Remote Work During the COVID-19 Pandemic: Making the Best of It

Introduction

Since late 2019, Corona virus disease 2019 (COVID-19) has spread throughout the globe, with infections numbers in the tens of millions, and deaths at hundreds of thousands and counting. To delay and reduce these numbers, unprecedented widespread shutdowns and policies were issued, which eliminated the majority of face-to-face interaction. As a result, businesses and organizations were forced to work remotely, including non-COVID-19-related scientific research. In March of 2020, we had to quickly count our losses and figure out how to work as scientists without a laboratory for days uncounted. Although these restrictions begin to ease and scientists return to the laboratory, we reflect on what we learned and what we can take with us moving forward (FIGURE 1).

In the current age, capabilities for scientists to work remotely have never been better. Collaborative communication platforms allow for workers to maintain a sense of normalcy in collaboration with colleagues. Likewise, cloud sharing and analysis software provide us with many of the same electronic capabilities that used to only be available in the laboratory, including data and idea sharing, access to journals and literature for scientific writing, and other data analysis tools to continue with their projects.

Although scientists have always been agile and innovative, we ask a number of underlying questions: What can scientists do when working away from the laboratory? What impact will this shift to remote work have on science as a whole? How will remote work affect the subsistence of us scientists? It has become clear that COVID-19 has impacted the scientific community and will likely alter how scientific research is conducted in the future, with some features likely changed permanently. Here, we offer some perspectives from each member of the laboratory toward the goal of beginning to answer these questions.

Senior Faculty

Science is interactive by nature, and most of my innovative project planning results from in-person interaction with colleagues, students, and laboratory staff. However, many new platforms have been developed for simulated face-to-face meetings, which have become the norm during the COVID-19 pandemic. This has allowed our collaborations, work groups, conferences, and study sections to continue, now with a new face. Although most of us senior faculty are not routinely in the laboratory conducting experiments, we must rather spend time writing grant proposals, manuscripts, and other activities that function to keep the laboratory productive. We are able to do this as well as other activities, including mentoring of graduate students and postdoctoral fellows online, with little to no effect on productivity. Teaching is also easily conducted online; however, keeping class activities moving forward can be difficult without face-to-face interaction.

I have found that senior faculty are faced with another interesting role that many are not trained to conduct, which involves counseling of junior faculty during a period that none of us have ever experienced. Most senior faculty have built up enough additional data and experimental results that manuscripts can be worked on during the pandemic; however, newer faculty do not have the luxury of having additional “banked” work that can be prepared for dissemination. It is important that senior faculty be the leaders among their scientific departments to shepherd junior faculty through these trying and uncertain times.

Junior Faculty

The many-year journey to tenure is a relentless balancing act. What was once dominated by bench work, now, bearing the faculty badge, we must simultaneously participate in meetings of all sorts, run the laboratory, manage personnel, and teach in the classroom and laboratory, all while squeezing in time for what matters most: writing grants and manuscripts. Although this lifestyle was not unexpected, many times the seemingly urgent tasks took up an entire week’s worth of time, while the grants and manuscripts lay unfinished. The successful junior faculty are the ones who prioritize these markers of progress over other things that may steal away focus. Thus, when universities began to close and research was put on hold, my list of daily responsibilities was drastically flipped; that is, now there was time for those grants and papers, since the many other tasks that could not be done from home had been pushed aside. We were forced to count our losses and make the best of the situation.

Balance during quarantine was a new game: conferences and talks cancelled, committees put on hold, laboratory business halted. Many who wished to spend more time with family were now forced to do so, with the closure of schools and daycares.
Half-written grants and manuscripts could now be completed, allowing for plenty of time for reviewing and re-reviewing. Post-quarantine, although not back to normal, I reflect on bringing daily rhythms toward the fundamentals of good science by spending time to read the latest literature, carefully plan experiments, and leave time for grant proposals and manuscript submissions. Junior faculty should take hold of this lesson learned in prioritization by bringing in our own sort of quarantine: taking time each day to turn off the “busy work” and focus on what matters.

**Laboratory Technician**

Remote work due to the onset of the COVID-19 pandemic may be more suitable for some than others. However, as a laboratory technician, we are required to generate data from experiments performed in the laboratory, and our work would naturally suffer from working remotely. Although there may be some benefits for the laboratory scientist forced to work from home, they are clearly outweighed by the drawbacks.

First, we can do sufficient work from home such as writing and data analysis; however, it’s clear that we are susceptible to experiencing loneliness and isolation from lack of face-to-face interactions. Texts, e-mails, and video calls may be the only forms of communications for the biomedical scientist. The many in-person, social interactions in the laboratory were taken away when working from home. The strong relationships I have built with fellow employees were put on hold: we have daily lunches with impromptu discussions about the science involved in our projects as well as banter about politics, sports, etc. In addition to the loneliness and isolation resulting from a lack of face-to-face contact, biomedical scientists specifically experience further frustration because they are precluded from physically conducting their experiments and properly analyzing the data. This cessation of data collection halts progress and is ultimately discouraging.

Due to the pandemic, I have had to adjust to this “new normal,” but there are some aspects of this that may be beneficial. First, I can work my own schedule with limited distractions, which may allow for better efficiency. Now that I can work limited hours, I work remotely in the morning, and I come in to work in the afternoon and evenings to complete laboratory work by myself. Although working from home may create feelings of isolation, it may also offer a less-stressful environment, since I am not being directly supervised and monitored. Having the freedom to work at my own pace in and out of the laboratory, I can take breaks, which reduces monotony and burnout. Therefore, I can be more productive, whether helping write a research paper or analyzing previously collected data. The emergence of the COVID-19 pandemic has forced biomedical scientists to work in relative isolation and has largely inhibited the advancement of their scientific discovery. Despite feelings of frustration and helplessness, I try to enjoy the freedom of working remotely but know that the dedicated scientist needs to be in the laboratory to be fully productive.

**Student Assistant**

Remote work presents a set of unprecedented challenges for student assistants. I am generally focused on daily bench work in the laboratory, but with COVID-19 regulations heavily limiting or altogether prohibiting students from entering the laboratory space, it has been particularly difficult to remain busy and productive. Many of my previous responsibilities have been halted, such as maintaining ongoing experiments and producing data using various wet laboratory protocols. The enormous reduction of normal laboratory duties created a feeling of a lack of purpose for many students in the laboratory, which is especially frustrating for students with time-sensitive projects that require in-person procedures. Student assistants are often the most transient form of help in the laboratory and thus require frequent training in laboratory techniques. Training opportunities have been limited to online tutorials and simulations, which may have negative consequences on the learning process and acclimation to the laboratory environment.

Although many of the student assistant’s normal responsibilities were paused during the quarantine period, we have tried to make the best of the situation and contribute to the laboratory in other ways. Many data analysis software can be operated remotely, enabling us to analyze previously collected data and prepare figures for publication. We have also been granted ample time to broaden our knowledge base of the field of study by reviewing the literature, with the encouragement and direction of mentors. I am sure this will give direction to current projects and create ideas for future projects. As a student interested in the biomedical sciences, it has been energizing to see the global community largely embrace and recognize the importance of biomedical research. This has undoubtedly reaffirmed my interest in pursuing a career in science.

**Potential Effects on Science Due to COVID-19**

Considering the majority of our basic science research involves hands-on techniques performed in the laboratory, the impact of these restrictions has been profound and has hindered the functionality of our laboratory greatly. This has been noted to be caused by the reduced teamwork capacity (1), which has been clear in our laboratory. For example, our current laboratory experiments have been paused, which has led to an inability to perform data collection. This cessation of data collection has resulted in the reduced capacity for data analysis and thus manuscript publications. This creates the potential for restrictions on in-person laboratory work to also have an effect on the work that we can perform from home as we now have limited possibilities to analyze specialized data remotely. Additionally, much of the training that is necessary to adopt new laboratory techniques has been delayed, which has an impact on scientists of all levels of expertise. Finally, despite a greater acceptance of remote communication, having to utilize video conferencing and e-mail as means of communication has led to significant delays compared with being able to converse directly in person with other laboratory members.

Despite these profound changes, our laboratory has found alternative ways to be productive. The onset of this unprecedented pandemic has particularly intrigued us, as we have begun to investigate how COVID-19 impacts our field of interest. This has led to many of our laboratory members analyzing the effects of the COVID-19 pandemic in our scientific field: cardiology. Additionally, we have found ways to contribute to the fight against COVID-19 by manufacturing test kits for our university. Moreover, due to
the lack of laboratory experiments and data collection, beginning to focus on literature reviews in the form of meta-analyses and reviews regarding data that already exists in the scientific community could be a productive use of time. This shift in research technique could allow us to identify knowledge gaps in the literature and adopt a more hypothesis-generating mindset that could provide intensive planning for experiments that can be conducted once laboratories reopen. Interestingly, the number of manuscripts, as well as grants, submitted to journals worldwide since the pandemic occurred has exploded, suggesting that scientists are utilizing the time away from the laboratory to research COVID-19 and/or submit lingering data (2, 4).

Conclusions

Is this the new norm or will things ever truly return to the way they were? As research fields begin to open back up, whether things will truly return to “normal” is cause for debate. The reality will likely come to fruition as a combination of the old norms and the new norms put in place by COVID-19 policy. Research that is essential to maintaining projects and can be conducted individually will be the first activities to be phased in, whereas less-essential in-person tasks, such as lunches and in-person meetings with colleagues, will likely be the last to be re-introduced, if at all. Face-to-face interaction will undoubtedly continue to be limited wherever possible in the laboratory. This means assurance that workers and their workspaces are socially distanced, meetings will continue to be conducted virtually, and all tasks with remote capabilities are required to be performed in this manner.

As current uncertainty about the future continues, it will become apparent what permanent effect COVID-19 will leave on the profession of science (Table 1). On one hand, it may have simply accelerated the inevitable by forcing many aspects of the field to go virtual. However, much of what a scientist does is hands-on in the laboratory and relies on direct collaboration among fellow scientists, for which there are no true remote substitutes. How these changes will affect scientific progress, and what changes will be permanent, are yet to be determined.

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