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LEARNING FROM THE PANDEMIC I

There is much to be learned from the SARS2/COVID19 pandemic.

Of course a large part of this relates to the biological and medical facts. The entire nucleotide sequence of the viral RNA was determined and published in early January, for example, an astonishing feat considering that prior to 1953 we did not even know the structure of polynucleotides and their roles. It was also learned early on how the virus gains access to human cells and how it affects different tissues. The case fatality rate was immediately recognized as significant. Then it was realized that it is related to age and presence of other medical conditions. But why this is remains a puzzle. The “Spanish Flu” of 1918, for example, disproportionately affected younger people. SARS2 was also almost immediately recognized, though initially denied, as being easily transmissible. This happens most commonly by aerosols, tiny droplets exhaled in breathing, talking, singing and, especially, coughing and sneezing. Then it became clear that many infected people have only very mild or no symptoms at all, facilitating their infecting others.

Treatment remains uncertain but began with experience from the SARS1 pandemic in 2002-2003 and the MERS outbreak in 2012-2015 caused by closely-related coronaviruses. This was why it was thought that hydroxychloroquine and azithromycin might be useful. It appears now that these medications are probably ineffective. Also on the shelf were other partially-started efforts including some to develop vaccines. Innovative approaches such as RNA vaccines, which began to be investigated in the 1990's, may offer particular promise. Yet there may never be an effective vaccine. More than 30 years after the appearance of the HIV virus which causes AIDS there is still no effective vaccine despite sustained and ongoing efforts to develop one.

Yet the present status of people living with HIV was not foreseen 30 years ago. So far, it does not appear that there are long-term aftereffects of having and recovering from COVID-19. But “so far” is not yet “long-term.”

Unavoidably, life must go on. With expanded testing and tracking, improved medical resources, systematic measures to improve indoor air quality such as the wearing of masks, continued suspension of large gatherings of people and extra measures to protect those at highest risk of mortality, SARS2 can be slowed down. This is important until either a vaccine becomes available or “herd immunity” is achieved at 66-75% of the population having had and recovered from the virus. It is a long way to either. Meanwhile, continued detailed genetic analysis of the virus shows that it has been evolving into different strains as it spreads through and adapts to the human population. This would be expected to reduce its virulence but also possibly increase its transmissibility. Both would be expected to be selected for as pathogens that quickly kill their hosts do not thrive. The four previously-known human coronaviruses, for example, are known to be relatively benign. But this could complicate the development of vaccines or require frequent modification as with influenza vaccines.

The need to track the virus over time geographically poses technical problems as well as concerns about privacy and civil liberties. Tracking the genetic evolution of the virus will also remain important. Both will require innovations in computer and “Big Data” science. Another challenge is dealing with the explosion of published reports about the SARS2 pandemic. Already there are far more published reports in the medical literature than anyone can possibly read, let alone be familiar with. Thousands more are published every week. The

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White House Office of Science and Technology Policy's Covid-19 Open Resource Dataset (CORD-19) has already made available tens of thousands of full-text machine-readable articles, including some on coronaviruses dating back to the 1950's. Yet the useful information in many of these is probably minimal. Artificial intelligence approaches may be able to address this. Yet another challenge is that a large and growing proportion of reports are behind paywalls, a problem that hinders the progress of science generally.

The pandemic also promises to teach us much about psychology, sociology, economics, political science, international relations, and even environmental sciences and other matters that cannot now be foreseen. For there are a panoply of ongoing "natural experiments" relating to changes in human travel, interaction and other behaviors, to quarantines and other government policies and practices, to the virtual shutdown or significant alteration of many businesses and industries, to the interruptions of trade and transportation, to significant impacts on recreation, communication, education, child-raising and to the interactions of all these things. Add to this that these would be expected to have a disproportionate effect on different regions of the world and people of different ages and economic status. There is only a rudimentary awareness of these things as of yet, especially among those who have personal or occupational/professional involvement in them. The variation of mitigation measures instituted in different countries in different ways at different points in time and for different lengths of time will make it possible to draw a wide range of conclusions as to their effectiveness, acceptability, benefits and hazards. The pandemic and its aftermath will be studied for years to come and sifted through for clues to the solutions of future problems that we can now only dimly foresee. The pandemic will come to be seen as a watershed event that caused or contributed to a variety of changes in the way the world and its people live and work. Many are already beginning to anticipate the nature, importance, consequences and meaning of these changes.

None of this should be taken to mean that there is some sort of good aspect to the pandemic. For there is no "good" side of breaking windows just because window-manufacturers and installers must replace them. Thus, along with the enormous ongoing cost in lives and resources, the pandemic is

exacting an "opportunity cost" of what might have been. Learning a great deal about some things has already begun to blind us to learning other things. Much medical research, especially clinical trials relating to unrelated medical problems has, along with so many other things, been delayed. Colleges, where much scientific research takes place, have shut down and many are in financial trouble. Field studies of all kinds, some of unusual and unique events, have been curtailed. Scientific data has been lost due to the inability to service remote sensors, for example, on marine buoys and in difficult terrain. And scientific conferences, like other mass gatherings, have been suspended. As a consequence, individual learning has been interrupted and untold numbers have suffered setbacks in their careers, an effective idling and loss of development of "human capital."

There are even larger lessons in all of these things, if we take the trouble to think about it.

All NTCOF in-person events are canceled until further notice in the interests of safety during the SARS2 pandemic !!!

We are hosting weekly teleconference meetings about which you can learn more by signing up for our email notices by entering your email address at the bottom of any of our website pages. BE WELL AND KEEP SAFE!

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The Fellowship of Unbelievers**

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