

COVID-19: *Helping to answer your questions Q&A*

During and in advance of the Club Vita webinar, *COVID-19: Helping to answer your questions*, 18 March 2020, participants were invited to ask questions of our panel and of Club Vita's longevity experts. We did not have time to cover all these questions during this webinar. This document collects together the questions asked. Where we are able, we have provided high level answers. We have also updated our Lexicon of Longevity to include a lot COVID-19 related vocabulary. See www.clubvita.net/glossary if you need a definition (and if it's not there let us know and we'll add it).

This document is not intended as any form of advice (medical, financial or otherwise) and is based on our understanding of events as at 24 March 2020. We note this is a particularly fast-moving subject, so answers here may be superseded in the relatively short term.

We have sought external expert advice from our panellist, Nicola Oliver on any medically related questions, and have highlighted below which responses are based on her expertise.

As a reminder, our panellists on 18 March 2020 were:

[Dan Ryan](#) – Founder and Chief Science Officer, COIOS Research

[Jay Olshansky, Ph.D.](#) – Professor of Public Health, University of Illinois at Chicago, and Co-Founder and Chief Scientist at Lapetus Solutions, Inc.

[Nicola Oliver](#) – Director, Head of Longevity, Mortality and Morbidity, Medical Intelligence, London

1. Origins of the virus

[Nicola Oliver, Medical Intelligence](#)

1. Where has the virus come from and why is it so devastating?

On 29 December 2019, Chinese authorities identified a cluster of similar pneumonia cases of unknown aetiology in Wuhan City, Hubei Province, China. A novel strain of coronavirus (2019-nCoV) was subsequently isolated from a patient on the 7th of January 2020. Most cases from the initial cluster had epidemiological links with a live animal market (Huanan South China Seafood Market), suggesting a possible zoonotic origin. (Read et al, Novel coronavirus 2019-nCoV: early estimation of epidemiological parameters and epidemic predictions 2020)

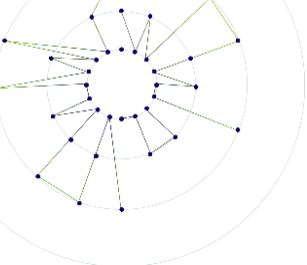
It appears at this stage to be highly transmissible, more so than seasonal flu for instance. It is also a novel virus (a virus not seen before), with many unknowns. The key issue is the speed at which it has taken hold, the huge numbers infected leading to a surge in healthcare requirements all at once.

2. Medical questions

[Nicola Oliver, Medical Intelligence](#)

2. I have read Avigan is effective? Do you think this could be a solution?

Favipiravir known as 'Avigan' is an antiviral drug bring developed in Japan. An antiviral drug does not act in the same way as an antibiotic. It does not destroy the virus, it merely slows its ability to reproduce and thus shortens the duration of the illness. The trial in Japan, which was open-label and non-randomised, showed some evidence of improvement over a similar anti-viral, but this is very early stages.



3. Germans with respiratory problems are apparently being advised to get vaccinated against pneumonia, not because it works directly against Covid-19, but because it can help prevent worse symptoms. Is this recommended in the UK?

In the UK, the pneumococcal vaccine is administered in infancy, (ages 12 weeks and 1 year), and to those over the age of 65 years. People with a long-term health condition are also offered the vaccine which is effective against the bacterium *Streptococcus pneumoniae* (which is responsible for some pneumonias), septicaemia and meningitis. The childhood vaccine protects against 13 strains of the pneumococcal bacterium, while the adult vaccine protects against 23 strains. In relation to the current COVID-19 crisis, it may prevent the onset of a bacterial pneumonia which is often secondary to a viral pneumonia such as that seen in COVID-19.

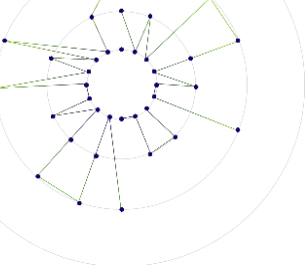
4. I am especially concerned about excess mortality among the younger ages, due to hyperinflammation (“cytokine storm”). Is this perhaps a reason to adjust the age distribution imposed by the CFR by age based on Chinese data?

The phenomenon described as ‘cytokine storm’ refers to an overly vigorous immune reaction. Cytokines are proteins used by the immune system and in an unregulated immune response, there can be a surge of activated immune cells into the lungs. (Cytokine storm). The resulting lung inflammation and fluid build-up can lead to respiratory distress and can be contaminated by a secondary bacterial pneumonia — often increasing the mortality in patients. In some of the most severe COVID-19 cases, the cytokine response — combined with a diminished capacity to adequately oxygenate the body — can result in multi-organ failure. There doesn’t seem to be evidence at this time that there is an age-specific risk of this happening.

5. There is conflicting information on what the high-risk groups are - are these primarily elderly, those with heart disease and lung disease? Or are asthmatics, diabetics etc. too? This is surely material as to who should be fully isolated or not to manage the "right" level of spread?

6. Can the panel give any insight to which ‘underlying conditions’ are associated with increased risk of death from the virus?

Older patients and those with pre-existing conditions appear to be at increased risk of death. In the first large study of the effect of underlying illness, researchers in China analysed 1,590 patients from throughout the country with laboratory-confirmed disease. After taking into account the patients’ ages and smoking status, the researchers found that the 399 patients with at least one additional disease (including cardiovascular diseases, diabetes, hepatitis B, chronic obstructive pulmonary disease, chronic kidney diseases, and cancer) had a 79% greater chance of requiring intensive care or a respirator or both, or of dying. The death rate for confirmed cases for those with cardiovascular disease, diabetes, chronic respiratory disease, hypertension and cancer were 13.2%, 9.2%, 8.0%, 8.4% and 7.6% respectively compared to an overall recorded Case Fatality Rate of 2.3%. (*China CDC (2020) The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) - China CCDC, 17 February 2020*)



3. Age effect

Nicola Oliver, Medical Intelligence

7. The few age-banded sources show massively higher death rates at older ages (important for many of our day-jobs) but also far fewer recorded cases at those ages. What do we think is the reason for fewer recorded cases? Is there better immunity? Or are we to expect worse news for older people once exposure to the virus is more widespread?
8. I would be interested to hear comments on the age distribution of Corona deaths, both arising from differential contact behaviour (older people see fewer other people) and arising from different CFRs (other people die faster).
9. How is the chance of getting infected distributed over age and gender?
10. How is the chance of becoming ill once infected distributed over age and gender? Current estimate is 50%, without differentiating to age and gender. What's your opinion on this?

It is unlikely that older people have improved immunity to the SARS CoV2 virus as it is a novel virus to which the population has not previously been exposed. The chance of becoming infected is equal, but social contact activity clearly plays a part. Older people are unfortunately more likely to die due to the natural waning of immunity with age, and increased likelihood of co-morbidities.

References to some external data sources that look at the age and gender splits are included later in this document.

4. Learnings from China

Nicola Oliver, Medical Intelligence

11. Do you think Wuhan has achieved herd immunity? (Important as this seems to be an objective of some strategies)
12. Jay said we may see it fizzle out by mid-April (if we observe the cases doubling every 3 days), however China is much further ahead in the progression of the disease - what can we see from their situation to help?
13. Given that China is further along than the US and UK, what can we learn from their curve and herd immunity?

I do not believe that Wuhan has achieved herd immunity, the lack of new cases is as a result of the public health measures to reduce transmission. The experience in China tells us that widespread testing, contact tracing and early lockdown are essential. (As advised by the WHO).

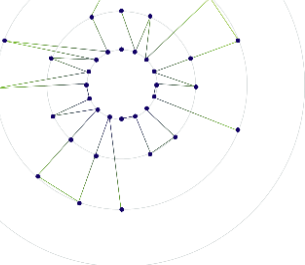
5. Testing

Nicola Oliver, Medical Intelligence and Erik Pickett, Club Vita

14. If we tested for the antibody, would it mean that the person had recovered and hence wouldn't need further treatment?

Presence of serum antibodies indicates past infection and an immune system response such that the body is prepared to recognize the virus a second time. However, whether the virus can 'mutate' (antigenic drift) is not fully understood, so it is not clear that a patient with certain antibodies would be able to fight off future versions of the disease.

An antibody test would allow for us to identify whether a person ever had the disease, rather than just if they have it right now. Using this kind of test could be very helpful in assessing how much of the population has come into contact with the disease, allowing better models of the disease spread and the underlying mortality rates associated to the disease.



6. Overwhelming health facilities

Nicola Oliver, Medical Intelligence

15. To Jay O's point on the low case fatality rate... is the crux of this issue not more around the number of individuals which are sick enough to need healthcare. If this volume exceeds our capacity to care for people, the knock-on implications are potentially huge. They go beyond COVID19 itself. The situation in Italy seems to show what can happen when a healthcare system is overwhelmed.

The crux is indeed whether the healthcare system is overwhelmed and also how the system will deal with those patients without COVID-19 who also require an ICU, such as trauma cases, those with septicaemia, heart attacks and strokes that are particularly severe. Routine surgery can be cancelled, but this still leaves those emergency admissions.

7. Denominators and the CFR

Erik Pickett and Conor O'Reilly, Club Vita

16. We think that the CFR is overestimated at the beginning of an outbreak, mainly because it is biased towards the heavier cases. What's the extent of this overestimation?

17. It is estimated that the CFR will eventually taper off to 1-2%. Is that realistic?

The Case Fatality Rate (CFR) of a disease is the percentage of known cases of a disease that result in death.

The CFR is calculated as the number of people known to have died from the disease divided by the number of known cases of people having the disease. For an ongoing pandemic, both numerator and denominator are unknown – we do not know how many people are ultimately going to be diagnosed, and we also do not know how many of those currently diagnosed with the disease will ultimately die.

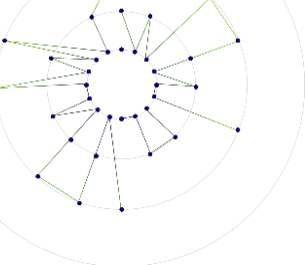
The CFR can also be used to estimate the Infection Fatality Rate (IFR), which is the percentage of people infected with the disease (whether diagnosed or not) who die from the disease. How close the CFR gets to the IFR depends on how well cases of the disease are identified and recorded. If every person who contracts the disease and every death attributable to the disease are known and recorded, then the CFR will equal the IFR.

The biggest challenge in accurately estimating the IFR is calculating the denominator, particularly allowing for those with mild symptoms or who are asymptomatic. Assumptions are therefore required around the proportion of such individuals, particularly in the early stages of spread. There is some (currently small sample) data from testing in [Iceland](#) and on the [Diamond Princess cruise ship](#) that suggests that the % of asymptomatic cases of the disease could be as high as 50%. A [spatiotemporal model](#) created by Columbia University researchers estimates 86% of all infections in China were undocumented. As with most models, we expect this model's estimates are highly dependent on its underlying assumptions, which we have not reviewed.

There was a range of views on our panel. 1-2% for the IFR does not appear unrealistic. Some think it could be even lower (potentially significantly). However, without more data, particularly on the denominator it is very hard to estimate.

18. Do you have a view on the % asymptomatic cases across different age groups?

Again, without more data it is hard to comment on this. If symptoms of the disease are felt more severely by older people, it is possible that there is less underestimation of the denominator for older age groups. However, it is also possible for there to be just as many from older age groups who are asymptomatic as for younger age groups.



19. What is your view on how to set the denominator in the mortality rate for COVID-19? Should we be comparing the current number of deaths to the estimated number of infected with a time lag (maybe 2-3 weeks), given the exponential spread of the disease?

This is an interesting question and highlights how difficult it is to estimate the IFR even if we had more complete data at this point. It might be appropriate to compare the number of deaths in a given time window to the number of infections in a previous time window. The lag between these windows could be the average period from infection to death for example. However, that in itself might be expected to vary, perhaps significantly, over time, and it would also be difficult in many cases to identify the point of infection, particularly for a widespread infection.

A good starting point for us now would be to conduct a series of random samples of a population using an antibody test to get some estimates for the percentage of the population that has had the disease (and possibly recovered) at different points in time. We should also record the timings of all the deaths due to the disease. As more of this data becomes available, and as we learn more about the pathology of the disease, we will then be able to make better estimates of the IFR.

8. Data requests

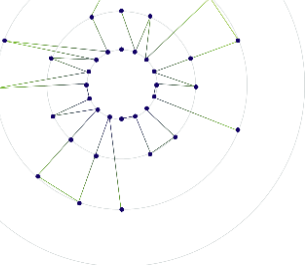
Erik Pickett and Conor O'Reilly, Club Vita

20. As the number of corona virus cases is developing quite quickly it is difficult to make any estimates of the severity and in particular the mortality of the virus. I was wondering whether there was any seriatim dataset of confirmed COVID-19 cases available. Having age and sex, (potentially country/region,) date of diagnosis and the date of death or recovery would enable scientist to assess the mortality much better.

21. Is there any reliable data indicating the mortality rate as a function of age? For pensions, the steepness of that curve will be highly influential on liabilities.

This is a fast-developing area and we expect these references to be quickly added to or replaced. Data we are aware of at this point in time:

- WHO situation reports (regularly updated) <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>
- CDC data for the US (up to March 16, 2020): https://www.cdc.gov/mmwr/volumes/69/wr/mm6912e2.htm?s_cid=mm6912e2_w
- Istituto Superiore di Sanita data for Italy (up to March 20, 2020) https://www.epicentro.iss.it/coronavirus/bollettino/Report-COVID-2019_20_marzo_eng.pdf
- Chinese Center for Disease Control and Prevention data for China (up to February 11, 2020) <http://weekly.chinacdc.cn/en/article/id/e53946e2-c6c4-41e9-9a9b-fea8db1a8f51>



9. Mitigation and suppression

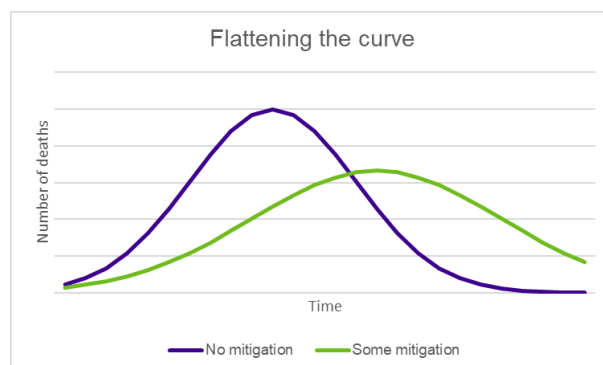
Erik Pickett and Conor O'Reilly, Club Vita

22. Any comments on the paper published by Imperial College about the impact of COVID-19 in the US/UK would be appreciated.

This paper can be found here <https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/gida-fellowships/Imperial-College-COVID19-NPI-modelling-16-03-2020.pdf>

It focuses on two strategies for dealing with this pandemic:

Mitigation: the slowing of the rate at which the disease is spread, with the aim of reducing the peak demand on healthcare systems and the protection of those most at risk from the disease. Mitigation aims to reduce the reproduction number (R_0) to reduce the speed at which the disease spreads. This should result in the number of people infected by the disease being spread out over a longer time period, sometimes referred to as “flattening the curve” as a high peak of cases over a short time is flattened to a lower peak over a longer period.



Suppression: Arresting the spread of an infectious disease with the reduction of case numbers to a manageable level and an indefinite maintenance of these levels. Suppression relies on the reduction of the reproduction number (R_0) to below 1 for a sustained period until the disease dies out or reaches manageable levels.

As there is currently no vaccine available for COVID-19 the paper focuses on *Non-Pharmaceutical Interventions (NPIs)* such as quarantine, isolation and social distancing.

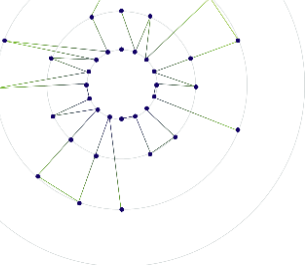
Clearly, like any projection model, its ‘accuracy’ is only as good as how well the underlying assumptions reflect reality. Given so much is unknown about COVID-19 at the moment, it may be that some of the underlying assumptions around, for example, spread rates for asymptomatic individuals are found to be either under or over-stated. Similarly, only time will tell how effective any NPIs are at influencing the impact of the pandemic.

23. What are your views on mitigation vs suppression as a relatively effective means of containing this contagion?

Neither is perfect and the efficacy of either will depend on the level of response of the population.

Under suppression, it seems that extreme social distancing, quarantine and isolation will be required for an extended period of time, probably until a vaccine is developed, which could be 12-18 months away. We don't know how people will respond to this or what the effect on the economy will be. A particular challenge would be that if this approach was successful, cases of infection would be low, therefore people may underestimate the potential seriousness, so be more tempted to ignore the required behavioural adaptations.

Under mitigation, the aim is to flatten the curve to relieve pressure on the health services and to protect the most vulnerable as we move towards herd immunity. The level of strain on health services will depend on how much we are able to ‘flatten the curve’. With a flatter the curve, health systems will be able to cope better, and mitigation policies will need to be in place for longer.



24. Why are some countries able to seemingly contain this or have low rates of serious cases but other countries seem to be looking at herd immunity and slowing the peak (but potentially numbers being significantly higher than they are right now)?

Different governments have taken different approaches to dealing with the pandemic. There are pros and cons for these different approaches. We are in unprecedented times and ultimately nobody knows how best to deal with this outbreak. Numbers from different countries could also be affected by different age profiles of their populations (for example Italy has a relatively old population), the capabilities of the local health services, and different levels of testing for the disease (apparently low occurrences of the disease in some countries could be due to a low level of testing).

25. The Dutch approach is aimed at achieving group immunity. Current estimates are that 50-60% of the population will be infected under this approach. What's your opinion in this? Will this approach work, and is 50-60% realistic?

We don't feel qualified to comment on the exact number required to achieve herd immunity. It will depend on a number of factors, such as the level of social contact between members of a population. This will need to be considered when deciding when it is safe to lift social-distancing policies.

26. How will the social distancing actually work? Won't it end up in marshal law and increases in social unrest if people refuse to stay in?

We don't feel qualified to answer this, but it will be a challenge. The hope is that people take on board the messaging of the seriousness of the risk. Although in an era of 'fake news' you don't have to look far to find various hypotheses and conspiracy theories. And as mentioned, where a large proportion of those infected are thought to be asymptomatic, or have only mild symptoms, there will be particular challenges in successful communication.

10. Endgame

Nicola Oliver, Medical Intelligence

27. How long is this expected to last and how quickly are we likely to have a cure?

28. How do we completely eradicate a virus that originally spread from one host - if we miss one case, can another outbreak not start from that one missed case and so on? What is the end game - must we wait for a vaccine/cure for it to be fully eradicated (c12 months away)?

29. Can the panel comment on the potential second spike even if we flatten the peak now?

A combination of a stable antibody presence in the face of a non-mutating virus and vaccine development are our best options. A vaccine will not be available for at least 12 months, and then there will be the challenge of mass production. There is potential for a second spike, due either to cases increasing when social-distancing practices are relaxed or due to a mutation in the disease. Given how little is known about this novel virus, things are far from certain.

11. Effects on mortality assumptions

Erik Pickett and Conor O'Reilly, Club Vita

30. Is portfolio mortality affected in the same way as general population mortality in an absolute or relative way? In other words: can we apply the experience rate mortality factors used in the base scenario to the excess general population mortality?

We generally expect pension plan and insured populations to be more affluent, and therefore have lower mortality rates, than the general population. It is not yet clear whether this will be a mitigating factor for excess mortality caused by this disease.

It's also not clear what proportion of people who die from COVID-19 would have been likely to die from other factors in a similar time-frame (many of the victims at this stage have had pre-existing medical conditions).

The experience in different countries is also likely to depend on the mitigation and suppression policies in place (and how effective they are) and the effect on health care infrastructure – in particular, the equality of access to health care throughout the population (geographically or socio-economically).

31. How might COVID-19 affect future longevity assumptions and when will we know?

It is still unclear the extent to which COVID-19 will affect emerging mortality data. Numbers of deaths to date (22 March) are fairly low when compared to other causes and the ultimate level of excess mortality due to COVID-19 (and knock on effects of increased demand on health care systems) will depend on the efficacy of different nations' responses to the pandemic (be they mitigation or suppression).

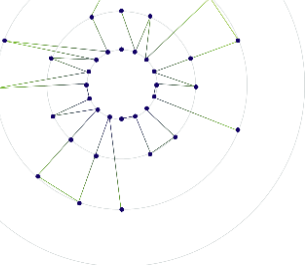
It is also not yet clear what the future longevity of survivors of the disease will look like. It is possible that the virus will affect those who are the frailest and with pre-existing health conditions, leaving behind a cohort of 'super-fit' survivors (in a similar way a year of heavy flu deaths is generally followed by a 'bounce back' with reduced deaths in the following year). However, it is also possible that the experience of contracting the disease but surviving will leave people impaired, triggering some kind of 'frailty decline' in the surviving population. We will need to monitor this situation as it unfolds.

A spike in deaths in the 2020 data will affect the calibration of mortality rates in two ways:

- **Current mortality / base tables.** A year of extreme mortality will increase estimates for current mortality and reduce life expectancy. Under normal circumstances, data from 2020 would flow into Club Vita base tables starting in our 2022 calibrations of VitaCurves. Large plans with credible data could make experience adjustments to existing standard tables as soon as the data is available.
- **Improvements / trends.** A year of extreme mortality will also feed into assumptions for future improvements in longevity rates. Based on current practices, 2020 data would flow into the CMI mortality projection model in the 2021 version and into the SOA's MP scale in their 2022 version. The result would be to reduce the estimate of improvements in the short term. The level of this reduction would depend on how much credibility was placed on the most recent year's data compared to historical years' data (i.e., how much 'smoothing' was applied to past data over different years).

The distortion in this year's data and the degree to which we think this likely to be replicated in future years may also necessitate adjustments to the way we calibrate our models of future longevity (both for base tables and assumed future improvement rates).

However, before more is known about how the disease progresses and the long-term prognosis for handling it in the future, it is difficult to comment on the most appropriate way to allow for this year's experience.



Regardless of where these modelling decisions end up, the more data we have the better, including socio-economic data to determine how the experience has differed between distinct sub-groups of the population.

32. Can we expect this will have a different effect for blue- and white-collar pension plan participants?

It is difficult to say for sure how the pandemic is affecting socio-economic groups differently. The different effects on sections of society will depend on things like population density, the propensity for pre-existing medical conditions (see the earlier question on groups with increased risk), the level of adherence to social-distancing policies and access to health care. As we set out above, it will be very important to monitor emerging data on the socio-economic characteristics of excess deaths due to the pandemic.

33. Suppose coronavirus causes a sharp increase in old age deaths in next 12 months (say, for example, they run at twice the “normal” mortality rates for all lives aged 70 or over) – approximately what impact would this have on the value of liabilities for a typical UK DB scheme?

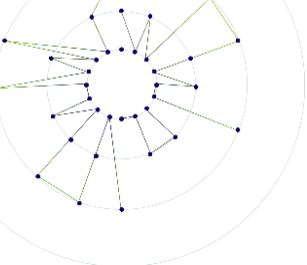
While, as discussed above, any impact on assumptions will depend on a number of factors, in the short-term schemes may see heavier deaths experience. This could potentially impact on scheme cashflows (with pension payments ceasing, offset to an extent by any death lump sums and/or spouse’s benefits) and so result in lower liabilities.

The impact would vary depending on the age profile of each scheme, and other factors such as the socio-economic mix. A typical mortality rate for a 70 year old is around 1.5%, and that mortality rate increases fairly rapidly with age. So, if an ‘extra’ 1.5% of 70 year olds were to die then there would be a liability reduction in respect of those lives. The overall impact would depend on which members died too – in most plans the most affluent lives represent a disproportionate amount of the plan’s liabilities. Given that the average socio-economic level tends to increase with age (as more affluent lives tend to live longer), it may be that such individuals are potentially more at risk, which would have a bigger impact on liabilities. As above, given the limited data we have at present, it is hard to be definitive on potential impacts.

It should also be noted that the economic impact on UK DB schemes may well be greater than the mortality impact.

34. Are there any initial thoughts on how COVID-19 will impact long term mortality improvement rates?

It is likely that a range of views on this question will emerge in the coming months. Best estimates for long term rates are difficult to set at the best of times, and expert judgement on how different drivers of health outcomes will develop is required. How COVID-19 will affect current best estimates depends on whether we view this pandemic to be a one-off or the start of a new normal. Do we expect mutations of this disease to occur each year similarly to influenza? How effective will any eventual vaccinations be? Will behavioural changes brought in to combat COVID-19 continue and result in second order effects on mortality rates (for example, increased hand washing and social distancing reducing the number of annual influenza cases or positive effects from the (temporary?) reduction in air pollution due to less travelling).



Reliances & Limitations

In this document Club Vita LLP has provided high level answers to questions asked during the Club Vita webinar held on 18 March 2020: COVID-19 – Helping to answer your questions. This document is based upon Club Vita LLP’s understanding of information and events as of 24 March 2020 and therefore may be subject to change. The Paper should not be construed as advice and therefore not be considered a substitute for specific advice in relation to individual circumstances and should not be relied upon. Where the subject of this document refers to legal matters please note that Club Vita LLP is not qualified to give legal advice, therefore we recommend that you seek legal advice if you are wishing to address any legal matters discussed in this Paper. Please be advised that Club Vita LLP (nor its respective licensors) does not accept any duty, liability or responsibility regarding the use of the Paper, except where we have agreed to do so in writing.