

COVID-19 Global Trends & Analyses: July Update 2

Summary

- The **global total** of reported cases surpassed **15 million** on 23 July, with over **620,000 deaths** and more than **200,000 cases** are being reported daily. At this rate, the global total will reach **50 million** by the end of the year.
- The total number of cases in the **United States** has surpassed 4 million, in **Brazil** 2 million, and **India** one million. These three countries along with **Russia** and **South Africa** account for 56% of the global total.
- The number of reported cases in **Africa** has surpassed 750,000 fuelled by the growing outbreak in South Africa, which has a seven day average of more than 12,000 new daily cases.
- **Indonesia** (93,657) has now reported more cases than **China** (83,729).
- **Papua New Guinea** has reported 21 further cases since July 17th, all in Port Moresby taking the total to 32. The initial 5 cases were among staff of the Central Public Health Laboratory, where coronavirus tests are done.
- Countries that had steadily declining numbers in May and June, which have experienced **significant resurgences** in July include **Spain, France, Belgium, Netherlands, Austria, Czech Republic, Denmark and Greece**.
- **Australia, Croatia, Iran, Israel, Japan, Montenegro, Serbia and West Bank** are experiencing clear **second waves** and have reimposed many restrictions.
- **Melbourne, Australia** has experienced a steady resurgence in new cases driven by community transmission, with a seven-day average of more than 300 new daily cases, reaching a peak of 484 on July 22nd. This is with high rates of testing with over 20,000 per day. More than 447 cases are linked to 49 residential aged care facilities.
- There are also a number of clusters of cases in **Sydney**, including a cluster of 56 cases linked to a pub and 46 cases linked to a Thai restaurant.



Recommendations for the Australian COVID-19 Response

1. **Decentralise the model of care for the public health response:** Considering South Korea's and Boston's successful experience, efforts should be accelerated to decentralise testing and tracing in Melbourne through a people-centred model of community care by engaging and involving Local Governments, community health centres, and local community organisations. These actions are important for sustaining effective responses in the medium to long term, including delivery of novel tools such as a vaccine when available. This may reduce gaps in testing and tracing delays to optimal levels (1-2 days each).
2. **Targeted testing and establish surveillance:** Consider more targeted active case detection based on epidemiology and at-risk groups rather than a passive model of mass testing of high volumes. This testing should be linked to a community-based surveillance system in primary care and sentinel sites (at-risk groups).
3. In **residential aged care facility (RACF)**, when a resident tests positive, in addition to a clinical assessment, assess the capacity of the facility to effectively isolate the patient. If this is not feasible, the patient -- even if mild disease or asymptomatic -- should be transferred to a medically supervised setting, such as a hospital. This is Hong Kong's approach and they have not recorded any deaths in RACFs.
4. **Engage adolescents:** Given the findings of the study in South Korea that adolescents (aged 10-19) years can transmit the virus to almost one-fifth of their household contacts, strengthen health promotion and communication to this group for prevention and isolation when required.



Community Involvement

- Looking at past experiences with HIV/AIDS and Ebola, it is clear that community participation should be emphasized through empowerment, incorporation of insights and ideas from diverse communities.
- The cooperative model of incorporating the community in collaboration with health professionals to plan, research, deliver and evaluate the best possible health promotion and health-care services is key.
- Community participation in the context of COVID-19 can enhance responses to adherence to and participation in lockdown, for the delivery of important prevention messages and for care delivery through community health workers or volunteer support.

Decentralisation, testing and contact tracing

- In **South Korea**, an initiative to contain transmission was engagement with local governments, which were involved through **coordinating drive-in testing, care centres and housing facilities** for patients who tested positive but did not display severe disease. The interplay between the central government, local government and their citizens was important in empowering individuals to feel like they were in charge.
- In an innovative initiative in **Massachusetts**, the state government contracted a non-government organisation **Partners in Health**, with extensive experience in responding to outbreaks in low income countries, to conduct contact tracing in Boston.
- In Australia, it would appear that NSW has an advantage over Victoria in that NSW Health has 15 local health districts responsible for both curative and preventive care. This makes it easier to build local test and trace capacity.

Adolescents as transmitters

- A large study in **South Korea** (59,073 contacts of 5,706 index patients) showed that household transmission of SARS-CoV-2 was high if the index patient was 10–19 years of age. **Children in this age group transmitted the virus to 18.6% of their household contacts** compared with 11.8% overall and just 5.3% for children aged less than 10 years.

Residential aged care facilities

- Currently, there are around 447 cases linked to 35 RACFs in Victoria.
- While the OECD average is 42%, the proportion of all COVID deaths occurring in nursing homes has varied widely: from less than 10% in **Slovenia and Hungary**, through 25% in Portugal and 28% in **Australia**, to 58% in **Israel and Norway**, 66% in **Spain**, and 81% in **Canada**, the highest in the world.
- Best practice is **Hong Kong**, which has not experienced a single death in a RACF. All nursing homes had to maintain at least a month's supply of face masks and other PPE.
Any nursing-home residents who were infected were isolated in hospital coronavirus wards—not in nursing homes—until they had tested negative for the virus at least twice.

Vaccines and Treatments

- Results from the phase I/II trials of vaccines from Oxford University, CanSino and Moderna have been released. These remain promising vaccine candidates, though some adverse events were noted. Further testing in more varied populations will best clarify which vaccines are viable for use on a global scale
- Research on monoclonal antibody treatments have shown promising early signs.



1. Global Epidemiology & Trends^{1,2}

- The **global** total number of reported cases surpassed 15 million on 22 July just five days after the number reached 14 million and 10 days after it reached 13 million. The number of daily new cases has surpassed 200,000 on all but two days during the past two weeks, reaching an all-time high of just under 250,000 on 16 July.
- The **USA, Brazil, India, Russia and South Africa** have recorded the highest number of cases in the world, accounting for 56% of the global total. The total number of cases has surpassed two million in Brazil and one million in India.
- Six of the ten countries that have reported the highest cumulative number of cases are low- and middle-income countries (LMIC) -- Brazil, India, South Africa, Peru, Mexico and Chile.
- The **United States** has now reported more than 4 million cases and 146,000 deaths; the number of daily new cases is more than 60,000 and reached an all-time high of almost 75,000 on 17 July.
 - During the last two weeks, the 7 day average of new daily cases has risen by 36% and new deaths by 63%.
 - Florida is now reporting more than 10,000 new cases daily, higher than any of the highly affected countries in Europe, like Italy and Spain, at the height of their outbreaks. Florida's peak of 15,200 on 12 July compares with 1,902 on 12 June.
 - The number of daily deaths exceeded 1,000 on 22 July, the highest since 2 June.



¹ <https://coronavirus.jhu.edu/data/new-cases>

² <https://www.worldometers.info/coronavirus/#countries>



- The number of reported cases in **Africa** has surpassed 750,000 with 15,000 deaths, fuelled by the growing outbreak in **South Africa**, which has recorded 408,000 cases, the fifth highest in the world .
- Countries that had steadily declining numbers in May and June, which have experienced significant **re-surgences** (spikes) in the past two weeks, include Spain (600-900 cases per day), France (500-700), Belgium (150-250), Netherlands (100-150), Austria (100-150), Czech Republic (100-130), Denmark (50-100) and Greece (40-60).
- Australia, Croatia, Israel, Iran, Japan, Montenegro, Serbia, and West Bank are experiencing **clear second waves**.
- The countries that continue to report **steadily declining case numbers after easing restrictions** include Norway, Ireland, and Italy.

1.1 Asia-Pacific Region

- **Indonesia** (93,657) has now reported more cases than **China** (83,729).
- **Hong Kong, Tokyo and Urumqi** (the capital of China's Xinjiang province) have all experienced record numbers of new daily cases during the past week. All three cities have reimposed strict restrictions.
- **South Korea** continues to report daily spikes of between 40 and 60 cases per day.
- In **Papua New Guinea**, in the past week, 21 new cases have been reported, including a 48 year old woman who was diagnosed post-mortem at Port Moresby General Hospital. This is the first COVID-19 related death in PNG. In addition, a cluster of five new cases has been detected among the 37 staff of the Central Public Health Laboratory. It is not yet known if these cases were infected from samples being tested in the laboratory or from community transmission. This is believed to be one of the few laboratory-based clusters of COVID-19 in the world.

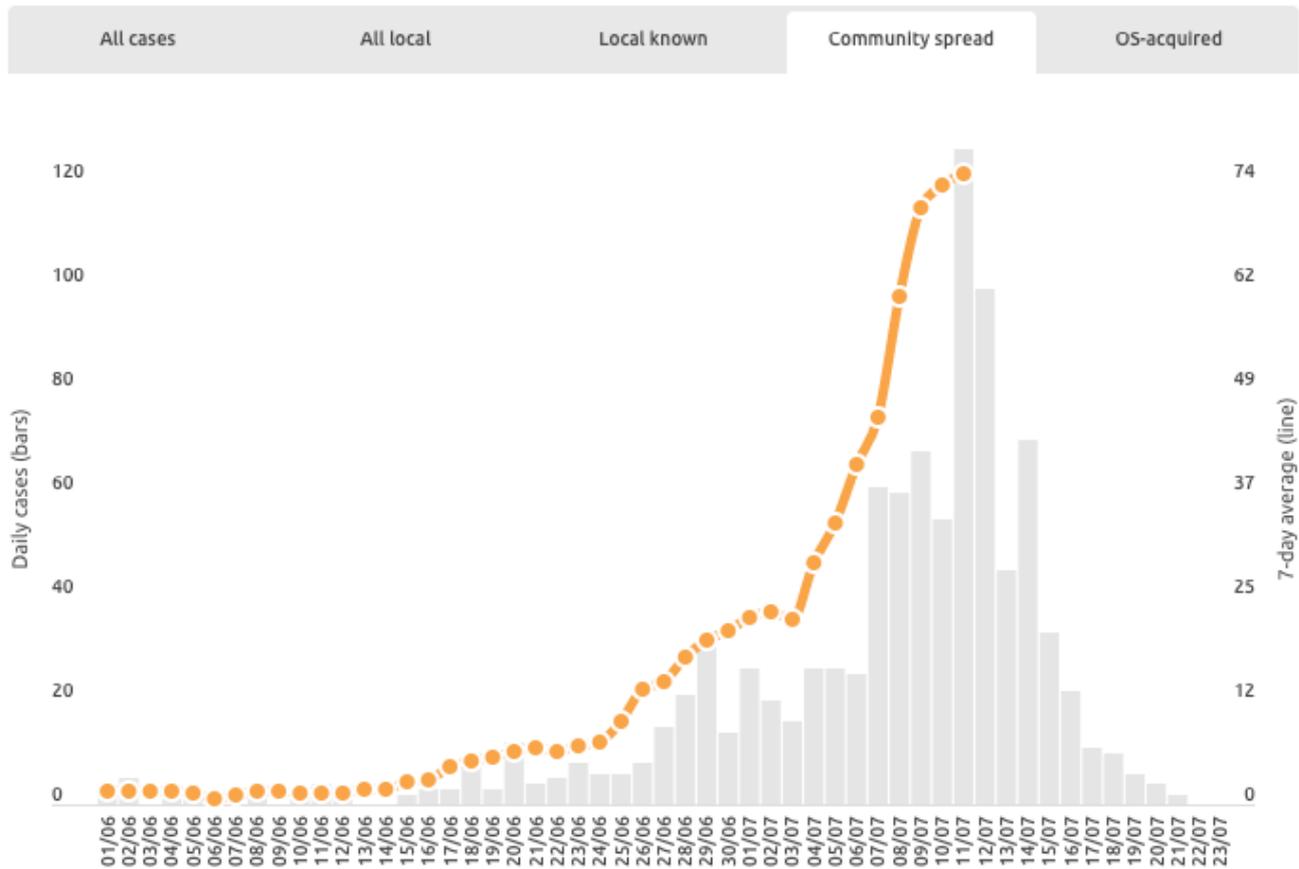
1.2 Australia

- Between 8 May and 17 June, Australia reported more than 20 new daily cases on just one day. However, since then daily new case numbers have steadily climbed into triple digits daily to reach a peak of 484 cases on July 22nd.
- Sydney has experienced a number of clusters, including 50 cases linked to a pub and 20 cases to a Thai restaurant.
- In April, there was a cluster of five cases in the Cairns Hospital pathology laboratory . A technician from Brisbane is believed to have started the spread after flying into Cairns earlier to conduct maintenance work at the laboratory, infecting a local worker. The Chief Medical Officer of Queensland said there was no evidence the cluster was linked to samples being handled at the facility.
- Victoria's "second wave" (or first wave of widespread community transmission) is dominated by **locally acquired infections**, including a large number of family, workplace, and school clusters, and community transmission of unknown source.



- There are currently more than 447 cases are linked to 49 residential aged care facilities.
- The rate of testing in Victoria has increased significantly, reaching more than 20,000 tests per day. In total, Victoria has tested almost one million people, with a rate of 14,370 per 100,000 and a positivity of 0.28%.

Daily new cases and 7-day moving average (line) of source unknown local transmission in Victoria



www.covid19data.com.au



2. Global Response Case Studies

2.1 Community involvement

For many decades, the value of engaging with and involving communities has been a pillar of population health programs, including routine immunisation and national campaigns (e.g., polio vaccination), disease control (e.g., malaria, tuberculosis and HIV and other sexually transmitted infections), maternal, neonatal and child health services, and epidemic responses (e.g., cholera and Ebola). Global health guidelines already emphasise the importance of community participation³.

Incorporating insights and ideas from diverse communities is central for the cooperative model of public health, whereby health professionals work together with communities to plan, research, deliver, and evaluate the best possible health promotion and health-care services⁴. Community participation is essential in the collective response to coronavirus disease 2019 (COVID-19), from compliance with lockdown, to the steps that need to be taken as countries ease restrictions, to community support through volunteering⁵.

Pandemic responses, by contrast, have largely involved governments telling communities what to do, seemingly with minimal community input. Yet communities, including vulnerable and marginalised groups, can identify solutions: they know what knowledge and rumours are circulating; they can provide insight into stigma and structural barriers; and they are well placed to work with others from their communities to devise collective responses. Such community participation matters because unpopular measures risk low compliance. With communities on side, we are far more likely—together—to come up with innovative, tailored solutions that meet the full range of needs of our diverse populations.

Past experience should be our guide. Grassroots movements were central in responding to the HIV/AIDS epidemic by improving uptake of HIV testing and counselling, negotiating access to treatment, helping lower drug prices, and reducing stigma. Community engagement was also crucial in the response to Ebola virus disease in West Africa—e.g. in tracking and addressing rumours⁶.

³ World Health Organization; Geneva: 2015. The global strategy for women's, children's and adolescents' health (2016–2030).

<https://www.who.int/life-course/partners/global-strategy/en/#:~:text=Global%20Strategy%20for%20Women's%2C%20Children's%20and%20Adolescent's%20Health%202016%2D2030,not%20only%20survives%2C%20but%20thrives>

⁴ Marston C, Hinton R, Kean S. Community participation for transformative action on women's, children's and adolescents' health. Bull World Health Organ. 2016;94:376–382. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4857226/>

⁵ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7198202/>

⁶ Gillespie AM, Obregon R, El Asawi R. Social mobilization and community engagement central to the Ebola response in west Africa: lessons for future public health emergencies. Glob Health Sci Pract. 2016;4:626–646. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5199179/>

The following steps have been proposed to achieve community participation in the COVID-19 response⁷:

Invest in cooperation	<ul style="list-style-type: none"> • Fund dedicated staff and spaces to bring the public and policy makers together • Create spaces where people can take part on their own terms (eg, avoid bureaucratic formalities or technical jargon) • Move beyond simply gathering views and instead build dialogue and reflection to genuinely co-design responses
Work with community groups	<ul style="list-style-type: none"> • Build on their expertise and networks • Use their capacity to mobilise their wider communities
Commit to diversity	<ul style="list-style-type: none"> • Capture a broad range of knowledge and experiences • Avoid one-size-fits-all approaches to involvement • Consciously include the most marginalised
Be responsive and transparent	<ul style="list-style-type: none"> • Show people that their concerns and ideas are heard and acted upon • Collaborate to review outcomes on diverse groups and make improvements

2.2 Community-based testing and contact tracing (decentralisation)

One of the key initiatives that helped **South Korea** to contain transmission was engagement with local governments, which were involved through coordinating drive in testing, care centres and housing facilities for patients who tested positive but did not display severe disease. The interplay between the central government, local government and their citizens was important in empowering individuals to feel like they were in charge.

It would appear that **NSW** Health has an advantage over Victoria to implement a decentralised approach to testing and contact tracing. In 2011, 15 local health districts (LHD) were established. The purposes of LHDs are to:

- provide relief to sick and injured persons through the provision of care and treatment, including the oversight of hospitals, and
- promote, protect and maintain the health of the community (public health)⁸.

By comparison, **Victoria** has a centralised health system, although there are five primary health care networks. It may have been easier for NSW to build into the LHDs the capacity and skills to run testing and contact tracing given the existing relationships with local communities.

The importance of prompt testing and efficient contact tracing in controlling transmission is highlighted in a paper published in **The Lancet Public Health this week**⁹. The authors evaluated the impact of timeliness and completeness in various steps of a contact tracing strategy using a mathematical model with explicit time delays between time of infection and symptom onset, and between symptom onset, diagnosis by testing, and isolation (**testing delay**).

⁷ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7198202/>

⁸ <https://www.audit.nsw.gov.au/our-work/reports/governance-of-local-health-districts>

⁹ [https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667\(20\)30157-2/fulltext?utm_campaign=tlcoronavirus20&utm_content=134833523&utm_medium=social&utm_source=twitter&hss_channel=tw-27013292](https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(20)30157-2/fulltext?utm_campaign=tlcoronavirus20&utm_content=134833523&utm_medium=social&utm_source=twitter&hss_channel=tw-27013292)



The model also includes tracing of close contacts (eg, household members) and casual contacts, followed by testing regardless of symptoms and isolation if testing positive, with different **tracing delays** and coverages.

For the most optimistic scenario (testing and tracing delays of zero days and tracing coverage of 100%), and assuming that around 40% of transmissions occur before symptom onset, the model predicts that the estimated effective reproduction number (Re) of 1.2 (with physical distancing only) will be reduced to 0.8 (95% CI 0.7–0.9) by adding contact tracing. The model also shows that a similar reduction can be achieved when testing and tracing coverage is reduced to 80%. A testing delay of more than 1 day requires the tracing delay to be at most 1 day or tracing coverage to be at least 80% to keep Re below 1.

The proportion of onward transmissions per index case that can be prevented depends on testing and tracing delays, and given a 0-day tracing delay, ranges from up to 79.9% with a 0-day testing delay to 41.8% with a 3-day testing delay and 4.9% with a 7-day testing delay.

Given the need to conduct testing as soon after symptoms develop as possible and to then trace all household and casual contacts within a day or two, a community-based (decentralised) testing and tracing system with strong community engagement could have a major impact on reducing transmission.

A community- based model of contact tracing – Massachusetts, USA

In early April, just over one month after the first case of COVID-19 was diagnosed in his state, the governor of Massachusetts approved an agreement with the non-profit agency **Partners in Health** (PIH), to conduct widespread contact tracing¹⁰. PIH's mission has long been to build durable medical systems in the poorest parts of the poorest countries on earth, by training local community-health workers and allowing them to mould programs to local needs. Much of P.I.H.'s work has been in the least developed countries of the world.

The Massachusetts COVID-19 **Community Tracing Collaborative** (CTC) employs around 1,600 workers whose roles are divided into three categories. Case investigators quickly call people who had tested positive for the virus and interview them extensively about their contacts, beginning 48 hours before they first noticed symptoms. Contact tracers, the largest group, call each of those contacts, ask them to isolate at home for 14 days, and then follow up frequently, to make sure that they were doing so and to check for any symptoms. The third group, care-resource coordinators, are effectively social workers, appointed to help people solve problems—how to get food, find a place to stay, or manage addictions—that might prevent them from being able to isolate themselves. By late April, it was taking between three and four days for the CTC to learn of a positive test, but after investigators had that information they were able to reach 70% of cases, and contact tracers were then able to speak to 74% of those cases' contacts. That equates to an approximate 50% coverage of eligible contacts.

¹⁰ <https://www.newyorker.com/news/us-journal/can-coronavirus-contact-tracing-survive-reopening>



2.4 Protecting the elderly – Residential Aged Care Facilities

Australia

As of 21 July, there were more than 250 cases linked to 49 residential aged care facilities (RACF) in **Victoria**. During the first wave of COVID-19 cases in Australia, there were a number of clusters in RACFs. However, the most severe was in the Newmarch Nursing Home in **Sydney** where there were 71 cases and 18 deaths. There were criticisms of the response including the fact that many of the infected residents were not transferred to a hospital for treatment and died in the facility.

Another outbreak at the Dorothy Henderson Lodge (DHL) nursing home, also in Sydney, occurred early in Australia's outbreak, when understanding and experience of the disease were limited. Altogether, 17 of 76 (22%) DHL residents were infected with COVID-19 and six died; five were more than 90 years old. Twelve residents were admitted to hospital; of the five who remained at DHL four recovered and one died, with palliation. The author of a paper in pre-release by the MJA summarised the lessons learned from the outbreak¹¹:

- There is a need for early, ongoing leadership by facility management and guidance from an experienced IPC professional.
- There is a widespread lack of IPC competence and confidence among healthcare and RACF workers. Regular, targeted training of hospital and RACF staff is required to embed IPC principles in routine practice and enable rapid escalation to high-level outbreak precautions, when required.
- Contingency plans are needed to ensure outbreak surge capacity of appropriately qualified and experienced RACF staff to deal with sudden demand, due to absenteeism, from illness or quarantine, particularly if multiple facilities may be affected simultaneously.
- Proactive allied-health support is needed maintain social connection, mobility and nutrition to mitigate risks of prolonged isolation or quarantine of elderly residents.
- Hospital admission of RACF residents with COVID-19 can be determined, on a case-by-case basis, according to medical need, resident preference and facility resources.
- In a RACF, a single confirmed case of COVID-19, in a resident, staff member or frequent visitor, requires an immediate outbreak response, including testing of all staff and residents, isolation or quarantine, as required, and implementation of strict IPC measures.

United States

More than 40% of all coronavirus deaths in the **United States** have been staff or residents in nursing homes¹². One in five facilities has reported at least one death. In just one New Jersey nursing home, at least 53 residents died after the sick were housed with the healthy and staffers had little more than rudimentary face shields for protection. The high rate of COVID-19 deaths in nursing homes has been attributed to (i) delayed and inadequate testing; (ii) lack of face masks and other PPE; (iii) inadequate training of staff in infection control; and (iv) the practice in some states of transferring COVID-19 patients from hospitals to nursing homes.

¹¹ <https://www.mja.com.au/journal/2020/covid-19-sydney-nursing-home-case-study-and-lessons-learned>

¹² <https://www.theatlantic.com/health/archive/2020/07/us-repeating-deadliest-pandemic-mistake-nursing-home-deaths/613855/>



Sweden

In **Sweden**, which did not impose restrictions comparable to other Western European countries, 66% of deaths have been in people over the age of 70 years; two-thirds were in nursing homes¹³. The reasons given for the high death rate among elderly Swedes include (i) Neglect and defunding of the aged care sector over many years; (ii) Reliance on low-paid and low-skilled workers in nursing homes who often had other jobs and lived in crowded conditions; (iii) Delayed restrictions on visitors to aged care homes; and (iv) a national shortage of PPE supplies and (v) Europe's lowest number of ICU beds per capita.

Canada

Canada has been ranked as the worst country in the world for the proportion of COVID-19 deaths that occurred among residents of aged care homes -- **more than 80%**¹⁴. While the OECD average is 42%, the proportion of deaths occurring in nursing homes has varied widely: from less than 10% in **Slovenia and Hungary**, through 25% in Portugal and 28% in **Australia**, to 58% in **Israel and Norway** and 66% in **Spain**. An analysis of OECD countries by the Canadian Institute for Health Information found the following factors explained Canada's high rate of deaths in long-term care (LTC)¹⁵:

- Compared with the OECD average, Canada had fewer health care workers (nurses and personal support workers) per 100 senior residents of LTC homes in 2017–2018.
- Countries with centralised regulation and organisation of LTC (Australia, Austria, Hungary, and Slovenia) were generally associated with lower numbers of COVID-19 cases and deaths.
- Countries that implemented specific prevention measures targeted to the LTC sector at the same time as their stay-at-home orders and closure of public places (Australia, Austria, the Netherlands, Hungary, and Slovenia) had fewer COVID-19 infections and deaths in LTC.

Hong Kong

Hong Kong, with a population of 7.5 million, has reported no deaths from COVID-19 in its care homes. The city learned a tough lesson from the outbreak of SARS in 2003, during which it suffered nearly 300 deaths, or almost 40% of the global death toll. Nursing-home residents were more likely than the general public to be infected with SARS, and 78% of infected residents died.

Immediately after the 2003 outbreak, the Hong Kong government launched a revamped policy of infectious-disease control that required nursing homes to have a designated, government-trained infection-control officer. All nursing homes had to maintain at least a month's supply of face masks and other PPE.

As soon as COVID-19 arrived in Hong Kong, in January of this year, its nursing homes halted non-urgent hospital trips among residents as well as family visitation. Nursing-home staff donned masks as they cared for the residents. Any nursing-home residents who acquired COVID-19 were isolated in hospital coronavirus wards—not in nursing homes—until they had tested negative for the virus at least twice.

¹³ <https://foreignpolicy.com/2020/06/23/sweden-coronavirus-failure-anders-tegnell-started-long-before-the-pandemic/>

¹⁴ <https://hellocaremail.com.au/81-covid-19-deaths-canada-nursing-homes/>

¹⁵ <https://www.cihi.ca/en/new-analysis-paints-international-picture-of-covid-19s-long-term-care-impacts>



Summary

Hong Kong has demonstrated that preparedness has been the key factor in preventing excess mortality due to coronavirus in aged care facilities. Lack of preparedness, inadequate centralised regulation and organisation of the aged care sector, delayed implementation of restricted visitation, poorly trained and low-paid staff, and unclear policies on hospitalisation of elderly residents have all contributed to high rates of mortality in nursing homes in Canada, Sweden, Spain and Israel.

The US CDC includes the following key recommendations for preventing transmission in aged care facilities¹⁶:

- Facilities should assign at least one individual with training in IPC to provide on-site management of their COVID-19 prevention and response activities.
- Educate residents, healthcare personnel, and visitors about COVID-19, current precautions being taken in the facility, and actions they should take to protect themselves.
- Implement source control measures (residents and health care providers).
- Have a plan for visitor restrictions.
- Create a plan for testing residents and healthcare personnel for SARS-CoV-2.
- Evaluate and manage healthcare personnel, including temperature screening at the beginning of their shift.
- Provide supplies necessary to adhere to recommended IPC practices.
- Identify space in the facility that could be dedicated to monitor and care for residents with COVID-19.

¹⁶ <https://www.cdc.gov/coronavirus/2019-ncov/hcp/long-term-care.html>

3. Research and Science Updates

3.1 Transmission from children to adults

In an early release paper, a group of South Korean CDC researchers analysed reports for 59,073 contacts of 5,706 COVID-19 index patients reported in South Korea during January 20–March 27, 2020¹⁷. They defined an index case as the first identified laboratory-confirmed case or the first documented case in an epidemiologic investigation within a cluster. Contacts in high-risk groups (household contacts of COVID-19 patients, healthcare personnel) were routinely tested; in non-high-risk groups, only symptomatic persons were tested. Non-high-risk asymptomatic contacts had to self-quarantine for 14 days and were placed under twice-daily active surveillance by public health workers.

Of 48,481 non-household contacts, 1.9% had COVID-19. Of 10,592 household contacts, 11.8% had COVID-19; rates were higher for contacts of children over the age of 9 years than adults. They found the highest COVID-19 rate (**18.6%** [95% CI 14.0%–24.0%]) for household contacts of school-aged children (10-19 years) and the lowest (5.3% [95% CI 1.3%–13.7%]) for household contacts of children 0–9 years in the middle of school closure.

Summary

The authors showed that household transmission of SARS-CoV-2 was high if the index patient was 10–19 years of age. In the current mitigation strategy that includes physical distancing, optimising the likelihood of reducing individual, family, and community disease is important. **Implementation of public health recommendations, including hand and respiratory hygiene, should be encouraged to reduce transmission of SARS-CoV-2 within affected households.**

3.2 Vaccines and Treatments

Promising Phase I/II Clinical Trial Data

Countries around the world have accelerated their vaccine development to find an effective and safe vaccine that protects against COVID-19. Vaccine development normally occurs over a period of years, so the creation and distribution of a safe and effective vaccine that can be delivered within 1 or 2 years would be highly unprecedented¹⁸. Advances in technology such as improved manufacturing and computational biology along with global collaboration has allowed potential vaccine candidates to progress at a rapid pace. Since the posting of the SARS-CoV-2 genome on January 10, 2020, there are currently more than 150 candidate vaccines in development, with at least 27 currently under evaluation in clinical trials¹⁹.

In recent weeks we have seen the preliminary results from 3 promising vaccine candidates. The candidates are being developed by institutes such as **Moderna** in the US²⁰, **Oxford University**²¹ in the UK and **Cansino Biologics**²² in Wuhan.

¹⁷ https://wwwnc.cdc.gov/eid/article/26/10/20-1315_article

¹⁸ <https://science.sciencemag.org/content/368/6494/945>

¹⁹ <https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html?smid=fb-share>

²⁰ <https://www.nejm.org/doi/pdf/10.1056/NEJMoa2022483?articleTools=true>

²¹ [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)31604-4/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31604-4/fulltext)

²² [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)31605-6/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31605-6/fulltext)



Results from the phase I/II trials have been promising, and all have progressed to the next phase. The aim of the earlier stages of clinical trials is to ensure safety and to determine the best dose with the fewest side effects. While no serious adverse effects have been reported, some trials have reported mild to severe adverse events. These events are commonly fatigue, muscle ache and headache. Although these events can be mitigated through use of paracetamol, it's important to be mindful of potential issues when considering the uptake of the vaccine by a much larger population.

The next steps in development for these candidates are application to a larger, more diverse population, as the current data was mainly obtained from healthy, non-ethnically diverse adults. We know that COVID disproportionately affects those over the age of 65 in higher income countries, while it affects the younger populations in LMICs. Therefore, risk profiles must be determined across different age groups and ethnicities. While the trial data showed that the vaccines were able to induce an immune response through generation of antibodies and activation of T cell responses, the duration of immunity is still under investigation.

Recently, there has been interest in the length of immunity to COVID-19 following a longitudinal study by King's College London that suggested that those who have recovered from the disease may lose immunity within months²³. The study demonstrated that the magnitude of the neutralising antibody response is dependent on the disease severity, reinforcing the idea that one vaccination may not be sufficient for prolonged immunity. This is consistent with the responses observed in the Moderna vaccine phase I trial. The ratios of neutralising and non-neutralising virus may change over time, but further research needs to be completed²⁴.

Global Mechanisms for Vaccines and Equitable Access

While vaccine development is progressing, the logistics of distributing the vaccine globally are also being addressed. Strengthening of funding and distribution methods is of utmost importance to ensure that those who need the vaccine the most can receive it in a timely manner. To address equitable global access to a vaccine, the COVAX facility has been formed. The COVAX facility is a measure designed to guarantee rapid and equitable delivery of COVID-19 vaccines to countries that may not be able to afford it. COVAX is co-led by Gavi, the Coalition for Epidemic Preparedness Innovations (CEPI) and the WHO. Over \$1.4 billion has been raised by CEPI toward vaccine development through institutes such as Inovia, Moderna and the University of Queensland²⁵.

On July 15, it was announced that 75 countries had submitted expressions of interest to the COVAX facility²⁶. These expressions of interest mark the beginnings of a partnership between the 75 countries and 90 countries that are lower income. The countries involved in COVAX represents more than 60% of the world's population. The goal of COVAX is to deliver 2 billion doses of safe and effective vaccines by the end of 2021 to all participating countries, with initial focus on healthcare workers. While the expressions of interest mark a significant step, the work is now underway to formalise vaccine funding and budgeting. The potential for significant spread through LMICs highlights the importance of strengthening distribution and equitable access systems.

²³ <https://www.medrxiv.org/content/10.1101/2020.07.09.20148429v1>

²⁴ https://www.medrxiv.org/content/10.1101/2020.07.14.20151126v1#discussion_thread

²⁵ <https://cepi.net/covid-19/>

²⁶ <https://www.who.int/news-room/detail/15-07-2020-more-than-150-countries-engaged-in-covid-19-vaccine-global-access-facility>



Potential Treatments

Aside from vaccines, other avenues have been explored for the prevention of COVID-19. One such treatment method is utilising neutralising antibodies. A recent paper by Liu et al. done in a single cohort of 5 patients hospitalised with severe disease looked at the potency of neutralising antibodies that they had formed²⁷. Through isolation of the antibodies, 19 were able to potentially neutralise SARS-CoV-2 *in vitro*. Similar research had been completed by Brouwer et al. to identify potential candidates for COVID-19 treatment and prevention²⁸. These early results are encouraging, but further research in larger sample sizes and eventual clinical trials is necessary to determine safety and efficacy.

Highlighted research articles

- **Routine childhood immunisation during the COVID-19 pandemic in Africa: a benefit–risk analysis of health benefits versus excess risk of SARS-CoV-2 infection²⁹**

This paper considers high-impact and low-impact scenarios to examine the rate of child death due to immunization coverage reduction during COVID-19 outbreaks. In the high impact scenario, it was found that for every one COVID-19 death attribute to visiting a vaccination clinic, 84 (95% UI 14=267) deaths could be prevented by sustaining routine immunization among children.

- **Younger ages at risk of Covid-19 mortality in communities of color³⁰**

In high income countries, a majority of the mortality due to COVID-19 skews towards those aged 65 and over. Recent data suggest that there is increased mortality among younger people in minority communities in high income countries, which suggests the significant potential for COVID-19 to affect younger people in LMIC.

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²⁷ <https://www.nature.com/articles/s41586-020-2571-7>

²⁸ <https://science.sciencemag.org/content/early/2020/06/15/science.abc5902>

²⁹ [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(20\)30308-9/fulltext](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30308-9/fulltext)

³⁰ <https://gatesopenresearch.org/articles/4-69/v1>