

Early, Rapid, and Concerted National Containment Strategies Strongly Linked to Limitation of Mortality in Coronavirus Outbreaks (with suggestions of a national recovery plan).

Authors: **SOAR, J.S., and BAKARE, T.A.**

Communication

Summary:

The worldwide spread of Sars-Cov-2 and associated COVID-19 symptoms from approximately Dec 2019 has already produced extraordinarily varying management responses from different countries. The nations that have largely succeeded in limiting fatalities from COVID-19, keeping their mortality figures down to a few hundred (for example Taiwan, South Korea, Singapore, Hong Kong, New Zealand, Australia, Denmark, Finland, Iceland, Greece, Japan, Cuba §), with some countries even keeping their economies running without lock-down (Taiwan, South Korea, Japan), have all collectively shown that a strict scientific strategy of virus containment can work extremely effectively. Even some very low income per capita territories such as Kerela State, India, (pop. 35M, Covid-19 deaths 4), and Cuba (pop. 12M, Covid-19 deaths 87), have managed as of 16/05/20, to keep their mortality rates extremely low. Successful infection containment is not therefore a technically exclusive practise for well resourced nations. Countries such as United States and United Kingdom, originally predicted to be the two best countries to manage the spread of a biological hazard such as coronavirus by the Johns Hopkins Global Health Security Index published March 2019 [1], have surprisingly produced the highest mortality results of any nation so far, and now showing an astonishing 100 times greater morbidity than the nations considerably lower in the same tables. The reasons for this may well now be emerging. We found the following list of strategies* for infection containment were invariably actioned by the successful countries:

- *implement the earliest possible actions of absolute containment of the virus [2], rather than using community spread to possibly elicit (herd) immunity,
- *rapid and extensive test/track/trace/isolate (TTTI) of infected individuals
- *immediate closing of international air and land borders,
- *early lock-down/restrictive measures
- *high levels of appropriate personal protective equipment for front line health and social care staff,
- *ready availability of public masks, particularly for use on public transport and social spaces,
- *high level fines for those not using masks, not respecting lock-downs, or breaking social distancing rules.
- *restriction of travel between regions so low infectivity regions are not further infected by people traffic from higher infectivity regions, thus keeping R_0 [3] down in different areas,
- *very well organised national information campaigns advising and communicating the level of both threat and progress, distinctly addressing children, commuters, essential workers, and the elderly as special groups.
- **use of thermal cameras in high throughput public places to check peoples' body temperatures,
- ** mobile phone applications to alert and limit contact of infected people, with anonymised access to the data by the public for tracing purposes,

(** countries using basic strategies plus additional technology - by Taiwan, South Korea, Singapore, and Hong Kong). More importantly, the above list (denoted the CBS list for 'Containment Based Strategies'), were in place on average within or very close to 14 days for the successful countries. With the list in place and within this important time frame, extraordinarily, the following measures were sometimes not necessary (e.g. Japan, Taiwan, South Korea, Hong Kong) :

- extensive lock-downs
- closing of all business and commercial activities

The benefits of the above concerted containment based strategies (CBS) of well prepared nations produced not only very limited mortality figures (all within the low hundreds only), but also the economies of these countries did not suffer the extremely injurious damage of the nations that did not act quickly. In contrast, the much slower responding nations took an average time of approximately 6-7 weeks to a lock-down, with patchy or no international border controls, and an incomplete CBS list. We propose that delay or omission of very specific control measures on this critical CBS list, allowed extensive spread of the virus often by persons who did not show symptoms. The end result for this delayed response by the high mortality nations necessitated catch-up strategy ranging from *contain* to *delay*, then *research* to *mitigate* [4]. Primary failure to contain and the mixing of strategies can and probably did therefore produce runaway mortality figures for particular countries. These mortality figures are now in the many tens of thousands and still rising for USA and UK, as well as Spain, France, and Italy (30/05/20).

In the UK, as COVID-19 mortality figures reached nearly 28,000 (as of 05/05/20), Professor Sir David King of Cambridge University (UK) was prompted to form the 'Alternative Safety and Advisory Group for Emergencies' (-AltSAGE), distinct from the official UK government body SAGE. The new 12 strong highly experienced expert scientific body deliberated and produced a summary (with due speed) of emergency interventions required to perform two important tasks [5]. Firstly, to propose actions to halt and maximally limit further COVID-19 deaths, and secondly, to expeditiously get the economy back to some form of normality by safely releasing social restrictions.

Their published conclusions are commendable. Firstly they ask for the lock-down to remain until other safety measures of fuller defences are in place. They concur with WHO statements emphasising that the main tool of '*virus containment*' is required, supported by very widespread test/track/trace/isolate (TTTI) with a 14 day quarantine period (not 7) be enforced.

Secondly they cite the usefulness of additional strategies used by the very low mortality countries, predominantly summarised in our CBS list, including phone mapping with readable displays of local cases. Thirdly AltSAGE asked for strengthening of links that led to the impoverishment of UK health resilience, such as compromised multi-agency responses, poor care of vulnerable and institutionalised people, and poor lower income safety nets, all factors that permitted the virus to spread so rapidly.

We suggest that the UK government, and indeed other countries that find themselves in difficult positions managing COVID-19 and are similarly obliged to reach for measures beyond the containment phase, should adopt the AltSAGE recovery recommendations alongside the summary of strategies on the CBS list that were a feature of the countries successfully controlling COVID-19. This now emphasises lock-down and assiduously re-visiting the TTTI recommendations of WHO until infection control is re-gained.

Continuing failure to do this in the UK by effectively 'experimenting' and allowing background spread of infection and the default spread of herd immunity, will most probably produce second and third peaks with potentially many thousands of further deaths over the next 12 plus months.

This is to be avoided at all cost. By observing WHO, AltSAGE, and the CBS list presented here, widespread unnecessary mortality could well be prevented, the economy spared deeper damage, as well as valuable time and breathing space gained to pursue promising research options.

This may, for example, allow technologies of new vaccines [6], re-purposed drugs [7], immune training using BCG [8], or development of serum transfer of COVID-19 convalescents [9] to be investigated. More widespread use of Vitamin D could potentially be offered already [10]. It is also important to add a strong ethical and humane dimension to manage and treat individuals affected by the pandemic. Herd immunity does not readily fit this humane dimension.

International scientific co-operation at formal levels should also be brought forward to focus on all possible solutions (including 'outside-of-box' possibilities). Mortality limiting humane goals for all nations can therefore be pursued and the pandemic defeated much sooner.

Factors that have possibly lead to the massive differences in levels of COVID-19 infectivity and mortality between different nations are discussed as a rational model.

Introduction.

Coronavirus disease 2019 (COVID-19) is a viral infection caused by [severe acute respiratory syndrome coronavirus 2](#) (SARS-CoV-2) [11]. It was first identified in December 2019 in Wuhan, China, and has since spread globally, resulting in an ongoing pandemic [12]. As of 30 May 2020, more than 6 million cases have been reported across 188 countries and territories, resulting in [more than 370,000 deaths](#). The distribution of infection rates have been extremely surprising and highly contrasting. It would seem that there is a two tier infection and mortality rate, the gap between the two tiers is also very wide, with the profoundly infected nations showing more than 100 times the infectivity rates of the lesser infected nations (at 18/05/20). We explore this large divergence and the possible contributing mechanisms.[13]

By Jan 2020, predictions for the potential national and world mortality figures due to Sars-Cov-2 and Covid-19 were often dire, particularly if control measures (containment of infections, adequate quarantine periods, social distancing, etc.) were not followed. In the UK, a final mortality figure of around 500,000 by herd immunity was suggested by Flaxman et al. of Imperial College London [14] as one possible scenario. Death rates of similar corresponding orders were proposed for other countries around the world. It was also stated that the only control of the pandemic was the development of a vaccine, however, the chance of an effective vaccine being ready within one year was considered unlikely. These predictions have to be qualified with others expressing considerable doubt about very high infectivity of COVID-19, especially Professor Gupta from Oxford (UK) [15]. Gupta suggests that after about 4-6 weeks of the initial infection, the virus for various reasons dies out itself. This is a commonly observed feature in many other viral pandemics as pointed out by Levitt [16]. This will have something to do with natural levels of immunity and disease resilience which evidently can vary between countries. Gupta recommends ongoing serological studies to explore the precise infectivity and immunity profiles in the UK, and comparative references.

The World Health Organization (WHO) by 18 March 2020, had emphatically underlined that testing (TTTI) was the principal way out of this pandemic. Its guidance on managing the pandemic was repeated many times. At a media briefing to update the public on the COVID-19 outbreak on Monday 18 March, WHO officials stressed the importance for countries to [test/track/trace/isolate new cases](#) to suppress the spread of the virus [17]. This would also buy time to develop new treatments. Despite this advice, what actually happened was very different both in the UK and indeed many other European countries that now found themselves in the unenviable position of

posting the top five worst death rates in the world (figures now in the tens of thousands). Moreover, these rates were paradoxically over a hundred times greater than the 'lower class' rated nations predicted to have generally poorer outcomes by the Johns Hopkins Global Health Security Index 2019 Report [1]. But these lower nations were interestingly showing considerably less infection, their mortality rates were also astonishing low and only reaching the mere several hundreds. Why such a disparity? It was also implicit in the WHO advice that this strategy of comprehensive testing not only limits mortality, but saves front line health care becoming overwhelmed, saves drastic losses to the economy, and buys valuable time to mobilise and develop alternative strategies to cope with the virus spread.

Discussion:

We propose here as our rationalised model, that the advice from WHO supported by the AltSAGE recommendations, and also the devised Containment Based Strategies (CBS) list be employed in full to limit mortality during this type of highly contagious pandemic. The CBS list is a summary of the principal methods used by the now successful, 'lower classified' nations that managed to effectively limit the spread of the virus and so dramatically limit infection and for whom daily life is coming back to normal so quickly. The 12 successful countries mentioned above (§, and the list is growing), have effectively pointed the way to manage pandemics of this and other very similar highly contagious and virulent types. The unsuccessful group (§) in contrast, and by not selecting the advised measures, have experienced terrible avoidable mortality figures, as well as deep and prolonged economic damage to contend with.

So why did countries that were predicated to be the best prepared to manage coronavirus (USA and UK) post the worst mortality figures by 16/05/20? As mentioned, these figures were over 100 times worse than many other countries who were initially given low to moderate scores in the Johns Hopkins Global Security Index coronavirus managing tables 2019 [1]. The primary failure was that they (UK and USA, as well as Spain, France, and Italy §) did not place test/track/trace/isolate (TTTI) at the top of their immediate management priorities, despite the warning advice by WHO. With this critical omission, the early low numbers of viral contagion did not get extinguished. For the successful nations and with the earliest TTTI in place, these early outbreaks are extinguished and the rise of seed level infection is deprived of chances to take off into a national pandemic. From observations, if this measure is not implemented immediately (within 10-14 days) the exponential spread of virus is permitted to run out of control, especially in highly populated areas. Better modelling of this would be very useful. The other factors on the CBS list and the AltSAGE list also need implementing with this 14 day critical time scale.

It is further questionable why these representative nations (§) as of 25/05/20, still have not placed and commenced full tracing firmly alongside testing. This is remiss and could alone account for the runaway mortality rates the worst performing nations have experienced. By not tracing contacts of infected people, individuals carrying the virus but not showing symptoms are likely to have transmitted the infection quite widely.

These countries all seemed to watch the virus develop for the first 3-4 weeks initially only stressing hand washing, and self isolation as the main defence if certain symptoms appeared. The UK even carried on with several major mass spectator sporting events into week 6-7 after their first official COVID-19 case. Also UK borders were not closed and are still not closed to this day. These countries also lost control of the most important *containment* stage, so had to use the less targeted *delay* stage and to do guesswork on how to slow down infection.

Countries considerably lower down the Johns Hopkins Security Index [1] rankings for coronavirus management however, used very different and far more precise approaches. It is possible that because these nations had directly or indirectly already experienced the serious damage a severe viral pandemic could do to their country, they had prepared and were able to rapidly mobilise their defences. These countries invariably closed their international borders, started very early lockdowns, started the full TTTI, introduced strict hygiene methods including use of masks, and most importantly, *within a very rapid 14 days*, had implemented the full spectrum of defences on the CBS list.

Lessons learned from a combination of recent epidemics were also evident by the successful nations (and also beyond). For example, the 2009 swine flu transmitting the H1N1 virus (where 208 countries were affected with 18,500 deaths mostly in the Americas), the SARS-Cov infection in 2002-3 in Asia claiming 774 lives, Ebola in Africa 2014 producing 3956 deaths, the Zika virus in 2016 affecting 84 countries, the MERS-Cov infection of 2015 claiming 850 lives, and the Nipah virus in Kerala, India of 2018 which claimed 17 lives. Severe flu pandemics of Cuba and Taiwan in 2009 were also important recent memory experiences. Countries and territories such as Cuba, Taiwan, and Kerala had learned to take no chances, quickly implementing their defence strategy to COVID-19 [18]. They had also listened and responded carefully to the WHO guidance [13].

There are possibly additional reasons why these top predicated countries performed so badly. One reason is that economic downturn by these countries (particularly following the 2007 US led banking crisis and ensuing recession that came to be equated with the great depression of the 1930's) forced these countries to prioritise basic domestic economic matters, so becoming distracted from any broader picture [19]. This was further compounded in the UK by economic stagnation from the Brexit movement, including the divisional Brexit vote in 2016 and then the protracted legal arguments for several years after [20, 21].

The collective effect of these stagnatory forces in the UK produced steadily declining commercial and industrial activity as major trading companies retracted or pulled out of the UK. This further produced increasingly poorer jobs in the 'gig' economy with ongoing conflicts and shifts in political clarity. Meanwhile, progressively deeper austerity measures from 2007 steadily weakened both the health system and the health of the people alike [22, 23]. Also economy driven falls in health resilience, and susceptibility to infection have also been mentioned by Gupta in helping understanding why there may be stark differences in the rates of infectivity and immunity between populations regarding COVID-19 [15]. More work is required to clarify these interesting suggestions.

Although the emphatic economic downturn and resulting social instability was the larger factor that very possibly dulled and distracted the UK response to COVID-19 (and very probably other leading nations above ¶), not affording face masks became one major economic consequence. It is now suggested by Greenhalgh (University College London) [24] that face masks would make a positive difference in limiting transmission of infection. Other studies suggest that a potential 75% reduction [25] in transmission of the COVID-19 virus may have been possible if the UK had made masks available for the public, as did most of the successful nations §). Most of these successful nations also invested in the manufacture and cost effective supply of high grade N95 [26] masks ensuring the public could easily acquire and use them in their daily affairs.

Another economy driven failure was the lamentably high nursing home deaths. Hospital bed numbers have historically been falling and nearly halved in the UK over the last 30 years [27]. In an attempt to create extra bed space in hospitals, elderly and sick patients were transferred to nursing homes without thought. This managed to infect the homes with COVID-19 and so induced viral transmission resulted in 12-15,000 unnecessary deaths in the UK care home sector alone; similar problems were present in other 'top nations' [28, 29]).

Conclusion:

It would appear there is a *two track* response around the world to Covid-19 infectivity. Nations are showing either very low levels of infections and corresponding low levels of mortality, or extremely high levels of infection and mortality from COVID-19. The wide separation of these two track responses is possibly caused by two very distinct and different ways infectivity from Covid-19 has been dealt with.

We have termed these two ways *level one* (in which the mortality figures are low - often only a few hundred), and *level two* in which case the mortality figures are very high. The level one response is naturally desired and superior. *Level two is really a failed management response.* How and why exactly do these two levels differ? Firstly, a 14 day time factor period to mobilise all defences is suggested to be one critical factor, secondly, the actual quality of the contagion defence approach is another.

In the inferior high mortality *level two* response, there is a delay to implement the points on the CBS list well beyond 14 days (the time line starts from the first official notified case of COVID-19), and/or there are omissions of very specific defences within the CBS list. The 14 day period is derived directly from observations of the successful countries (§). These countries managed to implement most if not all of the infection halting critical defences of CBS within this 14 day period. If any important defence on the CBS list was omitted or was not implemented within this 14 day period, then this would appear to be a sufficient failing to allow uncontrolled spread of SARS-Cov-2, most probably by persons who did not show symptoms. This is a level two, undesirable response.

Should this contagion spread in this manner, infection and mortality figures will start to rise exponentially. This was the reason countries such as UK experienced a runaway infection rate and large mortality figures. In addition, considerable, protracted, and very costly damage to the economy will result that will possibly take years and even decades to rectify. The *level one* response must therefore be implemented at all cost. The successful countries who managed to get both the time factor and the CBS (including AltSage and the WHO guidance) lists actioned quickly and effectively, produced the desirable *level one* response.

Get this right, and only extremely limited spread of the virus will have happened, and the CBS steps taken (includes AltSAGE and WHO list) within 14 days will effectively stop the virus replicating further. This was observed in the successful countries mentioned above.

Get this wrong by going beyond 14 days to implement all the points on the CBS and associated lists, and this failure will most probably send the mortality figures into the many tens of thousands, with loss of control of COVID-19 viral infection. This scenario has happened with the UK, and indeed in all the five worst performing nations we have mentioned above.

The mortality figures for these worst affected countries are then sent out of control (and are still mounting today). The pandemic for these countries may well now potentially reach into years. with many mini spikes of infection to be controlled. This most undesirable of situations should never have been allowed to happen. Curiously, as of 27/05/20, the UK had still not closed borders, implemented test/track/trace/isolate (TTTI) fully, decided on masks, or strategies on isolation [30]. Left to develop, UK mortality could now reach 50-100,000 plus as herd immunity by default is allowed to express. The other worst affected EU countries are very probably heading for similar order mortality patterns. But is there any return from this calamity other than waiting for herd immunity to slow down the infection figures? What are the earliest recovery possibilities now that, for the UK at least, the country has gone months past the 14 day critical period and has not implemented major defences on the CBS list?

We suggest that the UK, and indeed any other country that finds itself in this position, should adopt the AltSAGE recovery recommendations, the WHO advice, alongside the summary of strategies on the CBS list. To do this, we firstly have to go back to the containment stage and to a new, thorough, and well thought out national or regional lock-down (that also minimises harm caused by restricting or poorly managing medical or health care provision to vulnerable people). The nursing home debacle or similar should not be repeated. We then start test/ track /trace/isolate for all infected individuals and their contacts. A highly effective mobile phone based geographic tracer application for infections should be used, alongside a high specificity (reliable) test for COVID-19.

OF IMPORTANCE: When national level testing has been completed, and with few or no new infections showing for 10 - 14 days, the lock-down can slowly and carefully be lifted, watching to isolate any new outbreaks at any time (as observed in the successful nations). The country has to stay on high alert for many months thereafter. We propose this rescue programme would significantly limit mortality and could be achieved in 2-4 months, after which, alongside international borders being assiduously monitored for infection control, a nation (such as the UK) could quickly recover and function effectively close to normal.

Author Details:

Dr T.A. Bakare. Clinician scientist, Viapath, Guy's Hospital, London.

Dr J S Soar. Director of Studies and Research. The School of Health and Neural Sciences (SOHANS), Nottingham, (UK).

All enquiries to sohansmed@gmail.com

References:

- [1] Global Health Security Index 2019. Johns Hopkins Hospital. <https://www.ghsindex.org/>
- [2] Coronavirus action plan: a guide to what you can expect across the UK, DHSC (UK). Mar 2020.
- [3] Basic Reproduction Number/ https://en.wikipedia.org/wiki/Basic_reproduction_number
- [4] Coronavirus Action Plan: A guide to what you can expect across the UK 2020. <https://www.gov.uk/government/publications/coronavirus-action-plan/coronavirus-action-plan-a-guide-to-what-you-can-expect-across-the-uk>
- [5] The Independent Scientific Advisory Group for Emergencies (SAGE). COVID-19: what are the options for the UK? Recommendations for government based on an open and transparent examination of the scientific evidence. 12 May 2020. <http://www.independentsage.org/wp-content/uploads/2020/05/The-Independent-SAGE-Report.pdf>
- [6] Alexander, SPH, et al. [A rational roadmap for SARS-CoV-2/COVID-19 pharmacotherapeutic research and development](#). British Journal of Pharmacology; 1 May 2020; DOI: 10.1111/bph.15094
- [7] Drug Repurposing from an Academic Perspective. 2012. Oprea et al. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3285382/>
- [8] BCG-Induced Cross-Protection and Development of Trained Immunity: Implication for Vaccine Design, 2019 doi: [10.3389/fimmu.2019.02806](https://doi.org/10.3389/fimmu.2019.02806) , <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6896902/>

- [9] The convalescent sera option for containing COVID-19, JCI , Authors [Arturo Casadevall and Liise-anne Pirofski](#)
DOI :[0.1172/JCI138003](#), 2020
- [10] A cost-effective preventative approach to potentially save lives in the coronavirus pandemic, jointly using Vitamin D, Curcumin, and Vitamin C, (with updated dosage parameter). Authors Bakare T A and Soar J S. 2020. [indiarxiv.org/cq8sa/](#) DOI : [10.35543/osf.io/cq8sa](#)
- [11] A Review of Coronavirus Disease-2019 (COVID-19).2020.
[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7090728/](#)
- [12] Coronavirus Disease. 2020. [https://en.wikipedia.org/wiki/Coronavirus_disease](#)
- [13] Coronavirus Disease (Covid-19) Dashboard. WHO 2020.
[https://covid19.who.int/?gclid=EAIaIQobChMij8GU1pnc6QIV0e3tCh2H8Q5gEAAYASAAEgKApPD_BwE](#)
- [14] Estimating the number of infections and the impact of non-pharmaceutical interventions on COVID-19 in 11 European countries Seth Flaxman* et al.
[https://www.imperial.ac.uk/media/imperial-college/medicine/mrc-gida/2020-03-30-COVID19-Report-13.pdf](#)
- [15] [Sunetra Gupta: Covid-19 is on the way out – UnHerd](#) 2020. In person Interview
[https://unherd.com/2020/05/oxford-doubles-down-sunetra-gupta-interview/](#)
- [16] Levitt, M : Lock-down is a “huge mistake”. Unherd. 2020. In Person Interview.
[https://www.youtube.com/watch?v=bl-sZdfLcEk](#)
- [17] WHO Director-General's opening remarks at the media briefing on COVID-19 - 16 March 2020
[https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-16-march-2020](#)
- [18] List of epidemics 2020 [https://en.wikipedia.org/wiki/List_of_epidemics](#)
- [19] Financial crisis of 2007–08. 2020. [https://en.wikipedia.org/wiki/Financial_crisis_of_2007%E2%80%9308](#)
- [20] Damaging effects of Brexit. 2020. [https://en.wikipedia.org/wiki/Brexit](#)
- [21] Financial effects of Brexit. 2020. [https://en.wikipedia.org/wiki/Economic_effects_of_Brexit](#)
- [22] Effects of the Great Recession 2007-2012. 2020. [https://en.wikipedia.org/wiki/Effects_of_the_Great_Recession](#)
- [23] Health Impacts of the Great Recession: A Critical Review. [Claire Margerison-Zilko](#) et al. 2016.
[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4880023/](#)
- [24] Greenhalgh et al. Face masks for the public during the covid-19 crisis.
BMJ 2020; 369 doi: [https://doi.org/10.1136/bmj.m1435](#) Published 09 April 2020. Cite this as: *BMJ* 2020;369:m1435
- [25] Face Mask Use and Control of Respiratory Virus Transmission in Households. [C. Raina MacIntyre](#) , 2009.
[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2662657/](#)
- [26] N95 masks. 2020. [https://www.google.com/search?q=n95+masks+wiki&oq=N&aqs=chrome.69i59l3j69i60l3j69i65j69i60.4301j0j3&sourceid=chrome&ie=UTF-](#)
- [27] Hospital beds at record low in England as NHS struggles with demand.
[https://www.theguardian.com/politics/2019/nov/25/hospital-beds-at-record-low-in-england-as-nhs-struggles-with-demand](#)
- [28] Coronavirus: Care homes still expected to take Covid-19 hospital patients as deaths mount.
[https://www.independent.co.uk/news/health/coronavirus-care-homes-nhs-deaths-statistics-a9500326.html](#)
- [29] More than half of all coronavirus deaths were in care homes in a single day in May.
[https://www.itv.com/news/2020-05-26/latest-ons-data-show-proportion-of-coronavirus-deaths-in-care-homes-continues-to-rise/](#)

- [30] Soar, R. 2020. From personal communication. Source: Sage minutes reveal how UK advisers reacted to coronavirus crisis. <https://www.theguardian.com/world/2020/may/29/sage-minutes-reveal-how-uk-advisers-reacted-to-coronavirus-crisis>

Declarations: Both authors TAB and JSS declare no competing interests.

V6.4 30.05.20

