Written evidence from Junade Ali (DTA 16)

Public Administration and Constitutional Affairs Committee
Data Transparency and Accountability: Covid 19 inquiry

Junade Ali is a British computer scientist whose work on anonymous communication protocols has changed industry practice on password security and has helped lay the foundations for the Contact Tracing protocols developed for the COVID-19 pandemic. He is a Chartered Engineer via the Institution of Engineering and Technology and his professional experience includes developing software for embedded systems used in mission critical road safety applications and cyber security. He is currently studying Contact Tracing protocols as part of a PhD in anonymous communication protocols. He holds a Masters degree in Computer Science, with his thesis focussing on applications of Operations Research and data science to road traffic data collection.

"Is the public able to comprehend the data published during the pandemic. Is there sufficient understanding among journalists and parliamentarians to enable them to present and interpret data accurately, and ask informed questions of Government? What could be done to improve understanding and who could take responsibility for this?"

Professor Chris Whitty has stated the metric for international comparisons "should be all-cause mortality, age adjusted, and possibly seasonally adjusted, over the course of the epidemic, and we are not there yet" (Science and Technology Committee 2020). Instead, international comparisons presented so far by the Government have focussed on the use of “COVID-19 deaths”. Due to different counting techniques, “COVID-19 deaths” is a challenging metric for international comparisons. The University of Oxford’s Centre for Evidence Based Medicine has previously highlighted such challenges in the pan-UK context (Loke and Heneghan 2020).

Using 2020 death data to Week 35 (Eurostat 2020a) and population data (Eurostat 2020b), we are able to calculate the overall death rate per million people. For convenience, I’ve split these deaths into non COVID-19 and COVID-19 deaths using the data from Our World in Data (as reported by national governments) from the 30th August 2020 (end of Week 35) to help our understanding (Our World in Data 2020). Eurostat data is not yet complete; countries like Italy and Ireland haven’t yet reported deaths to Week 35 to Eurostat, and this is done without the age-adjustment or seasonal-adjustment that Chris Whitty alluded to, but provides the best picture of the pandemic so far. This chart is shown in Figure 1.

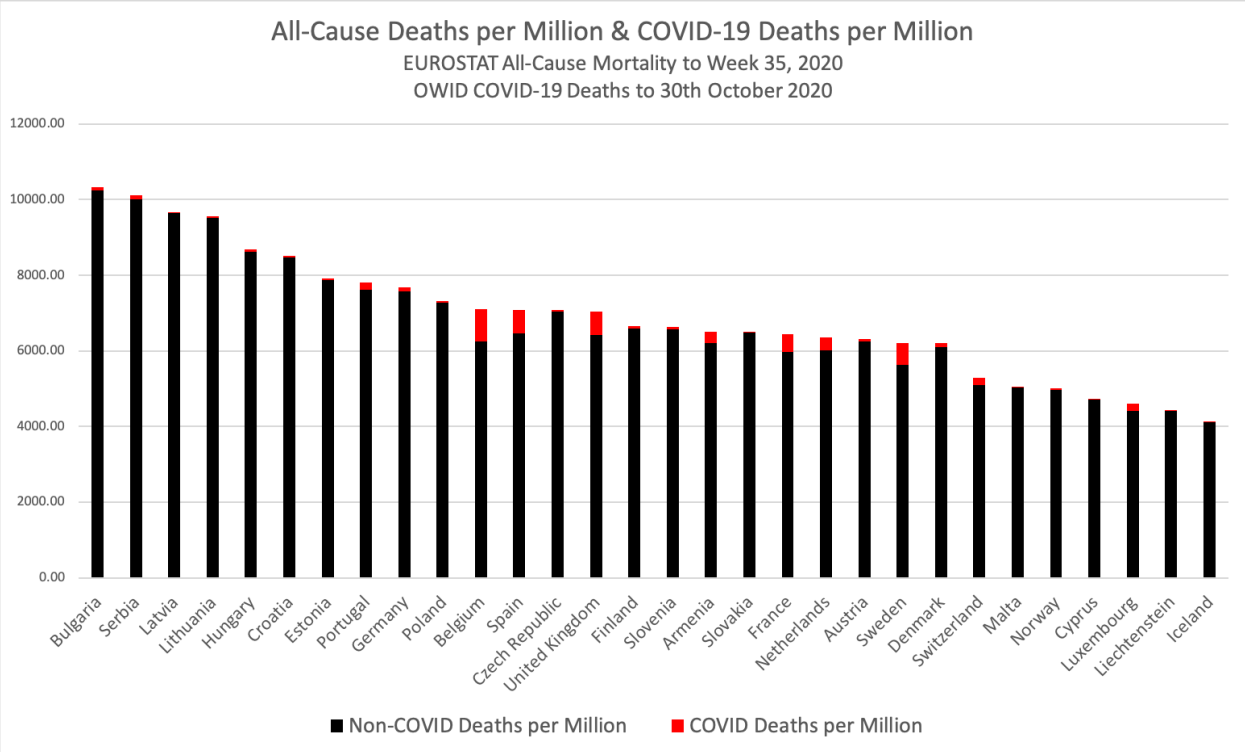

Fig 1: 2020 All-Cause Deaths per Million divided by COVID and non-COVID deaths

"Excess deaths" is another flawed metric that has been used to attempt international comparisons, namely by the Financial Times (Burn-Murdoch, Romei, and Giles 2020). Instead of understanding the real number of deaths (per million population), "excess deaths" compares a country to its own historical performance and then compares that excess to other countries. This neglects the fact that countries with more effective healthcare systems may have more vulnerable members of the population or that "excess deaths" can be less noticeable in lower mortality countries. The Financial Times did not even normalise their data to the number of excess deaths per million when presenting their comparisons.

Sadly, this failure is not only confined to the media. The Office for National Statistics published a report claiming to be a comparison of "all-cause mortality between European countries and regions" (Office for National Statistics 2020); unfortunately the report only contains "excess deaths" metrics, not "all-cause mortality" as the title of the report would imply. The raw data contained a note that they had superimposed their own data on the Eurostat data so it was "subject to caveats in relation to the temporal comparability". Whilst the ONS report claimed to compare 20 European countries, 5 countries in the ONS data set had missing data for the weeks they compared data up to. Countries with a higher all-cause mortality than the UK, like Germany and Italy, were amongst those with missing all-cause mortality data.

"Were key decisions (such as the "lock downs") underpinned by good data and was data-led decision-making timely, clear and transparently presented to the public?"

Next; I wish to turn to the issue of the scientific validity of data on interventions. The UK has excelled in generating strong research in vaccines and therapeutics using Randomised Control Trials. In other countries, cocktails of "promising drugs" were given to patients early on in the pandemic - causing harm to patients in many cases and leading to retracted non-randomised observational studies like Mehra et

al. 2020. In the UK, full confidence was given to the Randomised Control Trial approach, with all four CMOs wrote to NHS doctors to "strongly discourage the use of off-licence treatments outside of a trial, where participation in a trial is possible" (Whitty 2020).

This brings us to the fundamental difference in approaches to pharmaceutical and non-pharmaceutical data. Figure 2 shows the evidence-based medicine pyramid; quality of evidence represented by each level of the pyramid, with quality increasing from bottom to top. For example; Randomised Control Trials are of significantly higher quality than Expert Opinion, but there are far less Randomised Control Trials than Expert Opinions.

Unfortunately, by using retrospective observational data (if not modelling) to design non-pharmaceutical interventions, we have no understanding if they actually work. Masks are one such area where we've failed to resolve uncertainty by performing trials, causing opinions to divide towards the extremes (Jefferson and Heneghan 2020). Another example is Contact Tracing apps; we have modelling claiming it fails to reduce the *r* rate below 1 (Kucharski et al. 2020) but observational historical data from the Isle of Man showing it may be effective (Kendall et al. 2020). Using mobile apps to rapidly randomise individuals into groups and test different interventions would allow for robust interventions to be created using strong scientific evidence.

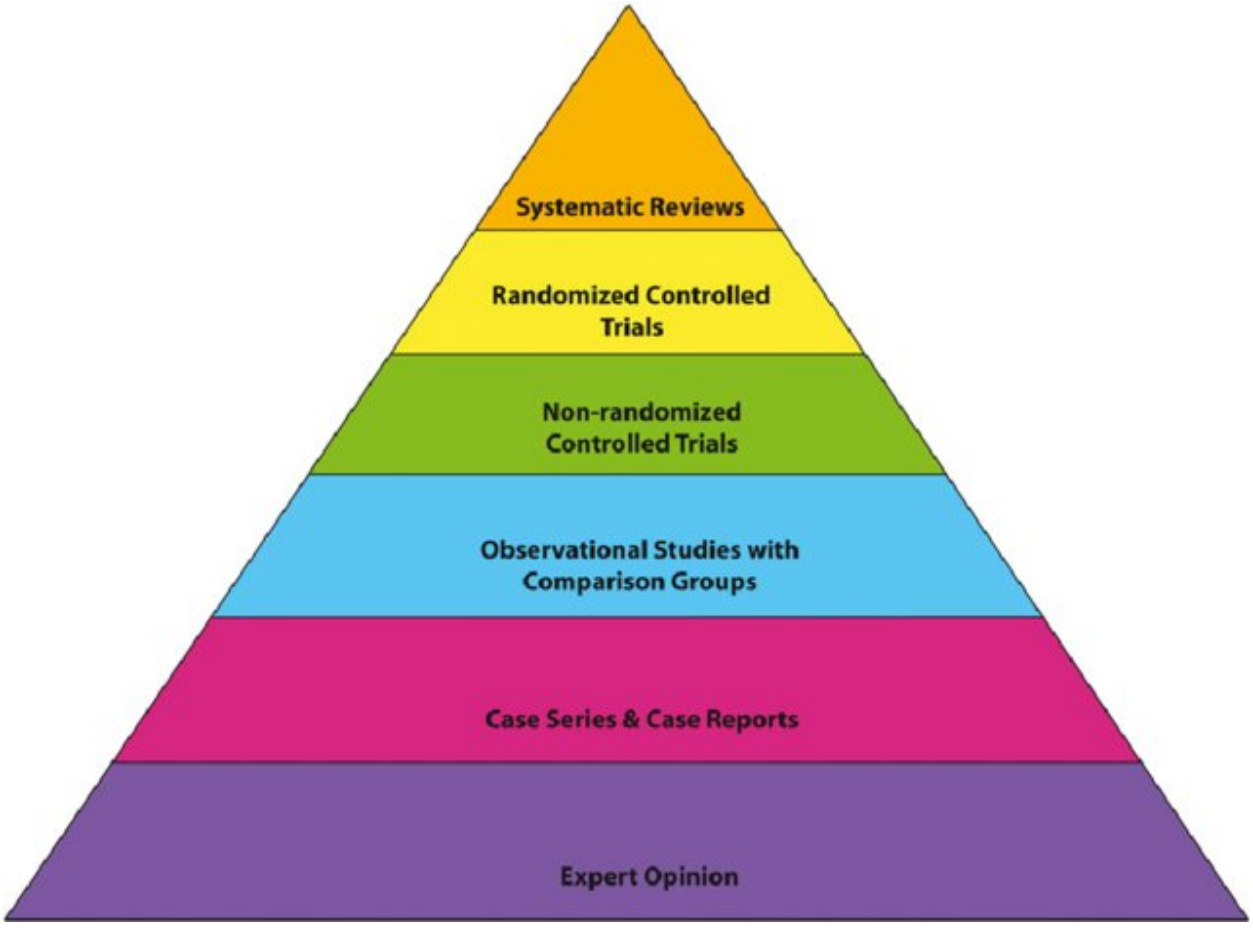

Fig. 2: Evidence-based medicine pyramid (Golden and Bass 2013)

“Does the Government have a good enough understanding of data security, and do the public have confidence in the Government’s data handling?”

Contact Tracing apps are one area that could have benefited from improved engineering oversight. Whilst the National Cyber Security Centre did seek to communicate on cybersecurity advice, industry engagement seemed more lacking on the side of NHSx alongside developers of the underlying protocols at Apple and Google. Low risk de-anonymization attacks have been identified within the Apple/Google contact tracing protocols (Ali and Dyo 2020) and their real-world effectiveness continues to be questioned; effective industry communication would have allowed such issues to either be fully resolved or there to be effective public communication on the risk/reward of such engineering challenges.

The Government’s implementation of Contact Tracing via their app was constrained by solutions of third party technology technology companies, but nevertheless many such issues could have been addressed with engineering oversight of the end-to-end solution. Engineers have made a valuable silent contribution to the pandemic, for example the Royal Academy of Engineering worked with Professional Engineering Institutions to obtain volunteers to help establish the Nightingale hospitals. Nevertheless, more work could have benefited from the input of engineers within the design process. Regulation and accreditation of data scientists and data engineers is an important issue that the Government should work with organisations like the Engineering Council UK and the Royal Academy of Engineering in solving.

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October 2020