



Australian Government
Department of Health

COMMUNICABLE DISEASES INTELLIGENCE

2020 Volume 44
<https://doi.org/10.33321/cdi.2020.44.42>

COVID-19, Australia: Epidemiology Report 14: Reporting week ending 23:59 AEST 3 May 2020

COVID-19 National Incident Room Surveillance Team

Communicable Diseases Intelligence

ISSN: 2209-6051 Online

This journal is indexed by Index Medicus and Medline.

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Communicable Diseases Intelligence (CDI) is a peer-reviewed scientific journal published by the Office of Health Protection, Department of Health. The journal aims to disseminate information on the epidemiology, surveillance, prevention and control of communicable diseases of relevance to Australia.

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Weekly epidemiological report

COVID-19, Australia: Epidemiology Report 14: Reporting week ending 23:59 AEST 3 May 2020

COVID-19 National Incident Room Surveillance Team

Notified cases of COVID-19 and associated deaths reported to the National Notifiable Diseases Surveillance System (NNDSS) to 3 May 2020.

Summary

The reduction in international travel and domestic movement, social distancing measures and public health action have likely slowed the spread of COVID-19 in Australia.

Currently new notifications in Australia are mostly considered to be locally-acquired with some cases still reported among people with recent overseas travel. Most locally-acquired cases can be linked back to a confirmed case or known cluster, with a small portion unable to be epidemiologically linked to another case. The ratio of overseas-acquired cases to locally-acquired cases varies by jurisdiction.

The crude case fatality rate (CFR) in Australia remains low (1.3%) compared to the World Health Organization's globally-reported rate (7.1%) and to other comparable high-income

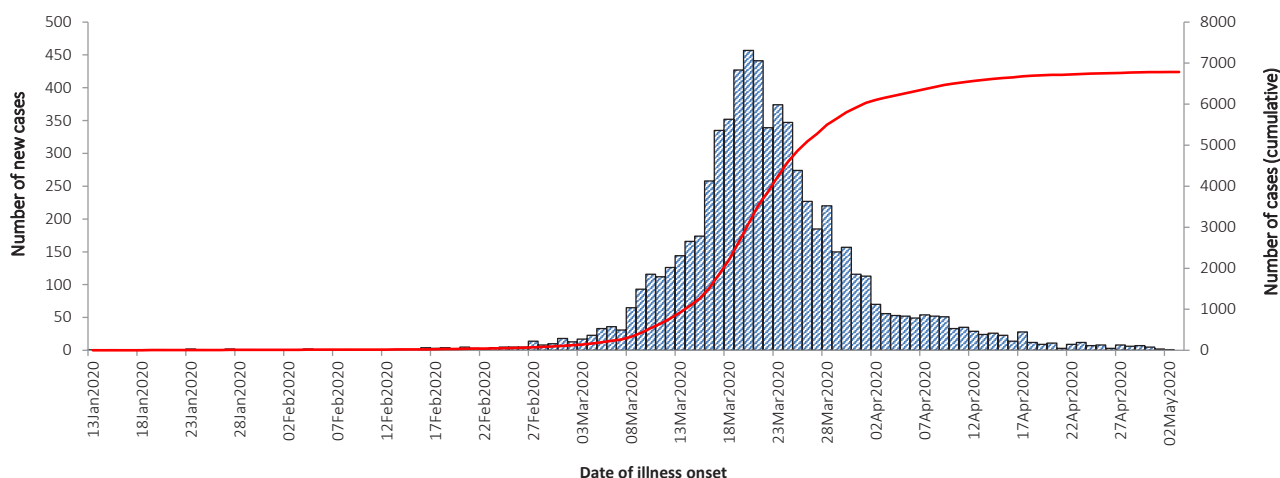
Confirmed cases in Australia notified up to 3 May 2020ⁱ

Notifications	6,784
Deaths	89

countries such as the United States of America (5.7%) and the United Kingdom (15.4%). The lower CFR in Australia is likely reflective of high case ascertainment including detection of mild cases.

Internationally, cases continue to increase. The rates of increase have started to slow in several regions, although it is too soon to tell whether this trend will be sustained.

Keywords: SARS-CoV-2; novel coronavirus; 2019-nCoV; coronavirus disease 2019; COVID-19; acute respiratory disease; epidemiology; Australia



ⁱ Data caveats: Based on data extracted from the National Notifiable Diseases Surveillance System (NNDSS) on 5 May 2020. Due to the dynamic nature of the NNDSS, data in this extract are subject to retrospective revision and may vary from data reported in published NNDSS reports and reports of notification data by states and territories.

Australian cases: descriptive epidemiology

National trends

For the week ending 3 May 2020, there were ninety cases of COVID-19 notified to the NNDSS, bringing the total number of confirmed cases notified in Australia to 6,784.

Following the national peak in cases during the week of 16-22 March, the number of new cases has continued to decrease (Table 1), which indicates a reduction in disease transmission, as demonstrated by a flattening of the cumulative cases curve. Note that rates are presented by diagnosis date and may differ from the number of new notifications in each week. While reduction in international travel has decreased the number of imported cases, public health measures such as social distancing remain important in continuing to limit domestic spread.

At the jurisdictional level, NSW, Vic, Qld, SA, and ACT reported their highest rates of new cases during the week 16–22 March (Figure 1). For Tasmania the highest rate of new cases was recorded in the week 6–12 April, which was the result of outbreak-associated cases in North West Tasmania.

Aboriginal and Torres Strait Islander persons

Fifty-five cases (0.8%) have been reported in Aboriginal and Torres Strait Islander persons since the start of the epidemic in Australia.

These cases were reported across several jurisdictions, with the majority reported in areas classified as ‘Major cities of Australia’ based on the case’s usual place of residence (Table 2). No cases among Aboriginal and Torres Strait Islander persons have been notified from remote or very remote areas of Australia.

Across all Australian cases, completeness of the Indigenous status field was approximately 95%.

Forty-seven percent (n = 26) of cases in Aboriginal and Torres Strait Islander persons acquired their infection overseas, while 45% (n = 25) of cases acquired their infection domestically. Four (7%) were still under investigation at the time of this report.

The median age of COVID-19 cases among Aboriginal and Torres Strait Islander persons is 34 years (interquartile range: 21–55 years), which is lower than the median age of non-Indigenous COVID-19 cases.

Of the cases notified amongst Aboriginal and Torres Strait Islander persons, 11% were admitted to hospital, which is similar to the proportion of all cases hospitalised (All cases = 13%). Of cases in Aboriginal and Torres Strait Islander persons, no cases were reported as being admitted to ICU.

Geographical distribution

In the current reporting week, cases of COVID-19 were reported from all jurisdictions except South Australia (Table 3). Tasmania and New

Table 1: Rate of weekly confirmed cases (per 100,000 population) by date of illness onset,^a by jurisdiction

Week	NSW	Vic	Qld	WA	SA	Tas	NT	ACT
6–12 April	1.24	0.64	0.37	2.06	0.4	14.03	–	1.41
13–19 April	0.83	0.23	0.14	0.57	0.06	5.61	–	0.23
20–26 April	0.37	0.15	0.04	0.08	–	1.31	0.41	0.23
27 April – 3 May	0.23	0.02	0.08	0.04	–	0.56	0.41	–

a Based on diagnosis date from NNDSS reporting period up to 23:59 AEST 3 May 2020.

Figure 1: Weekly COVID-19 new case notifications per 100,000 population, as at 3 May 2020, by jurisdiction

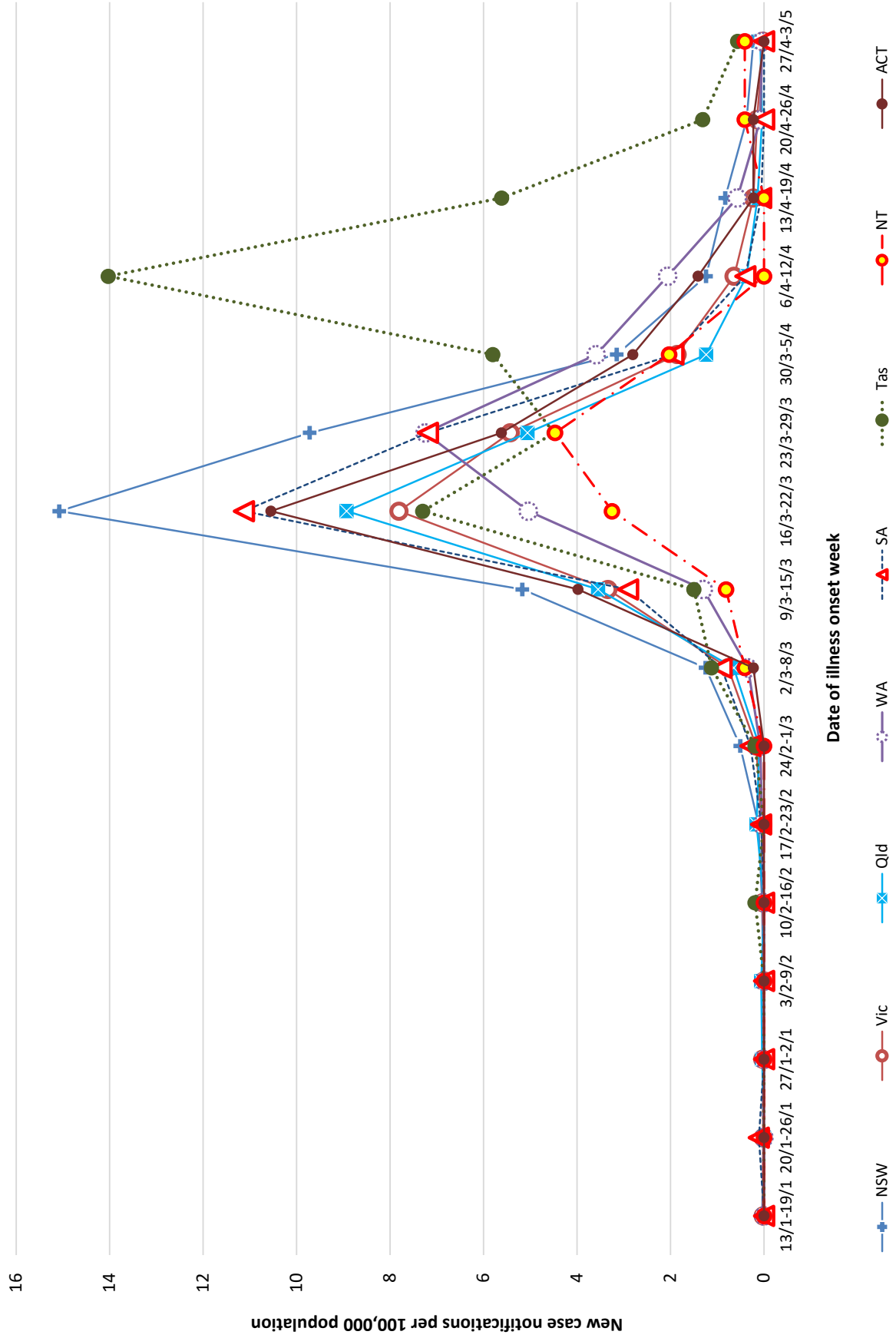


Table 2: COVID-19 cases notified among persons by remoteness classification, Australia

Population	Major cities of Australia	Inner regional Australia	Outer regional Australia	Remote/very remote Australia	Total
Aboriginal and Torres Strait Islander persons	37	12	6	0	55
All persons	5,289	817	376	38	6,784 ^a

a Total includes 178 overseas residents and 86 persons with unknown remoteness classification.

South Wales have the highest cumulative rate of COVID-19 notifications (42.1 and 37.8 per 100,000 respectively) and the Northern Territory has the lowest (11.8 per 100,000). The majority of new cases have been reported in New South Wales.

Compared to the last reporting week, the number of new cases in the current reporting period decreased in all jurisdictions except for NSW (54 new cases this week, 45 new cases last week) and the NT (2 new cases this week, no new cases last week). SA reported no new cases in this reporting period.

Most cases over the past fortnight were reported to reside in major metropolitan areas, with the exception of Tasmania (Figures 2 and 3).

Age and gender distribution

The median age of all COVID-19 cases was 48 years (interquartile range, IQR: 29–63 years) (Figure 4).

The median ages of cases who were hospitalised (median: 61, IQR: 42–72 years) and died (median: 80, IQR: 74–86) were higher than for cases overall. This is consistent with international reporting and reflects a greater risk of severe disease, complications, and deaths in the elderly (Table 4, Table 5, and Figure 4).

The highest rate of disease was among those in the 60–69 years age group, followed closely by the 70–79 years age group, with 43 cases and 40 cases per 100,000 population respectively (Figure 5). The high rate amongst those in the 60–69 and 70–79 years age groups is linked to

outbreaks on cruise ships, with 29% of cases in the 60–69 years age group and 42% in the 70–79 years age group acquiring their infection at sea.

The lowest rate of disease was among children in the 0–9 years age group, with 2.4 cases per 100,000 population. Among those in the 10–19 years age group, the rate of disease was 6.7 cases per 100,000 population. The number of cases among school-aged children aged 5–18 years was one hundred and sixty-four cases (2.4% of total cases). This is consistent with international reports.

Notifications by gender differed by age group with a higher rate of notifications in females in the 20–29 years age group and a higher rate in males in the 40–49 years age group, as well as in those aged over 60 years (Figure 5). It is unlikely that this disparity reflects differences in underlying susceptibility to COVID-19; instead, it is more likely linked to transmission and possibly to differences in travel patterns.

Source of infection

The incidence rate of overseas-acquired COVID-19 cases in Australia has decreased in the last three weeks; the rate of locally-acquired cases has also decreased (Table 6, Figure 6). During this same period the proportion of overseas-acquired cases has been much lower than locally-acquired cases, driven predominately by changes in overseas travel rates. Whilst overall the number of new cases reported each day currently continues to be low, among cases that are considered to be locally acquired, these are predominately associated with contacts of confirmed cases or are associated with known outbreaks.

Table 3: Notifications and rates of COVID-19 and diagnostic tests performed, Australia, by jurisdiction

Jurisdiction	Number of new cases this reporting period	Total cases	Rate (per 100,000 population)	Cumulative number of tests performed (proportion of tests positive %)
NSW	54	3,056	37.8	243,128 (1.25)
Vic	6	1,355	20.5	138,433 (0.99)
Qld	10	1,040	20.4	115,598 (0.89)
WA	2	534	20.4	46,167 (1.19)
SA	0	438	25.0	60,769 (0.72)
Tas	15	225	42.1	14,782 (1.51)
NT	2	29	11.8	4,828 (0.60)
ACT	1	107	25.1	9,402 (1.13)
Australia	90	6,784	26.7	633,107 (1.07)

Of all cases with a reported place of acquisition, 63% had a recent international travel history and 26% were considered to have been locally acquired from a confirmed case. The rate of new cases has declined in all place of acquisition categories with the steepest decline observed in cases acquired overseas – likely due to the reduction in international travel (Table 6, Figure 6). The majority of overseas-acquired cases continue to report a travel history to the European Region, the Americas Region or on board cruise ships (Figure 7). Of the locally-acquired cases, most were considered to be contacts of a confirmed case, with a very small proportion of cases not able to be epidemiologically linked to a confirmed case. Cases where a place of acquisition has not been reported (0.5%) are currently under public health investigation.

Cluster and outbreak investigations

Investigations are taking place in states and territories in relation to a number of clusters and outbreaks of COVID-19. To date the largest outbreaks have been associated with cruise ships, with some other large domestic clusters associated with aged care and healthcare facilities and private functions, such as weddings.

Cluster:

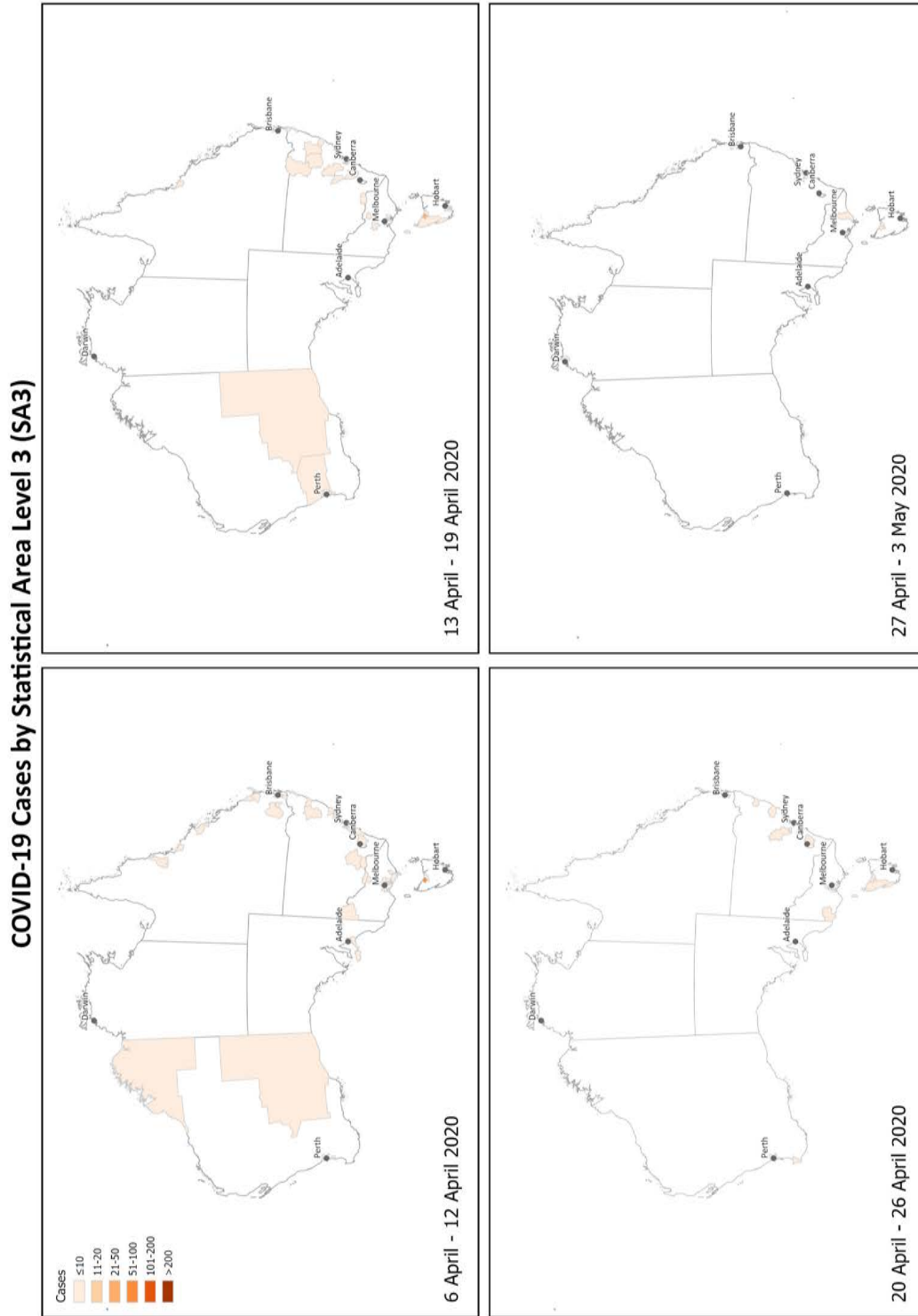
The term ‘cluster’ in relation to COVID-19 refers to two or more cases (who do not reside in the same household) that are epidemiologically related in time, place or person where a common source (such as an event or within a community) of infection is suspected but not yet established.

Outbreak:

The term ‘outbreak’ in relation to COVID-19 refers to two or more cases (who do not reside in the same household) among a specific group of people and/or over a specific period of time where illness is associated with a common source (such as an event or within a community).

Cruise ships account for a substantial proportion of cases of COVID-19 in Australia. Of cases with a reported place of acquisition, 18% (n = 1086) were acquired at sea on a cruise ship. The number of new cases acquired at sea on cruise ships has decreased in comparison to previous weeks and in part reflects the implementation of public

Figure 2: Number of cumulative new confirmed cases of COVID-19, Australia, by location of usual residence and statistical area level 3 (SA3),^a 7 day heat maps for the four most recent weekly reporting periods^b



a Represents the usual location of residence of a case, which does not necessarily mean that this is the place where they acquired their infection or were diagnosed. Overseas residents who do not have a usual place of residence in Australia are not shown.
 b Based on diagnosis date from NNDSS reporting period up to 23:59 AEST 3 May 2020.

Figure 3. Number of cumulative new confirmed cases of COVID-19, Australia, by location of usual residence and selected areas,^a 7 day heat maps for the four most recent weekly reporting periods^b



a Represents the usual location of residence of a case, which does not necessarily mean that this is the place where they acquired their infection or were diagnosed. Overseas residents who do not have a usual place of residence in Australia are not shown.

b Based on diagnosis date from NNDSS reporting period up to 23:59 AEST 3 May 2020.

Table 4: Demographics of all cases, hospitalised cases and deaths

	All cases		Hospitalisation		Death	
	Male	Female	Male	Female	Male	Female
Median age (IQR)	48 (31–63)	47 (28–62)	62 (45–73)	60 (40–71)	79 (74–84)	81.5 (74.5–89.5)
Crude CFR						
By gender	1.6%	1.1%	8.6%	6.5%	–	–
All gender	1.3%		7.6%		–	

Table 5: Crude Case Fatality Rate (CFR) of all cases and hospitalised cases, by age group

Age group	All cases		Hospitalisation	
	CFR	Total cases	CFR	Total cases
All age group	1.3%	6,784	7.6%	850
Under 50	0.03%	3,618	0.4%	270
50–59	0.1%	1,086	0.8%	132
60–69	0.6%	1,127	4.0%	177
70 and over	4.6%	953	11.4%	271

health responses, in particular the cruise ship arrivals ban. There have been 24 deaths among cases acquired on cruise ships in Australia.

Residents of aged care facilities are at increased risk of COVID-19 infection due to the environment of communal living facilities and are more vulnerable to serious complications if they do become infected. As of 3 May 2020, there have been 113 cases of COVID-19 associated with 24 residential aged care facilities, with 36 recoveries and 24 deaths. Sixty-three of these cases occurred in aged care residents, with the remaining 50 cases occurring in care staff. In addition, there have been 41 cases associated with 30 in-home Commonwealth funded aged care services providing support to older Australians who live at home, with 21 recoveries and 3 deaths. Thirty-one of these cases occurred in care recipients, with the remaining 10 cases occurring in care staff. Advice and guidelines have been provided to aged care services, including the release of an outbreak management guide.

Symptom profile

Of the symptoms reported among cases of COVID-19 in Australia, cough (69%) was the most common (Figure 8). Forty-eight percent of cases reported fever, 40% reported sore throat, and 37% reported headache. Pneumonia and/or acute respiratory disease (ARD) was reported in 3% of cases with symptoms. In addition, loss of smell was reported from 583 cases and loss of taste from 556 cases. These conditions were reported in approximately 9% of cases, noting that this is currently not a standard field in NNDSS, and is likely to under-represent those presenting with these symptoms.

The symptom profile of Australian cases is broadly similar to the symptoms reported by COVID-19 cases internationally. Among EU/EEA countries, fever/chills, dry or productive cough and sore throat were the most commonly reported symptoms.¹ Differences in reported symptoms will be influenced by differences in surveillance strategies and symptom reporting across countries.

Figure 4: Age distribution of all cases, hospitalised cases, and deaths with median, interquartile range, and range

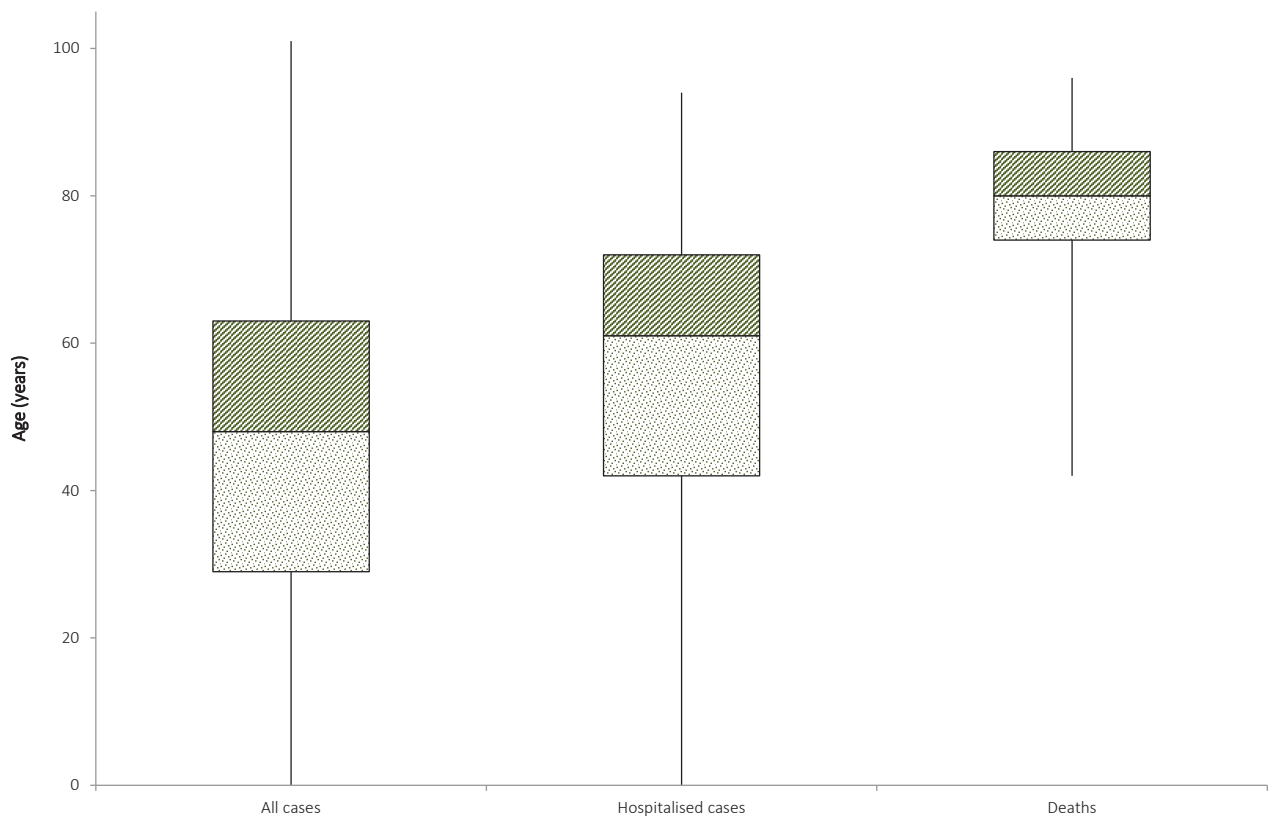


Figure 5: COVID-19 rates per 100,000 population of all cases notified in Australia, by age group and gender

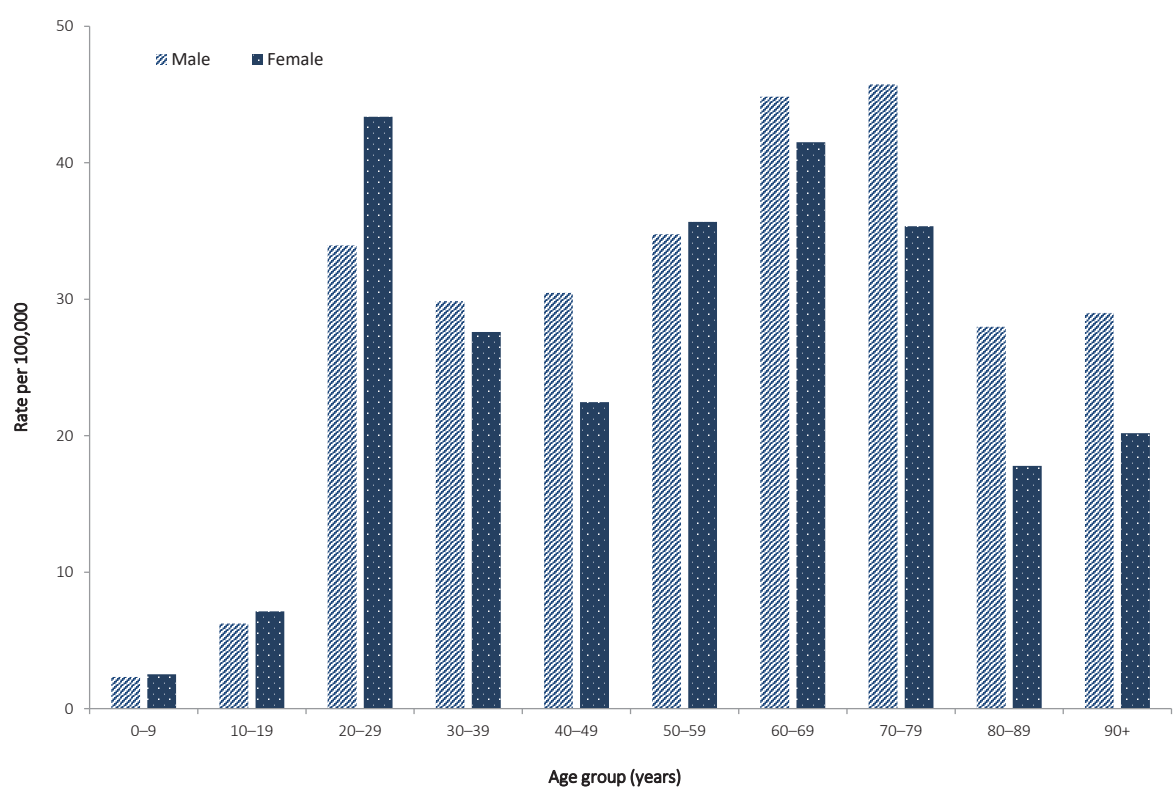


Table 6: Rate of weekly confirmed cases (per 100,000 population) by date of illness onset^a and place of acquisition, Australia

Week	Overseas acquired	Locally acquired—close contact of a confirmed case	Locally acquired, not epi linked	Under investigation
6–12 April	0.347	0.611	0.02	0.217
13–19 April	0.11	0.343	–	0.083
20–26 April	0.012	0.146	0.004	0.047
27 April – 3 May	0.032	0.051	–	0.032

a Based on diagnosis date from NNDSS reporting period up to 23:59 AEST 3 May 2020.

Severity

Of total cases of COVID-19 (n = 6,784) notified, 850 (13%) were admitted to hospital. Although this is substantially less than the proportion of diagnosed cases requiring hospitalisation reported from EU/EEA countries (42%), for instance this difference is affected by each country's testing strategies, with some European countries now only testing hospitalised individuals for COVID-19.¹ The highest rate of hospitalised cases was among the 70–79 age group (10.3 per 100,000 populations), followed by the 80–89 years age group (8.7 per 100,000).

The most commonly reported comorbid conditions among hospitalised cases were cardiac disease (20%), diabetes (19%) and chronic respiratory conditions (13%). Obesity was reported as a comorbid condition by 8% (n = 45) of hospitalised cases (Table 7).

Of the hospitalised COVID-19 cases, 18% (n = 151) were admitted to an intensive care unit (ICU), with 41 cases receiving ventilation. The number of ventilated cases has not changed since the last reporting period. The most commonly reported comorbid conditions among cases admitted to an ICU were diabetes (24%) and cardiac disease (22%), which is similar to the most commonly reported comorbid conditions among hospitalised cases. Compared with hospitalised cases, a greater proportion of cases

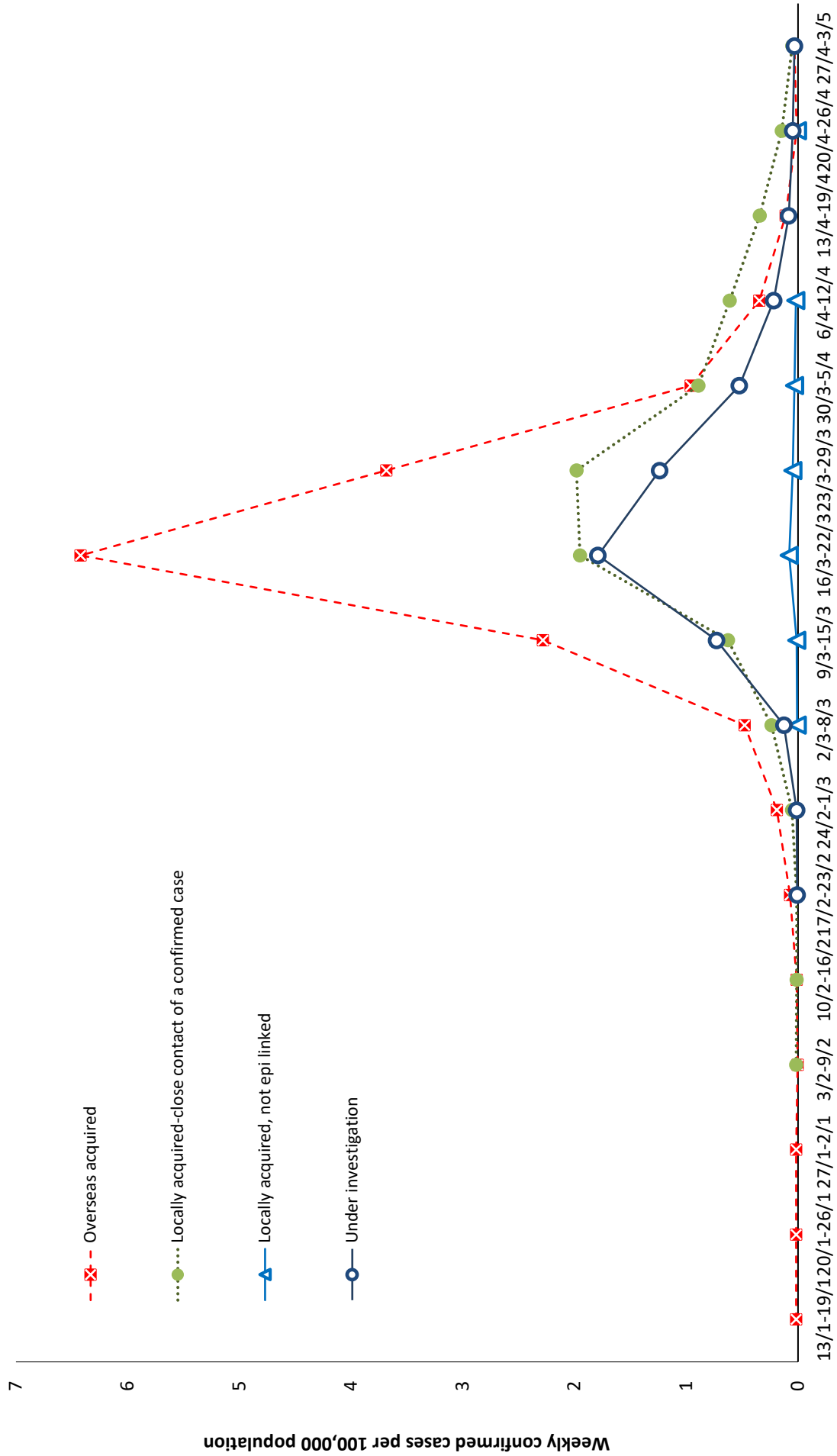
admitted to an ICU or receiving ventilation (14% and 25% respectively) were reported as being obese.

Of all cases, 32% reported one or more comorbid conditions, 7% reported two or more and 2% reported three or more. The proportion of COVID-19 cases who reported one or more comorbid conditions increased with the level of care required, with 71% of ventilated cases reporting comorbid conditions.

Across all cases, the median time between onset of symptoms and laboratory testing was 3 days (IQR: 1–6 days).

Eighty-nine COVID-19 associated deaths were confirmed in Australia up to 3 May 2020. The median age of cases who died was 80 years (IQR: 74–86 years). Fifty-three of the cases were male and 36 were female. The most commonly reported comorbid conditions among COVID-19 deaths were cardiac disease (34%), diabetes (28%) and chronic respiratory disease (22%). Immunosuppressive condition/therapy (19%) and neurological disorder (17%) were also more commonly reported among deceased cases. Comorbid conditions were more common among cases who died, with 77% reported to have one or more specified comorbid conditions, 44% with two or more and 14% with three or more.

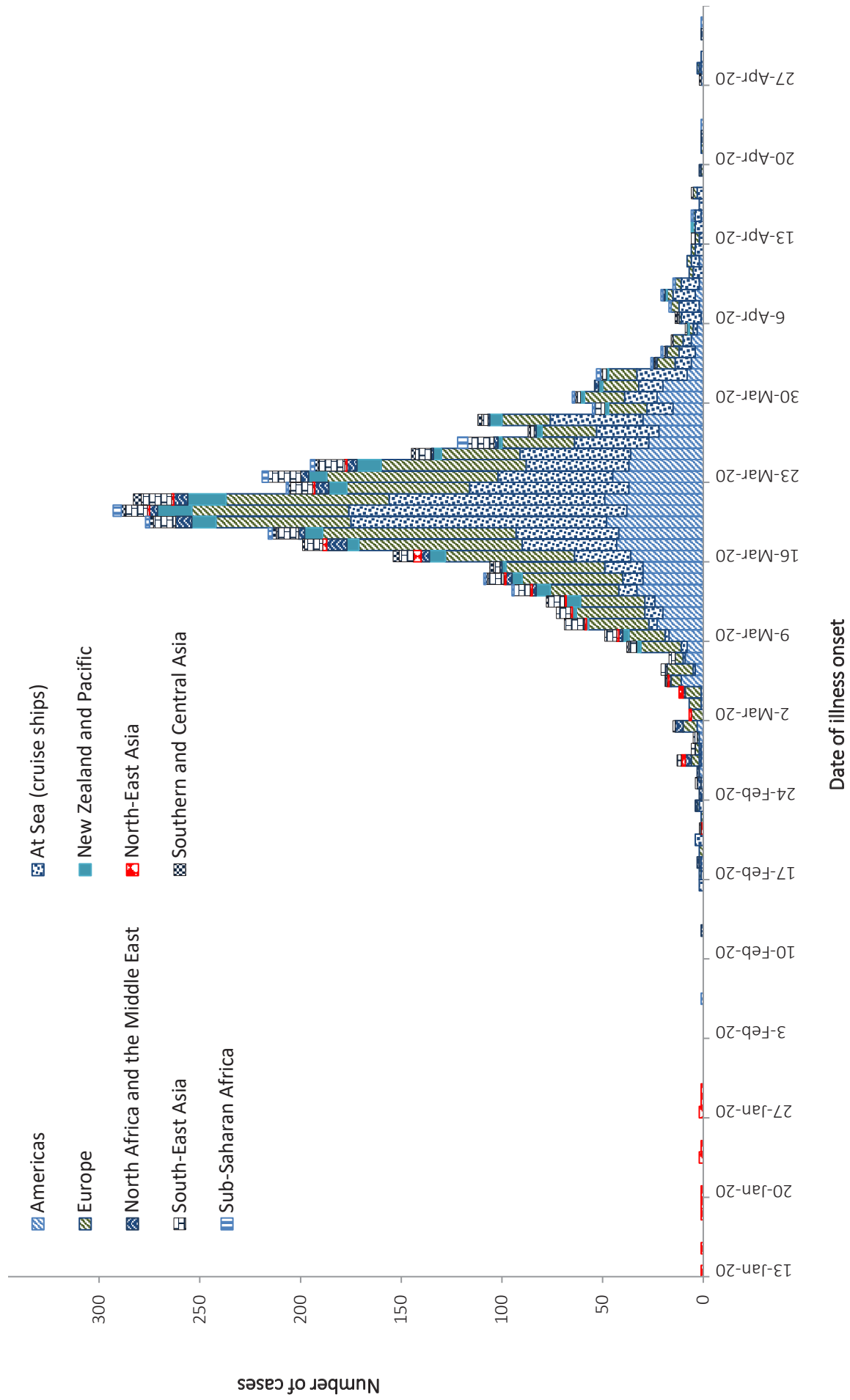
Figure 6: Rate of weekly confirmed cases by date of illness onset^a and place of acquisition, Australia



Outbreak week

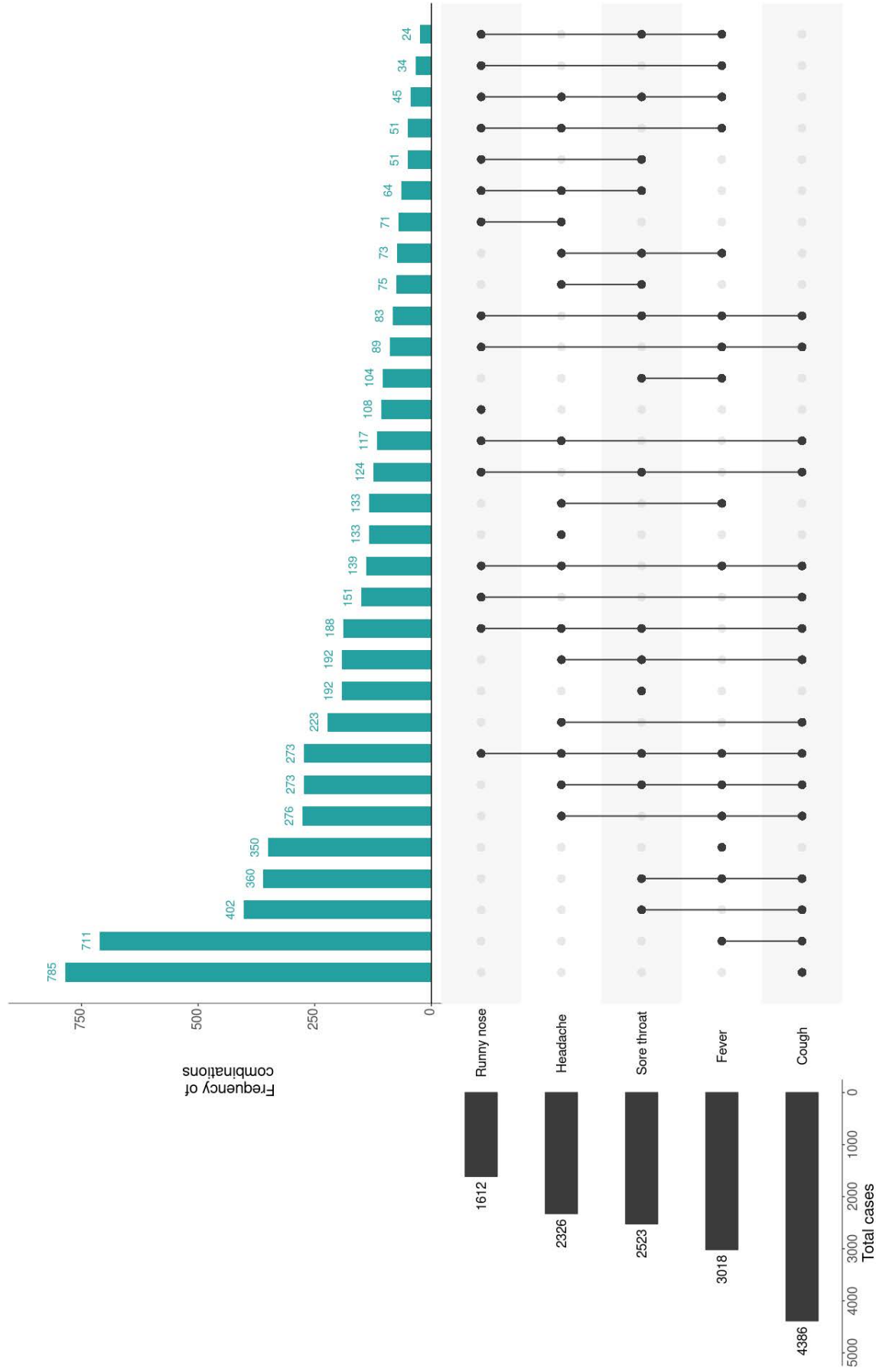
a Note that this graph is from NINDSS where there is a data completeness lag compared to more current proportions presented in text.

Figure 7: Confirmed cases of overseas-acquired COVID-19 infections^a



^a Note that this graph is from NINDSS where there is a data completeness lag compared to more current proportions presented in text.

Figure 8: Variation in combinations of COVID-19 symptoms in confirmed cases, Australia^a



^a This figure shows the variation in combinations of symptoms observed in reported cases (n = 6,317) for the five most frequently observed symptoms (cough, fever, sore throat, headache, runny nose). The horizontal bars on the left show the frequency of symptom occurrence in any combination with other symptoms. The circles and lines indicate particular combinations of symptoms observed in individual patients. The vertical green bars indicate the frequency of occurrence of the corresponding combination of symptoms.

Table 7: Common COVID-19 comorbidities for all cases, hospitalised cases, cases admitted to ICU and cases ventilated in ICU

	All cases (n = 4,546) ^a	Hospitalised cases (n = 562) ^a	Cases admitted to ICU (n = 113) ^a	Cases ventilated in ICU (n = 28) ^a
Common comorbidities				
Cardiac disease (excluding hypertension)	427 (9%)	115 (20%)	25 (22%)	6 (21%)
Diabetes	349 (8%)	105 (19%)	27 (24%)	8 (29%)
Chronic respiratory condition (excluding asthma)	168 (4%)	73 (13%)	14 (12%)	2 (7%)
Obesity	190 (4%)	45 (8%)	16 (14%)	7 (25%)
Number of specified comorbidities^b				
One or more	1,441 (32%)	322 (57%)	74 (65%)	20 (71%)
Two or more	330 (7%)	103 (18%)	27 (24%)	7 (25%)
Three or more	77 (2%)	36 (6%)	11 (10%)	3 (11%)

a Excludes those with missing data on comorbidities or where comorbidity is unknown.

b Includes asthma, chronic respiratory conditions (excluding asthma), cardiac disease (excluding hypertension), immunosuppressive condition/therapy, diabetes, obesity, liver disease, renal disease and neurological disorder.

Similar comorbidities have been reported from COVID-19 cases internationally, with cardiac disorder (excluding hypertension), chronic lung disease (excluding asthma) and diabetes the most commonly reported underlying health conditions in EU/EEA countries.¹ Similar to Australia, the proportion of cases with underlying conditions increased with COVID-19 severity.

Public health response

Since COVID-19 first emerged internationally, Australia has implemented public health measures in response to the disease's epidemiology, both overseas and in Australia. These measures are focused on domestic and international travel and public gatherings; priorities for testing and quarantining of suspected cases and close contacts; guidance on effective social distancing; and the protection of vulnerable populations such as those in residential care facilities and remote Aboriginal and Torres Strait Islander communities. Key aspects of Australia's evolving public health response are summarised in Table 8.

The Australian Health Protection Principal Committee (AHPPC) has issued advice to inform the national public health response to the pandemic. This advice has most recently included risk management for re-opening boarding schools and school-based residential colleges. The Australian Government has also launched a new voluntary coronavirus app called COVIDSafe to support prevention and control efforts through enhanced contact tracing capacity.

During the current reporting period, select state and territory governments have begun easing restrictions on public gatherings, dependant on local epidemiology. The Northern Territory has permitted outdoor recreational activities and gatherings of more than 10 people. Western Australia has permitted a range of non-contact recreational activities and gatherings of up to 10 people indoors and outdoors. Queensland has lifted stay at home restrictions and permitted travel up to 50 kilometres for individuals and household groups. New South Wales has permitted groups of two adults and their children to visit other households for social activities.

Table 8: Timeline of key COVID-19 related events, including Australian public health response activities, from 1 March to 3 May 2020

Date	Event / response activity
1 May 2020	AHPPC releases a statement on risk management for re-opening boarding schools and school-based residential colleges. ²
26 April 2020	The Australian Government launches a new voluntary coronavirus app, COVIDSafe. ³
24 April 2020	AHPPC provides statements on the recommencement of kidney transplantation, updated advice regarding schools, and use of PPE in hospital with patients with COVID-19. ⁴
21 April 2020	AHPPC provides advice for residential aged care facilities about minimising the impact of COVID-19 with information on entry restrictions, managing illness in visitors and staff, and hygiene measures. ⁵
21 April 2020	The Australian Government announces the gradual ease of restrictions on elective surgery from Tuesday 28 April 2020. ⁶
16 April 2020	AHPPC provides advice on reducing the potential risk of COVID-19 transmission in schools. ⁷
9 April 2020	Air crew on international flights will be required to self-isolate at their place of residence (or hotel if not in their local city) between flights or for 14 days, whichever is shorter. ⁸
30 March 2020	Special provisions be applied to vulnerable people in the workplace and application of additional regional social distancing measures to combat COVID-19. ⁹
29 March 2020	Both indoor and outdoor public gatherings limited to two persons only.
28 March 2020	All people entering Australia required to undertake a mandatory 14-day quarantine at designated facilities (e.g. hotels) in their port of arrival.
26 March 2020	Restricted movement into certain remote areas to protect community members from COVID-19.
24 March 2020	<ul style="list-style-type: none"> • Temporary suspension of all non-urgent elective procedures in both the public and private sector; • Progressive scale up of social distancing measures with stronger measures in relation to non-essential gatherings, and considerations of further more intense options; and • Aged care providers limit visits to a maximum of two visitors at one time per day.
25 March 2020	School-based immunisation programs, with the exception of the delivery of meningococcal ACWY vaccine, are paused; and Australian citizens and Australian permanent residents are restricted from travelling overseas.
21 March 2020	Qld, WA, NT and SA close borders to non-essential travellers.
20 March 2020	<ul style="list-style-type: none"> • Travel ban on foreign nationals entering Australia; • Restriction of travel to remote communities; and • Tasmania closes borders to non-essential travellers.
18 March 2020	<ul style="list-style-type: none"> • DFAT raises travel advice for all overseas destinations to Level 4 'Do Not Travel'; • Continuation of a 14-day quarantine requirement for all returning travellers; and • Restrictions on indoor gatherings.
16 March 2020	Non-essential static gatherings of > 500 people banned.
15 March 2020	All overseas arrivals required to self-isolate for 14 days and cruise ship arrivals banned.
8 March 2020	Restrictions on COVID-19 contacts and travellers from listed higher risk countries.
5 March 2020	Restrictions on travel from Republic of Korea.
1 March 2020	Restrictions on travel from Islamic Republic of Iran.

Victoria, Tasmania, South Australia and the Australian Capital Territory have not commenced easing of restrictions during the current reporting period. Restrictions in these jurisdictions differ slightly.

International situation¹⁰

As at 10:00 CEST 3 May 2020, the number of confirmed COVID-19 cases reported to the World Health Organization (WHO) was 3,349,786 globally. COVID-19 was reported across a total of 216 countries, territories and areas. Global cumulative cases reported as of 3 May 2020 were 19% higher than the total as of the previous week. The proportional rate of increase in new cases per week has been declining, though the increase in total cases remains consistent (Table 9).

The reported epidemiology varies by country or region, with outbreaks following different trajectories after their first 100 cases. Figure 9 highlights that case counts within the USA continue to increase. Within Europe: Spain, Italy, France and Germany are now starting to see a plateauing of new case numbers. Within the UK this trend has not yet been fully realised. As these countries begin to lift restrictions a second wave of infection remains a possibility.

For Singapore and Japan, there continues to be a slow but steady rate of increase in their number of new cases, with the majority of Singaporean cases reported in migrant worker dormitories. Within the Republic of Korea and Hong Kong very few cases are reported each day, and these jurisdictions are no longer shown in the Figures below. No new cases have been reported within Pacific Island countries since 27 April. Outbreaks

are beginning to accelerate in India, the Middle East and South American countries. Reported case numbers will be influenced by rates of testing, case definition, and case detection as well as overall health system capacity.

Globally, 238,628 deaths have been reported. Of all deaths reported globally, approximately three-quarters have been from the USA (26%) and the European Region (notably Italy, 12%; and the United Kingdom, 12%; Spain, 11%; and France, 10%). The number of deaths in Japan has increased by more than 40% in the past 7 days, continuing the quick growth observed in the previous report. New additions include the Philippines who is one of two countries with a case fatality rate above the global average in the region (the other is Indonesia). Belgium has reported deaths comparable with Germany. Brazil is also a new addition which has seen a dramatic rise in the number of deaths that now exceeds that reported from Germany (Figure 10).

The crude case fatality rate (CFR) in Australia is 1.3%. This is substantially lower than the global WHO reported rate of 7.1%. Crude CFR is reflective not only of disease severity (with the risk of death reported to increase with age) and of health care capability in different countries, but also of case ascertainment. Cases with high severity are more likely to be detected by public health surveillance; under-ascertainment of cases with mild infections can therefore artificially inflate the reported CFR. Internationally the CFR varies by country. The low CFR in Australia is likely to be reflective of high case ascertainment.

Table 9: Global COVID-19 cases as reported to the WHO

Measures	Reporting period end			
	12 April 2020	19 April 2020	26 April 2020	3 May 2020
Total cumulative cases	1,696,588	2,241,778	2,804,796	3,349,786
Total case difference	562,830	545,190	563,018	544,990
% difference from previous reporting	+ 49.6%	+ 32.1%	+ 25.1%	+19.4%

Figure 9: Number of COVID-19 cases (logarithmic scale) by selected country and days since passing 100 cases, up to 3 May 2020

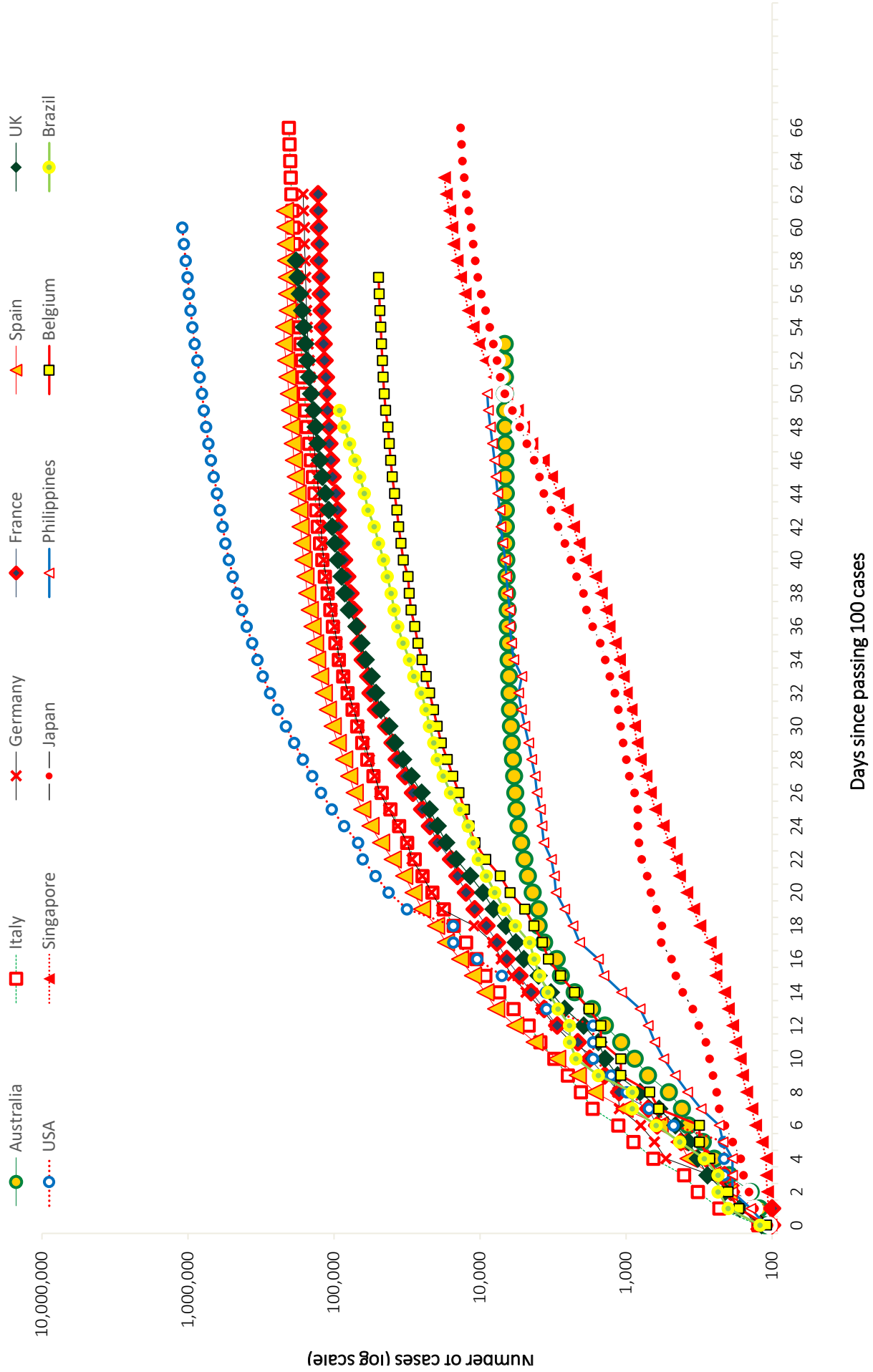
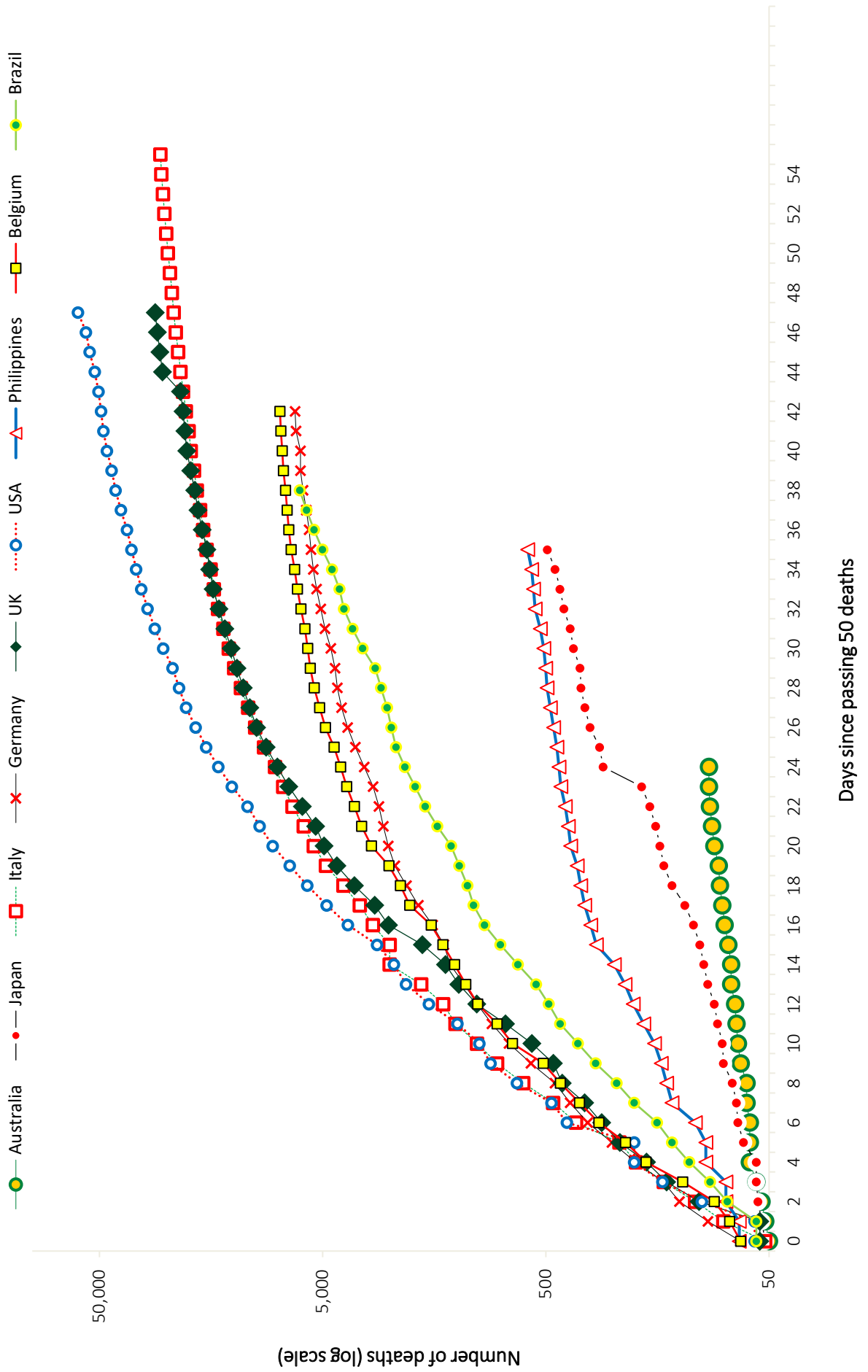


Figure 10: Number of COVID-19 deaths (logarithmic scale) by selected country and days since passing 50 deaths, up to 3 May 2020



Background

The current estimates on epidemiological parameters including severity, transmissibility and incubation period are uncertain. Estimates are likely to change as more information becomes available.

Transmission

Human-to-human transmission of SARS-CoV-2 is via droplets and fomites from an infected person to a close contact.¹¹ A virological analysis of hospitalised cases found active virus replication in upper respiratory tract tissues, with pharyngeal virus shedding during the first week of symptoms.¹² However, current evidence does not support airborne or faecal-oral spread as major factors in transmission.¹¹

Viral RNA has been identified in respiratory track specimens 1–2 days prior to symptoms onset, and has been observed after symptom cessation. In 50% of the patients, seroconversion occurred after seven days with a range of up to 14 days; this seroconversion was not followed by a rapid decline in viral load.¹³ However, it is unknown if detection of viral RNA correlates with shedding of live virus and transmission risk.^{1,13}

A recent study suggests that children do not play a key role in household transmission and are unlikely to be the primary source of household infections.¹⁴ In a population-based study in Iceland, children under 10 years old had a lower incidence of SARS-CoV-2 infection than adults; 6.7% vs. 13.7% in children and adults respectively.¹⁵

Incubation period

Estimates of median incubation period, based on seven published studies, are 5 to 6 days (ranging from 1 to 14 days). Patients with long incubation periods do occasionally occur; however, they are likely to be ‘outliers’ who should be studied further but who are unlikely to represent a change in epidemiology of the virus.^{16,17}

Molecular epidemiology

Since December 2019, the virus has diversified into multiple lineages as it has spread globally, with some degree of geographical clustering. The whole genome sequences currently available from Australian cases are dispersed across these lineages, reflecting multiple concurrent introductions into Australia.^{18,19} Genomic clusters—closely related sequences reflecting local transmission chains—have also been identified in Australia.¹⁸ Genomic epidemiology has successfully been used to link to known genomic clusters many cases that were epidemiologically classified as ‘locally acquired – contact not identified’.¹⁸

Clinical features

COVID-19 presents as mild illness in the majority of cases, with cough and fever being the most commonly reported symptoms. Severe or fatal outcomes are more likely to occur in the elderly or those with comorbid conditions.^{11,20}

Some COVID-19 patients show neurological signs such as headache, nausea and vomiting. There is evidence that SARS-CoV-2 viruses are not always confined to the respiratory tract and may invade the central nervous system inducing neurological symptoms. As such, it is possible that invasion of the central nervous system is partially responsible for the acute respiratory failure of COVID-19 patients.²¹

There is some evidence to suggest that impairment or loss of the sense of smell (hyposmia/anosmia) or taste (hypoguesia/ageusia) is associated with COVID-19.^{22,23} This is supported by research finding a biological mechanism for the SARS-CoV-2 virus to cause olfactory dysfunction.^{24,25}

Examination of cases and their close contacts in China found a positive association between age and time from symptom onset to recovery. The study also found an association between clinical severity and time from symptom onset to time to recovery. Compared to people with mild

disease, those with moderate and severe disease were associated with a 19% and 58% increase in time to recovery, respectively.²⁶

Several studies have identified cardiovascular implications resulting from COVID-19.²⁷⁻²⁹ Vascular inflammation has been observed in a number of cases and may be a potential mechanism for myocardial injury which can result in cardiac dysfunction and arrhythmias.

Recently published literature outside of Wuhan found that approximately 10% of all cases developed gastrointestinal symptoms associated with COVID-19 infection either on admission or during hospitalisation.^{30,31} This number is higher than the 3% previously reported in Wuhan.

Treatment

Current clinical management of COVID-19 cases focuses on early recognition, isolation, appropriate infection control measures and provision of supportive care.³² Whilst there is no specific antiviral treatment currently recommended for patients with suspected or confirmed SARS-CoV-2 infection, multiple clinical trials are underway to evaluate a number of therapeutic agents, including remdesivir, lopinavir/ritonavir, and chloroquine or hydroxychloroquine.^{33,34} Several COVID-19 vaccines have commenced clinical trials.

Data considerations

Data were extracted from the NNDSS on 5 May 2020, by diagnosis date. Due to the dynamic nature of the NNDSS, data in this extract are subject to retrospective revision and may vary from data reported in published NNDSS reports and reports of notification data by states and territories.

Acknowledgements

This report represents surveillance data reported through CDNA as part of the nationally-coordinated response to COVID-19. We thank public health staff from incident emergency operations

centres in state and territory health departments, and the Australian Government Department of Health, along with state and territory public health laboratories.

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Appendix A: Frequently asked questions

Q: Can I request access to the COVID-19 data behind your CDI weekly reports?

A: National notification data on COVID-19 confirmed cases is collated in the National Notifiable Disease Surveillance System (NNDSS) based on notifications made to state and territory health authorities under the provisions of their relevant public health legislation.

Normally, requests for the release of data from the NNDSS requires agreement from states and territories via the Communicable Diseases Network Australia, and, depending on the sensitivity of the data sought and proposed, ethics approval may also be required.

Due to the COVID-19 response, unfortunately, specific requests for NNDSS data have been put on hold. We are currently looking into options to be able to respond to data requests in the near future.

We will continue to publish regular summaries and analyses of the NNDSS dataset and recommend the following resources be referred to in the meantime:

- NNDSS summary tables: <http://www9.health.gov.au/cda/source/cda-index.cfm>
- Daily case summary of cases: <https://www.health.gov.au/news/health-alerts/novel-coronavirus-2019-ncov-health-alert/coronavirus-covid-19-current-situation-and-case-numbers>
- *Communicable Diseases Intelligence* COVID-19 weekly epidemiology report: https://www1.health.gov.au/internet/main/publishing.nsf/Content/novel_coronavirus_2019_ncov_weekly_epidemiology_reports_australia_2020.htm
- State and territory public health websites.

Q: Can I request access to data at post-code level of confirmed cases?

A: Data at this level cannot be released without ethics approval and permission would need to be sought from all states and territories via the Communicable Diseases Network Australia. As noted above, specific requests for NNDSS data are currently on hold.

A GIS/mapping analysis of cases will be included in each *Communicable Diseases Intelligence* COVID-19 weekly epidemiology report. In order to protect privacy of confirmed cases, data in this map will be presented at SA3 level.

Q. Where can I find more detailed data on COVID-19 cases?

A: We are currently looking into ways to provide more in-depth epidemiological analyses of COVID-19 cases, with regard to transmission and severity, including hospitalisation. These analyses will continue to be built upon in future iterations of the weekly *Communicable Diseases Intelligence* report.