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COVID-19: A Time to Reinvest in Our Scientists

To the Editor:

The coronavirus disease (COVID-19) pandemic has profoundly challenged the careers of physicians and scientists. Although we should take pride in the care we have provided and our many extraordinary scientific accomplishments, the pandemic has taken a toll on many of our colleagues. Healthcare provider burnout (1) has been pronounced among academicians whose professional aspirations, need

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Originally Published in Press as DOI: 10.1164/rccm.202012-4497LE on February 17, 2021

for dedicated research time and institutional support, and dependency on collaborations compete directly with COVID-19–imposed increased clinical duties, laboratory closures and disrupted research, social distancing, financial constraints, and additional domestic responsibilities. Although the future of physician-scientists, early career scientists, and women scientists has long been recognized as in peril (2, 3), COVID-19 has intensified these challenges that arguably threaten their career trajectories and endanger the future of academic medicine.

The success of academic medical centers (AMCs) is dependent on leveraging profits from clinical revenue to train clinicians and scientists and applying this new knowledge to cutting-edge clinical programs. However, the dependence of AMCs on clinical revenue, combined with reduced profit margins during the COVID-19 pandemic (down >25% after including support from the CARES Act (4)), has reduced support for research training, emerging and established scientists, and scientific infrastructure.

Social distancing, a reality of our “new normal,” has limited opportunities for collaboration and spontaneous interactions. Although our profession has adapted remarkably to new methods of communication, unstructured scientific discussions, often the source of creativity and innovation, have suffered from constraints of social distancing. Early career investigators who are just beginning to establish collaborative networks will likely be most affected.

Women academicians have more domestic responsibilities than men, even in dual career academic couples (5), and consequently, COVID-19 has further added to this disparity with a measurable decrease in female authorship (6). Before COVID-19, women, more than men, were making adjustments in their professional roles to accommodate their personal lives, including their area of expertise and commitment to research (7). Women scientists are now juggling more—trying to balance their career priorities with immediate concerns of childcare, home schooling, and care for elderly parents. In the absence of intervention, these developments foreshadow a worsening gender gap in academic medicine, as has been experienced by the general workforce (8).

Potential Solutions

The pandemic has highlighted the importance of science. Basic modeling and infectious disease epidemiology have helped us understand what's next, masks and social distancing have controlled the spread of infection, clinical trials have identified beneficial therapies, novel serologic assays and monoclonal antibodies have identified the extent of disease and controlled outbreaks, and broad administration of effective vaccines will control the spread of infection. Moreover, interdisciplinary collaboration was critical to our ability to take care of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)–infected patients and to develop effective vaccines in record time. However, physician-scientists, early career scientists, and women scientists need support from several sources to maintain the trajectories of their careers.

First, we should reorient our medical centers around team science and integrated mentorship programs. Scientific partnerships that combine clinical insight with cutting-edge research have long been proposed as an effective approach to secure the future of emerging scientists and physician-scientists. Physicians uniquely understand disease and by being part of interdisciplinary teams of basic scientists, public health scientists, engineers, and others are able to more meaningfully contribute to the cycle of discovery (9). Social distancing and subsequent professional isolation have made it more apparent that scientific partnerships are needed to foster

the development of early career scientists. Dedicated mentors working in teams to support the development of our emerging scientists are essential to their success. Supporting an interdisciplinary environment with team science and mentorship will require that we realign our culture, values, infrastructure, and investments to reward and promote collaborative accomplishments.

Second, we need to invent ways to revitalize chance interactions and support social networking. Virtual scientific conferences should freely include mentoring and networking sessions, and after a period of time, these conferences should be made universally accessible. However, we need to advance novel approaches to stimulate spontaneity in our professional lives.

Third, we need to recognize that additional responsibilities at home represent key drivers that not only limit career development but force some of our colleagues to leave medicine and science. Programs addressing childcare, home schooling, cleaning services, and eldercare are needed to restore balance to home and work. We also need to think more creatively about flexible work expectations and more broadly about work environments and support a culture in which both men and women are accepted as caregivers.

Fourth, we need to recognize that these additional responsibilities and competing priorities, along with isolation and loneliness, take an emotional toll. Consequently, although wellness programs are essential, work environments should foster trust, inclusion and equity, and career development and provide dedicated mentorship (1).

Fifth, funding agencies are critical to reinvestment in our scientists. Although extending deadlines for grant submission, relaxing recruitment milestones, and expanding the scope of no-cost extensions have proved helpful, funding agencies should also consider developing programs to give scientists back the time lost to COVID-19. Emerging scientists would benefit from fully funded extensions of mentored research and early career development awards. The NIH can establish programs, similar in impact to the Doctor Draft for the Korean and Vietnam Wars, that would reinvigorate the pool of physician-scientists. Expanded support for trainees and emerging scientists should be considered, focusing on transition points in career development and programs that stimulate collaboration between M.D. and Ph.D. scientists (9).

Sixth, AMCs and philanthropic foundations should recognize that their financial reserves were established to provide support in times of need. Investments should be focused on our scientists who are torn between their careers and their families, and those who need to make up for time lost to the pandemic. Start-up packages should be extended, investments should be made in infrastructure to stimulate programmatic research, and early career scientists should be provided additional time to reach their scientific goals.

Finally, there is the larger problem of how science is valued by our nation, which, despite the current economic travails brought about by the pandemic, is wealthy. Congress must now face up to the sad lessons learned from the ways science has been pushed aside in the pandemic by political leaders and substantially increase the federal research budget. It is time to go big.

Concluding Remarks

To sustain our scientific pipeline and ensure the future of academic medicine, there is an urgent need for funding agencies, schools of medicine, AMCs, and philanthropic foundations to address the challenges the pandemic has imposed with bold approaches that will require realignment of our culture, values, infrastructure, and investments. To do nothing, or to continue the status quo, is not an option. ■

Author disclosures are available with the text of this letter at www.atsjournals.org.

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ACE2 Elevation in Severe COVID-19



To the Editor:

ACE2 (angiotensin-converting enzyme 2) serves as the entry receptor for the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes coronavirus disease (COVID-19). ACE2 is also the key enzyme of the *alternative* renin-angiotensin

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Supported by the Austrian Science Fund (FWF grant KLI 861-B) and by the Medical-scientific fund of the Mayor of the federal capital Vienna (grant MA 40-GMWF-COVID027).

Originally Published in Press as DOI: 10.1164/rccm.202101-0142LE on February 18, 2021