

COVID19

Risk-Based Response

A report for the IRM UK from New Zealand

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COVID19 – Risk-Based Response

The appropriate response level to COVID19

1. New Zealand is a unique country with a unique position globally, both physically and metaphorically. It has a first world, predominantly western outlook, but is multiculturally diverse and inclusive of all races.
2. The geographical and demographic uniqueness gives New Zealand a comparative advantage for dealing with COVID19.
3. Any risk presents a suite of response options depending on the likelihood and consequences of that risk.
4. Similarly, any issue (a risk that has already been realised) presents differing methods of response. This document sets out, in simple, easy to understand language, the circumstances surrounding the northern hemispheres challenges, and why these are different to New Zealand and Australia.
5. While the report focuses on New Zealand and Australia, it also explains why each key country, region, or area in the northern hemisphere requires a different set of responses to manage the risks of COVID19, and how some trends in other countries such as South Africa - considered to be 'unusual' - are the way they are.
6. Practical explanations in this report will enable global leaders to determine exit strategies from lockdowns, how and when to mobilise their economies and the population, and help their communities return to normality.

“The University of Arizona conducted an experiment and infected one door handle of an office with one virus. They found within four hours the virus had spread throughout the entire building”

Executive Summary

7. The northern hemisphere is currently dealing with multiple deaths from a new virus, COVID19. This virus derives from the Coronavirus series, two of these are particularly notable: MERS and SARS.
8. While the death toll from COVID19 is creating headlines around the northern hemisphere, the toll between Australia and New Zealand (and South Africa) combined is not.
9. There are many factors that affect the volatility of a virus and how it behaves. There are hundreds of thousands of viruses, many of which do us no harm at all. In the human lungs at any given time there are around 175 viruses!
10. So why is COVID19 causing havoc in the northern hemisphere, and why not in the Southern Hemisphere? Why do experts believe the virus has only been in New Zealand since the beginning of March - after it arrived in Northern Hemisphere countries? Why are New Zealand and Australia in lockdown, and Sweden is not? Will the virus abate in northern hemisphere countries? Are there any areas of science or medicine we can draw on now to aid our management of cases? How do we exit the lockdowns safely and what areas in science and medicine should experts be focused on? All of these questions require much broader analysis and when understood, point towards a much different set of mitigation and exit strategies in the short and medium term for individual countries and hemispheres.
11. Viruses thrive in cold environments, and there are many scientific reasons for this, some of which have not been explained to the public. They are:
 - Cold weather helps viruses survive longer: some viruses can live for up to 30,000 years in permafrost - it's why Petri dishes are put in freezers¹
 - In winter the human body produces substantially more nasal mucus than in summer and mucosa is a superhighway for any viruses

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- Viruses live 20 times longer in a nasal mucus secretion than in the air
 - In cold air the relative humidity is high, meaning the virus doesn't break down that quickly

12. Experts state that COVID19 is unseasonal and much more potent than SARS (2003), MERS (2012) and Influenza. However, as will be shown, COVID19 demonstrates a seasonal pattern, and is more likely to have less overall annual fatalities than influenza.

13. There are many factors globally affecting the risk profile of COVID19, from general levels of immunization, weather, age, sex, health, diet and geographical location. These things must be viewed as one and COVID19 cannot be considered in isolation of the other factors which are equally material. Moreover, when leaders can take into account these other key factors, they will be able to plan more strategically, and help to take their country forward with confidence.

14. Understanding all of these things means each country, depending on its location on the planet, the time of year, its demographics, and its health infrastructure, can set their own risk appetites for responding to COVID19. For example, the risk appetite in New Zealand, Australia and South Africa during the summer and autumnal months can be significantly higher than those in the Northern Hemisphere. Similarly, as the Southern Hemisphere transitions into autumn and winter, monitoring of the risks should be increased, whereas in the north, greater risks can be taken.

15. It is well known that influenza, and colds – of which COVID19 and the Coronavirus series are part - are seasonal. Many scientific and medical experts are currently stating that COVID19 does not behave like influenza, is unseasonal and is more dangerous, but this is too limiting and inaccurate. The seasonality, along with other key factors are reasons for the current level of deaths in the northern hemisphere, and these key factors are equally relevant but have not yet been highlighted. There

¹ Bill Bryson – The Body. *The author has drafted this report from all publicly available open source material.*

are also other aspects beyond weather that apply to New Zealand and Australia that are distinct from the northern hemisphere.

16. After World War Two there was a significant baby boom. From 1945 to 1955 in Spain, France, USA, UK and Italy, populations grew by as much as 25 – 30%.
17. Sweden, who are not in lockdown, were neutral in the war, and while this has not been published as a factor, this is of relevance to their level of deaths relative to other countries surrounding them, and probably one factor not to go into lockdown.
18. The Baby Boom produced a tsunami of around 100 million people in the aforementioned countries (excluding Sweden). While a number of these Boomers will have died prematurely, as of this year, there has been a new, larger and much more material wave of tens of millions of people who have, relatively speaking, only just appeared in the higher vulnerable group this year (see main text). This is material as the global risk profile has changed significantly for any virus now over previous pandemics and indeed influenza in general.
19. During the SARS outbreak in 2003 the average age of the Baby Boomers would have been around 53, with the youngest in the boom period being 48², and the eldest being 58. Wind forward to 2020 and the differences are stark: the average age of the boomers is now 70, with the youngest 65 and the oldest 75. Such a large group, and their relative risk-profile, did not exist ten or fifteen years ago when SARS and MERS and H1N1 were in play. This is one reason why Italy and Spain, and soon the UK, France and USA, will have a disproportionate level of deaths. However, there is good news in that seasonality, along with a change in resting metabolic state, increased immunity, and reduction in humidity, is about to reduce their burden.
20. There are other factors. In addition to the Boomers, those who were born in the war, and all the Boomers that followed, were the first wave of human beings who benefited from drugs which aided them at the time, but that are now helping to kill

² This is measured from 1955, when the majority of the boom started to abate.

them: antibiotics. This is unique to the Boomers and those that followed, and while this applies to some people born prior to the war, the effects are more devastating for Boomers who have had access to these drugs their entire life. It is likely that some very elderly people (90 plus) who are pre-boomers may survive COVID19 when Boomers may not due to their stronger immunity (as it is unlikely, having survived WW2, they will be anything but hardy and would be more likely to decline antibiotics).

21. Penicillin was created in 1945 and made available thereafter. The use of the drug has, as we know, led to 'superbugs' such as MRSA (which kills around 700,000 per annum globally). While these drugs were of benefit to those who have taken them at the time, pretty much all those over 70 will have taken these drugs, and the more they have had the less their immune system can cope unaided. Antibiotics are a first line of defence for bacterial pneumonia.

22. In addition to the Boomers and antibiotics and superbugs, there is a further simple explanation as to why New Zealand, Australia and South Africa are not currently subject to any notable deaths from COVID19. The human body has a metabolic state that changes with the seasons. It goes from being relatively bullet proof in summer, to much more susceptible in winter, this is because the increase in metabolic state accelerates the growth of any given virus that takes hold. Other things happen too: in autumn the body increases insulin resistance and gains fat, as well as increasing glucose production: the body is working hard going into winter. *The levels of fat, and glucose production is one aspect of COVID19 management that scientists need to analyse in more depth: sugar and insulin management should be considered as part of their first line of defence.* At the end of winter, the body has worked hard, is tired, and much more susceptible to diseases in general.

23. Proof of seasonality lies with the annual deaths in the UK: more people die in January to March each year in the UK than in any other given months: whereas they have the least number of deaths in September, at the end of their summer: the differences between these two months are stark: around 140,000 deaths in March, versus 80,000 in September: this is chiefly because older people are more

susceptible to viruses in winter and their metabolic state is at its lowest ebb and they are literally worn out by March.

24. So, while New Zealand, and Australia to a lesser extent, had their own Baby Boomers, we are protected in this current pandemic by our reduced metabolic state during summer and autumn. Both countries initiated a lockdown based on information available at the time, but did not factor in any seasonality: chiefly due to a lack of information from experts. As a seasonal virus, a tailored approach to the lockdowns may have been more beneficial (for example, protecting rest or care homes): conversely in the Northern Hemisphere a lockdown was appropriate for many countries.
25. In the southern hemisphere summer and autumnal periods are the very time when resilience is high and for seasonal viruses it is more beneficial for those who are under 60, and have no immune or pre-existing conditions, to be mixing in the community.
26. As learning from COVID19 and other future potential respiratory pandemics, is the timing of the pandemic and which hemisphere is in summer, and which is in winter: these should be major determinants for risk-based responses of the future, as should their demographics, general health, location, risks for contamination, etc.
27. New Zealand and Australia are in a position to capitalise on the weather, and by having had lockdowns early. The lockdowns have galvanized the mindsets of the public and have helped them understand the benefits of social distancing, good hygiene, and self-isolation. These lessons will be invaluable once winter sets in, and physical resilience and reserves are run down, and the impact of COVID19 increases. The lessons that have been learned, along with some partial immunity, will be of great help during September to November in the Southern Hemisphere.
28. In the Northern Hemisphere, countries were led in their decisions by the aggressive nature of the spread of the virus in northern Italy (and to a lesser extent Northern

Spain). As will be shown, these regions, along with the UK, France and some other countries, will be at greater risk in March.

29. Alcohol, diet and weight are major factors to consider. Alcohol depresses the immune system and is heavily consumed in some countries as outlined, particularly after during and after Christmas. Excess body fat and weight is an indicator for increased insulin and sugar production, and these appear to be material factors to be considered in the context of COVID19, as the virus, like most viruses, feeds off specific proteins and sugars which are linked to the pancreas and lungs.
30. This report sets out the multiple factors affecting New Zealand and Australia's risk profiles, the causative factors, and explains, in simple terms, why having the lockdown now in the Southern Hemisphere, may have brought a much greater risk during winter.
31. There is clear evidence to suggest that COVID19 almost certainly arrived in Australia and New Zealand over Christmas and New Year, well before the WHO declared a pandemic (it also almost certainly arrived in other countries in the Northern Hemisphere, like Italy, USA and the UK much earlier than was realized).
32. The current controls are disproportionate for New Zealand and it is recommended the country come out of lockdown quickly, with specific risk-based controls. Conversely, the UK, USA and other Northern Hemisphere countries have put in place some proportionate controls, but very soon these countries will be in a position to de-escalate their controls and maximise wellbeing and economic impacts.
33. The report also looks at the current (as at 5 April 2020) issues facing the Northern Hemisphere, and key impact factors in that region, outlining how there is good news ahead for Northern Hemisphere countries, and how they should be planning their exit strategies with some increased confidence now. Key countries will be discussed, including the UK, USA, Italy, Spain, France et al.

34. Other socio-economic factors will be touched upon and how global markets should be confident there is a fairly robust timeline to future events: it is not all doom and gloom: on the contrary, the future looks bright.

Viruses and introduction

35. A lot of viruses are not bad news, despite Nobel winner Peter Medawar stating a virus was “a piece of bad news wrapped up in a protein”, viruses are largely inert and only come to life when they are picked up by a host.

36. Viruses have been in existence for hundreds of millions of years. It is estimated that there are hundreds of thousands of viruses globally, but of those, around 590 affect animals, and only around 270 affect humans. There are viruses everywhere, in the sea, in the air, in water, on clothes, in offices, in homes. Every healthy human being has, on average, around 175 species of virus contained just in their lungs alone. Methicillin-resistant *Staphylococcus aureus* (MRSA) for example, which is now immune to antibiotics, kills over 700,000 people globally each year: influenza viruses kill a similar amount. Viruses that have been shown to transfer from animals to humans have been of particular note in the last 17 years (SARS, MERS and COVID).³

37. Viruses can survive for a long time. Some viruses, such as Pithovirus Sibericum, have survived innate for 30,000 years in permafrost, and then, when given a suitable host, have been ‘activated’, coming to life.

38. Most viruses, such as the common cold, are more frequent, spread more aggressively, and do more harm in winter. There are many theories as to why this is. The main reasons, which are vital when considering the proportionate response - and how northern hemisphere countries can take heart that there is a light of the end of the tunnel, are that:

³ Bill Bryson, *The Body*.

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- colds (coronaviruses included) and flu are more prolific in winter because people spend a greater time indoors, and are therefore more susceptible to being infected from other people who are sick as people spend more time at home, and at work – people go for less walks in winter, go to the gym, or bike rides or socialize outside around the barbecue etc, and if indoors their physical contact, directly and indirectly multiplies by hundreds of contacts per day over a given day. There is also a surge in new ‘gym memberships’ and attendances at gymnasiums in January and February in the north, at the very time the body is already struggling to cope it gets even more tired;
 - there is a material change in human metabolic rate in winter: it speeds up, so any virus presented with a host, accelerates: it’s like a nitrous-oxide boost for cars;
 - Mucus is more prevalent in winter, and this is like a superconductor for viral transmission – as will be shown, once one person is infected, and they have any form of mucosal discharge, the virus will run rampant;
 - Humans are run down in winter and a lot of people eat more, having more sugars and fats: both things viruses thrive on;
 - The colder months are lethal for older people, many of whom cannot afford heating – in the Northern Hemisphere the deadliest months are January, February and March;
 - Viruses are more aggressive in optimal settings: for the Northern Hemisphere and Coronavirus, this appears to be when the daily average temperatures are 3 degrees (low) to 11 degrees (high): a major shift outside of these ranges up or down would appear to see a change in the risk profile.

39. So, bearing all of this in mind, and all the hundreds and thousands of viruses, why are we acting differently for one single virus which is known as COVID19? Is it because it is the deadliest virus in the world? Well the answer to that we know of course, and have known since January 2020, is ‘no’.

40. The WHO itself has not been immune from making rushed or hasty statements about the severity of the virus and are now including fiscal and economic risk in

their statements, which is outside of their purview and are particularly damaging to countries not yet in winter.

41. It is well known to auditors and investigators that one of the biggest risks in any pandemic or audit or investigation is cognitive bias: these biases, when formed at the early stage of any issue, are often very hard to reverse: WHO is in this phase now. Still, despite this, Northern Hemisphere countries are in disarray, and are struggling in some of them to manage the death toll and hospital admissions – this document explains the key strategic concerns about why this is happening there now, and why, while COVID19 is a contributory factor, it is not the only reason. Moreover, this document explains why the extent of damage done in the Northern Hemisphere is unlikely to be as severe in New Zealand and Australia before August, particularly if the lockdowns in place in Australasia are tweaked to enable some limited herd immunity.

42. When faced with uncertainty, good risk management is critical to commercial, government and daily life. When done well it will mitigate (adverse) risks, and maximise opportunities. It will look at facts and reduce bias. Given there are some unknowns with COVID19, and much disparate data, then a risk assessment, examining all the past and present data, and including subjective and objective facts, and then applying common sense, forms a basis for the correct mitigation strategy and for maximum human and economic wellbeing.

The Context

43. Research has shown that some viruses can survive, if housed in nasal mucus, for over two weeks on banknotes. People with mucus can transfer a virus rapidly from person to person, or from fabric or plastic, to other persons. The average human touches their face between 14 and 18 times an hour. These facts, mucus, and frequency of touching, along with the weather, metabolic shift by humans in winter, age and country-specific characteristics, are important in the context of COVID19 and are relevant to the current levels of death and infection. It is why there are material differences between continents and why Australia and New Zealand should consider coming out of complete lockdown for a few weeks, whilst maintaining the social distancing controls and border controls: this would likely be better in the longer term, not only for health, but mental health, economic health etc.

44. There are many ways COVID19 has been analysed in terms of death rate. Some assess based on deaths per infected. Some based on other means, but not all are consistent, and some present a skewed perspective.

Wuhan Province

45. COVID19 is believed to have originated in Wuhan Province in China. The only material relevance for the origin of COVID19 is in which hemisphere it originated. Wuhan is made up of approximately 11.2 million people and COVID19 has thought to have been active in Wuhan since December 2019, but it is almost certain it was in existence earlier as explained below.

46. December is wintertime in Wuhan, and their winter temperatures are similar to Northern Hemisphere countries such as the United States of America, the United Kingdom, Italy, Spain, Germany etc. The temperatures for Wuhan are generally 2 degrees (low) to 8 Degrees (high) in December, 3 to 11 in January & February, 7 to 15 in March, 13 to 22 April, and 18 to 27 May, rising up to a high of 33 degrees in July and August: the shift in warmth in Wuhan from February to April of some 11 degrees is notable.

47. The metabolic state of the people in Wuhan would have been slightly ahead of most Northern European (as it's colder in those countries) countries and the USA. Northern Hemisphere countries would have had a diametrically opposite metabolic state to New Zealanders and Australians during the December 2019 period. In winter the human body accelerates its metabolic state which acts as accelerator for viruses. As the metabolic rate speeds up it magnifies the effects of a given virus. Some experts are quoting 'cytokine storms', which is a fancy way of saying the body is fighting the virus at in such an over-accelerated way it cannot keep up – it destroys itself: this happens a lot in winter because of the evident increase in the body's metabolic state. If the immune system is compromised, which after the festive season, cold weather, stresses of Christmas and so forth, is the case, it is less able to regulate this response. It is why there are more deaths January to March in the Northern Hemisphere.

48. As with most Chinese cities Wuhan has a very high level of pollution and particulates relative to many other countries, especially New Zealand and Australia. Their residents, as with most of China, have a high level of tobacco and other smoking consumption (China accounts for 33% of the world's tobacco sales).

49. Wuhan is highly dense, therefore the opportunity for the spread of any virus is very high.

50. Around 10 December 2019 some of the first symptoms of COVID19 were reported in Wuhan. It is almost certain that the virus would have been in circulation in November 2019 or earlier given that it is generally accepted it takes 2-14 days for symptoms to show, and more critical cases will tend to appear around 5-7 days after symptoms, or later, in addition to the ability of the virus to survive up to two weeks.

51. In the four months since COVID19 was reported in Wuhan around 2,500 people have died there. It's almost certain this has been under reported by around three to four times, but reporting may have been initially along the lines of influenza (i.e. the most patently obvious cause of death, and pre-existing conditions, were being

recorded). It is also likely that herd immunity is almost in place in Wuhan given the population density: as will be shown, the same can be said for most major cities and countries with a direct link to China, even more so for New Zealand and Australia.

52. In Wuhan the total number of deaths as a percentage of the population equates for 2,500/11,200,000, which is 0.0002%. This way of calculating the death rate, along with deaths per 1 million of population are the most reliable way of assessing the actual death rate relative to the country, and if done globally ensures comparisons can be made readily which may indicate seasonality early. For China as a whole their reported death rate for COVID19 is 2 deaths per Million, or 0.0000025%. Even if China and other countries are under reporting to some extent, it is academic, because on balance all countries will be reporting COVID at a far higher (up to twenty times as much) rate than a similar influenza death because of the nature of the recording.

53. Initially when COVID19 was escalated to the WHO the WHO stated they could see no evidence of person-to-person transmission. This sent an initial signal globally that there was little to be concerned about.

54. Wuhan originally reported a death rate of 3%. So, globally, other countries, social media, and laypersons assumed that 3% of their country, or 3 in a 100 people would die. This as we know is incorrect. Later statements came out from other health bodies and on 11 March 2020, the Director General of the World Health Organisation (WHO) stated:

“There are now more than 118,000 cases in 114 countries, and 4,291 people have lost their lives.”

55. So, over at least a three month period, 114 countries had the virus, and 4,291 people had died from it, those deaths predominantly in Asia – northern hemisphere and winter. Despite COVID19 being spread across the major cities in China, and Hong Kong from as early as December 2019, the death rate in the other areas remained relatively low, indicating a lag to increased mortality rates of 10 weeks.

56. On 11 March, based on predominantly Wuhan and other data, the WHO stated that the death rate from COVID19 was 3.4%. This was - and is - incorrect, and certainly would have been misleading to countries around the world who, having been advised five weeks earlier there was no person-to-person risk, would have then been scrambling to put border controls in place well after the horse had bolted. However, as outlined below, regardless of the data inaccuracies and mixed messages from the WHO, major Northern Hemisphere conurbations would have benefited from early interventions.

57. Wuhan province initiated a series of restrictions from 23 January 2020 onwards, escalating in nature. Several lockdowns were put in place in February and March and the province will lift most restrictions week commencing 6 April 2020.

Demographics, Weather and Culture

58. The demographics of key countries are important to consider so comparisons can be made about the likelihood and impact from COVID19. The following table summarises the key players and key characteristics. All figures are approximates:

Country	Median Age	Pop. Total	65 - 75 years old	75 -85 years old	85 years +	COVID at 4 April 2020
China	37	1.4billion	96million	47million	10million	3,332
USA	36	330 million	28million	16million	8 million	7,391
Italy	46	61 million	6.8million	7.1million	3.5million	14,681
Spain	45	47 million	4.2million	3.8million	1.6million	11,198
UK	40	65 million	4.5 million	5.4 million	2.3million	3,605
Australia	38	25 million	2.2 million	1.2 million	500,000	28
Sweden	41	10 million	800,000	400,000	260,000	358
New Zealand	37	5 million	347,000	189,000	73,000	1

Key deaths from various causes per annum:

Country	Smoking	Motor vehicle	Alcohol	Influenza*	COVID at 4 April 2020
China	240,000	262,000	720,000	90,000	3,332
USA	85,000	35,000	88,000	50,000	7,391
Italy	90,000	5,000	20,000	20,000	14,681
Spain*	65,000	1,700	30,000	17,000	11,198
UK	90,000	1,800	7,500	14,000	3,605
Sweden	13,000	325	1,200	1 – 2,000	358
Australia	21,000	1,150	6,000	2,500	28
New Zealand	4,400	353	700	500	1

**with influenza, all cases are underreported. More often than not the underlying cause for death is recorded. For example, recent studies in New Zealand, and this is typical of many countries globally, stated that influenza deaths were likely underreported about 20 to 23 times the actual number, because the doctor would record death as the primary cause, i.e. COPD, heart attack, heart failure, cancer. If the patient had flu and died in a car crash it would be recorded, quite rightly as a car crash because the cause of death is patently obvious: it's the same with influenza reporting. However, for COVID, pre-existing conditions, while being noted, are not being submitted as the primary cause of death, it is the virus.*

Weather – COVID19 is a weather and metabolic dependent virus

59. The key countries listed in the charts are divided by the equator. December to March inclusive is generally when the coldest weather takes place in all of the northern hemisphere countries, and inversely when the warmest weather occurs in the southern hemisphere countries (greater detail on the higher risk regions is outlined below).

60. Viruses thrive in cold environments because:

- People spend more time indoors
- Public transport is used more
- Spores increase
- Viruses can survive for longer in a colder environment
- Colds are prevalent in winter, which create mucus, which is a better transmitter of viruses

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- Viruses carried in mucus survive for much longer (days) than those carried in the air (hours)
 - People are gregarious at the festive season and also take up gym memberships afterwards
 - Alcohol and other pleasures are taken in the festive season, depleting the immune system
 - The festive season is a time of increased stress (domestic violence for example rises exponentially)
 - A reduction in air humidity in cold weather helps viruses thrive (in drier air the molecules dissipate faster)
 - Viruses thrive on things that are touched, and given humans touch their face 15-18 times an hour, and then touch other things, if the virus is contained in mucus, it will spread rapidly
 - Children, who are known carriers of many unwelcome viruses, spend more time indoors in winter because of colder weather

61. France, the UK, and the USA are almost certain to have a material increase in COVID19 fatalities during April because:

- Their respective climates - temperature and humidity in late March were ideal for viral spread
- The metabolic state would have been highest and the resilience of their citizens would have been at their lowest
- lockdowns initiated in March would bring about increased risks initially to enclosed areas (i.e. rest homes, complexes, health facilities)

Global Humidity and Temperature – the virus will be prevalent within certain parts of the globe

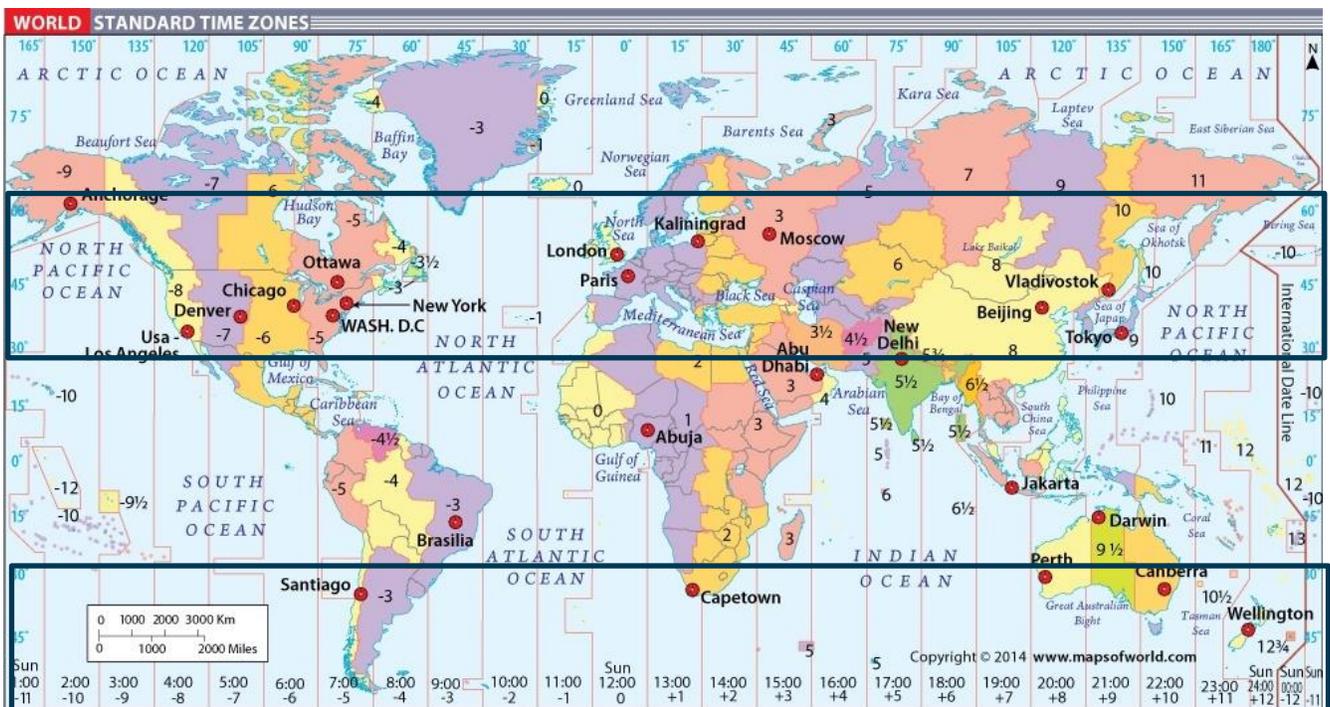
62. The northern and southern polar regions have the lowest specific humidity levels. And we can expect to see fewer cases in these very cold areas not just because they will be less populated, but because transmission in the air is lessened.

63. Around the equator the humidity is generally very high, but so are temperatures and as such this is not an ideal environment for a typically seasonal virus. Daylight savings do not exist and there is little change in daylight, so the body will be less subject to metabolic influences: we should therefore expect to see less impacts around equatorial areas.

64. There appears to be a 'sweet spot' for COVID19, which is between 30 and 60 degrees latitude in the northern hemisphere, and a similar amount in the southern hemisphere (see diagram below). These areas are generally subject to more prominent seasonal shifts (spring, summer, autumn, winter), with a greater variation in a person's metabolic state, temperature, and humidity, act as a perfect combination.

65. The temperature of the weather, humidity, and time of year all play an important part in the risk profile of the virus and this knowledge will help world leaders determine their exit strategies and the timing of these exists from lockdowns. For example, as spring really gets into its stride in Europe and the USA in April and May, we can expect to see a dramatic drop in mortality(not just as a result of lockdowns): while infections may continue, the impact of these will be lessened, particularly in those under 60 and without any pre-existing conditions.

66. If Northern Hemisphere countries stagger the release of their lockdowns sensibly, fatalities by June will be negligible, and certainly far less than other causes (smoking, motoring, influenza etc). The following chart illustrates the 'sweet spots' in the Northern and Southern Hemispheres for COVID19:



SARS and Baby Boomers – a critical factor in the level of fatalities for COVID19

67. After World War 2 there was a massive increase globally in birth rates. The countries most affected by the war in overall numbers, the USA, France, Spain (Spanish Civil War primarily and the Catalonia region), Italy and Germany had a boom of births post WW2. New Zealand had a significant boom. Australia had a relatively small boom which was much flatter than most other countries and the peak was less prolific.
68. France for example had a population of around 40 million in 1945, but with the large birth rate and some movement from North Africa, this was up to over 50 million, 20 years later.
69. Around 50 million Americans were born between 1945 and 1955.
70. Italy and Spain had similar profiles in terms of baby boom between 1945 and 1955.
71. It is notable that Sweden, who were Neutral during the Second World War, have had a relatively flat birth rate cycle: this is important when analyzing the currently high level of deaths in the other European countries, relatively speaking, for COVID, especially when we consider that Sweden is the only country in Europe not to have gone into lockdown. Sweden also capitalises on a suite of effective internal controls, including timely national respiratory and influenza monitoring that undergoes rigorous quality assurance (this allows Sweden to make high-quality, risk-based decisions on expected versus actual mortality levels, and in accordance with the Country's risk appetite). These things that are notable absent in New Zealand.
72. Population graphs and data shows a 'large wave' in population boom around 10 years in depth from 1945 to 1955, and this wave has been moving forward in time from the Second World War up to the present time.

73. Life expectancy in many countries has increased significantly in the last thirty years. The average life expectancies are:

Country	Life Expectancy
China	76
USA	79
Italy	82
Spain*	82
UK	81
Sweden	82
Australia	82
New Zealand	82

Demonstrating seasonality against mortality

74. Most countries see an increase in deaths in December and January (primarily alcohol related). However, just about all Northern Hemisphere countries have their highest rate of deaths (outside of the festive season) in March. This is as a result of high metabolic rates, relatively low temperatures, and tired people (as the body has been fighting colds and flu since Christmas, imbibing, etc).

75. In the Southern Hemisphere New Zealand and Australia's highest months for deaths are July to September, when the months are the coldest, and the metabolic state is the highest.

Southern Hemisphere

Timing of the virus arriving in Australia and New Zealand

76. COVID19 was in existence in Wuhan since November 2019 at the latest (given recorded symptoms started the following week to ten days later). It is probable COVID19 was around even earlier than that and that it was spreading but not getting a grip because of warmer weather and because peoples defences were better earlier in the year for reasons outlined above. There are two coal fired

power stations in Hubei, and these would have been increasing their power and emission outputs as winter arrived, exacerbating respiratory illnesses.

77. Shanghai can be reached within five hours on flights from Wuhan. Given an active virus within mucus can survive for up to three days on fabric, and for up to two weeks on bank notes or plastic, it is certain that at some point in December and January someone drove or flew to or from Shanghai. Any aircraft or public transport would have become infected, as would retail outlets and public toilets. With a high density of people in Shanghai and the frequency of flights, this would have led to a rapid spread of COVID19 in Shanghai and China.
78. There were some confirmed cases of COVID19 in Shanghai from mid-January 2020. This indicates that the virus would have arrived in Shanghai around Christmas or the New Year at the latest. The reported cases are at the more serious end of the spectrum, so it is likely many other cases were present earlier, but, as has been reported in the media, it is certain there would have been many hundreds and thousands of other cases unreported as the symptoms would have been considered seasonal, initially being confused as influenza or colds.
79. China Eastern Airways and Air New Zealand operated flights directly from Shanghai to New Zealand. Given that ground and other crew at airports operate in multiple roles, whether this be check-in, baggage handling, flight maintenance, cargo, cabin cleaning and re-equipping, the likelihood of internal spread of the virus from staff either to each other, and in aircraft or on cargo would have been almost certain in Shanghai and Wuhan.
80. Australia has daily flights direct to Wuhan and Shanghai, both with their own airline Qantas, and also with multiple partner airlines. The amount of flights from Australia to these and three other major cities in China, equated at the time, to 50 flights per week.

Visitor and Resident movement numbers

81. Australia gets circa 8.5 million Chinese tourists each year. New Zealand around 400,000. In both Australia and New Zealand there is a large contingent of Chinese people, with Australia having around 1.3 million people of Chinese origin as resident there, and New Zealand having around 231,000 of Chinese origin resident here, or 5% and 4.6% respectively: this does not include the student population who would also have travelled. Many residents of both Australia and New Zealand travel to or from China during Christmas and New Year, and especially for Chinese New Year (early February) which sees a material increase in movement, or they have visitors come to see them during these times: for example New Zealand alone has around 60-70,000 Chinese visitors in a typical February.
82. During the December 2019 to early February 2020 period inclusive, there would have been at least 200,000 passenger movements on aircraft between (to and from) China and New Zealand. Moreover, there would have been a further 400,000 passenger movements (to and from) Australia in the same period. It is almost certain that COVID19 was brought into New Zealand over the festive period, and certainly prior to the 3 February 2020 restrictions placed on travel between New Zealand and China. The rationale for this is outlined below.

Indicators COVID19 arrived in New Zealand and other countries over December 2019

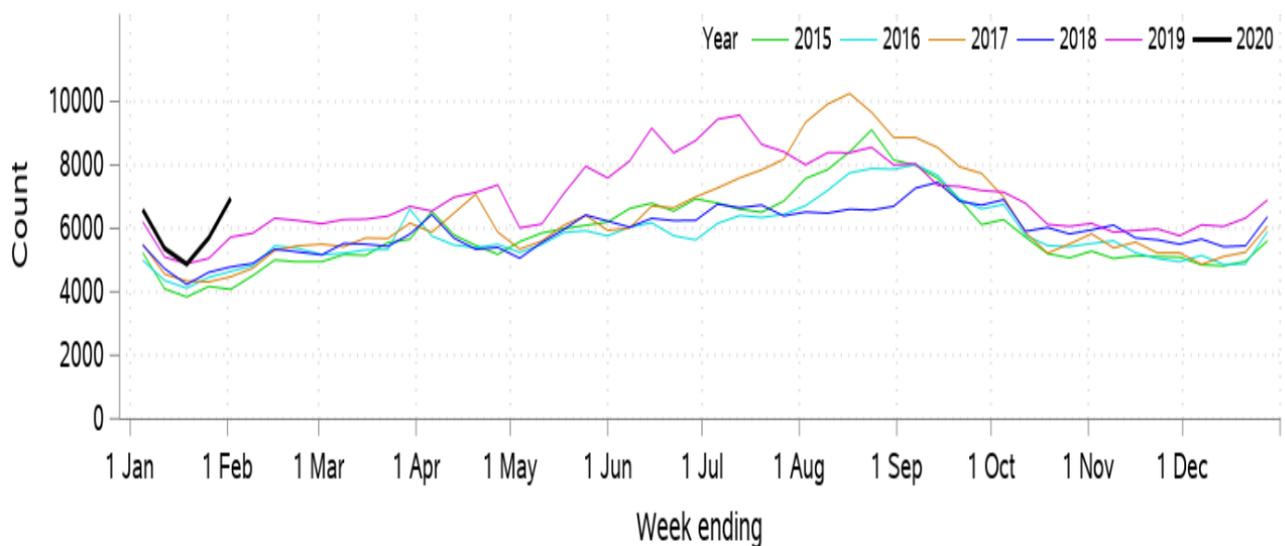
83. Several southern hemisphere countries, in particular some States within Australia, and particularly New South Wales (which has integrated influenza monitoring), reported a significant increase in influenza-like and unknown respiratory illness in December and January 2019/20.
84. In Australia, despite it being the height of summer, the January 2020 New South Wales Influenza survey stated, amongst other things:

“Influenza activity was high for this time of year and increased throughout the month. Activity was even higher than the unusually high activity seen in January 2019. Respiratory presentations to NSW emergency departments increased and were above the historical range for this time of year”

85.The NSW Survey also stated:

“Presentations in the All Respiratory Illness, fever and unspecified infections category increased through the month and remained above the historical range for this time of year (Figure 1). Emergency Department presentations for Influenza Like Illness (ILI) increased through the month and were above the historical range for this time of year .”

Presentations and increase in Influenza Like Illnesses (ILI) for 2020



86.It is worth noting the stark difference between 2015, 16, 17 and 18 and 2020, where ILIs were nearly double the usual rate. 2019 was considered an unusually high level of flu and an outlier in of itself, so, given the correlation between COVID19 prevalence in China, movements over borders, and these increases, it is almost certain that COVID19 was present in New South Wales (NSW) and Australia in January 2020 causing hospital admissions, but at the time, and given the WHO were signaling there was no person-to-person link, Australian authorities could not identify it. Also note, as described, the seasonal increases between July and September.

87.Emergency Department visits for respiratory illnesses in NSW is typically around 30-40 visits each January. However, in January 2020 the rate of ED admission was around 150-170 ED visits - over four times the usual level, and in the main the reasons were unknown.

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88. Interestingly, while in percentage terms the increases in overall Influenza Like Illnesses was circa 30%, and all patients were tested for influenza and other known respiratory illness, the test results showed influenza only to be responsible for 8.1% of the increase: around 9 - 82% of these illnesses appear to be of unknown origin, and therefore a strong indicator COVID19 was present.
89. New South Wales reported that in February 2020 there were seven respiratory outbreaks in residential care facilities. They conducted testing in every instance and could only determine influenza as being the causative factor in two of the seven facilities. These unknown cause outbreaks led to hospitalizations, and a death in one instance. It is also known that some cruise ships, which were on two-week trips around Australasia, were carrying passengers who were almost certainly infected before 1 March 2020, well before lockdowns were enacted.
90. ESR in New Zealand, along with the Ministry of Health, are responsible for providing Influenza and disease surveillance reports. However, there are minimal surveillance records for New Zealand for the 2018, 2019 and 2020 periods, and certainly not ones that are published publicly as with Australia and Sweden. However, at the time of writing there are some anecdotal and firsthand reports from the public and some Kiwi Doctors and employers, that suggest New Zealand, as with Australia, was having an unseasonably high level of respiratory illnesses in December 2019 and January 2020. It was noted by some Wellington residents for example that in late December 2019, and in the New Year, that there was an unusually high level of people walking throughout the city with continual coughs. A number were also unwell in January, February and March from respiratory related illnesses of unknown origin, some of these being reported in the context of COVID19, but were excluded from being tested because they did not meet Ministry of Health criteria (as they hadn't travelled from Iran or Italy).
91. While the focus above has been on primarily of human contact and human carriers of the disease, if someone orders a product or goods from China, and that package is packed or touched by an infected person, who has COVID19 and is also producing

mucus, then there is a possibility this will survive on the package or item until it reaches its destination if travelling via air directly (as it is leaving a cold origin and will be cold in the hold until unloaded): it would be useful to investigate whether ground cargo or border / customs staff had any 'unknown' respiratory illness in December or January in Australia and New Zealand.

So when did Coronavirus arrive in New Zealand

92. The first positive case is published as being reported on 3 March 2020 for a female who arrived from Iran on 28 February 2020. The first two swabs came back with a negative result. A third, more intrusive swab provided a positive result.
93. Testing in New Zealand between 28 February and 1 April 2020 was limited to overseas travelers, or those who could have been in direct contact (known as contact tracing). New Zealand were following what was considered best practice and based on global advice at that time. There was, as with most countries in response to the virus, little capacity to conduct testing during March with limited test kits, so these could only be provided sparingly to General Practice. There was no centralised booking system for testing. In the last week of March 'test centres', mainly drive-through in nature, were established. These, and the practice of using these drive-in facilities, will be of great help to New Zealand in winter when we will likely see a more aggressive, albeit less consequential than could have been, increase in COVID19 fatalities.
94. At the time of writing the current method of testing in New Zealand is a swab test, done either through the nose into the rear of the sinuses, or through the mouth to the top of the throat, but generally speaking it is a nasal airway entry. Open source information suggests around 10-15% of results will typically give a false negative or positive for this type of test (as is typified by the first positive test from Iran, which followed two negative tests). So it's almost certain, that for every one hundred people tested, at least one person will get a negative result who is positive, meaning the chances of community spread are absolute.

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95. Current medical thinking states that COVID19 will be picked up on a swab test seven to fourteen days after symptoms show, or around seven days after the virus becomes active. This means, that those who were infected between 28 February and 1 April 2020 but were not tested on grounds of non-overseas travel, or were tested after the 7 to 14 days, would return a negative swab test.
96. There is likely to be tens to hundreds of thousands of people globally who were infected during February and March who were not tested, and were carriers because they were excluded on the grounds of contact levels, or they hadn't flown, or they were tested but it gave a false positive, and there were delays in their being tested (because kits were in short supply). There are other factors too, such as the quality of the tester or methods applied. Overseas some countries insist that swabs are taken from both nasal cavities (vestibules), so the test kit gets as much mucus as possible. In New Zealand and many other countries just the single-entry technique is applied, which given it is autumn in New Zealand, may result in much lower positive outcomes than the 85-90% standard measure of reliability.
97. New Zealand and Australia both had symptoms of increased, unseasonal and unexplained respiratory illnesses in December and January. This is despite the time of year – mid summer, and despite, at least in Australia, them having had an unprecedented high level of influenza the previous year.
98. Given New South Wales admissions were four times the level for unknown respiratory illnesses, and on the balance of probability while some of this could have been attributed to the fires that were raging in Australia at the time, it is almost certain that COVID19 would have been being transmitted in both Australia and New Zealand during these periods through international travel of varying means.
99. It is inconceivable that the first case of Coronavirus arrived in New Zealand on 28 February from Iran, because:
- On 28 February Iran had 28 deaths from Coronavirus.
 - On 28 February China had 2,835 deaths from Coronavirus.

100. The deaths as at 28 February 2020 were based on around 83,000 reported cases globally. The deaths in China were based on positive test results, and will not have included those excluded from testing, those who showed little in the way of symptoms, or false negatives. Initially, testing in most countries was limited to cough, temperature, and shortness of breath: only in March was it apparent that other symptoms were also key indicators (diarrhea, fatigue, sore throat, sore or red eyes, muscle aches, loss of smell etc).

101. It is inconceivable that China, and particular Wuhan region, who were significantly more advanced in the fatality and infection rates than Iran, and linked to Shanghai and Australia, would have not brought a case in to New Zealand or Australia during January and February 2020, particularly given there were 83,000 reported (which would have been nearer 800,000) cases around the globe. It is inconceivable that the first case of COVID19 in New Zealand was from Iran.

So what does this mean?

102. It is almost certain, given the unknown respiratory illnesses, the frequency and amount of travel, the cases in New Zealand that were excluded from testing when illnesses were likely being spread etc, that thousands of New Zealanders will have been exposed to COVID19 since the New Year, if not earlier. This is not because of any negligence, on the contrary, New Zealand was one of the first out of the block, and following advised best practice: it is just the nature of virus transmission for low level viruses (0.01% fatality rate or less) and the stark reality is that once a country has identified it, and think they have identified the first batches of it, there will be hundreds and thousands of other cases already in existence: it's one of the reasons for the lag in identified cases versus hospital admissions and deaths.

103. There will be many thousands of people who are immune to it now in Australia and New Zealand. How do we know this, well one factor is that in other countries with the outbreak, even just after lockdown, cases have exponentially doubled, particularly deaths, until they reach a crescendo. Some of this is heavily related to metabolic acceleration, but in New Zealand there has been the luxury of

contracting the virus while their metabolic state is relatively benign. We have seen no such increased in New Zealand and Australia of exponential (doubling every two or three days) of any cases: some experts argue this is because of the lockdowns being initiated early, but the main reasons are the seasonal and metabolic states of these countries, along with the relative resilience of individuals for the given time of year, and the lack of sufficient broad testing in the initial stages of transmission – in effect, there was no doubling because they were not looking for it early enough and each country was already peaking.

104. The levels of death will continue to rise in Europe until mid-to-late April, then will plateau before dropping off at the end of May. Some areas of Russia should expect an increase in cases in mid-April with a rise in fatalities in late April as it's temperatures rise to the 'sweet spot'. While containment is a key factor, and will help delay and reduce some levels initially, a primary reason for these differences is the weather and demographics. In June deaths from COVID19 in Northern Hemisphere countries will be very few relative to other causes of death.

105. For New Zealand and Australia there is a small window to capitalise on their circumstances and while the metabolic rate of the population is low and the weather is good. Northern Hemisphere countries, particularly those with high density and large cities (Milan in Italy, London in the UK, Madrid in Spain, etc) could ill afford to run the risk of instigating a herd immunity approach in winter. New Zealand on the other hand, had the perfect opportunity to beat the virus using a different strategy to their Level 4 or complete Lockdown, because:

- It's likely had the virus in play since the New Year, and it has been circulating for three months, and there was direct evidence (Australian cases) and indirect evidence (anecdotal cases New Zealand) it was in circulation already
- thousands of New Zealanders (and Australians) who have had it already will be immune
- the influenza season is about to start off, but there is a window of a few weeks of good weather where Kiwis could afford to have those in low risk groups mingling with some caveats, and where influenza immunization could be initiated in all at risk groups (while COVID19 is a different disease, having high levels of immunization will help the body fight other infections, as it generally has less to do overall, or might bounce back quicker)

- Having a lockdown in place now actually increases the risks to New Zealanders and to a lesser extent (as it's warmer) Australians longer term, because while the countries have profiles like South Korea (low level ups and downs), as soon as winter hits properly, and they come directly out of Lockdown, there could be a double whammy: it's is potentially better and safer to get it out of the way now, and build immunity sensibly, than have a major spike later: the inevitable cannot be avoided.

Consequence Matrix

106. Many governments will have a centralised table for their leaders or Cabinet for assessing the likelihood and consequence for their citizens. New Zealand or Australia may for example assess wellbeing, fatalities, economic impact etc. These matrices may or may not look something like the following:

Minimal	Minor	Moderate	Major	Extreme
Up to 50 deaths	50 to 250 deaths	250 to 1,000 deaths	1,000 to 5,000 deaths	5,000 plus deaths
\$50 to \$500 million impact	\$500 million to \$1billion impact	\$1-5Billion impact	\$5-\$10billion impact	\$10billion plus impact
Limited media exposure	Some media	National media exposure	Oceanic media exposure	International media exposure

107. The deaths may or may not be from natural causes such as terrorism, pandemics, volcanic activity, earthquakes, airline, mining, construction accidents etc. The risk appetite for any government or Cabinet will be set by the Prime Minister or head of state at the time and in conjunction with their government, and these figures could go up or down depending on the appetite of government and how a given country, or others, perceive risk.

108. The risk appetite of New Zealand as a whole was very high in 2005. Following the Pike River disaster, the Canterbury Earthquake, the Wairarapa Balloon accident, Jan Molenaar Police shootings, the Christchurch Shootings, and the White Island Volcanic eruption etc, the risk appetite of New Zealand has reduced. There has been a significant focus on health and safety in the last five years.

RISK PROFILE TO NEW ZEALAND (& AUSTRALIA)

All the reported factors indicate that the greatest risk to New Zealanders (and Australia) from COVID19 during 2020 will change in accordance with the season as follows:

Month	Inherent Risk Rating Movement
May & June	Low
July	Moderate
August	High
September & October	High to Critical
November to January	Low to Moderate
February to April	Low

109. Risk mitigations strategies should be tailored depending on the inherent risk rating, the season, the metabolic state of the population, and the current extent of the spread of the virus. For example, there may be some low level cases in existence in August, but if these are being monitored, and there is little indication of material increase, it is disproportionate to put a lockdown in place just because the inherent risk is high: the decisions need to be made factoring in all aspects of the context. Similarly, risk mitigation strategies should be balanced: for example, if we expect 20-30 people in summer to die each month from influenza like illnesses, and this is acceptable with current controls, then why initiate a lockdown?

Northern Hemisphere

UNITED STATES OF AMERICA

110. The USAs 'Medical Brief' stated on 15 January 2020 that flu deaths were up more than 65% on previous years for the time of year, but these could not be explained. This is an almost perfect mirroring of the Australian position, so it's likely, given America has a substantial number of Chinese tourists, and that people travelling to and from Italy and USA is high, that the USA had COVID19 in its midst since December 2019. However, as there were no warnings in place from WHO no tests were being conducted, so it was not being identified.
111. The WHO were stating in January 2020 that there was no evidence of person-to-person risk from COVID19, when they should have been stating the impact from the virus was known, but the likelihood of rapid transmission was unknown. In essence the WHO did not follow good risk management practices. Any layperson would correctly surmise that if there is a spate of influenza-like illnesses, and there is a large swathe of the population with it, particularly a demographic you would expect to see in person-to-person transmissions being affected (i.e. medical staff), then there is almost certain to be person-to-person transmission in existence.
112. a significant window of opportunity was missed to allow US authorities to initiate early interventions and manage risks appropriately. For example, in December the State of New York, who receives high numbers of visitors, could have instigated travel restrictions until such time the risk profile of the virus relative to metabolic and other conditions was better understood: this window was substantially missed by many weeks.
113. It is notable that most countries dealing with the COVID19 pandemic seem to limit their testing, and when faced with a respiratory admission will only test for 'one or the other': many do not test both Influenza and COVID19, or other respiratory illnesses, and it could be a combination of these that is exacerbating the

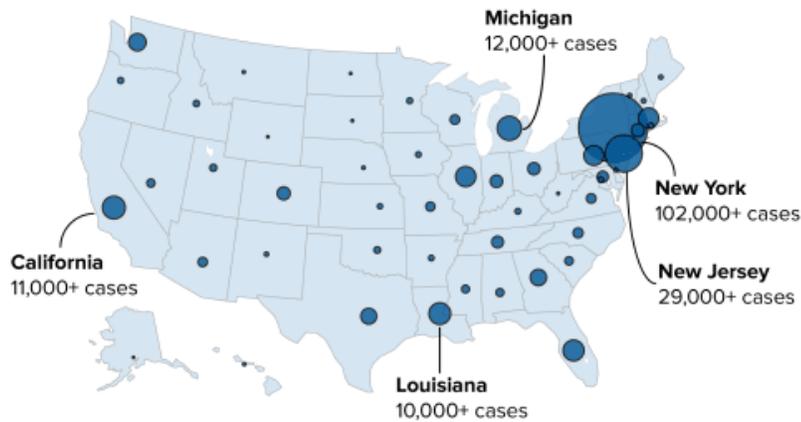
effects of COVID19, particularly as it seems to mimic Adenovirus closely. For example, a patient might have had influenza, and be coming out of that, to then get COVID19: it's not uncommon to have a cold followed by influenza or vice versa.

114. The USA eastern seaboard is more humid than the western seaboard due to the Atlantic Ocean being colder than the Pacific. This indicates, if the virus is weather and metabolic dependent, that it is almost certain that as we progress into mid-April the mortality rates will rise materially in cases in the colder (north eastern) areas of the country (see next).
115. *New York* has a large densely packed population and is cold in winter and placed on the Eastern Seaboard. The State has high humidity because of the prevailing Atlantic conditions, and lots of transiting visitors, so we can expect to see a perfect storm for infections in early April leading to substantial fatalities in mid-April (due to the 1-21 day lag). *New York* and States nearby such as *New Jersey* and *Michigan* have increased risk profiles for transmission and mortality being in the north eastern areas, in late winter, and being near to large areas of water (*Michigan* being next to lake *Michigan* and not far from the east coast relative to other States).
116. America has a higher risk profile relative to some other countries because of the baby boomers, the high levels of obesity, increased general illness, and a dependence on antibiotic-based farming which introduces things like antibiotics into food: over 80% of all antibiotic purchases by the USA are used for farming and food applications, so these will make their way into the human chain. Some parts of the USA will be even more at risk, such as the black community, as their relative levels of obesity are materially higher than Hispanic or white Americans. However, with high quality, timely interventions, all races can have an equal outcome (see 'medical intervention – a discussion')
117. The following chart shows Coronavirus cases as at 3 April 2020 in the USA: we can expect to see significant increase in mortality in *New York*, *New Jersey* and *Michigan* during mid-to-late April. In terms of exit strategy, the USA will see a

reduction materially in late April, and there will be nominal mortality in late May and June.

Reported coronavirus cases in the US

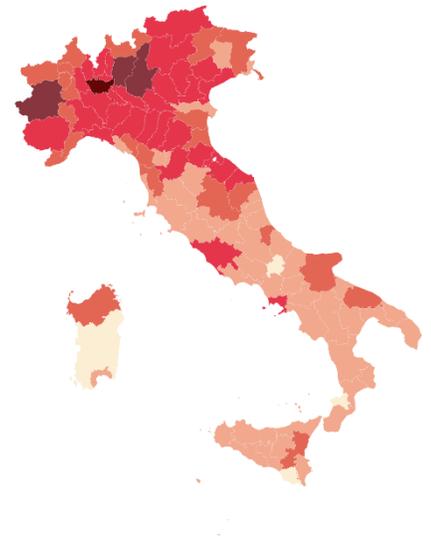
As of April 3, 2020



SOURCE: Johns Hopkins University. Data as of April 3, 2020 at 5:40 p.m. ET

Italy (and Spain)

118. Northern Italy is colder and wetter than the southern areas. In addition to the mountainous regions in the north, the northern areas are subject to *Scirocco* winds which bring in higher levels of humidity. Again, the relatively cold weather, combined with higher humidity, and dense population, acts as a large-scale petri dish. When you combine the environmental factors with highly compact and highly dense populations in northern Italy, as well as high levels of Chinese tourism (the numbers of Chinese tourists who visit Italy are substantially higher than most other European countries), you have a perfect area for COVID19 activity.



119. Italy has a very aged population relative to the rest of Europe, particularly in the over 85s.

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120. Italians are notable for their alcohol intake and smoking: these are major factors in fighting a virus such as COVID19. It is not unusual for example at some petrol stations in Bergamo, Italy, to have a glass of wine and cigarette while filling your car up with petrol!.
121. Italian (and Spanish) culture also lends itself to being highly gregarious: many people kiss and hug, and families – and this is especially so in Spain – are highly involved socially, spending family meals together every week. As has been shown in other countries, one social gathering can virtually infect the entire group in attendance with COVID19 causing clusters.
122. The metabolic rates of Italian and Spanish people will alter materially in mid-to-late April as temperatures increase. We can expect to see a material drop in mortality in mid-April in these countries.
123. Italy and Spain's exit strategies should be focused on lifting lockdown restrictions in Mid to late April to mid-May, with a view to controlled re-introduction of some social activities. Most restrictions on non-vulnerable (over 65 or with pre-existing conditions) could be lifted in late June to October inclusive.

UK

124. London has had, on average, the average highest levels of humidity in the UK over a thirty year period. The UK population has a high number of Boomers, and the life expectancy in the UK is year or so less than Spain and Italy. This means that the UK can expect to see a significant increase in mortality in early to mid-April, with a reduction in cases late April, with a material reduction by May. From June onwards mortality will be on a par, more or less with influenza for the time of year for non-vulnerable people.
125. The UK's exit strategy should be focused on lifting some lockdown restrictions for more essential services in late April, and other less essential services in early-to-mid May, with a view to controlled re-introduction of social activities in mid-to-late May. Most business should be able to resume limited or managed services in early-

to-mid May. All restrictions on non-vulnerable (over 65 or with pre-existing conditions) could be lifted in late June to October inclusive as the weather improves.

126. The summer is the perfect time for vacations in the UK. The UK, in conjunction with the islands (Isle of Man, Ireland, Shetlands, Channel Islands etc) and local tourist destinations (national parks, National Trust areas etc) should strongly encourage domestic tourism until such time European and global controls are lifted. A lot of small businesses (detail, B&B etc) could recoup losses during this period, and other industries, such as car hire, domestic airlines, ferries etc, which have been pummeled could equally have material recovery rates.

127. The UK, as with other countries, should mobilise its counter-fraud capabilities (National Audit Office, Police, etc) to analyse risks to government grants that have been given to businesses and enterprise.

FRANCE

128. France is another country with a high level of Boomers. It is also a high consumer of alcohol and tobacco goods and social norms (kissing). These are key factors the virus will likely seize upon (See medical section).

129. France is further north than Spain and Italy so we can expect to see a two-to-three-week lag in their cases and recovery. Expect to see a material increase in mortality in mid-April, followed by a drop in early May.

130. France's exit strategy should be focused on lifting lockdown restrictions in early-to-mid May, with a view to controlled re-introduction of social activities. All restrictions on non-vulnerable (over 65 or with pre-existing conditions) could be lifted in late June to October inclusive. As with the UK and other countries, domestic tourism and local businesses when the risk profiles are low should be heavily promoted.

RUSSIA

131. As Russia's temperatures increase into the 3 – 11 degrees area, we should expect to see a country that has relatively few cases as at 5 April, have an increase in cases into mid-to-late April, with a potential increase in fatalities in mid-April to early May.

SOUTH AFRICA

132. Global 'experts' are at a loss to explain why South Africa has had such a low number of cases and fatalities. However, as this report shows, their general location, other than the Cape Town, and the Southern Cape region of South Africa, are outside of the sweet spot for viral transmission. South Africa, like Australia and New Zealand are enjoying their autumnal months. Moreover, the average age in South Africa is just 27 years old, as opposed to the UK and USA's near 40-year-old average. This means their overall risk profile at this time of year is very low, particularly when you consider they are yet to enter their most humid period (July). South Africa would be wise to consider risk-management strategies for the Cape area into July to October for at risk or vulnerable people.

Death

133. A subject that no one likes but everyone needs to accept, because ultimately death but comes to us all. It is always hard to put into words the appetite for death because one person's view is perceived as heartless while another person's view can be seen as mollycoddling. Finding that right balance, particular in the modern world, is nearly impossible. There is relentless pressure applied to every government office to mitigate risk from social media, lobbying, strikes etc.

134. It is a sad fact of life that hundreds of thousands of people die each year just from influenza alone. In this regard, COVID19 is no different. It will be shown to be about the same or slightly less dangerous than Influenza ultimately (albeit its mechanism of action and consequences are distinct and more aggressive for some).

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135. In more recent years world leaders have had to face public pressure from groups and individuals (Hong Kong fugitive offenders, Extinction Rebellion, Greta Thornburg et al) to deliver their needs. There is an obsession in the current times with apologies: any leader of public figure who goes against a group norm is generally vilified into submission until they revert or apologise, or both. These groups, by their very efforts to make things (at least as they perceive them) better, have in fact made countries much more risk averse. The pressure groups, and general social media pressure, has perversely inhibited a national or global response in the event of crisis, because officials may be more focused on potential backlash than taking immediate action. So how do we ensure we make a risk-based decision that allows just one person to die seemingly needlessly?
136. Fundamentally it comes down to the 'what would your family say' question. If you were to ask your mum, what would she say? If you were to ask your grandparents what would they say?
137. For New Zealanders, many Kiwis have faced incredible hardships and have lost many loved ones: just look at the Canterbury earthquake. But so have other countries - the 2004 Indian Ocean Earthquake and Tsunami for example killed over 230,000 people across different countries. Globally these dreadful incidents help unite countries, who if they apply objective thinking, can learn and introduce better systems and processes, based on risk, to mitigate the future effects of further events: for example, early Tsunami warning controls.
138. For all of the countries in the Northern Hemisphere who are likely to lose many people through COVID19, their parents and grandparents will have direct knowledge of mass loss from global conflict: they will be resilient and pragmatic.
139. Death as everyone knows it is painful. Equally, Kiwis know for example, because they are a gregarious bunch, that if you asked many Kiwi families they would say that life is for living. One of New Zealand's USPs is it's perceived risk-taking: sky diving, water rafting, bungee jumping, road racing, triathlons. While New Zealanders are open to taking considered risks to excitement, they are, quite

rightly, more conservative when it comes to health. A paradigm to this is Sweden: a country that makes the world's safest cars (Volvos) and is perceived as one of the most risk averse countries is not in lockdown – why is this? Is it because they make decisions based on risk and practicable controls and make their own informed decisions?

140. So what would someone's family say about COVID19 and what it means. If well read, and from the Southern Hemisphere today, they might say:

- It is particularly aggressive in terms of consequences for those over 70
- Those with compromised immune systems are at greater risk of an adverse outcome
- People with pre-existing conditions, such as diabetes, lung disease, COPD, heart problems, cancer, asthma, alcohol issues, or obesity are at greater risk
- While some people under 50 have had COVID and died, it's no more, in fact it's less, than influenza globally, and far less than alcohol, car accidents, pneumococcal related diseases etc
- The initial reports for COVID mortality were being over reported as test rates reported a 100% rate of cause of death, unlike influenza or other illness which tend to be under reported (as the predominant condition is reported on) – the media and social media profile exacerbated the perceived risks
- More than 400,000 under 5 year olds die from pneumococcal related diseases each year
- 7 million people die from smoking each year
- 3 million die from alcohol related issues
- More than 1.5 million people die each year from motor accidents, and many millions are seriously injured
- At least 650,000 people and probably nearer 2 to 4 million people, die because of influenza or other viruses each year (and there are vaccines for Flu)
- Over 700,000 die each year from MRSA
- So far, in a four month period over winter in the northern hemisphere, around 54,000 people have died and the cause of death, despite other more likely inherent causes (COPD, heart issues, cancer, stroke, obesity, asthma, smoking), is being attributed to COVID, in a period when influenza would have killed

around at least 200,000 to 250,000 (although it is accepted that by late April the death toll will be nearer 175,000)

- Typically in New Zealand the country loses 40 people a month on average from flu, notwithstanding this is higher in winter month on month: as at 5 April New Zealand had lost one person from COVID19 (although this is expected to rise into mid-April to 5-10 people).
- Over 1million people die each year from colon rectal cancer
- Over 350,000 die each year from prostate cancer, and over 500,000 women die each year from breast cancer.
- In total there are over 9million deaths each year from cancers of all sorts, although the human body cures itself of multiple cancers every week.

141. So COVID19, like influenza, is killing people, particularly in the northern hemisphere on a large scale, but there are reasons for this happening. You are probably twice as likely to die from influenza in general terms currently, and it is almost certain that the number of deaths from COVID are being overreported relative to influenza, which is underreported. COVID19 deaths are unlikely to exceed that of influenza over this year (circa 500,000 to 650,000 plus), and especially in subsequent years as immunity kicks in (and anti-viral drugs).

142. People are much less likely to die from COVID19 in Australia, New Zealand and South Africa during summer and autumn because it is too warm for it to cause much damage. Both countries are lucky in the timing of the outbreak, because as a seasonal virus, they have had some chance to build immunity without material consequences, and have been able to enact, and practice emergency and civil response measures, while the fatality rate is very low.

143. Overall, whilst lockdowns were appropriate for northern hemisphere countries in winter and spring, and they were certainly appropriate for New Zealand and Australia while COVID19 was an unknown quantity and the WHO were panicking, there is an opportunity to now tailor the risk response in Australasia: equally, the exit strategies for Northern Hemisphere countries, factoring in all of the context, can now be tailored.

144. There is an opportunity for Northern Hemisphere countries to take heart and have faith in the fact that, while their lockdowns have helped to reduce the overall contamination rates (from over 2 for each person to under 1), their immune systems will now start to recover as spring blossoms. For critical and emergency care services in the UK, Europe, America and other northern hemisphere countries, they can expect a return to normalization around June. This knowledge will give them hope and allow them to start planning their exit strategies from lockdown and initiate a controlled, sensible risk mitigation so people are not unduly harmed medically, mentally or fiscally.

Medical & Other Interventions - Ideas

145. Investigation of medical interventions are outside the purview of this report. However, based on open source information there are some striking patterns that should be highlighted for consideration by the medical and scientific professionals.

COVID19, Proteins, Obesity, and DPP4

146. Most viruses need food to survive. COVID19 appears to be no different. Open source material indicates that some viruses that attack the lungs are reliant on protein, and some on sugar. Some of the proteins and sugars that are the most desirable reside in the lungs.

147. Dipeptidyl peptidase 4 (DPP4) is known to be a receptor for the Middle Eastern respiratory syndrome of coronavirus (MERS): DPP4 resides in both the lungs and in the pancreas: this is notable as one of the symptoms of COVID19 includes 'stomach pain': this could in fact be pain referring from the pancreas as it is overloaded, or from the intestines as a result of changes in insulin and sugar levels resulting in diarrhea.

148. Medical and Scientific experts should analyse the insulin and sugar levels of COVID19 patients carefully, preferably against prior baseline measures (from previous insulin or sugar results from their GP for example).

149. Based on open source material, at a macro-level, COVID19 will be more dominant if the following systemically-linked conditions or factors co-exist:

- Increased insulin resistance – increase sugar production
- Being overweight / Obesity
- Lower IGG blood results (relative to baseline if such exist from prior testing)
- Ambient humidity high, ambient temperature low
- Recent history of any alcohol consumption (less than 14 days if over 40 years of age)
- Previous history of smoking
- Late Winter Setting (i.e. March / April in Northern Hemisphere)
- Limited cardiovascular exercise (aerobic / anaerobic) or poor cardiovascular fitness
- Diabetes
- Liver disease
- Recent cold or flu
- Age
- Extreme fatigue

150. The more that the above factors are in existence, then it is evident the outcomes are poorer for COVID19 patients. A good history of these areas could be vital for determining the medical intervention: it could just be something as simple as their sugar levels looking a little bit high.

151. DPP4 receptors exist in both the lungs and in the pancreas. Some studies have shown that treatment in mice with inhaled sugar (sugar and oxygen) can in effect 'drown' a harmful virus, as the virus overloads on the sugar: this is in effect the same as 'flooding' a car with petrol, causing it to stall, or an airplane flying through a volcanic ash cloud causing the jet engines to stop. Medical and Scientific experts should study DPP4 research to see if other interventions, for example adjusting a patients' relative production of insulin, or intake of sugar generally, or sugar

atomized in oxygen, the level of humidity and warmth of oxygen, can impact or effect outcomes.

152. All hospitals that are heavily committed to ICU care should employ a full-time auditor (either qualified Doctor, or Nurse, or professional health auditor) to monitor all interventions and outcomes and provide an independent report back to practice managers or hospital managers, or COVID19/Pandemic response team, preferably in real-time, on trends and outcomes. A range of criteria should be established, and these should be analysed. This on-going monitoring will free up the capacity of clinical staff to focus on patient management and not have to spend as much time in debriefs of cases or trying to understand broader patterns: an expert can do this for them.

Fraud Risk

153. There is a substantial risk of fraud against government and hospitals, and for medical providers.

154. Governments, hospitals, and procurement teams are encouraged to consider employing a respected lead investigator or auditor from within an existing government or related department or agency on immediate secondment (the use of Big4 providers is not recommended for a variety of reasons) to investigate the response taken to date by agencies, and to analyse the following:

- Grant or loan payment controls – test a sample of these
- Benefit payments – look for fictitious recipients, or duplications etc
- Invoices from providers – check legitimacy, check stock
- Goods supplied – quality, timeliness etc
- Fictitious vendors

155. The investigators should accept that the primary focus now is on care and health. However, this should not stop their work and they should be encouraged to pursue, without putting at risk the welfare of any patients, staff, or the bereaved,

the economic risks to their organization, agency or country. This work will also inform future responses in the event of a crisis or pandemic and supply chain management.

Mitigation Strategies – Southern Hemisphere

156. Based on the key arguments set out above (this is not an exhaustive report of all causative factors), the following mitigation strategies could be considered for both New Zealand and Australia week commencing 6 April 2020:

- Conduct a review of cases – if these have not doubled once every two to three days as has been seen in the northern hemisphere, or the rates remain relatively stable or reduce, it will be safe to lift some restrictions from lockdown, but these need to be carefully measured and monitored: some examples are outlined below of what these may look like
- Keep anyone over 60 out of the workplace for two months, but encourage them to be active, getting fresh air and quality rest and dietary requirements. Recommend reduction in smoking and drinking alcohol (as these are obvious links to cancers and virus outcomes) and an increase in rest and quality food, then review
- Keep anyone who is immune compromised out of the workplace and encourage working from home for two months, again advising sensible exercise and dietary preparation for winter, then review
- Open retail outlets with additional controls (see below) and domestic flights, encourage spending in local holiday areas for under 70s and non-immuno compromised – help the economy to return
- Instruct all car rental companies that they must thoroughly disinfect every vehicle before and after it is hired (many rental companies do not clean cars at all inside), including wiping seats, handbrakes, handles, gear levers, fuel filler caps, etc
- Ban the use of shared electric bikes until further notice (Uber et al) as in winter these will be mobile petri-dishes
- Instruct all airport lounges, airport check-in areas and airport arrivals areas, to have abundant levels of hand sanitizer, similarly with social areas in any business. Instruct baggage handlers to wear durable disposable gloves
- Lift the requirement for masks worn by employees who are not sick – masks make mucosal viral transfer worse for those wearing them for more than a few hours, as

the wearers adjust the masks, touching their damp face near the mouth, then other points of contacts like doors, or patients: this significantly increases transfer and lulls people into a false sense of security – anyone with a slight cough should self-isolate completely if the relative risk-profile of a given country is moderate or above, and if they must go out, should wear a mask in case they spontaneously cough: the mask will also indicate to others they are sick

- Let businesses open as usual but ask people to continue to respect social distancing in that business, and support businesses to reserve the right to have people who are not social distancing, or are unwell, to be removed by from their premises (the Police and other members of the public should support this)
- Ensure everyone observes sensible social distancing, even in social circles or at cafes, and if talking to neighbours: try to limit physical interaction, encourage hand sanitization and washing etc
- Construction is the life-blood of New Zealand and Australia. Builders and related providers should return to work in New Zealand (Australia isn't limiting this, quite rightly). However, any builder or service provider working for at-risk clients must remain at home, for 21 days (see below) if showing signs of respiratory illness
- Limit gatherings to no more than ten people for work purposes (i.e. Board or office meetings), or as much as a room can allow with two-meter distancing
- Team games should be banned until November 2019 in the Southern Hemisphere (when warm weather returns) with a view to revising this in September 2019 in anticipation of lifting the ban (in the Northern Hemisphere games and sports should be encourage from 1 July onwards subject to on-going monitoring)
- Open schools but don't allow parents to leave children with their parents or grandparents: children and parents of sick children will be required to self-isolate for 14 to 21 days
- Instruct anyone who is sick to self-report, and take 21 days sick leave and isolation (this gives time for the disease to abate). Provide a grant to employers for additional paid sick leave. Employers should encourage working from home if people are displaying respiratory illness but are able to work remotely
- Encourage 20 – 50 year olds to socialise more now, while it is still warm, but respecting distancing: they are almost immune to the virus currently and this will help with herd immunization come July to October when flu and COVID19 season will be a greater risk: there will be a whole suite of the working country who will be able to work in winter having had some prior exposure
- Consider taking some economic steps in both countries, for example raising the interest rates slightly by 0.25 or 0.5%
- Instigate an investigation into testing quality and infection levels using antigen blood tests: select a sample of 100 people who displayed COVID19 symptoms but

gave a negative test, and use an antigen test to see if they have had it. Select another 100 randomly to test from those having already tested positive (to look for false positives), check 100 from a random sample of the population, ensuring half of these are Border staff at international airports with Chinese and Tasman links between Australia and New Zealand. Test all aircrew who flew to China from December to March inclusive. Test a sample of baggage handlers at Auckland and Christchurch. These sample-based testing approaches should be used as a basis for broader testing decisions and in determining confidence levels for lifting lockdowns

- Publish in real time the causes of death, age, and pre-existing condition that the patient had. This will not compromise privacy related concerns (as there will be no personally identifiable information). BMI, smoking and asthma history should also be recorded. These sharings will help other countries to identify if there are commonalities, i.e. diabetes, BMI, smoking, age.
- Medical and Scientific experts should investigate what links if any exist between adenovirus, which has some late peaks around March / April most seasons in the Northern Hemisphere, and COVID19. While adenovirus is a DNA-based virus and distinct from COVID19s RNA viral behavior, the symptoms and timing of COVID19 are strikingly similar to adenovirus (Bronchitis, Pneumonia, sore throat, pink eye, stomach pain, etc – all symptoms that have only just latterly been associated with COVID19). Moreover, adenovirus is well known to be much more easily transmitted and more resistant to hand sanitization and cleaning etc, just like COVID19.

Consequences of staying in Lockdown too long, or coming out of one too soon

157. The longer countries are in lockdown, the greater the economic impact. There is a fine balance between managing the threat to health services and protecting lives, and the threat to social services and mental health, and protecting the economic interests of the country.

158. New Zealand and Australia (Australia to a lesser extent as their restrictions are not as substantial) should consider coming out of lockdown for a few weeks at least because there are many material benefits before these countries arrive in their winter cycle that outweigh the risks.

159. Nearly all respiratory viruses are seasonal. They are here nearly all year round, but have particular peaks depending on weather, temperature, metabolic state, etc. Some viruses, like adenovirus have a tendency to peak in March and April (as we know COVID was in existence in November), and so, if we accept based on logic and context that this is also likely to be the peak for COVID19 (albeit it is a different RNA type of virus), Australia and New Zealand can ready its reserves for the equivalent southern hemisphere period: which is September and October. In the Northern regions they can instigate lesser controls as it warms.

160. Being in a lockdown too long or too early can create a significant burden in the following ways:

- Full or partial herd immunity cannot be capitalized on during the low threat period and while weather is warmer, and the relatively immune population of 20 – 50 year olds is kept indoors: it may be more sensible to let the 20-50 year olds in good health to be exposed to the virus now because their resilience will be higher in the Southern Hemisphere currently, than in the north: their metabolic rate is low, and mucus levels are low. Similarly, Northern Hemisphere countries should encourage social interaction within limits during summer and autumn.
- Delaying now means it's possible New Zealand will have a material increase in fatalities in September and October because Australasian countries were unable to capitalise on the relatively 'good' conditions during autumn and general stress and resilience will be less (as people will be more overweight, tired etc). If lockdowns continue into August, September and October from April, these are likely to be damaging to both New Zealand and Australia as they will have a disproportionate impact relative to the disease on their economies: it is impossible to eliminate any virus, so it is better to outsmart and manage it properly – it is unrealistic to expect people to be in lockdown for something that currently presents less danger than driving or cycling to work in New Zealand
- It's prudent to lift some restrictions slightly now as it's impossible to see how both countries can tolerate a lockdown for longer than four to eight weeks, particularly in respect of some concerns outlined below - if some restrictions are not lifted now it may make it impossible to come out until November
- Domestic violence will increase exponentially in countries (with long term consequences for families): this would be just as catastrophic for some families as a bereavement, as parents separate and children are left to pick up the pieces. Mental health is likely to be materially affected in some socio-economic classes

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- Fiscally New Zealand has limited means and relies on tourism, milk, meat, wine and wood exports primarily and therefore it has a limited depth of field for recovery. Large fiscal reserves are already being eaten into. Australia's economy isn't in great health. It may be more proportionate to take some increased risk now as many of the people who have died in the Southern Hemisphere to date are people with pre-existing conditions, who would like have become unwell and died anyway (from a cold, or flu in a few months or so) – the hard question to answer is, is it worth keeping 29 million people indoors for two countries for around 35/50 fatalities, when they would have had around five times the deaths in this time from influenza?. This is the approach Sweden have taken, despite being in winter, with some circa 370 deaths for a population of 10 million people. It is however, like that Sweden's death toll will rise in April as outlined before dropping again.
 - New Zealand is susceptible to major earthquakes. An 8.0 or above magnitude quake happens every 300 years fairly reliably, and it is 30 years overdue. If the country stays in lockdown until a vaccine comes out, and the country is hit by an 8.0 earthquake, it will be even harder to recover. This is a tough call for New Zealand: should it save a handful of lives now, but at the same time put the lives of tens of thousands of others at risk in future? New Zealand's resilience to a natural disaster will be materially lower the longer it stays in lockdown as fiscally it will be less resilient, it's health and emergency services will be less resilient, etc. In comparison, the UK and USA have great economies that rely on supply services: these countries need to encourage spending and getting businesses back to normal as soon as practicable – this can be done, and sensible measures can be put in place to manage the risks, into late spring and summer
 - The longer Australia and New Zealand stay in lockdown, the greater the shocks will be on the system when influenza and other illnesses arrive in the coming months, because people will be less fit, their immune system will be lowered, and their stress levels heightened, and as this report outlines, it's likely many people will have gained weight and drunk alcohol – all increased risk factors for a second more material wave of deaths and illnesses: in addition, those tasked with care of the ill will become burnt out – this level of alertness and stress is unsustainable in such a small country, or in States or Territories. it may be better to have a sharp shock and get it out of the way while the human body and population and infrastructure can cope with it, than to wait until it isn't in a position to do so
 - If they don't come out of lockdown now, Australia and New Zealand's ability to re-open international borders may be delayed until 2021 or 2022, because it's unlikely they could risk having northern hemisphere people come into those countries as they enter the depths of winter and spring before the vaccine comes out.

161. As a country New Zealand was one of the first to close it's borders. However, as with every other country the horse had already bolted. It's one of the reasons New

Zealand and Australia are likely seeing a flatline of cases and low deaths: it's not because of the time of their intervention (although this has helped without question), it is because of the seasonality and metabolic state of their citizens, relatively low Boomers, and to some extent Australians and New Zealander's 'she'll be right' attitude, means less medical risk from a lesser uptake in antibiotics over the last fifty years.

162. It would be helpful for medical, scientific, and emergency responders, to assess their current capacity and capability, and assess whether they can put people 'in reserve' for the coming months in New Zealand and Australia, while lifting some lockdown restrictions. Similarly, in the Northern Hemisphere, if the mortality is reducing as expected in late April, then notwithstanding rest for staff who are tired, the NHS, and other government and private sector health services can start to plan now for elective and other surgery or medical cases from July onwards.

163. If we make decisions based on risk and common sense, and are able to seek the support of the public, while not bowing to social media and media pressure, we may have much more sustainable and happier outcomes. After all, it is impossible to eliminate all risk.

164. The lockdowns in the northern hemisphere will have helped to avoid more deaths. They will have also without doubt saved their respective health services from collapse. However, there is good news ahead for these countries, and they should be encouraged that in the coming months, and into their summer, that they, notwithstanding their personal tragedies, sacrifices and suffering, be able to return to some semblance of normality.