SRLs in a Global Pandemic: An Administrative Perspective

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IN March of 2020, we found ourselves in the midst of a global SARS-CoV-2 pandemic with severe health consequences and an alarming transmission rate. Central to the response to slow infectivity were the limitation of movement of people, incorporation of physical distancing, and use of personal protective equipment (PPE). These measures were implemented to different extents across a variety of industries. Here, we address the impact, challenges, and some steps taken by biomedical shared resource laboratories (also called research core facilities, or Cores) in areas that include operations (ramp down, closure, and ramp up plans), staffing (including staff training and engagement), productivity (including impact of supply chain issues), and financial implications. We focus here on an administrative viewpoint, and particularly on flow cytometry shared resources (Flow Cores). The guidance presented represents the collective experience of the authors. However, many of the pandemic-related issues and lessons learned can apply to all Cores and are also at various stages of implementation at other institutions.

SHUTTING DOWN RESEARCH AND THEN RAMPING BACK UP

Many academic Cores are associated with academic medical centers. As such, their staff can be considered “essential workers.” Therefore, local government restrictions on movement often do not limit core staff ability to travel from home to work to support onsite operations. Based on our experience, representing ten different institutions from a wide array of locations, and also on discussions with a large group of colleagues at diverse institutions, during the current pandemic crisis (from the local level to the international level), Flow Cores are offering a wide range of onsite operational availability, with some cores remaining fully operational while others were/are completely closed. In addition, there are those institutions which allow operations to continue only in support of essential experiments for institutionally designated critical research, such as COVID-19 related research.

For Flow Cores not completely shut down but limited to supporting approved critical research, proposals for research supported onsite by the core are first reviewed by a committee at most institutions. These committees are often at either a departmental or higher institutional level. Typically, these proposals are initiated by the investigator, often without prior discussion with the Flow Core Director or core staff who would need to support the research. Improved communication with the Core Director, preferably initiated at the investigator level, or if not, at a committee level, would allow for improved research support. Since the timing of flow experiments is often critical, direct communication and planning...
would allow the Core Director the necessary time to allocate available staff (if assistance is required) and to ensure instruments are in optimal working order.

In cases where an institution has implemented a complete shutdown, there is often only a very short time line given for the effective date of the shutdown. This places a burden on both core directors and core users to quickly prioritize existing experiments. In addition, core leaders have needed to quickly organize: (1) staff communications (e.g., laptops, remote connection, and preferred routes of communication); (2) mechanisms for remote data analysis support for core users during the shutdown; and (3) continued training for both staff and users.

For those institutions that have had a formal declaration of a “research pause,” there usually is a committee that focuses on a planned phased return to work (1,2). At some institutions, this is done at a departmental level, in others at a higher institutional level. Occupancy levels (most often based on square footage) for each room are determined (signage posted), often in conjunction with an institutional Environmental Health and Safety group. At many institutions, formal plans from individual researchers and Core Directors, indicating how they will manage their groups within any given occupancy limit, must be submitted for review by these committees prior to receiving permission to return to onsite work. Most institutions, and most Cores, develop and implement detailed physical distancing and infection control SOPs for essential activities. For Flow Cores, the plans always include procedures for cleaning the core’s instruments both before and after each use.

Timing of these phased returns differs among institutions but generally aligns closely with guidance from local governments. Most initial phase reopenings permit between 10% and 25% occupancy (in Cores where capacity was measured) and allow higher levels of occupancy in subsequent phases. Most Flow Cores in our eight institutions were up to 35% to 80% capacity by mid-August of 2020.

**STAFFING**

During this manuscript preparation, Flow Cores were operational, semi operational, or in closed modes. This had a major impact for Core staff on professional, personal, and emotional levels, only some of which is under the control of the Core Director. One major issue is how to engage staff currently working remotely when they previously have spent the majority of their work time onsite and at the bench. The authors remain impressed by the agility of the various Flow groups and organizations that organized a multitude of training sessions for various levels of engagement for both staff and users. Individual Core Directors engage staff with weekly online meetings and tasks. Some Core Directors initiated Flow Cytometry blogs, which staff could write articles (reviewed by the Core Directors), learn how to QC samples remotely, or plan future workshops. However, many Core Directors continue to be concerned regarding how this type of “learning experience” affects the training of very junior staff. Moreover, particular attention needs to be paid to staff who may experience feelings of isolation or depression during lock downs. In some communities, including in New York City, there were also incidences of racially biased attacks that created fear of commuting on public transportation for staff members (3,4). In response to these fears, ride-sharing can be created whenever possible.

For those labs that are partially closed or beginning to return to on site operations there are many challenges that need to be addressed with regard to staff; (1) physical distancing; (2) staggered schedules to meet child care and other personal needs; (3) suitable PPE; (4) general anxieties; and (5) managing user expectations. To address physical distancing requirements, most Flow Cores use electronic calendar booking systems per instrument. This can render a nearby instrument inaccessible during the booked time of a particular instrument. Whenever possible, Cores should reach out to building plant operations to try to identify alternative open space to move closely packed instruments, in order to optimize Core capacity.

Often building restrictions for people entering can hamper Core efforts, and many cores are initiating sample drop off only, with analysis being performed by Core staff after meeting the user and obtaining the samples. Vendor instrument maintenance has also become an issue, with some institutions requiring documentation of COVID-19 status of vendor staff prior to service, or in some cases, not allowing service engineers traveling from COVID-19 “hot spots” to come onsite to perform service.

During most stages for return to onsite work, expectations of staff involvement in Core activities seem to vary, from voluntary on campus presence, to mandatory, at least for activities that can only be done on site. These transitions seem to be progressing well, as most staff would like to return to some sense of normalcy, particularly when flexible accommodations can be made to suit their needs while contributing to Core productiveness. For staff who were more reluctant to return, many Core Directors turned to partnerships with their Human Resource department, which many found to be helpful.

**PROCUREMENT/SUPPLY CHAIN ISSUES**

Supply chain issues impact deviated the most among the institutions represented in our group. Global competition for PPE fueled sales to the highest bidder and subsequent loss of product from previously reliable major vendors. Most sources for these goods are in China and South East Asia, and flooding in China also contributed to interruptions in the supply chain. For Cores, the major impact is usually significantly higher costs to the Cores that is often not covered by their budgets. However, at some institutions, costs of ethanol and PPE are covered by a COVID-19 expense account across the institution.

Supply chain issues impact is lessened when institutions provided a centralized ordering system available to all across an institution. However, at some institutions, PPE is
sequestered to meet hospital needs first. N95 masks in particular are in short supply and often require vetting through Biosafety to determine if there was a true safety need. In some cases, both individual research labs and Cores have access to donated materials that were not appropriate for hospital use. Thus, strong partnership with the supply chain team at every level seems to ease the procurement of supplies if not the cost.

**FINANCIAL IMPACT**

Core Facilities have a mission to provide research support while remaining fiscally sustainable. During the current pandemic crisis, the research pauses, physical distancing in core space, and staff availability impact practically all service levels within Flow Cores and thus have directly impacted Core revenues. The financial impact varies per Flow Core (whether it be assisted or unassisted services), is related to the extent to which a Core can provide services, and in some cases is compounded by the extent of the research pause in basic, translational, clinical research and in clinical trials. In general, Cores are considered business units with the mission to provide the highest quality research support while maintaining fiscally sustainable.

Another area of variation is how individual institutions address these revenue deficits. In some cases, layoffs or furloughs of varying degrees have put in place. In some cases, pricing adjustments will be implemented. Core Directors are also exploring alternatives to costly service contracts. In addition, some institutions are willing to implement a window of 3 years to determine how best to address Core financial shortfalls. Moreover, some institutions are implementing a COVID-19 forgiveness plan where the institution will absorb the Core debt during the fiscal year. In the cases of most forgiven plans it is based on prior year (2-3) recoveries as compare to the pandemic year with the per cent variance translating to the forgiveness rate.

It remains to be seen what happens to capital equipment budgets and priorities. Across most institutions, all current capital expenditures are halted, and hiring is basically frozen. In addition, there is a general lack of willingness to commit to any major expenditure at the current time for 2021 equipment. Many institutions have spending restrictions in place for travel for an indefinite period of time. In addition, depending on the institution, merit increases, and bonuses may be withheld and pay cuts may be introduced.

**LESSONS LEARNED**

We have presented a range of issues affecting all Cores that arose during the ongoing global pandemic crisis, particularly from the perspective of maintaining business operations and fiscal sustainability. This crisis has highlighted the critical need for business continuity planning in the event of disruption of normal operational activities to help minimize the impact on Core business, regardless of the incident, by planning how to return to normal operations as quickly as possible. Contingency planning is an important part of any Core business continuity plan, as it should allow for dynamically sensitive changes in work flow and communication within any given Core and should be tailored to each individual Core. In general, contingency plans provide options for shifting approaches to daily operations and support business continuity (5,6).

Core contingency plans should be based on strong institutional partnerships. We are learning from our experience during this crisis that it is possible to at least partially support the research enterprise while working remotely. Robust IT support before and during a crisis is critical to maintain best function. Supply chain partnership is another important consideration. Partnering with a centralized supply chain team may offer advantages, since they have the ability to make commitments for bulk purchasing. Trained staff is one of the most valued resources for a Core and establishing a close relationship with HR can provide training and tools that can help Core Directors work with staff during times when not only is work life upended but personal life as well.

Finally, the heart of all Cores is communication and collaboration, and strong communication and collaboration between Core Directors, core staff, the research investigators who use cores, and institutional leadership, should be clear and continuous throughout the crisis, to allow Cores to effectively support research.

**ACKNOWLEDGMENT**

The development of Flype has benefited from the continuous feedback from Drs. Mir B. Alikhan, Kathy A. Mangold, and Nora E. Joseph and from Mike Akroush, MS. We also acknowledge technical support from Charlie Cron, Eric Cron and the rest of the Unix team in our Health Information Technology department. The authors gratefully acknowledge the support from multiple anonymous Foundations.

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Julie Auger: Writing-original draft; writing-review and editing. Diane Tabarini: Writing-original draft; writing-review and editing. Luellen Fletcher: Writing-original draft; writing-review and editing. Shawn Frackowiak: Writing-original draft; writing-review and editing. George Grills: Writing-original draft; writing-review and editing. Victor Lemas: Writing-original draft; writing-review and editing. Sheenah Mische: Writing-original draft; writing-review and editing. Marta Montiero: Writing-original draft; writing-review and editing. Andrew Vinard: Writing-original draft; writing-review and editing. A. Nicole White: Writing-original draft; writing-review and editing.

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