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Review

COVID-19: A tale of two pandemics across the Asia Pacific region

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Educational Aims

The reader will come appreciate:

- The impact of COVID-19 upon countries differed widely across the Asia-Pacific region.
- Children experienced milder disease as elsewhere in the world.
- Vietnam, New Zealand and Australia have had incredibly successful initial outcomes in response to COVID-19.
- Common problems with poor preparedness and a lack of centralised response hampered efforts to fight the pandemic in some countries.

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ABSTRACT

The widely diverse impacts of SARS-CoV-2 infection resulting in the COVID-19 pandemic cannot be held in more stark relief when contrasting the devastating impact upon China, Italy, Great Britain, America and Brazil with the considerably milder course in the geographically isolated countries of Australia and New Zealand and the densely populated Vietnam. Children in the Asia-Pacific region, as with children all over the world to date, have fared better than older adults. Other countries in the Asia-Pacific region, including Indonesia and India have struggled to deal with the pandemic because of a lack of health infrastructure, inability to provide sufficient testing and isolation and widespread poverty. This article will provide a snapshot of the impact of COVID-19 upon countries in the Asia-Pacific region in the six months since the first case of the novel zoonotic coronavirus infection appeared in China.

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The Asia Pacific region contains a number of first world countries as well as a range of populous and crowded countries, some with prosperous economies, and other low-middle income [LMIC] countries that have tremendous economic challenges and limited health care resources for maintaining everyday wellbeing. The COVID-19 pandemic has unmasked the impact of the health resource inequities and lack of preparedness to upscale a co-ordinated response in many countries in the region. The Asia Pacific region includes East Asia, South East Asia, South Asia and Oceania. It spreads from India, Sri Lanka and Pakistan in the west,

to China and Japan in the north and Australia, and New Zealand in the South.

Approaching six months since the first case of the novel SARS-CoV-2 infection was identified in Wuhan, China there has been a swathe of destruction across the globe with over 7.88 million confirmed cases and 430,000 deaths in 180 countries [covid19.who.int; accessed June 16th, 2020]. Some the world's most affluent nations in the USA [115,000 deaths] and the United Kingdom [41,600 deaths] have struggled to deal with the pandemic. Brazil [currently 43,300 deaths] has surpassed the UK with fatalities due to COVID-19. Fears of dramatically increasing deaths are well founded as the pandemic begins to gather momentum in the South American continent with its population of 640 million people [1].

Out of the horrific pictures from hospitals in Wuhan that shocked the world in January 2020 came early fears of the worldwide impact of the condition. Limited information from China's

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official agencies contrasted the pictures that were becoming available on social media of death and devastation in Wuhan. Concerns have been raised about the veracity of official Chinese data on the true impact of the COVID-19 crisis as it unfolded, subsequent revising up its mortality figures' weeks after the peak of the reported crisis, and its potential under-reporting of fatalities based on modelling of cremation data [2]. By late January 2020 many political leaders on the advice of their health administrators were becoming increasingly concerned as cases were diagnosed in travellers returning from Wuhan, on international flights, to higher income countries [Table 1] [3]. The impact of the evolving health crisis/pandemic upon an under-prepared world was compounded by some political leaders' reticence to appreciate the advice of their senior health officers. That inertia no doubt contributed to the mortality from the first wave of COVID-19 infections in countries such as the UK, Brazil and the USA. With this backdrop, we present the impact of the COVID-19 pandemic across the Asia Pacific, showing that decisive action early in the course of the pandemic translated into many lives saved, albeit it at a record economic cost [4].

CHINA

In late December 2019, the outbreak started in the city of Wuhan in central China. It was clear that this novel infection is highly contagious as health care workers without proper personal protective equipment could easily get infected. The initial impression was that children were less affected as almost all patients in the initial reports were adults [5–7]. Because of efficient modern ways of travelling, there were already reported cases in Thailand, South Korea and the United States within a month, by late January 2020. The first day of the Chinese New Year holidays was on 25 January 2020. During this important holiday in China, there is usually massive movement of people around the country. It was

appreciated that it would be catastrophic if the virus was brought to different parts of China causing outbreaks similar to the magnitude of that in Wuhan. With the experience of severe acute respiratory syndrome (SARS) in 2002–2003, the central Chinese government decided to lock down the city of Wuhan on 23 January 2020 to minimize movement of people in and out of the city as well as the province of Hubei [8].

Retrospective analyses of stored respiratory samples from children in Wuhan who presented with respiratory tract infections revealed that there were already cases of COVID-19 in children in January 2020 [9]. In order to minimize possible nosocomial spread of the infection, the Wuhan Children's Hospital was designated by the central government to be the only centre to assess and treat infected children less than 16 years of age. The initial experience at the Wuhan Children's Hospital clearly suggested that the spectrum of disease is milder in children than that in adults [10]. Only 40% of infected children developed fever while 20% only manifested symptoms of upper respiratory infections. Furthermore, children usually got infected from contact with an infected household member. Therefore, the strategy used in China was to test all children from families with confirmed or suspected COVID-19 cases regardless whether they had symptoms or not. With this screening strategy, one in five infected children was found to be asymptomatic [10]. Furthermore, approximately one in ten infected children had radiological signs of pneumonia but they remained asymptomatic [10]. Younger children were more likely to be symptomatic when compared to older children and adolescents. Schools in China remained closed until May 2020, when the outbreak became largely controlled within China.

SOUTH KOREA

South Korea had its first documented case on 19 January 2020 when a Chinese visitor from Wuhan travelled to South Korea

Table 1
Selected events leading up to the WHO declaration of a pandemic on March 11th, 2020.

Date	China	Australia	Rest of the World	Great Britain	USA
Dec 31st 2019	WHO reports cluster of pneumonia cases in Wuhan, China				
Jan 12th 2020	WHO confirms a novel coronavirus as the cause of cases in Wuhan, China				
Jan 13th 2020			1st reported case outside China occurs in Thailand		
Jan 15th 2020			1st case Japan		
Jan 19th 2020			1st case Korea		
Jan 23rd 2020	City of Wuhan begins lockdown		1st case in Vietnam		1st case USA
Jan 24th 2020			1st case Vietnam		
Jan 25th 2020	Chinese New Year Holiday begins	1st case Australia	1st case Europe occurs in France		
Jan 29th 2020			1st case United Arab Emirates		
Jan 31st 2020				1st case in England	
Jan 31st 2020	WHO announces a "Public Health Emergency of Global Concern"				
Feb 1st 2020		Australia closes its borders to China			
Feb 15th 2020			1st case African continent occurs in Egypt		
Feb 25th 2020					CDC warns US to prepare for a local outbreak
Feb 27th 2020		Australian Prime Minister declares COVID19 a pandemic	1st case in South America occurs in Brazil	1st cases in Scotland, Wales and Northern Ireland	
March 8th 2020	100,000 deaths globally from COVID-19				
March 11th 2020	WHO declares a global pandemic				
June 13th 2020	Cases 84,659 Deaths 4,645	Cases 7,290 Deaths 102	*Worldwide Cases: 7,410,510 Deaths: 418,294	Cases 291,413 Deaths 41,481	Cases 1,988,646 Deaths 112,810

*Case numbers: www.covid19.who.int; accessed June 13th, 2020.

[11]. The Korea Centers for Disease Control and Prevention quickly stepped up their border control and contact tracing system. However, the 29th identified case did not have an epidemiological link or travel to China. Subsequently, there was a major outbreak related to gatherings at a church in Daegu. By late February, it was obvious that there were community outbreaks in different parts of the country. Compared to Wuhan, the Korean Government took a different approach to manage its population including the use of mobile testing facilities, isolation of infected cases, efficient contact tracing and quarantine, wearing of masks by the public and other social distancing measures without locking down of cities [12]. These measures were highly effective. The number of daily new cases dropped to less than 50 per day by early April from the peak of over 800 new cases per day in late February.

TAIWAN

In Taiwan, many lessons were learned during the outbreak of SARS in 2003. The Taiwan Centers for Disease Control had established a highly efficient system which combines information from their centralized health care system, immigration department, and customs authorities [13]. The control of the outbreak was also highly effective despite its close proximity to mainland China and there were many direct flights between the island of Taiwan and the cities in mainland China. Along with a low threshold of testing, contact tracing, isolation and quarantine, border control and testing of visitors, there was minimal community spread. Imported cases were quickly identified and isolated with minimal spreading of infection to the local population. With a population over 23 million people, there were only 443 confirmed cases and 7 deaths [www.who.int; accessed June 16th 2020].

VIETNAM

Vietnam has provided an excellent example of how to control an outbreak given the limited resources available in the country. Seeing the devastation in nearby China the country took the threat of COVID-19 very seriously right from the outset. Vietnam established a National Steering Committee chaired by the Deputy Prime Minister within a week of the first case being confirmed in the country [14]. The first case was reported on 23 January when a couple returned from a visit to Wuhan [15]. The country took a centralized approach including testing of infection, centralized quarantine and home quarantine measures, suspension of flights to and from affected countries, 14 days of mandatory quarantine for all arrival passengers, and social-distancing measures [14]. For a densely populated country with 95 million people, it was remarkable that there were only 331 cases with no deaths reported.

INDONESIA

Indonesia with a population of 275 million people has reported 35,300 cases and 2000 deaths since its first case in February 2020 [www.covid19.who.int; accessed June 13th, 2020]. Like many LMIC with limited healthcare infrastructure, inconsistency of surveillance platforms and a persistently low testing rate this is likely a significant under-representation of the true impact of the COVID-19 pandemic [16].

INDIA

India, a country of 1.4 billion people, has an enormous population living in poverty. It has reported 297,000 cases and 8,500 deaths [www.covid19.who.int; accessed June 13th, 2020]. Prob-

lems with low testing rates, stigmatisation of people with COVID-19 infection may prevent people presenting for testing, violence against health-care workers, an ill-equipped health-care system and the mass migration of migrant workers and concerns about food security for many millions of people challenge the veracity of the figures produced and true impact of the pandemic [17].

NEW ZEALAND

The first case in NZ was reported on February 28th, 2020. The borders and entry points were closed to non-New Zealand residents on March 19th, 2020. The country went into lockdown on March 25th with what were described as Level 4 [highest level] restrictions on community activities [18]. There were 1502 cases and 22 deaths that occurred [19]. The last case of COVID-19 was reported on May 22nd, 2020 and there were no active cases as of June 16th, 2020 [www.covid19.govt.nz]. On this day the country lifted all community restrictions with the exception of opening its borders [Level 1].

AUSTRALIA

Australia had its first case identified in a 58 years old man returning on a flight from Wuhan to Melbourne who had reported symptoms from January 13th, 2020 and was diagnosed on January 25th, 2020. Another 11 cases were confirmed in the following week and investigations had confirmed that all 12 cases were acquired in China [20]. The first local case was reported in Queensland, after contact with an imported case from a Chinese tourist, in the first week of February. Locally acquired cases remained in the minority, with estimates suggesting at least 60% were acquired overseas as tourists or Australian residents arriving on flights or cruise ships [20,21]. The majority of cases were diagnosed in quarantine settings with well organised screening and contact tracing methodologies established early in the pandemic. Australia had its peak daily incidence in early April 2020, culminating in a total of 7,290 cases and 102 deaths as of June 13th, 2020 [www.health.gov.au; accessed June 13th, 2020]. Australia consolidated its mitigation approach around four key strategies: (1) Border closure, (2) Testing widely, (3) Tracing of all contacts, and (4) Physical distancing principles of hand hygiene, 1.5 m apart, not touching your face, with face masks as optional [www.health.gov.au; accessed June 16th, 2020]. Based upon the success of a tracing app in Singapore, a free, voluntary smartphone tracing app became available in mid-May 2020 and within a month was downloaded by 6.3 million people out of a target of 16 million Australian adults with smartphones [39%] [www.health.gov.au; June 16th, 2020].

The distribution of COVID-19 cases was similar to overseas with <3% cases occurring in children, the majority occurring in healthy people aged 20–30 years whilst the majority of fatalities occurred in people over the age of 70 years with co-morbidities. There was only one death of a person under the age of 50 years. No children required mechanical ventilation [www.health.gov.au; accessed June 13th, 2020]. The Children's Hospital at Westmead in Sydney, located in New South Wales [NSW] with a population of 7.5 million, has admitted one child for 24 hours for observation before he was discharged home and recovered. In NSW there have been over 650,000 screening tests undertaken, 3128 confirmed cases, consisting of 1816 acquired overseas, 1243 acquired locally and 69 acquired from interstate. The rate of diagnosis in adults was approximately 10 times higher in adults [0.48 per 100,000 adults] than in children [0.05 per 100,000 children]. For 0 to 4 years olds the proportion of positive tests was 0.1%, for 5–11 years olds it was 0.14%, for 12–17 years olds it was 0.3% compared to

0.6–1.0% for adults] [www.health.nsw.gov.au; accessed June 16th, 2020].

LESSONS TO BE LEARNED FROM COVID-19

Identifying patients

In the beginning of the outbreak, the reported mortality in adults of this novel infection was extremely high approaching that of SARS (1–2). Outbreaks in health care facilities and within families confirmed the efficient human to human transmission. Subsequent large epidemiology studies reveal the true spectrum of the disease caused by this novel coronavirus [7]. In particular, a large proportion of patients [up to 20%] is asymptomatic and the viral loads in their respiratory secretions could be as high as those from symptomatic patients [22]. Identification and isolation of these asymptomatic patients may be crucial for the success in controlling the spread of the infection in the community, as seen from data on the Diamond Princess cruise ship where around 10% of subjects with proven COVID-19 infection were asymptomatic [23].

Isolation of infected patients

The approach in Wuhan was to isolate all infected patients in designated hospitals or centres regardless of the severity of their disease. In order to cope with the massive number of patients, different types of temporary hospitals were built to cater for patients with different levels of severity. Instead of home isolation for patients with mild disease, these patients were isolated in Fangcang shelter hospitals which are rapidly built by converting existing stadiums or exhibition centres [24]. By isolating these patients in such facilities, community spread of the infection could potentially be reduced drastically. In contrast, the use of home isolation in Australia, the United States and many European countries for mildly affected patients in recent a modelling paper has been suggested to be one of the important reasons for widespread community transmission [25]. This may be more applicable with established community derived infection rather than the majority of cases reflecting imported infection from overseas as is the case in Australia and New Zealand. The real world experience to date of containment of COVID-19 infections there, where forced quarantine for 14 days was used for all overseas arrivals in hotels [paid for by the government], and community identified cases were mainly [>80%] managed in self-isolation in the home setting [26]. Similarly, the success of containment in the resource limited setting of Vietnam would argue that home-based isolation is feasible and successful as part of a group of measures involving widespread testing, rigorous tracing and physical distancing principles [15].

Severity of COVID-19 infection

The initial impression from small and biased samples of adult patients suggested that SARS-CoV-2 infection could have a mortality approaching that of SARS. Subsequent systematic screening of children with household contact of confirmed cases revealed a spectrum of disease which is very different from previously thought [5]. In particular, the large percentages of asymptomatic or mild symptomatic patients may have been one of the key factors making control of COVID-19 so difficult [23]. The differential severity in this pandemic has been striking and coming to appreciate the immunological mechanisms underlying it will prove vital for our understanding of the age-related response to novel coronavirus infections [27,28].

Widespread community testing

Another key lesson learnt from the experience of South Korea, Vietnam, Australia and New Zealand is the importance of massive upscale of testing and contact tracing in controlling the spread of COVID-19. There was no formal lockdown in South Korea but the outbreak was quickly controlled. Adequate testing will identify almost all infected persons such that asymptomatic or mildly symptomatic patients will be isolated and will not spread the infection to other vulnerable individuals [18]. The approach taken by the Singaporean government was very similar to that in South Korea and the country had very few cases until there were outbreaks occurring in migrant workers. There were major difficulties of social distancing because the migrant workers were living in densely populated dormitories such that infections were spreading quickly within such dormitories [29]. When we compare the outbreaks of COVID-19 in many Asian countries with those in Europe and America, we must ask the question why the magnitude of the outbreaks appeared to be much bigger in countries such as Italy, Spain, United Kingdom, and the United States. By mid-February, there were hundreds of new cases diagnosed daily in China and South Korea while there were very few cases in Europe or America. The drastic approach of lockdown in Wuhan, including strict traffic control, home confinement, and universal use of face masks were associated with a rapid decrease in community spread within Wuhan and the rest of China [8]. In about 8 weeks in China, the number of locally transmitted cases went down from over 3000 per day down to less than 10 in a country with a population of over 1.4 billion. However, such restrictive public health measures may not be as easily replicated in other countries because of significant social and legal differences in other countries. Nonetheless, in democratic countries such as Australia and New Zealand the community response to dramatic physical distancing restrictions was associated with excellent outcomes when compared to the more permissive approaches seen in Sweden, the USA and the United Kingdom. Widespread community testing was a key step in understanding the dynamics of the pandemic and optimising the response to locally acquired infection, which comprised about 10% of cases in Australia [30].

The issue of civil liberties in the time of a pandemic

In the absence of effective vaccine and specific antiviral treatment, public health interventions including various forms of social distancing, testing, isolation and efficient contact tracing will continue to be the main measures to minimize the outbreaks of COVID-19. It appears that a centralized country-wide approach is necessary for rapid control of the spread of COVID-19. Each country or region will have to institute policies and restrictions of personal freedom acceptable to their citizens and to balance these measures against the potential morbidity and mortality related to COVID-19 [31].

Truly integrated national co-operation

Australia and New Zealand can be considered to be the exemplars with regard to their responses to the COVID-19 pandemic in democratic countries. Both countries enacted similar policies to fight the spread of COVID-19 following similar timelines. In Australia, the Prime Minister convened a 'national cabinet' in early March 2020, based upon war-time models of the past, which comprised all elected State and Territory leaders as well as key federal politicians [32]. This group met regularly and provided updates to the public on policy decisions in response to the evolving threats of the pandemic. It provided a forum for discussion and decision making with a consistency of messages which the community

had needed in uncertain times. Healthcare and economics were presented as the dual pillars central to navigating through the pandemic crisis and this was reiterated to the population through frequent press conferences held jointly by the Prime Minister and Chief Medical Officer. In fact, it is the combination of effective communication and ability to achieve reasonable, but not uniform consensus on most matters was achieved. Notably, exact dates of return to school timing and state border openings for domestic travel represented some differences of opinion.

Lack of preparedness

One aspect of the response that affected all countries was the under-preparedness for such an event despite SARS and MERS previously [32]. Specifically, the lack of capacity of intensive care beds for a surge in first wave cases, lack of testing reagents and time taken to get widespread testing implemented were all challenges faced in the initial weeks of the pandemic that were evident in in the Asia-Pacific region, as seen world-wide [33]. These were overcome with good co-ordination between state and federal authorities, but highlighted supply chain dependence on overseas suppliers for commodities such as Personal Protective Equipment [34]. Repurposing of factories in Australia and local measures assisted but there are definitely needed improvements in response capacity organisation that will result for the future.

Non COVID-19 morbidity and mortality

The direct effects of COVID-19 on child health have been fortunately modest in comparison to adults [35]. However, the indirect, longer-term consequences for the morbidity and mortality resulting from the disruption to the distribution of humanitarian aid, vaccine programmes and reduced access to medical care for treatment of other common conditions such as hypertension, ischaemic heart disease, type 2 diabetes and intercurrent infections will be difficult to quantify [36]. More specifically for children, there are real concerns about the spread of misinformation on social media about exaggerated risks of developing COVID-19 by visiting physicians' offices or the risks of immunisation [Erroneous references to autism] increasing the degree of vaccine hesitancy which could well predispose to increases in a range of vaccine preventable diseases [37]. The hidden morbidity from the pandemic may take years, if ever, to be fully appreciated, particularly in LMIC populations.

DIRECTIONS FOR FUTURE RESEARCH

- The best way to strengthen international co-operation through existing structures such as the World Health Organisation needs to be assessed.
- The evolution of zoonoses attributable to novel coronaviruses needs to be better monitored through measures taken to provide better early surveillance.
- Vaccine research needs to be accelerated in the anticipation of similar threats from zoonoses.

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