FLASHPOINT

Spring 2020

Covid coping
Beirut levelled

NZ INSTITUTE OF HAZARDOUS SUBSTANCES MANAGEMENT

USEFUL ORGANISATIONAL CONTACTS

NZ Institute of Hazardous Substances Management
www.nzihsm.org.nz
The official home of professionals committed to the safe management of hazardous substances and dangerous goods. The NZIHSM is a 'not for profit' industry association specialising in improving safety, health and (site) environmental performance, particularly the safe management of hazardous substances in the community.

Responsible Care NZ
Box 5557 Wellington 6145
Responsible Care NZ works with industry partners to implement the hazardous substances legislation.

WorkSafe (MBIE)
www.worksafe.govt.nz
Government agency formed to provide compliance and enforcement of hazardous substances. Responsible for hazardous substances certificates.

EPA
www.epa.govt.nz
The EPA administers the HSNO Act and supplies extensive information on working with hazardous substances.

Ministry for the Environment
www.mfe.govt.nz
The Ministry administers the HSNO Act, and provides policy, publications, technical reports and consultation documents.

HAZANZ
www.hazanz.org.nz
An association of the safety organisations in New Zealand.

Institution of Chemical Engineers
Since 1922 the multi-national IChemE has advanced chemical engineering's contribution for the benefit of society. Its offices include UK, Australia and New Zealand

Local Government NZ
www.lgnz.co.nz/lg-sector/maps/
Local Authorities have responsibility for policing building controls. Some local authorities are contracted to Department of Labour to provide enforcement of the Hazardous Substances legislation.

Ahead at half time, but the battle continues?

Spring is arriving and the joy of new life is appearing all around us.

For many it has been a long winter, for some it is still not over, but in spite of all this the human spirit is prevailing and no more than in New Zealand.

An early isolation strategy against the Covid virus has proved sensible so far, limiting the impact of the latest human invader, which along with back-up from government financial assistance means that Aotearoa is still coping as science searches for the decisive chemical or vaccine

In this Spring edition of our *Flashpoint*, our NZIHSM team too has a positive feeling as we deal with life's intrigues – detailed in the articles in this magazine such as:

(i) Coping with Covid
(ii) Beirut blown apart
(iii) Short history of the chemical industry
(iv) Methyl bromide decision
(v) Worksafe Covid guidelines
(vi) General industry observations

Perhaps it is the continuing positive nature of many humans and the ability to think and use science to solve the tests of nature, that has allowed us to work together through major obstacles. Perhaps this ability to work together and solve problems has not been better summarised than in the recent statement "Be Kind".

We at the NZ Institute of Hazardous Substances Management extend our best wishes that YOU and ALL yours to keep well over this testing planetary period!

President John Hickey

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Flashpoint

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Beirut turned into rubbish heap

One explosion achieved what several years of civil war couldn't do – turned Beirut into a rubbish heap.

The once beautiful Paris of the East has progressed from a partly war-torn city to a shambles, damage is in the order of $3bn and some say the city will essentially have to be completely rebuilt.

The culprit was 2750 tonnes of terrorists' chemical of choice, ammonium nitrate, that had been stored in a warehouse on the Beirut port wharf space for six years.

Somehow a fire began in the warehouse which quickly became quite intense and many of the inner city population was watching the huge cloud of smoke from various standpoints. Then the nitrate blew with an equivalent force of one quarter of the Hiroshima atomic bomb. People were bowled over, found themselves upside down in their vehicles and those watching from apartment towers were suddenly showered with their own shredded windows.

The noise was heard over 1000 km away in Cyprus and windows in Beirut were demolished up to 15km from ground zero. The pressure wave has stripped the city of habitable accommodation and above-ground infrastructure. The casualty toll was at lleast 180 dead, 7000 inured, 300,000 homeless. Some may be surprised at the relatively low human casualties versus structure damage. Blast specialst Brad Wojtylak says this is because ammonium nitrate produces a pressure wave as opposed to a shock wave.

Due to excellent video coverage, he was able to time the wave. Shocks, because of their fascinating and complex physics, travel faster than the speed of sound, and they cause far more damage than pressure waves. "Thankfully, we know this blast did not produce a shock because the speed of the water-vapor-filled white dome can be measured.

"The speed of sound in air is 343 meters per second. Based on the viewing angle and distinctive red chairs pictured in some of the later frames, I traced one of the Beirut videos posted by *The Guardian* to its filming location on the rooftop terrace of La Mezcaleria Rooftop Bar, and measured it to be 885 meters from the center of the blast.

"From that vantage, the pressure wave can be seen neatly traveling from the center of the blast first to the point halfway between the end of the pier and the edge of the long, massive gray grain silo building, a distance of 151 meters, then to the end of the pier, 262 meters, then eventually to La Mezcaleria.

"By measuring the times at which the pressure wave reaches these landmarks on the video, we know that, as it blazed down the pier, its rampage occurred at a speed of only 312 meters per second. That's slow for a bomb. Then by the time the audible crash and mayhem reached the formerly peaceful and picturesque outdoor bar, it had slowed to at most, 289 meters per second.

"The pressure wave, slower than the 343 meters per second speed of sound, caused

Three stages of disaster: fire, explosion; pressure wave forms in its own mist on the site before descending on the city. Photo: *Sky News*

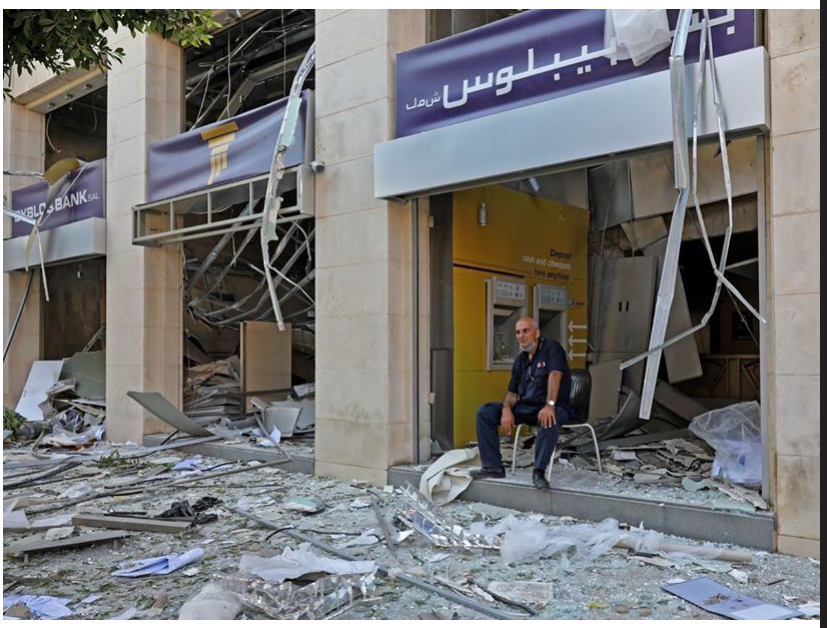
destruction, horror, confusion, shattered glass, torn-apart flat surfaces, and disorientation for onlookers as their ears were subjected to the rapid pressure fluctuations. But a shock wave could have caused them to drop dead from lung trauma as they watched."

Nevertheless, the blast caused many hundreds of casualties from flying glass and other bits of buildings or vehicles and deaths by being buried under rubble.

Relevant port officials were instantly arrested. Warning had been given a couple of weeks earlier that the stored agricultural chemical was unstable. The mystery of just who in authority knew the fertiliser was there deepens. It appears first responders didn't - as their bosses said, they would have issued an evac warning at the first sign of smoke instead of sending the crews into fatal danger.

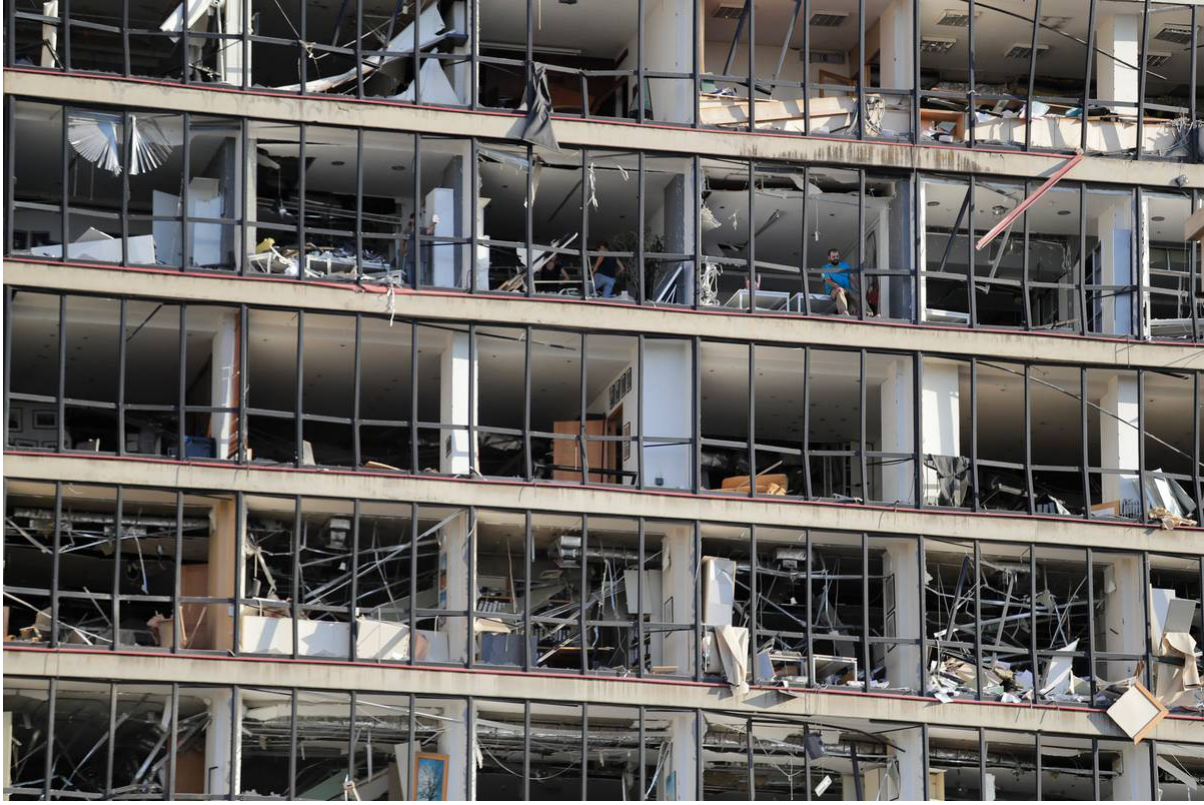
A crew of 10 firefighters are among the casualties - nine have simply disappeared and only the paramedic firefighter was found whole. That first team in immediately called for backup – they had been told it was a fireworks fire, but their instincts told them different at the scene.

The first team managed to get that one call in, and in doing so saved the lives of many colleagues. A second team was just leaving the port brigade's building when the blast hit them, destroying the upper floors where firefighters would have been in their offices. One fire official said: "there were not two blocks left upon another."



Shop frontages shattered...
...the massive grain silos on Beirut wharf bore the brunt of the blast, and most of the grain was lost in the process.

The port area was left totally derelict.



When the second team arrived, apart from the deceased paramedic with the ambulance, all they could find were small pieces of their colleagues, such as a hand.

The mystery of just who in authority knew the fertiliser was there deepens. It appears first responders didn't - as their bosses said, they would have issued an evac warning at the first sign of smoke instead of sending the crews into fatal danger.

Fifteen-storey apartment buildings in the suburbs were rendered uninhabitable.

Under normal handling conditions, ammonium nitrate is not harmful. However, inhalation of high concentrations of ammonium nitrate dust can cause respiratory tract irritation. Symptoms may include: coughing, sore throat, shortness of breath, or even suffocation.

When swallowed in high concentrations, ammonium nitrate may cause headache, dizziness, abdominal pain, vomiting, bloody diarrhea, weakness, a tingling sensation, heart and circulation irregularities, convulsions, collapse, and suffocation.

Ammonium nitrate forms a mild acid when mixed with water, which can cause irritation to the eyes, nose and skin.

Methyl bromide decision not well received

Anti-methyl bromide protestors are not amused at the EPA's waiving of a deadline for log exporters to recapture emissions of the toxic fumigant methyl bromide, considering it another example of the EPA's pro-industry stance.

The EPA is currently considering an application by forestry group Stakeholders in Methyl Bromide Reduction (STIMBR) to re-assess the recapture controls – it was against this background that the deadline waiver was granted. STIMBR argued that it needed the extension because of the long lead-time for log exports to India, and how these might be affected by the decision-making process.

The EPA says the deadline extension is a temporary measure to make sure the industry can continue to function while the main decision-making process is progressing.

The waiver would not influence or impact the ongoing process, it said.

The use of methyl bromide was re-assessed by the EPA's predecessor, the Environmental Risk Management Authority in 2010, at which point controls around monitoring and buffer zones were implemented – and the 2020 deadline for recapture imposed. After that date, fumigators would have to have machines capable of recapturing enough methyl bromide so that less than five parts per million are left after a treatment.

Fumigators have made some progress on recapture technology in the intervening years, but say the technology does not exist to recapture all emissions. STIMBR wants the definition altered to say that 80% of emissions be recaptured.

A recent EPA report recommends that recapture targets be staggered, so that 80% be achieved by October 2022 and 95% by 2037. It also recommends larger buffer zones than currently in place, and more monitoring.

Lawyer Kate Barry-Piceno says the staff report indicates the EPA will give the industry what it wants, which she says is outrageous. "It's just a repeat of 10 years ago, the same issues," she says. "It was pushed out 10 years for them to try and get their act together, and they haven't."

The EPA received 72 submissions on STIMBR's application – 43 in support and 23 opposed. The Bay of Plenty Regional Council was concerned that STIMBR was downplaying the potential exposure to workers and residents.

It recommended the recapture definition be set as a concentration value, or parts per million, rather than a percentage, to make it easier for regulators to enforce. The EPA staff report concluded that the use of methyl bromide under the proposed recapture definition would have "moderate risks to human health, and negligible risks to the environment".

The health risks could be mitigated with controls, the report said. Meanwhile, it found the benefits of the continued use of the gas were "significant".

EPA given more muscle

The Environmental Protection Agency has gained new powers with changes to the Resource Management Act and will be able to provide greater support to local councils in enforcement action.

CEO Dr Allan Freeth said the EPA now has the statutory power to assist in an enforcement action, and directly enforce the requirements of the RMA. "It will always be our intention to work in partnership with local auhtorities. The changes allow the EPA to build stronger partnerships with local government, and suppport an increase in compliance, monitoring and enforcement actions under the RMA."

The EPA's geneal manager of compliance, Gayle Holmes, said the the new powers do not affect any change to compliance certificate or certifier requirements relating to hazardous substances, which are regulated under the Health and Safety Act.

Battle of the bugs:

Coping with Covid

by John Hickey

In April 2020 we considered the turbulence of 2020 with eruptions, firestorms, floods, droughts, and then along comes the toxic bug Covid-19.

One little bug, Covid-19 virus had mastered the art of jumping (allegedly) from bats to humans, but even worse, became very adept at jumping from human to human at almost twice the speed of 'flu.

Now there are 'Good bugs' and 'Bad bugs' and indeed bugs and humans actually live together in our bodies with some estimates that every human actually has 2kg of bodyweight directly attributable to our onboard bugs.

Who's who?

To assess how bad or dangerous a specific bug is to us, we compared the Covid bug to a matrix of toxic markers. So how does it rate against our risk criteria?

Covid-19 Toxic risk analysis:

- How toxic are they (do they control or destroy) ?
- Are they resistant to degradation?
- Are they able to spread quickly to water and air?
- Are they able to accumulate in body parts and fats?
- Are they able to be passed on from person to person?
- Are they able to be passed on from animals to humans?

Based on this and four months later, Covid-19 still appears to be a Bug Beauty, highly contagious, easily-spread, has a lethal bite and very fast travelling right across our planet hitchhiking rides in the human body and their transport mechanisms.

The speed of travel had caused us the major surprise to date. In its first three months, Covid-19 spread at an alarming rate having jumped out of China and infected at least 1.3 million people all over the planet and killed over 74,000 humans.

Now in only its second four months later, and in spite of much of Earth's air travel being cancelled, the worldwide cases have increased from 1.3m to 23 million and 10 times the death rate.

While the population deaths have increased as would be expected in a pandemic, the deaths per 100,000 population do appear significantly less in those countries who rapidly adopted 'full lockdown' and rigorous PPE also assisted. The case fatality rates, however, do show some unusual signs, with not always the expected reductions as knowledge is gained, which could benefit from further examination.

But what do homo-sapien humans do when faced with such a bug and how do we control other lifeforms on our planet that may be a threat to our race.

Our four usual control methods are:

(i) Have immunity against them

We find a vaccine to protect humans by developing our internal antibodies so that our immune system can stop the virus overtaking our body.

(ii) Chemical treatment

Find a chemical which

can kill the bug without killing us.

(iii) Isolation or prevention : We need to prevent the bug from getting near to our bodies through the use of self isolation to keep unaffected humans away from the virus and personal protective equipment (PPE) and hygiene methods where we cannot fully isolate

(iv) Testing :
To have effective isolation we must locate ALL of the bug and isolate it ALL to stop its spread – this is where comprehensive reporting and testing is important.

The current position

So, this bug has caused 800,000 deaths in seven months, from 23 million infections worldwide as shown above and it has continued to spread throughout most of the human world. However, it has been particularly bad in most of the Western world (America, Western Europe, Russia, South Africa) with a lesser effect to date in the Pacific, North Africa and East Asia as is shown on the attached world map. (Source: Wikipedia.)

Is the lockdown worth it?

It will take some time to develop a vaccine or a chemical cure and trials to ensure that it is safer than the bug to administer to humans. In the meantime, we must create some time against what has to date proved to be a virulent, contagious and fast moving bug. To buy this time we will need to isolate the bug from humans and its transfer mechanisms until a treatment chemical or vaccine can be found.

The best method that we have to date appears to be a lockdown method where the bug can be separated from its human hosts.

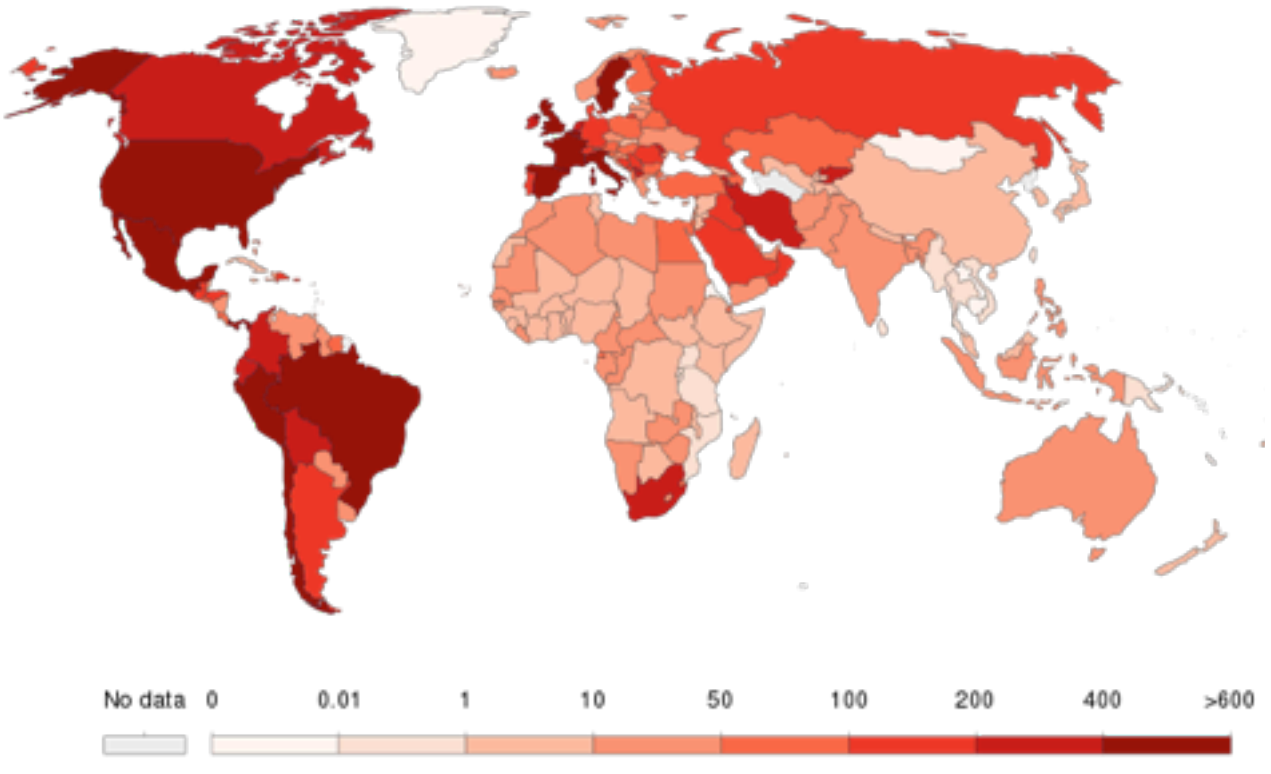
The death rate effect

Based on the current seven months' data, the death rates per contagion per country are as follows:
Based on the preliminary deaths/confirmed case ratios (table next page), it would appear that those countries who adopted an early lockdown strategy (eg; NZ, Australia, South Korea, Taiwan) a deaths per 100,000 rate of <2/100kp vs a rate of >10 for those with partial lockdown and >50/100kp for those countries where full lockdown has not been effectively employed would indicate that lockdown is an effective strategy.

In addition an infected case , death rate rate of <2% versus

Total confimed Covid-19 deaths per million people, Aug 20, 2020

Limited testing and challenges in the attribution of the cause of death means that the number of confirmed deaths may not be an accurate count of the true total number of deaths from COVID-19.



Source: European CDC – Situation Update Worldwide – Last updated 20 August, 09:04 (London time)+

a death rate of >6% for those who have not 'locked-down' appears to indicate that without a vaccine or chemical solution the lockdown and 'virus cluster containment' method to keep infected persons away from others until there immune systems can recover would also indicate that lockdown is an extremely effective strategy.

However, the virus death effect is not the only effect to the human population, as we also have a society where humans must trade food, goods and services to also remain alive. We control this process through the use of money as our method to value the trade on goods and services.

The problem with a 'lockdown strategy' is that it doesn't just isolate the bug, it also restricts the flow of goods and services as humans are restricted from close interaction with one another so that any bug infection cannot transfer between them. This has a secondary effect of disrupting the human economic value system so that some people cannot work and so not receive payment for their goods and services. In turn, they cannot buy goods and services to easily survive, which over a long term can cause related harm to the human race.

Some Worldwide statistics during the Convid-19 Virus Pandemic

Coronavirus disease (COVID-19) is an infectious disease caused by a new virus

The disease causes respiratory illness (like the flu) with symptoms such as a cough, fever, and in more severe cases, difficulty breathing and Death

Convid-19 Virus Pandemic **22-Aug-20**

Changes in the April 2020 case leaders by August 2020

Location	Confirmed cases	Deaths	Deaths per 100,000 popn	Case fatality rate
Worldwide	22,954,220	799,350	**29.4**	3.48%
United States	5,713,776	177,834	53.3	3.10%
Spain	377,906	28,813	61.7	7.60%
Italy	256,118	35,418	58.6	13.80%
Germany	231,292	9,263	11.2	4.00%
China	84,939	4,634	0.3	5.30%
United Kingdom	323,313	41,405	62.4	12.80%
Sweden	85,810	5,805	57.0	6.80%
South Korea	16,670	309	0.6	1.90%
Australia	24,407	472	1.9	1.90%
New Zealand	1,321	22	0.5	1.30%

Source: Wikipedia 22 Aug 2020

Results of Highest case countries in August 2020

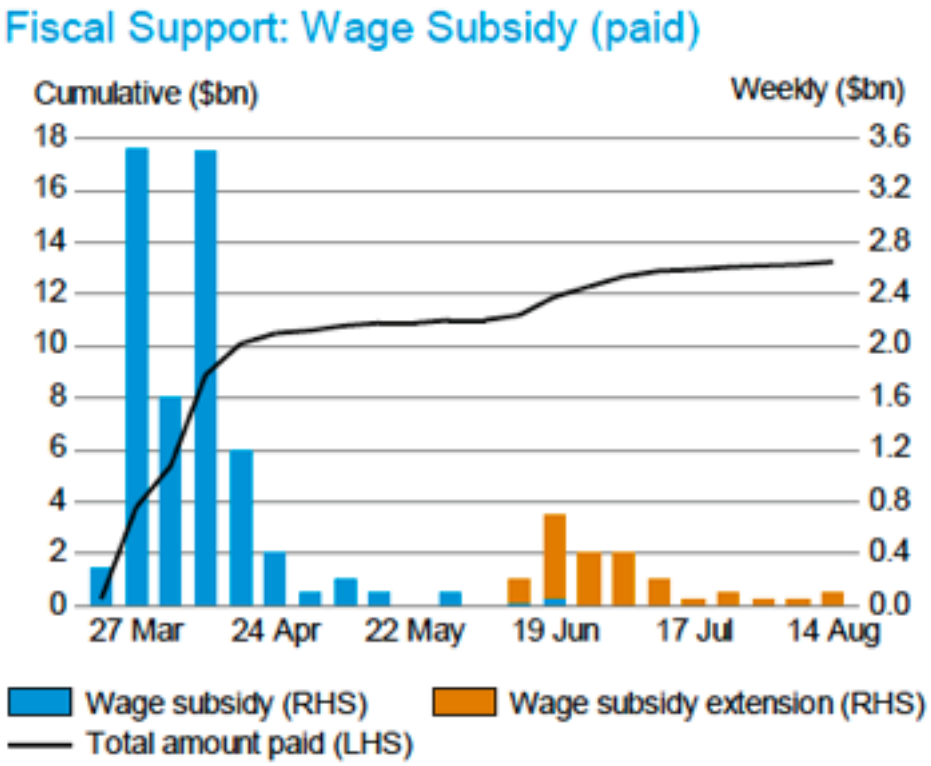
Location	Confirmed cases	Deaths	Deaths per 100,000 popn	Case fatality rate
Worldwide	22,954,220	799,350	**29.4**	3.48%
United States	5,713,776	177,834	53.3	3.10%
Brazil	3,532,330	113,358	53.6	3.20%
India	2,975,701	55,794	4.1	1.90%
Russia	951,897	16,310	11.1	1.70%
South Africa	603,338	12,843	21.8	2.10%
Mexico	549,734	59,610	46.8	10.90%
Peru	576,067	27,245	83.9	4.80%
Iran	354,764	20,376	24.8	5.70%
United Kingdom	323,313	41,405	62.4	12.80%
China	84,939	4,634	0.3	5.30%
New Zealand	1,321	22	0.5	1.30%

Source: Wikipedia 22 Aug 2020

New Zealand does have a remote Pacific island border advantage over many overseas countries, so in spite of some warranted criticism of the border controls, we have learned, rather than badly suffered, from past mistakes and do have an easier controllable border than larger landmass human countries.

That is we can save deaths directly related to the bug but in doing so create harm to the overall human operating system which can lead to severe hardship to some needy humans and possibly even sickness and death. To limit this damage society must also assist the needy to avoid the potential economic downside while finding a cure against the bug.

This does cost money and in very crude economic risk analysis terms one could say what is the cost per human life? This is a very difficult and moral



Source: MSD

economic problem and the New Zealand Government response to date has been to use a lockdown to isolate the bug.

To compensate this lockdown strategy the Government has donated money to the business economy workers through 'Covid Income relief payments', 'Job seeker support' and the like, to the cost of around $8 billion pw, according to the Treasury's *Weekly Economic Update* of WE 210820 for around 240,000 people or >$50000 per working recipient to keep the economy moving.

These are large numbers and criticism has been made that this will significantly increase overseas borrowing.

Yes, all strategies have risk and the new vaccine to finally protect humanity against the bug is yet to be finalised and our isolation strategy does rely on a final cure being found.

But somewhat amazingly, at present according to the latest Treasury Weekly Update (21 Aug 20) it appears that the NZ economy contracted Current Account %GDP only fell by 2.7% in 2020Q1 against the previous. Overseas, the data have been less encouraging. In Japan, June quarter GDP was 7.8% lower than in the March quarter, the largest quarterly fall since WWII. In the USA, analysts expect September quarter GDP to be around 5% higher than in the June quarter. This follows the 10% fall in the June quarter.

Thailand's economy contracted at its sharpest pace in 22 years, with GDP down 9.7% in the June quarter compared to the previous quarter. Finland's GDP fell 3.2% in the three months to the end of June, while Denmark's dropped by a record 7.4%.

Both countries fared better than Sweden, which had no formal lockdown, where GDP contracted by 8.6%.

Summary

While this lockdown will effect our human desire to be travellers and masters of the world, the results in NZ to date show one of the world's lowest infection rates, but at only a 2.7% GDP fall is better than many expected and I for one believe that we New Zealanders are still in the game to beat this bug at an affordable cost and is it not more important that we all live in line with nature to see another day?

***John Hickey** MBA,CEng*
HS Engineer/Certifer

Postscript: On 17 Sept NZ 2nd quarter lockdown GDP dropped 12.2% compared with average drop in Europe of 12.4%. However when most of NZ came out of level 3 lockdown there was also a stronger rebound than expected

Uncle Archie

Kia ora HS practitioners!

It is the year of the virus, almost all of humanity has become affected by this virus and indeed many have also become infected.

Vindictive virus?

The virus has rapidly spread around the planet within seven 7 months with over 23 million having been Covid positive, millions sickened and over 800,000 dead. What have we learned from this experience?

Global industry change

With much of the world in lockdown and the levels of sickness rising, the need for vehicles has slowed in the USA and the 'developed' world in general. With surprising speed GM and Ford USA converted some facilities from car to ventilator production in under three weeks to assist with hospital respiration. Air travel is a shadow of its recent self.

NZ industry

New Zealand was placed in to a four-week isolation lockdown from 23 March, 2020, with the goal of isolating the virus from infecting the public as it was rapidly happening offshore. As a small country in a big sea along with rapid action, good communication and management, our team came out ahead. Any lessons from this?

Lockdown

While lockdown has slowed the virus, it has also slowed the pace of many New Zealand industries, especially those in face-to-face services. But we are still progressing well with a special thought for essential services and schoolkids adapting to the new reality.

A new hygiene

For many years 'Wash your hands before you have your dinner' has been the norm; this is now revised to "Wash your hands before you pick your nose!'

Wildfires

Like last summer USA wildfires are back in record levels, lest we forget global warming

The Big Bang theory

'What use are hazardous substance regulations, inspectors and certifiers to society?'

On 4 August, 2020, near a port in Lebanon there was a major explosion, liquidating central Beirut making more than 300,000 homeless with many deaths. More than 2700 tonnes of ammonium nitrate, a raw material of explosives, had been stored in the centre of town, 10% the size of the Horoshima nuclear explosion in a town? At least some hazardous substance controls would have been helpful here!

A Bug and a Mug!

Speaking of total destruction, nuclear options seem to have lost favour amongst humanity, which is good. Unfortunately a new war is raging on a much smaller but equally devastating scale. Now all that is needed is 'A Bug and a Mug'.

If you want to send your comment, you can send it to archie@NZIHSM.org.nz.
The ideas expressed in this column are not necessarily the views of the NZIHSM or Flashpoint and in some cases the NZIHSM frankly does not approve!

The main explosion, then the pressure wave dome forms over the site before descending on Beirut.

It's all about evolution

This article, published several years back in a UK chemical magazine, was recently drawn to the author's attention by a colleague, and is reproduced here in a paraphrased form for the lessons it delivers."

– Dave Lascelles

What distinguishes chemistry firms with hundred-year histories from those that have failed?

Many chemistry-based companies can trace their heritage back over a century, outlasting contemporaries that have withered and died. Reportedly, 49 of the world's 100 largest companies in 1912 had disappeared by 1995; through bankruptcy, takeover, or by being nationalised. Company closures leave huge gaps in former employees' personal and professional lives, and in the local economy. Reflecting on the differences between long-lived companies and their extinct rivals holds valuable lessons for other companies looking to ensure they continue to flourish. All companies exist to deliver quality-of-life benefits from their products. Long-lived companies importantly build links with local communities; and meet peoples' reliance on their work for a sense of community.

Long-lived companies build significant technical, organisational, and marketing capabilities, thus acquiring often unassailable first-mover advantages. However, dynamic markets mean these capabilities have to change and evolve for companies to survive. The following case histories show how different attributes have contributed to the company's survival or demise.

In 1817 Percival Johnson in London founded a business determining the gold content of ore and metal samples. Science was relatively primitive at the time - it predated Charles Darwin's evolution-discovering mission on *HMS Beagle*.

The company became Johnson Matthey when George Matthey became a partner in 1851. In its early years the company supplied alloys for the benchmark metre, kilogram and imperial measurement standards. It later supplied the aluminium for the sculpture popularly known as Eros (pictured) in London's Piccadilly Circus, erected in 1892. Today, Johnson Matthey supplies around a third of all the catalysts fitted in new cars to reduce harmful pollution worldwide; using science to make the world a cleaner, healthier place.

Long-lived companies are often the product of many mergers and acquisitions. Global pharmaceutical giant GlaxoSmithKline (GSK) is a classic example. It had its beginnings as Silvanus Bevan's apothecary shop in Plough Court, London, in 1715. This became Allen and Hanbury's in 1856, which was acquired by Glaxo in 1958, which in turn joined Burroughs Wellcome and others, to become Glaxo Wellcome in 1995.

GSK has absorbed many varied companies throughout its history; which extends from Allen and Hanbury's ballroom floor polish to malted milk drink Horlicks, which reportedly outsells Pepsi in India. Horlicks was acquired by Beecham's in 1969, which in turn became SmithKline Beecham in 1989, merging with Glaxo Wellcome to form GSK in 2000. But through all this Glaxo has maintained a strong sense of direction and identity.

On the other side of the coin there have been some famous companies failing through losing direction and diverging from their identity. Imperial Chemical Industries (ICI) coalesced in 1926 from four companies founded in the late 19th and early 20th centuries, including Nobel Industries, established by Swedish dynamite inventor and science prize originator Alfred Nobel.

In the 1930s, ICI devised the world-changing plastics

polythene and perspex, but its future would be defined by the pharmaceuticals business set up in the 1940s and 1950s. ICI became one of the largest companies listed on the UK stock exchange. It was spoken about in reverent tones as "The ICI."

However, entering the 1990s threatened by an aggressive takeover, and needing money to grow the pharmaceuticals division, its most profitable asset, ICI started selling off parts of itself. In 1993, it spun its pharmaceutical division off as Zeneca, which in 1999 merged with Swedish firm Astra to form AstraZeneca.

Without Zeneca, ICI sold mainly commodity chemicals, whose sales and profits varied in cycles. For this reason ICI acquired Unilever's steadier speciality chemicals businesses in 1997, funding the deal by selling most of its bulk chemical plants. However, ICI had to accept lower prices than planned, landing the company with a large debt in the process. To repay this debt, ICI progressively sold off units, until eventually Dutch rival AkzoNobel bought the entire remaining business in 2008.

Disastrous aquisition

Commentators described the disastrous Unilever acquisition as contradictory to ICI's scientific identity. Nobody seemed to question whether the sale of ICI's bulk chemical plants would meet the debt, and the probability of this happening. *[The author can relate to this story as an employee of ICI (NZ) Ltd at that time].*

Another characteristic of long-lived businesses is a capacity for innovation and research. In New Zealand in the early 20th century, faced with excess milk from its farms one year, Joseph Nathan and Co decided to try drying it, as a preservation technique. The resulting product sold well in New Zealand and in the UK for babies and those with trouble eating. The product established Glaxo in New Zealand.

In the four years of the First World War Glaxo's turnover increased tenfold. Glaxo further balanced that exploitation with ongoing research, so developing their first pharmaceutical product, a vitamin D supplement. The New Zealand company subsequently became part of Glaxo UK, one of the biggest global pharmaceutical companies.

Another family-driven success story is that of Merck in Germany. About 350 years ago Jacob Merck established a pharmacy in his town. Some of his early medicines reportedly used powder extracted from mummified corpses, said to be imbued with 'the eternal life force'.

However, the company became much more scientific in the 19th century, and the company discovered how to isolate morphine from opium – a discovery Merck built on, pioneering morphine's commercial manufacture. Merck was initially established as a family partnership with three sets of complementary skills: a businessman, a pharmacist, and a chemist. The balance of family values, exemplary governance and business performance drove long-term business success.

A laboratory technician working at ICI(NZ) in the 1960s.

The capacity to change and evolve in a dynamic market is also a key characteristic for corporate longevity. And failure to adapt successfully led to the most notable recent example of chemical business collapse: Kodak's bankruptcy in 2012, after 124 years.

George Eastman's role as founder of Kodak, based on his patents - including for photographic films made using silver emulsions, was critical in creating its identity. Eastman promoted the company as a family, which created an unprecedented sense of loyalty among his employees, who were actively encouraged to submit ideas for technological improvements and innovations.

The company was considered one of the world's five most valuable brands until the 1990s. Kodak considered itself to be a film business, not an equipment maker; selling cameras at a low cost, with the company's profit and growth focused on film. However with the advent of digitalisation, Kodak got trapped by seeking to integrate digital and film.

Kodak was rattled when Sony launched its first digital camera in 1981. Kodak attempted to diversify in 1988 by buying Sterling Drug, best known for making Lysol cleaning products.

As with ICI's ill-fated acquisitions, that deal saddled Kodak with massive debt. Kodak sought salvation through selling off assets, including spinning off its chemical arm as Eastman Chemical in 1994, which exists to this day. But, unable to move beyond film, Kodak itself eventually faded away after another 18 years.

The lesson here is, as the CEO of Johnson Matthey recently commented: "It's about continuing to evolve, and engage with our employees, and our customers. We've only got to 2020 by evolving."

Covid health requirements

The Worksafe website has listed Alert Level 2: Public Health Requirements –

This information is based on the Covid-19 Public Health Response (Alert Level 2) Order 2020 and a summary is on the Worksafe website and as follows:

A person in control of a workplace must:

- ensure a copy of the Government-issued QR code is displayed in a prominent place at or near the main entrance, and
- have other record-keeping processes in place to support contact tracing.

All businesses and services (apart from those where specific requirements apply, which are referred to below) must:

- maintain 1-metre physical distancing, to the greatest extent practicable, for all workers
- maintain 2-metre physical distancing, to the greatest extent practicable, for any other persons entering a workplace or using its services, and
- mitigate the risks that arise if this distancing isn't fully maintained.

Businesses and services with controlled access, including office premises and factories must:

- maintain 1-metre physical distancing, to the greatest extent practicable, for all workers, and persons entering a workplace or using its services
- mitigate the risks that arise if this distancing isn't fully maintained, and
- if they are an event facility, permit no more than 100 customers or clients to be in any one defined space in the workplace at any one time (not including workers).

Businesses and services that provide food or drink to be consumed in the workplace, like a café, restaurant or soup kitchen must:

- permit no more than 100 customers or clients to be in any one defined space in the workplace at any one time
- ensure each customer or client is seated at a table and maintain one metre separation between adjacent tables where customers or clients
- ensure only one worker serves at any table, to the greatest extent practicable, and
- mitigate the risks that arise if this distancing isn't fully maintained. Your obligations under the Health and Safety at Work Act 2015 (HSWA) to ensure the health and safety of workers and other people in the workplace, so far as is reasonably practicable, will continue to apply.

Take steps to mitigate risks, including thinking about measures such as disinfecting surfaces, providing hygiene facilities, and implementing practices to ensure workers don't come to work sick.

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