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**Inter-Institutional pain learning exchange (PLEX):**

*Virtual opportunities for learning and collaboration in chronic pain fellowships during the COVID-19 pandemic and beyond*

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**Running Title: Virtual Educational Collaboration Among Pain Fellowships**

**Introduction:** Opportunities for collaboration and learning not previously available arose with the arrival of COVID-19 in the United States. Online learning/meeting platforms became the norm (Gegenfurtner), removing a barrier that has historically prevented academic medicine from group collaboration that corporate America has long since overcome (Choudhury P). That, along with general unease, allowed separate academic institutions to move past the challenges of tradition, competition, and physical distance to begin expanding educational opportunities in new ways leading to increased innovation and scientific advancement (Nerantzi). With this in mind, the pain fellowship at the University of Washington reached out to similar pain fellowships nationwide to establish a learning platform to mitigate the reduced hands-on learning opportunities, to offer networking opportunities for both fellows and faculty, and to share ideas and practice styles. Though it was impossible to replace the hands-on experience of direct patient care, this program proved to be effective and well received in other areas vital to the development of future leaders in the field. It provided an educational depth not previously available with no financial costs either to the trainees or participating universities. On top of educational opportunities, this program helped to mitigate the stress associated with potential lost educational time through the provision of a connection to the fellowship and faculty and a consistent daily routine, vital to trainee well-being at the time (Russell). During the initial wave of the pandemic, there was a wide variety in fellowship training experience resulting in an unraveling of the generally standardized training paradigm (Orhurhu). Cohen et al recommended maintaining a daily schedule of activities and the development of proactive approaches to continue working from home as part of an effort to limit the deleterious effects of quarantine on health care workers. The educational advantage of this didactic became a valuable addition to the

participating fellowships and, with some modifications to the schedule, continues on in conjunction with clinical duties.

**Methods:** Recognizing the potential impact of the pandemic, the University of Washington (UW) Pain Fellowship Program identified 11 other Pain programs nationally and reached out via email addresses obtained through fellowship websites. The initial contact email sought to engage the other programs in a collaborative learning process to support the education of the fellows. Brigham and Women's Hospital (BWH) Pain Medicine Fellowship responded and the two programs quickly developed a daily, Zoom based didactic designed to provide both formal learning opportunities and institutional collaboration. The pain fellowship programs from Boston Children's, Johns Hopkins and Cedars-Sinai joined approximately three weeks after the initiation of the program.

The curriculum was designed to meet for one hour per day (noon EST, 9am PST) Monday through Friday. Three days per week were reserved for faculty lectures (Monday-Wednesday) while two days per week were reserved for fellow-led presentations of difficult cases related to the lectures (Thursdays) and journal club (Fridays). On the days that fellows led the discussion; support was provided by a faculty mentor. A shared document was created through Google Drive in which faculty and fellows could sign-up to give lectures and presentations. As a primary goal was to quickly initiate an educational program to mitigate lost learning opportunities, a formal curriculum was not designated, and lectures were not assigned. Faculty were able to sign-up for a day(s) and present on a topic of their choice. The program officially launched on March 30<sup>th</sup>,

2020. In order to assess the quality of the program and obtain real-time feedback of the didactic for targeted improvements, we developed an anonymous survey. It was undertaken at the end of the first week (April 3<sup>rd</sup>, 2020), for immediate feedback, and after the 3<sup>rd</sup> month (July 1<sup>st</sup>, 2020), to guide directions on how to proceed with the program. The survey was designed to assess 3 primary domains: collaboration, education and networking. The section focused on collaboration was inspired by the IDEA Partnership Success Rating Scale which identifies areas of effective partnerships and determines where additional support could be added (Idea Partnership).

**Results:** At initiation of the program, an average of 20-25 participants were present for each didactic increasing to a peak of 46 participants in May 2020, after additional programs joined the collaboration. Two anonymous surveys were sent out and the program directors held focus groups with fellows. The first survey was brief and used to inform curriculum planning in real time as the series progressed while the focus groups were designed to more clearly delineate fellow attitudes toward the program. The second survey, which we are reporting on, was more formal and was completed by 31 participants. Twenty-seven respondents had been participating in the collaboration for longer than 4 weeks and the majority (n=27) were either an attending or a fellow physician. According to the first survey, at the initiation of the collaboration, 20 respondents were participating 5 days per week. However, at the time of the second survey, when many clinics had reopened in at least some capacity, that number had decreased to 8 with a near even distribution between those attending anywhere from 1-5 days per week. Given the decline in attendance, participants were surveyed regarding continuation of the program. Nearly all preferred to continue, though at a decreased frequency, 1-2 days per week (58.1%) or 1-2 days per month (38.7%). Ninety-three percent either agreed or strongly agreed that the program

was valuable to their growth as a pain specialist with over 96% of participants indicating that continuation of the collaboration would be beneficial beyond pandemic times. Finding ways to encourage fellow engagement and networking was a challenge with 83.8% of participants reporting that there were sufficient opportunities for fellows to engage with other fellows with 6.5% neutral and 9.7% disagreeing. The lecture format was popular with 100% reporting that they found them helpful. Ninety-six percent found case reports helpful and 93.5% found journal clubs helpful (Figure 1 – Collaboration and education). When asked which type of didactics participants would like to continue to have in the post-COVID era, 87% wanted to continue with faculty lectures, 67.7% with case studies, 58% with journal clubs 48.4% with faculty debates, 29% with board review questions, and 16.1% with jeopardy (Figure 2 – Most beneficial didactics).

**Discussion:** After completing 3 months of the program and evaluating it through surveys and focus groups, we determined that the overwhelming majority of the participants felt that the program was valuable both to their education and their growth as specialists in pain medicine. Fellows also identified the importance of maintaining connection to the fellowship that the program provided. The PLEX program created consistency and opportunity for novel learning at a time where stress was elevated due to the potential for lost educational experience and lack of clarity on if completion of the fellowship in the year would be possible. Further, there was a general consensus that the collaborative nature and ability to learn from a diverse field of experts added a unique opportunity not previously available in the fellowship education and that it would be ideal to maintain a similar program outside of the Covid-19 pandemic.

*Feasibility:* The program was quickly developed to meet the rapidly changing needs of the fellows. As such, there was an inherent understanding between those participating that challenges and troubleshooting would be expected. There was also an understanding that the program would be flexible and continue to adapt to the changing landscape of the pandemic. At the inception of the program, the limited outside demands on the time of those participating enabled early engagement and focused opportunity to trial variable programs and strategies. As clinics became busier, it became challenging to create protected time across the institutions. It became apparent that having a daily moderator was essential to ensuring the success and flow of the program. Similarly, it was important to have an identified individual at each site responsible for confirming that daily lecture slots were filled and for supporting connections between fellows and faculty. This role was undertaken by the program fellowship directors with additional support from the identified moderator, a distinguished faculty member who was able to be present at all lectures. This ensured that there was someone engaged from each institution who was focusing on both facilitating connections, introductions and collaborations across institutions as well as ensuring that there was a diversity of presentations and presenters involved in the program. It also became apparent that administrative support was essential for a daily didactic. While the shared Google document worked well for individuals to sign-up to give lectures, without administrative support for confirmation, it was possible for people to either miss their time slots or for slots to go unfilled. In response to this, a fellow from each program was assigned to take responsibility for necessary reminders and internal communications in their respective institutions. This was an easy and effective solution at the time but, when clinics began to open and fellows had additional responsibilities, it became apparent that having

dedicated administrative support would be essential to ensure smooth functioning of the program.

From a logistical perspective, the time difference between Eastern Standard Time (EST) and Pacific Standard Time (PST) was a consistent scheduling challenge, particularly when clinics resumed normal operations. Also, as new programs joined, orientation to the program and expectation setting was required to ensure shared understanding of the agenda and goals of the program. As such, it was important for the organizer to take time to orient and introduce the participants from the new programs.

While the overall feedback regarding the structure and function of the program was positive, challenges were identified. Specifically, though technology made the collaboration possible, the web-based platform also impeded active discussion for both didactic and non-didactic presentations. For some, it was difficult to engage in discussion because they were unsure when it would be appropriate to interject, others were managing family responsibilities simultaneously and still others expressed being inherently uncomfortable speaking up in an unfamiliar environment. With the reluctance of participants to activate their camera, presenters felt as though they were presenting to a non-existent audience.

Attempts to mitigate challenges with active participation included encouraging individuals to keep their videos on in order to support attention, visual feedback for presenters and a sense of



community engagement as well as defining a specific moderator to manage time and ensure presenters were aware of questions and comments. Presenters were also provided educational materials to support engaging in active teaching styles over an online platform. Specifically, presenters were encouraged to include questions throughout their lectures to facilitate discussion, polling features and variable presentation styles (eg. traditional lectures, debates between faculty members, jeopardy, journal club) to support interaction, mentorship of fellows assisting in presentations to increase engagement and understanding, and utilization of communication features through the platform to generate questions and conversation. With initial adjustments, we did note an increase in discussion and use of platform functions to pose questions and comments.

*Curriculum:* With respect to the specific components of the program, participants particularly appreciated that there was not a set curriculum. The open scheduling allowed faculty to provide lectures on topics that they were passionate about, thus creating more dynamic and engaging presentations. Similarly, this allowed presenters to share both their expertise and their current work which was beneficial to understanding the current state and directions of the field. This approach did require that individuals actively sign-up and be willing to participate and offer their expertise. We found that faculty and fellows were more than happy to do so. While fellows recognized that the lectures being given may not specifically follow the core curriculum set by the ACGME, which the board exam is based on, it was considered far more valuable in terms of being prepared for future practice.

Participants also valued that the curriculum included time each week for non-didactic presentations. At the beginning of the program, the non-didactic presentations included case study and journal club presentations by the fellows. After the initial survey and focused feedback sessions with the fellows, additional non didactic presentations were added in order to provide additional diversity to the curriculum. These included debates in which faculty members presented research from opposing sides of an issue, board review questions and jeopardy. The inclusion of weekly time for educational formats intended to spark discussion and provide space for engagement with faculty and fellows from other institutions supported increased collaboration. It also provided opportunity for mentorship as the fellows worked with faculty across institutions on the presentations. In particular, participants reported that the lectures, cases studies, journal clubs and debates were most valuable to their growth and that they appreciated that the interactions and discussions fostered an environment where everyone could learn from the different perspectives and management styles of the individual programs.

*Future Directions:* As the pandemic evolves and fellows and faculty have increased obligations, the program continues to be modified to maintain the spirit of collaboration and novel learning that this program has initiated. Since this didactic is an international venue, a new objective was added to the goals of the program, “To advance the careers of associate and assistant professors”. Currently, the program has evolved to mimic the experience of a guest speaker and represents a supplement to traditional fellowship curriculum. Each month, one of the participating fellowship programs invites a guest speaker to record a 30-45 minute lecture on their work. The fellows then watch the lecture and convene on the second Monday of the month with the “guest speaker” for an hour long unrecorded Q&A. Currently it is held at noon Pacific Time, however as more

programs from across time zones join, more sessions will be added. This format allows for continued cross-institutional engagement but with more flexibility; allow fellows to prepare, encouraging more engagement; and supports the use of the library of recorded lectures, a valuable resource. As more industry sponsored virtual didactics become available, virtual burn-out is something to contend with. As an interventional field, pain medicine does collaborate closely with industry, especially with regards to new technologies. However academic institutions will have to prioritize and make space in already busy schedules for fellows to have access to well rounded, unbiased, academic didactics.

**Lessons Learned:** Early on, the importance of flexibility was recognized as essential to meeting the needs of the participants during the pandemic. Logistics such as determining the best meeting time despite variable time zones and ensuring the participation of faculty speakers made it clear that administrative support was essential to the successful functioning of the program. The importance of having a skilled moderator to facilitate conversation and collaboration and ensure a shared agenda between programs, particularly as new programs joined, was also quickly identified as essential. While the virtual platform did hinder robust discussion initially, through the support of the moderator, use of interactive teaching tools and differing styles of presentation, participants were able to more effectively engage with one another. Further, enabling faculty to choose their topics of presentation rather than having a defined curriculum provided more dynamic interactions and dissemination of the most current information in the field.

While it cannot be a substitute for hands-on learning, essential in a procedural fellowship, the PLEX program has been highly valued as an original and previously unavailable educational opportunity. Further, it has created a unique community for fellows and faculty to learn about diverse topics from a range of individuals and institutions that are at the forefront of the field of pain medicine.

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## Figure Legends

Figure 1. Collaboration and education. Stacked bar chart summarizing answers to survey questions about the collaboration and education components of the program.

Figure 2. Most beneficial didactics. Stacked bar chart summarizing didactic preferences.





