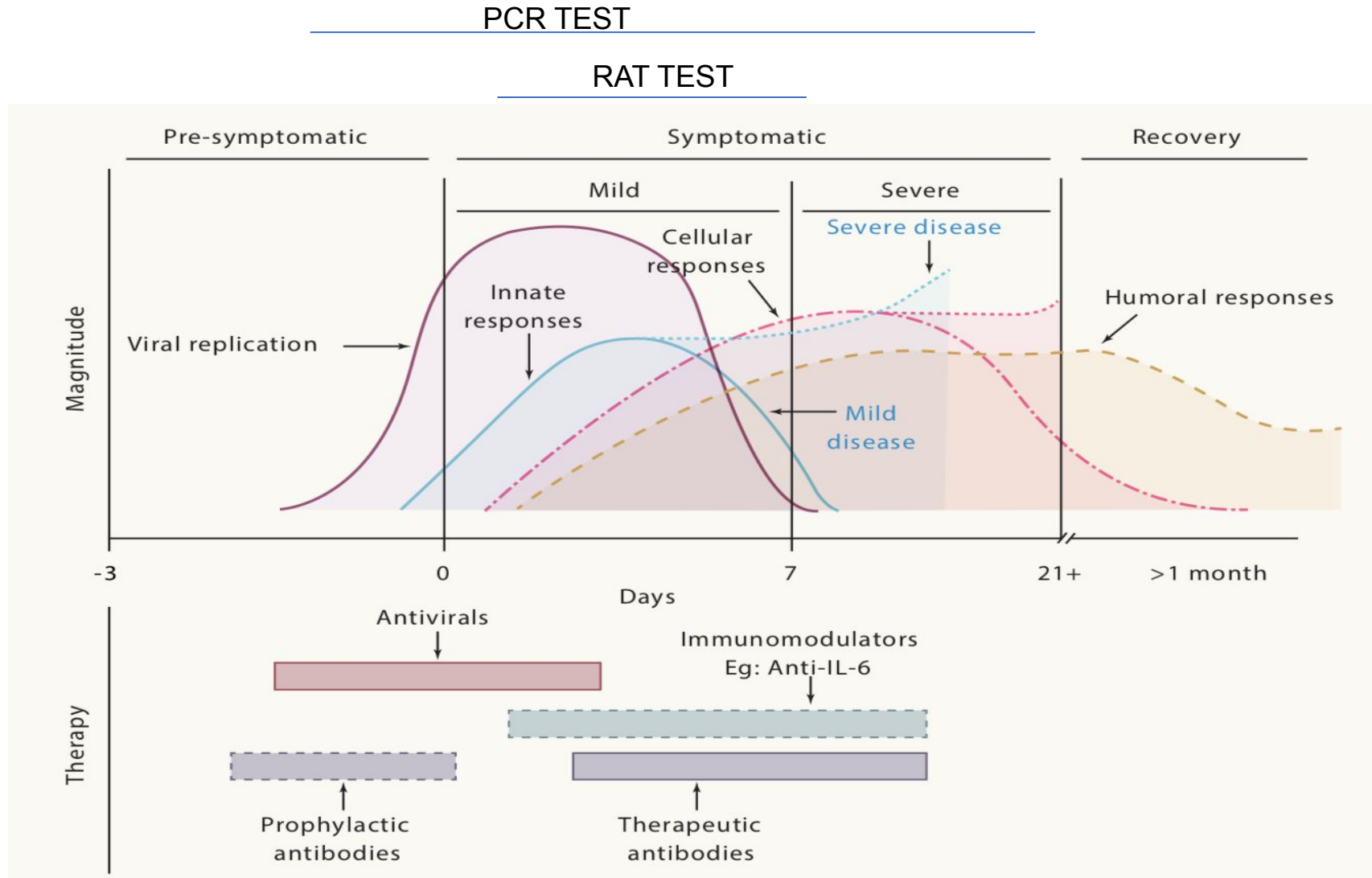
High-risk groups

- aged 50 years or older
- weakened immune system
- neurological disease, such as stroke or dementia
- chronic lung disease,
- heart disease
- Obesity
- Diabetes

COVID-19: Clinical course



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- Some have significant sequelae
- Many have poor neutralizing antibody.
- Antibody wanes leading to reinfection
- Post-COVID19 syndrome

Pre- and post-approval diagnostic test accuracy of FDA-authorized rapid antigen SARS-CoV-2 tests used according to instruction: A systematic review and meta-analysis

[https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X\(25\)00349-0/fulltext?dgcid=raven_jbs_aip_email](https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(25)00349-0/fulltext?dgcid=raven_jbs_aip_email)

- Manufacturers claim high sensitivity yet systematic reviews report considerably lower sensitivity.
- The pooled sensitivity for pre- and post-approval studies was 86.5% compared to PCR (100%)
 - (95% CI: 83.3–89.1) and 84.5% (95% CI: 81.2–87.3),
- 79% of FDA-approved rapid antigen tests lacked post-approval studies

Symptoms

Emergency warning signs for COVID 19:

- Trouble breathing
- Persistent pain or pressure in the chest
- New confusion
- Inability to wake or stay awake
- Pale, Gray, or blue-coloured skin, lips, or nail beds, depending on skin tone

Children-

MIS-C (multisystem inflammatory disease)

An unusual presentation in children, similar to Kawasaki Disease (rare):

- Hypotension
- Non-purulent conjunctivitis
- Polymorphic rash
- Mucosal changes
- Swollen extremities

SARS CoV 2 is a neurotropic virus

- 10%-15% of patients develop acute neurologic symptoms.
- is associated with specific neurologic syndromes in the form of stroke or acute neuroinflammatory disorders, such as meningitis or encephalitis.
- Less frequently, peripheral nerve involvement, such as muscle weakness or Guillain-Barre syndrome.



Clinical symptoms

- Multifocal pathogenesis
 - sometimes instigating destruction to blood vessel endothelial cells leading to blood clots, strokes, heart failure, heart attack, as well as potential kidney and neurological problems ([Sardu et al., 2020](#))
- Cytokine storm
 - Lymphocytopenia,
 - elevation of inflammatory markers like C-reactive protein (CRP)
 - elevation of cytokine interleukin 6 (IL-6) ([Chen G. et al., 2020](#))
- Patients with Pre-existing Neuromuscular Conditions
 - Exacerbation of Neuromuscular Degenerative Conditions
 - Autoimmune conditions, GBS.
 - Virus reactivation – Herpes group, enteroviruses, HTLVs

COVID-19 and Disorders of the Gut/Brain (DGBIs)

- DGBIs are a heterogeneous group of conditions in which gastrointestinal symptoms occur without any detectable structural or biochemical abnormalities. They include IBS (irritable bowel syndrome), functional dyspepsia, and chronic idiopathic constipation
- Covid commonly causes diarrhoea, nausea and abdominal pain which can lead to IBS: Psychological stress also a significant factor through lockdowns, fear and isolation.
- Surge in IBS and constipation in USA – May 2021- May 2022
- IBS prevalence rose from 6.1% in May 2020 to 11.0% by May 2022, an increase of 0.188% per month (adjusted $P < .001$). (N=160,000 +)

SARS-CoV-2 induces Alzheimer's disease (*In vitro* study)



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- Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) induces amyloid- β extracellular protein aggregates in human retinal explants and retinal organoids.
- Pharmacological inhibition of neuropilin-1 resulted in reduced amyloid- β deposition in human retinal explants treated with SARS-CoV-2 Spike 1 protein.
- These results suggest that Spike 1 protein, during infection with SARS-CoV-2, can induce amyloid- β aggregation, which may be associated with the neurological symptoms experienced in COVID-19.

Miller et al 2025:

https://www.science.org/doi/10.1126/sciadv.ads5006?utm_source=sfmc&utm_medium=email&utm_content=alert&utm_campaign=ADVeToc&et rid=256477473&et_cid=5665316

Complications and sequelae of COVID-19 disease

Post covid condition or Long covid



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- A range of metabolic, cardiovascular, respiratory, immunological and neurological sequelae following COVID-19 have been reported in the literature.
- Post-COVID-19 condition ('long COVID') is currently not well defined, but generally consists of persistent symptoms that develop during or after COVID-19, continue for greater than 3 months after the onset of the illness, and are not explained by an alternative cause.
- This can consist of various physical symptoms (e.g. fatigue, dyspnoea, chest pain, and cough), cognitive symptoms (memory and concentration issues) and psychological symptoms (anxiety, depression, post-traumatic stress disorder).

Complications and sequelae of COVID-19 disease

Post covid condition or Long covid



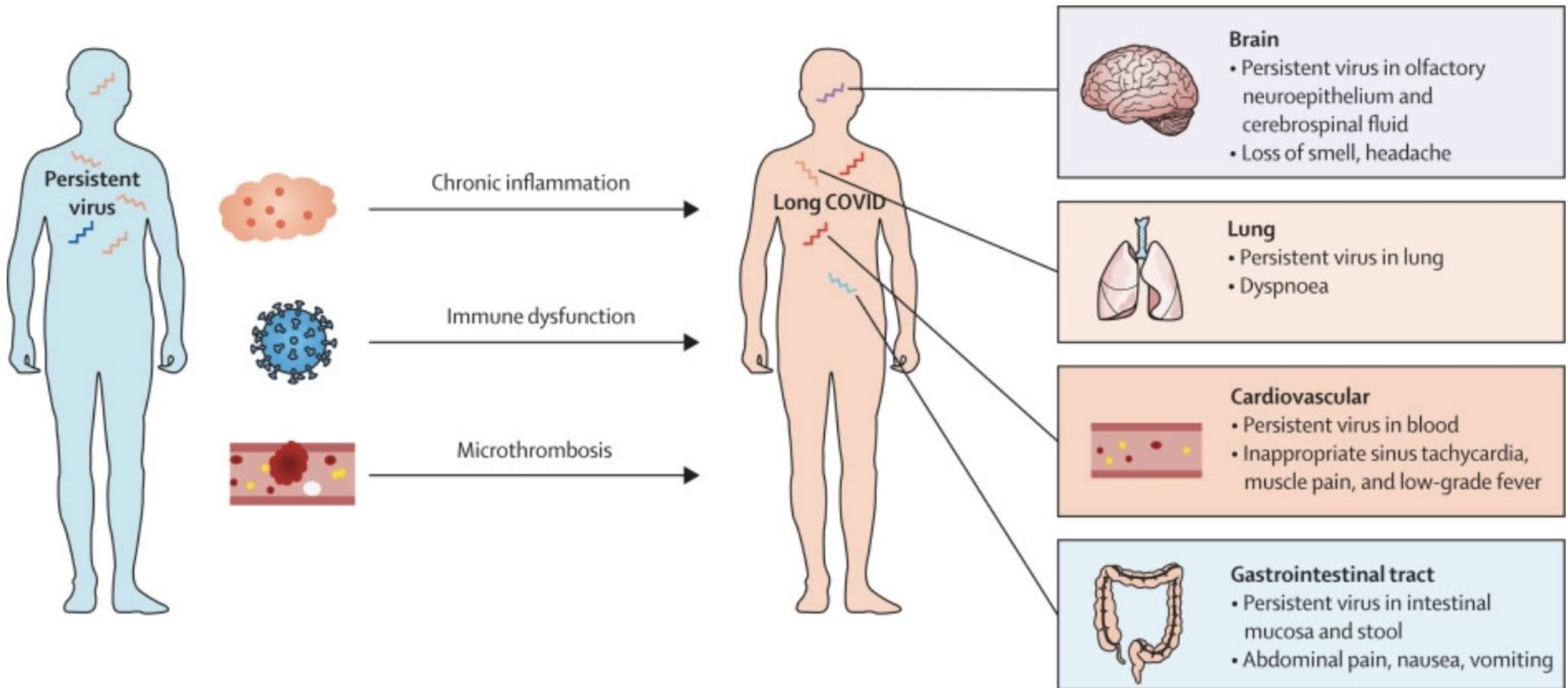
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- The prevalence of post-COVID-19 condition is highly variable due to differing definitions.
- A systematic review and meta-analysis including over 750,000 participants reported that 45% of COVID-19 survivors experience a range of unresolved symptoms at 4 months.
 - Long COVID burden substantially reduced after 7 mo.
- Risk factors for post-COVID-19 condition may include the presence of comorbidities, prior hospitalisation from COVID-19, female sex, older age, high body mass index and smoking.
- Vaccinated people have a significantly lower risk of post-COVID-19 condition (OR: 0.57, 95% CI 0.43-0.76)

Long Covid (Post Covid syndrome)



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Long COVID and elevated inflammatory biomarkers



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- Long COVID patients present elevated inflammatory biomarkers
 - eg interleukin-6, C-reactive protein, tumour necrosis factor- α ,
 - function as a core set of blood biomarkers that can be used to diagnose and manage long COVID patients in clinical practice.
- Evidence, including from murine studies on the related Middle East respiratory syndrome and severe acute respiratory syndrome, identified the role of coronaviruses in complement activation, which could be a key contributor to COVID-19 pathogenesis

Lai YJ, Liu SH, Manachevakul S, Lee TA, Kuo CT, Bello D. Biomarkers in long COVID-19: A systematic review. doi: 10.3389/fmed.2023.1085988.

Phetsouphanh C, Darley DR, Wilson DB, et al. Immunological dysfunction persists for 8 months following initial mild-to-moderate SARS-CoV-2 infection. *Nat Immunol* 2022;23(2):210–16. doi: 10.1038/s41590-021-01113-x.



Long Covid in children

- Common in the USA
- Affecting up to 10% to 20% of children with a history of COVID-19.
- 6 million US children affected

Gross R et al 2020:

<https://jamanetwork.com/journals/jamapediatrics/article-abstract/2834480>

<https://jamanetwork.com/journals/jamapediatrics/fullarticle/2834486>

- Earlier CDC studies suggested 1% of children

<https://www.cdc.gov/nchs/products/databriefs/db479.htm>

Long COVID happens when a child continues to have symptoms ≥ 3 months after having a COVID-19 infection.

Sometimes symptoms change, or symptoms may reappear after feeling better.



Signs and symptoms of long COVID are variable in children of different ages.

Infants and toddlers (0-2 y)

- Trouble sleeping
- Poor appetite
- Stuffy nose
- Dry or wet cough

Preschool-aged children (3-5 y)

- Daytime tiredness or sleepiness
- Low energy
- Dry cough

School-aged children (6-11 y)

- Trouble with memory or focusing
- Feeling lightheaded or dizzy
- Back or neck pain
- Headaches
- Trouble sleeping
- Stomach pain
- Nausea or vomiting
- Fear of specific things
- Refusing to go to school
- Itchy skin or rash

Adolescents (12-17 y)

- Trouble with memory or focusing
- Feeling lightheaded or dizzy
- Back or neck pain
- Headaches
- Change or loss in smell or taste
- Body, muscle, or joint pain
- Daytime tiredness or sleepiness
- Low energy
- Tired after walking

Unravelling the interplay between respiratory disease and the immune landscape in long COVID

Long-term dysregulation after infection underlies many of the persistent symptoms of individuals with long COVID.

Harker, J.A., Thwaites, R.S. Unravelling the interplay between respiratory disease and the immune landscape in long COVID. *Nat Immunol* **26**, 640–641 (2025). <https://doi.org/10.1038/s41590-025-02140-8>

Treatment Options



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- The management of COVID-19 requires timely diagnosis and prompt intervention to prevent progression to severe disease.
- Antiviral agents such as nirmatrelvir-ritonavir (Paxlovid) and molnupiravir have shown effectiveness in reducing hospitalisation and death when administered early in the course of infection (Hammond et al., 2022).
- These medications are particularly beneficial for older adults and those with comorbidities.

Treatment Options

- Hospitalised patients may receive corticosteroids (e.g., dexamethasone), IL-6 inhibitors (e.g., tocilizumab), or antiviral remdesivir, depending on the severity of illness (RECOVERY Collaborative Group, 2021).
- Caution must be exercised in older adults due to potential side effects and drug interactions.
- Telehealth has also emerged as a vital tool for delivering during periods of high transmission, helping to monitor symptoms and adjust treatment remotely while reducing exposure risks.

Molnupiravir and Paxlovid (nirmatrelvir/ritonavir)

Both antivirals were associated with lower all-cause mortality risk—a 39% reduction for molnupiravir, 75% for paxlovid compared with no antiviral use. <https://doi.org/10.1016/j.ymthe.2017.11.017>

Also, while Paxlovid is authorised for use in children as young as 12 years old, molnupiravir isn't authorised for use in children younger than 18 years because it may affect bone and cartilage growth.

Molnupiravir, is not recommended for pregnant individuals because animal studies suggest it could cause foetal harm.

The COVID-19 global health emergency is over

So, what are we dealing with now?

- A steady state respiratory infection in the community
- The virus, SARS-CoV-2, has been mutating overtime towards *less severity*
 - Mostly Asymptomatic/Mild infections
- Omicron lineage viruses are predominating globally (NB.1.8.1)

There is no need to catastrophise every appearance of each new subvariant.
- Vaccines are available and important for those over 75 years and health compromised persons: can be rapidly updated
 - *The rise of hybrid immunity.*
- Antiviral Drugs are available
- Home testing kits available
- In Australia: approx. 1-2 thousand people are expected to die annually from COVID-19 but the death rate is declining.
 - Risk in Homes for the elderly.

Continued focus on protecting individuals is imperative

- Continued Vaccination Campaigns.
- Education campaigns should address vaccine hesitancy and misinformation.
- Early Access to Antivirals
- Non-Pharmaceutical Interventions:
- Integrated Health Services: Coordinated care models that address chronic disease management alongside COVID-19 surveillance can help reduce the overall burden on older adults.
- Mental Health Support

Conclusions (1)

- People over 50 face significantly higher risks of severe illness and death from COVID-19 due to age-related physiological changes and the higher prevalence of comorbidities.
 - In Australia and globally, this group has borne a disproportionate burden of the pandemic.
- Vaccination remains the cornerstone of prevention, especially in closed community settings, with booster doses crucial for sustaining immunity.
- Access to effective antiviral treatments and adherence to public health guidelines can mitigate risk.
- Continued vigilance, tailored health interventions, and targeted communication strategies are essential to protect this vulnerable segment of the population.

Conclusions (2)

COVID-19 is likely to continue globally as an endemic disease with fluctuating incidence driven by:

- Diminished vaccine uptake
- Waning immunity (sub-optimal vaccines)
- Virus mutation leading to new SARS-CoV-2 variants with immune escape potential
 - Likely update the vaccine every 12-18 mo
- Seasonal factors. (Travel/seeding virus)

Challenges remain: Covid fallout...



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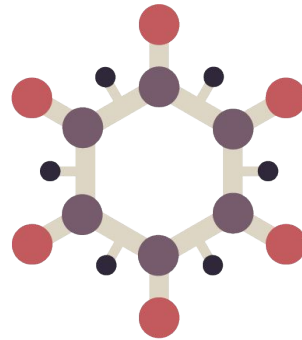
- **Long Covid (10%)**
- Community blasé attitude to booster vaccinations resulting in low vaccine uptake
- Damage to health & education programs, economies etc
- Vaccine injury, Mandates, job/income losses
 - class actions
- Vaccine fatigue, distrust, Fear and **disinformation**
 - (<https://insightplus.mja.com.au/2025/13/vaccines-under-attack/>)
- Need: Better Vaccines, Antivirals and other drugs

Thank you



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Acknowledgements



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Questions

www.immunisationcoalition.org.au



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Thank you to Gary and Andrew, and to you for your engagement and questions.

The next update webinar is **2025 Pertussis Update on 17th September 2025**.

You can register for this on our website or via our Newsletter (published every Monday).

A very short survey will be sent to your registration address – We appreciate your feedback.

