



## *Notes on the Pandemic #7* May 6, 2020

**Dear DCI Community,**

Since I first communicated with you on March 17 in the [first of my Notes on the Pandemic](#), I am continually amazed by how much we have learned and how much remains unknown about this current pandemic. My own naivete was blatantly evident in that initial communication when I mentioned that in addition to “sheltering in place” I didn’t have any planned travel until the end of April, even though I noted that could change. But the reality is that looking forward from mid-March, I did not fully appreciate how profoundly all of our lives would change. And as I have also commented in [the six prior Notes](#) our knowledge about SARS-CoV-2 and COVID-19 has also continued to evolve in many directions, some anticipated but others coming as surprises. Especially noteworthy are the clinical manifestations of COVID-19 beyond the respiratory tract as well as the way in which it produces “silent hypoxia” in some individuals, as well as heart failure, strokes, vascular disease, coagulopathy and more.

A commentary by Stuart Weston and Matthew Frieman from the University of Maryland entitled *COVID-19: Knowns, Unknowns, and Questions* that was published in *mSphere* and the American Society for Microbiology about the same time [Notes on the Pandemic #1](#), raised some of the issues about SARS-CoV-2 and COVID that we have been discussing over the past seven weeks, including:

- *What is the animal/intermediate host?*
- *What is the true case count (mild symptoms, asymptomatic carriers) and lethality?*

- *What comorbidities are associated with severe disease outcome and how do these affect viral pathogenesis?*
- *Can the spread of SARS-CoV-2 be contained/will the virus persist in the human population?*
- *What in vitro and in vivo systems can be used for research?*
- *Can we find therapeutic options?*
- *Can a vaccination strategy be developed?*
- *What is the host response to SARS-CoV-2 and pathology of COVID-19?*
- *Why does SARS-CoV-2 appear to spread more rapidly than SARS-CoV or MERS-CoV in the human population?*
- *What will be the next coronavirus to enter the human population?*

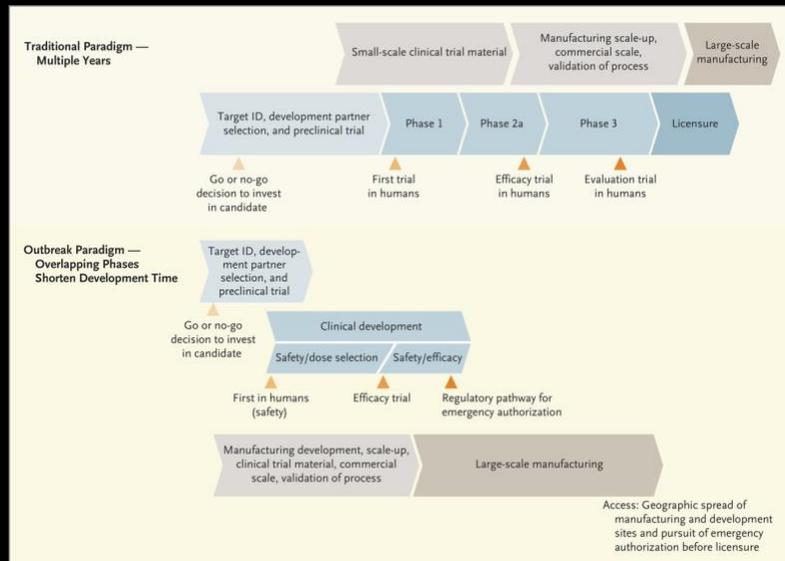
As readers of past [Notes on the Pandemic](#) will know, we have in fact made progress, even if preliminary, in addressing a number of these questions along with others. Based on increasing global epidemiological data we now recognize the variegated differences in prevalence of infection globally and within countries. In the US the worst fear is of overcoming hospital and ICU beds. The fear that prompted sheltering in place was that hospitals would have insufficient ICU beds and ventilatory support. Because of social distancing and sheltering in place that fear was realized in relatively few hot spots, New York City being among the most notable. We now know that the vast majority of infected individuals have asymptomatic or minimally symptomatic infection and that severe disease can occur among all age groups. Children younger than 18 years of age appear least severely impacted but severe disease can occur in those younger than a year of age. The highest mortality is in individuals over 60 – and especially those over 70 years, with men disproportionately at risk for death. We also know that several comorbidities impact the case fatality index, especially hypertension, obesity, and diabetes. Of these, obesity may be among the most significant and could be one of the factors contributing to severe COVID in younger individuals (as noted in the May 4 *The Lancet Online* by D. Kass et al, “Obesity could shift severe COVID-19 disease to younger ages”).

We also now recognize that the course of disease unfolds in stages, with a minority advancing in the second week of infection to more serious disease, which can accelerate rapidly

with hypoxia and/or other organ involvement. We know that many of the early proposed treatments have failed to demonstrate efficacy when subject to more rigorous clinical trials but we are encouraged that a global collaborative trial has demonstrated some benefit for Remdesivir, which was forecasted by some of the data I shared in [Notes #6](#). And while Remdesivir requires intravenous administration, the fact that it has shown even limited benefit is encouraging as a harbinger that other even more effective drugs will be either repurposed or discovered over the next months and years. To that regard, the CDC has announced the important SARS-CoV-2 Sequencing for Public Health Emergency Response, Epidemiology and Surveillance (SPHERES), a national genomics consortium to coordinate SARS-CoV-2 sequencing across the US. SPHERES is intended to foster broad engagement of clinical and public health laboratories, academic institutions and the public sector to monitor genetic changes in the virus as it continues to circulate; gain insights to support contact tracing; aid in identifying diagnostic and therapeutic targets (some of which were shown in the graphic in [Notes on the Pandemic #6](#)); and advance research in transmission dynamics, host response and the evolution of the virus. This is an example of how the scientific and public health communities, from the public and private sector, have established new and important ways to collaborate and advance knowledge and discovery.

Of course, a number of the questions listed above remain unanswered but even then, there is evidence of progress. In [Notes on the Pandemic #5](#) I reviewed the path to a vaccine and in the past week highly preliminary but still encouraging news was “reported” from Oxford’s Jenner Laboratory. There have been notable efforts by the World Health Organization (WHO) to coordinate these initiatives, although the US Executive Branch has taken a go-it-alone position. It will be important to follow an accelerated approach to vaccine development as outline by Nicole Lurie et al. in “Developing Covid-19 Vaccines at Pandemic Speed” in the *New England Journal of Medicine* (updated April 24). A helpful schema that contrasts the traditional path to vaccine development and an accelerated one is shown in Lurie’s article. Some have also [advocated the potential for human challenge testing to further accelerate assessment of the immunoprotecting efficacy of candidate vaccines](#).

## Difference between Traditional Vaccine Development and Development Using a Pandemic Paradigm.



N Lurie et al. N Engl J Med 2020. DOI: 10.1056/NEJMp2005630

The NEW ENGLAND JOURNAL of MEDICINE

Clearly progress is being made but there is still so much we need to learn to better balance the risk benefit ratios for individual health, public health, and national and global economic health and security.

## The Big Question on our Minds – Re-Entry and the Future of Higher Education

Because our DCI Community resides in different parts of the US and world, there are likely different recommendations and experiences taking place as parts of the US “re-op.” This topic is front and center for all of us, as I have shared in prior [Notes on the Pandemic](#). In the last [Notes \(#6\)](#) I underscored the need to balance individual risks from public health ones, many of which focused on not overwhelming health care facilities by reducing spikes or the potential for exponential recurrence of transmission. We have discussed the numerous models and their assumptions that speak to this, especially until we have (more) effective treatments and particularly a vaccine. Until then, the combination of individual monitoring for symptoms,

checks on symptoms (including fever) at work, school or public places, will be coupled with diagnostic testing, contact tracing and measures of seroprevalence. We have noted in past [Notes](#), that in most of the US the seroprevalence is in the single digits and that “herd immunity” would not be in place until 55-70% of the population had been infected. As noted by Stephen Kissler et al from the Harvard T.H Chan School of Public Health in “Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period” published in *Science* online on April 14, in the absence of a vaccine, surveillance programs could continue until 2024. Certainly, that is an unwelcome projection which also needs to be coupled with another reality – that at this time it is not known whether post-infection antibody is protective, either fully or partially. While these are somber issues, a Pollyannaish tone is the hope that SARS-CoV-2 might follow the path of SARS-CoV and disappear from the world stage, for reasons still unknown - of course wishful thinking.

In the meantime, [guidance from the CDC/White House](#) have been published as has [interim guidance from the WHO](#). The recommended approach for US states (which already appears to be being ignored by some of them) includes gating criteria that should be met before phased opening is planned. These are based on criteria that apply to individuals and institutions (especially hospitals). Once the gating criteria are met, plans for phased opening can commence as outlined in the table below.

Phases	CDC-WH Criteria for Opening Up America Again
<b>Gating Criteria</b> <b>Before Proceeding to</b> <b>Phased Opening</b>	<b>Symptoms</b> <ul style="list-style-type: none"> <li>• Downward trajectory of influenza and COVID-like syndromic cases reported within a 14-day period</li> </ul> <b>Cases</b> <ul style="list-style-type: none"> <li>• Downward trajectory of documented cases within a 14-day period or</li> <li>• Downward trajectory of positive tests as a percent of total tests within a 14-day period</li> </ul>

Phases	CDC-WH Criteria for Opening Up America Again
	<p><b>Hospitals</b></p> <ul style="list-style-type: none"> <li>• Treat all patients without crisis care and</li> <li>• Robust testing program in place for high risk health care workers – including emerging antibody testing</li> </ul>
<p>There are core state preparedness responsibilities that require availability of testing and contact tracing, health care system capacity and plans to protect workers in critical industries, high-risk facilities as well as users of mass transit. In addition to social distancing, plans need to include steps to limit and mitigate rebounds or outbreaks by returning to quarantine, shelter in place, etc.</p> <p>The guidelines for all phases include individual responsibility for good hygiene and for self-quarantine if illness occurs.</p> <p>The guidelines include responsibilities for employers regarding monitoring and testing of employees along with hygiene and infection control methods, including minimizing non-essential travel</p>	
<p><b>Phase One:</b> <i>For states and regions that satisfy the gating criteria</i></p>	<p><b>Overall employers should</b></p> <ul style="list-style-type: none"> <li>• Encourage telework whenever possible</li> <li>• Return to work in phases</li> <li>• Close common areas to avoid congregate gathering – and enforce strict social isolation</li> <li>• Minimize non-essential travel (and do isolation post travel)</li> <li>• Consider special accommodations for vulnerable populations/personnel</li> </ul> <p><b>Specific Types of Employers</b></p> <ul style="list-style-type: none"> <li>• Schools and Youth Activities that are currently closed should remain closed</li> <li>• Visits to Senior facilities and hospitals should be prohibited.</li> </ul>

Phases	CDC-WH Criteria for Opening Up America Again
	<ul style="list-style-type: none"> <li>• Large venues (restaurants, movie theaters, sporting venues, places of worship) can operate under strict physical distancing principles</li> <li>• Elective surgeries can resume as clinically appropriate</li> <li>• Gyms can open if they maintain physical distancing and sanitation protocols</li> <li>• Bars should remain closed.</li> </ul>
<p><b>Phase Two:</b> <i>For states and regions with no evidence of rebound and that satisfy the gating criteria a second time</i></p>	<p><b>Individuals</b></p> <ul style="list-style-type: none"> <li>• Vulnerable individuals should continue to shelter in place</li> <li>• Individuals should maintain social distancing protocols in public spaces, including parks, outdoor recreation areas, etc.</li> <li>• Social settings with greater than 50 people should be avoided</li> <li>• Nonessential travel can resume</li> </ul> <p><b>Employers</b></p> <ul style="list-style-type: none"> <li>• Continue to encourage telework when feasible</li> <li>• Keep common areas where aggregation occurs</li> <li>• Non-essential travel can resume</li> <li>• Strongly consider special accommodations for personnel who are members of vulnerable populations.</li> </ul>
<p><b>Phase Three:</b> <i>For states and region with no evidence of a rebound that satisfy the gating criteria a third time</i></p>	<p><b>Individuals</b></p> <ul style="list-style-type: none"> <li>• Vulnerable individuals can resume public interactions but should practice physical distancing, minimizing exposure to social settings where distancing may not be practical</li> <li>• Lower-risk populations should consider minimizing time spent in crowded environments</li> </ul> <p><b>Employers</b></p> <ul style="list-style-type: none"> <li>• Resume unrestricted staffing of worksites</li> </ul>

Phases	CDC-WH Criteria for Opening Up America Again
<i>Definition of Vulnerable Individuals</i>	<ul style="list-style-type: none"> <li>• <i>Elderly individuals</i></li> <li>• <i>Serious underlying health conditions (e.g., high blood pressure, chronic lung disease, diabetes, obesity, asthma, congenital or acquired immune compromise)</i></li> </ul>

These criteria and the related phases seem sensible and consistent with the tools and approaches we have been discussing for some weeks. They recognize the importance of monitoring testing, contact tracing along with social distancing and responsible behavior by individuals, employers and communities. If they are followed by all they can work – up until the time when we have a vaccine and/or effective and orally available therapies. A friend sent me an article by Greg Stewart et al that was published in the April 17 issue of the *Institute of Electrical Engineers and Electronics* on *How Control Theory Can Help Us Control COVID-19* and it was interesting to see how known principles and practices from other fields are so relevant to personal and public health. But as in all systems, including healthcare, success depends on the behavior of individuals. One of the major reasons for failure to improve health (e.g., high blood pressure) is failure to comply with taking prescribed medications. Noncompliance becomes even more of a problem when the times for intervention are longer – which clearly will be case for the current pandemic.

While the focus of the guidelines is on the workplace, they obviously have implications for education and this needs to be bifurcated and stratified. When sheltering in place was enforced, schools were closed and remain so through the current school year. It is notable that not all countries closed schools and some have found successful ways of keeping them open. Because children and adolescents have done well with this coronavirus, many have advocated for reopening schools, certainly by fall, for the sake of children whose personal development is being negatively impacted, as well as for parents of young children, whose work lives are also being disrupted, particularly parents who are not able to work remotely. A strong case for reopening non-residential elementary and high schools is made in the May 2 *The Economist* [\*Open Schools First\*](#). Unlike many other infections, to date there isn't strong evidence that children are silent spreaders of SARS-CoV-2 but this concern cannot be eliminated, along with the prospect

that if infected, children can transmit infection to others in the home, including other older relatives and grandparents. As *The Economist* notes, “it is an exercise in risk balancing.”

The issues are more complicated and nuanced regarding higher education, especially residential colleges and universities that have dormitory living, common cafeterias, large and small classrooms, students from broad geographic regions, including internationally, who mix with each other in education, social and other settings, including the prospect of intergenerational engagement. Coupled with this is the fact that faculty include a range of individuals, including some who fall into vulnerable groups. As we know all too well, when the current pandemic began and before its impact was even more fully appreciated, colleges and universities closed down and nearly all students returned home. Classes went from the lecture hall and seminar room and educational laboratory to completely online. Some colleges and universities were better prepared for this dramatic switch to virtual education than others – but all were impacted, in their missions and especially economics. Not only has the pandemic had a major impact on the economy, it has more specifically and dramatically affected sources of revenue (from tuition, facility rentals, food, athletics, philanthropy and so much more) as well as the impact on endowments and the need to use reserves to protect staff and faculty through the current closure period. For many colleges and universities these economic tolls are not sustainable, and they will be made much worse if the current closures, or even partial closures, extend into the fall. Already students and parents are reconsidering whether to enroll for fall, especially if there is a risk that classes will continue to be online.

In this context an opinion piece was published in the April 26 *New York Times* by Christina Paxson, President of Brown University, entitled “[College Campuses Must Reopen in the Fall. Here’s How We Do It. It won’t be easy, but there’s a path to get students back on track. Higher education will crumble without it.](#)” President Paxson correctly identifies the risks to students, higher education and their communities. She notes that the business model of higher education, largely dependent on tuition and fees (among a number of other services including room, board, facility rentals, public and private support) would challenge the finances of even well financed institutions and potentially damage irreparably the prospects for colleges and universities that were already compromised. In fact, with a declining birthrate and a business

model that is less relevant today, many smaller colleges and universities would have trouble surviving. She also notes that higher education is an extremely important asset to the national economy and their communities. Higher education employs around three million people and in many communities is the largest employer. Thus, she argues that “The reopening of college and university campuses in the fall should be a national priority.” In doing so, however, she is emphatic in stating that “*institutions should develop public health plans now that build on three elements of controlling the spread of infection: test, trace and separate.*” Her recommendations are aligned with the CDC-WH policies noted above, but she adds the importance of electronic monitoring to help with contact tracing – a tool that has already demonstrated utility in other countries. The success of a public health program will require the full cooperation of students, staff and faculty – but it should be feasible.

Of interest, *The Chronicle of Higher Education* has been updating a “[List of Colleges Plans for Reopening in the Fall](#)” (started on April 23 the list is updated daily). While some colleges and universities are definitive that they will hold in-person classes in the fall, many note that they are still considering their options and will make a decision between May and June (and a couple even later). The plan for Stanford in this publication states “**expects to make a decision in May, but might delay fall quarter till winter.**” This is consistent with the comments provided by the Stanford Provost and President in various official and less official communications. As for DCI, we have been paying careful attention to the official position of the University, but we have also been cognizant of the unique nature of our program and our community. Because some of DCI Fellows and Partners could be considered in the “vulnerable group” (as would be its Founding Director), we are also considering the travel and accommodation needs for our global DCI community and the many issues required to begin a year at Stanford. Also central to this is our commitment to not begin a DCI class that would not be in person. With those concerns and conclusions, we will be deciding about whether to shift the start of the 2020 class from fall to winter quarter likely at time before the University makes its decision. More on that shortly.

While the current focus of discussion is more immediate, it should not escape notice that the current pandemic could become the equivalent of a disruptive technology in higher

education. Interestingly on March 29 we had our first (and I'd like to think last) virtual Community Dinner with the 2019 DCI Class that featured the distinguished scholar and academic leader Gerhard Casper, who served as the 9<sup>th</sup> president of Stanford University (1992-2000) following a long and distinguished career as a faculty member, dean of the Law School and Provost at the University of Chicago. President Casper shared an article for discussion that he had written in 1996 entitled "Come the Millennium, Where the University?" (see *Minerva* 1996; 34:69-83) that was prescient and timely. In this remarkable review and provocative discussion, President Casper traced the university from its western inception at the University of Bologna a millennia ago, noting that "Universities have been extraordinarily durable as institutions in terms of the functions they have performed in Western societies...Clark Kerr has estimated that of 75 institutions founded before 1520, "which are [still] doing much the same things, in much the same ways and under the same names" about 60 are universities." Casper wrote this thoughtful review at the cusp of the entry of information technologies into higher education. In doing so he reviewed the role of the university in conferring credentials, social integration, providing a rite of passage, networking, the assessment and creation of knowledge, the selection of academic elites and peer review, fostering a world-wide community of scholars, and the transfer of knowledge. While others were already beginning to forecast the future of the university as a virtual one, President Casper appropriately concludes that "The university as a physical space will remain attractive to the extent we make it more valuable to people to interact personally and face to face in learning and research....The university will remain viable if we can convince the society in which we exist that, as a society, it would be poorer but for the continued investment in institutions that combine the rigorous tradition of knowledge and the rigorous search for truth with the excitement of frequently serendipitous discovery and the opportunity for societal greatness."

As expected, the continued transformation of technology accelerated and had an ever-bigger impact on higher education. The development of MOOCs (Massive Open Online Courses) led some universities to dedicate themselves to online offerings and for some new companies (Coursera, EdX, Khan Academy and others) to develop offerings as free-standing entities or in partnership with universities to foster the development of the virtual university.

President Casper's successor, John Hennessy, the 10<sup>th</sup> president of Stanford (2000-2016) and a renowned computer scientist, famously forecast the "[Coming Tsunami](#)" of online learning in higher education in *The New Yorker*, that was also featured in [an opinion piece by David Brooks in the New York Times on May 3, 2012](#). The radical transformation predicted in 2012 did not unfold across higher education and President Hennessy offered a reflective tone in [a speech to the American Council on Higher Education in March 2015](#) in which he noted that "an undergraduate degree is a lot more than a group of unrelated courses" and "it's value proposition is different from the sum total of credits." The focus was more on developing hybrid models where the best of instructional models, faculty and courses would be combined with university faculty as coaches and guides.

One evolution of that hybrid model is the "flipped classroom" that has become an increasing platform for medical school education (see: "Lecture Halls with Lectures – a Proposal for Medical Education" by Charles Prober and Chip Heath in the *New England Journal of Medicine*. 2012; 366:1657-1659). This model has been productive and has allowed students to achieve background information online and participate in small group discussions with faculty members to consider the topics in greater detail and in an interactive format. It is likely that these hybrid models, in tandem with new online offerings from universities committed to virtual education along with companies and organizations fostering their development, would have led to steady and ideally creative and interactive balance between technology and personal instruction and teaching. Hopefully this will not be lost.

But then came the 2020 pandemic and what was once forecast as a tsunami has also become a hurricane, typhoon and to some extent an earthquake and cyclone (I will leave out fires for now). Within days to weeks what seemed improbable has become reality, albeit with different levels of success and disappointment. As we are learning, some faculty have made their online courses better than their prior offerings, but others have missed the mark and then some. And while many efforts have been made to use technology to foster community and engagement, most everyone I have spoken with – undergraduate and graduate students and our DCI Community – sees this as a major loss and something many are missing and grieving.

Because our new virtual world is not likely to return to normality within weeks or months, the question is how will COVID-19 change higher education (and so many other aspects of society). As noted above, many colleges were already facing problems of enrollment given a declining birthrate and the cost structure of higher education – and to some its very relevance. While there is no doubt that a number of colleges will hold in-person classes this fall, many are concerned about whether the students will elect to travel to them or decide to stay near home and attend local colleges or just wait out a year. For some institutions the consequences could prove quite damaging. A wide range of views about this are reflected in 23 short essays by professors, administrators and staff from colleges and universities in a recent Chronicle Review (from *The Chronicle of Higher Education*) entitled “How Will the Pandemic Change Higher Education?” While ideas about this topic are still forming and while none of us truly know how things will unfold, I take note of the fact that most predictions range from dire to serious concerns. And while there is no doubting that significant consequences will unfold for many institutions if the current virtual world is sustained through 2020 – or even worse, into 2021 – I think it is preferable to consider the opportunity and move toward that.

While I have points of view I won't opine on how Stanford or other research universities will change and evolve over the next year(s), I will offer some perspective on how programs like DCI can catalyze and foster positive change and how some of the principles we have been learning can have a broader transformative impact on higher education. The DCI pillars of renewing purpose, building community and recalibrating wellness are relevant to individuals across the lifespan and to institutions, including higher education. Of these three pillars, building and renewing community is one of the most valued aspects of DCI – perhaps the most cherished. The relationships that form require time to evolve, opportunities for informal and formal gatherings, trust, shared respect and mutual support. These cannot be achieved virtually and they are the reason why “The university as a physical space will remain attractive to the extent that we make it more valuable to people to interact personally and face to face in learning and research” as President Casper noted in his “Come the Millennium, Where the University?” that I referred to earlier in this communication. While we can find purpose and also sustain many of our lifestyle choices remotely, building community requires physical presence. That is very much the underpinning of DCI. While we had no choice but to assume a virtual reality (along

with the rest of Stanford, the nation, and world) it is clearly evident that we must be together to fully connect and foster community. I am reminded of the beginning of EM Forster's opening of *Howard's End*: "Only Connect! That was the whole of her sermon. Only connect the prose and the passion, and both will be exalted, and human love will be seen at its height. Live in fragments no longer."

So while we still have no choice for this quarter and the summer that follows, we will not begin a DCI program until we are sure that we can connect in person, even if that means switching to a calendar year program (as we have done in the past). "Only connect" not only applies to the interactions of our DCI Fellows and Partners with each other but also to the incredibly important, as we have witnessed, ever-expanding intergenerational engagement – although this too requires personal connections.

Thankfully there are many things we can sustain in a virtual world, even if imperfectly. I am grateful to our 2019 DCI Fellows/Partners for agreeing to share Life Journey Transformations each week. They have each been moving and impactful. And I am grateful to our DCI staff and faculty who have worked tirelessly to create connections and programs to bring us together. As noted last week we had our first virtual community dinner and at the end of the month we will host our first virtual colloquium. As valued as these programs have been, I also hope that they are the last times we will do them virtually. At the same time, the dciX opportunities that [Susan Golden \(DCI 2016\)](#) has put together offer potentially valuable opportunities for social innovation and connection which could serve as models that we will bring forward to the post-COVID world.

Finally, I believe that our DCI program and the partners we have developed and are continuing to develop across the US and around the world also have the prospect for transforming higher education in a positive manner. Just as the university has been a physical place for a millennium, it has also been focused on those beginning their life journeys for that same amount of time. Now is the time to connect the generations and to have higher education offerings through the life journey. With over 30 million unemployed in the US alone and with longevity still a reality, the need to renew purpose and chart new courses is ever more important.

Colleges, community colleges, and public and private universities can all participate in these important needs. They will benefit from what we learn about virtual offerings and in-person education – and they can contribute by improving opportunities across the lifespan.

The triad of purpose, community and wellness can have positive impacts on all of us and educational settings can provide platforms – whether virtual or physical. And I will have more to say about that in the next (8th) *Notes on the Pandemic*.

A handwritten signature in black ink, appearing to read 'P. Pizzo'.

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