Collaboration Platforms in China for Translational and Clinical Research: The Partnership Between Peking University Health Science Center and the University of Michigan Medical School

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Abstract

Problem

Clinical and translational research is increasing in China, attracting faculty-to-faculty collaborations between U.S. and Chinese researchers. However, examples of successful institution-to-institution collaborations to facilitate this research are limited. The authors describe a partnership between Peking University Health Science Center (PUHSC) and the University of Michigan Medical School (UMMS) designed to enable faculty-initiated joint translational and clinical research projects.

Approach

In 2009, UMMS leadership identified PUHSC as the most appropriate institutional partner, and the Joint Institute for Translational and Clinical Research was established in 2010. Each contributed $7 million for joint research projects in areas of mutual interest. A shared governance structure, four thematic programs (pulmonary, cardiovascular, liver, and renal diseases), three joint research-enabling cores, and processes for awarding funding have been established along with methods for collaborating and mechanisms to share data and biomaterials.

Outcomes

As of November 2015, 52 joint faculty proposals have been submitted, and 25 have been funded. These projects have involved more than 100,000 patients in the United States and China and have generated 13 peer-reviewed publications. Pilot data have been leveraged to secure $3.3 million of U.S. extramural funding. Faculty and trainee exchanges take place regularly (including an annual symposium), and mechanisms exist to link faculty seeking collaborations. Critical determinants of success include having co-ownership at all levels with coinvestment of resources.

Next Steps

Both institutions are committed to continuing their support with a repeat $7 million investment. Next steps include initiating studies in new clinical areas and pursuing large clinical intervention trials.

Problem

Medical schools in the United States have been increasing their emphasis on translational and clinical research through participation in initiatives such as the National Institutes of Health's (NIH's) Clinical and Translational Science Awards program. China has appeared as an attractive partner for the U.S. research enterprise, and funding opportunities to support collaborative research are available.[1] China's population is roughly four times the size of the United States', its health system is predominately controlled by the central government, and its social demographics are rapidly changing, which make partnering with Chinese researchers to access the patient populations necessary for research of potential interest to U.S. researchers.

The Chinese government has been increasing its support for biomedical research. While such support has historically been dominated by industry, the annual growth rate for biomedical research and development expenditures by government between 2007 and 2012 in China was 32.8%, compared with a decrease of 1.9% over the same period in the United States.[2,3] A growing number of entities are being established to advance biomedical research in China, including private companies such as the Beijing Genomics Institute.[4] One of the largest sources of financial support is the National Science Foundation of China, which allocated 90 billion renminbi ($13.5 billion) in 2010 for projects with potential clinical applications.[5]

U.S. institutions have been collaborating with institutions in China for the purposes of medical education and research for over 100 years, such as in the codevelopment of Peking Union Medical College (with support from the China Medical Board and an endowment from the Rockefeller Foundation) at the turn of the last century.[6–9] Drivers for these collaborations include access to students and trainees, as well as a research environment that can be less costly than in the West. Yet examples of successful institution-to-institution collaborations to facilitate clinical and translational research are limited.

Institution-level collaborative partnerships across cultures are not without their challenges, however, including differences in governance structures, funding mechanisms, protocols regarding human subjects protection, data integrity, authorship criteria, and intellectual property laws. Furthermore, differences in languages and time zones can present practical challenges to communication. Untested assumptions about how things work in one institution are often erroneously generalized to the partner institution. Conflict resolution is typically based on culture and can become problematic if not dealt with directly but diplomatically. Finally, collaborations between individual

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investigators can suffer in the absence of supportive, enabling institutional leadership, whereas collaborations only between leaders can lack the grassroots enthusiasm of investigators necessary to embrace innovative opportunities.

It is for these reasons that the University of Michigan Medical School (UMMS) set out to establish a new institution-to-institution collaborative platform in China to facilitate faculty-initiated joint clinical and translational research projects. In this report, we describe the establishment of this platform and the outcomes as of November 2015.

Approach

In January 2009, an analysis was completed at UMMS to identify publications authored by UMMS faculty in collaboration with authors at non-U.S. institutions. The results showed that faculty from Chinese academic institutions were the most likely foreign coauthors. To explore mutual interest in an institution-to-institution platform, in August 2009 a leadership team from UMMS visited the four institutions in China with whose faculty UMMS faculty had the greatest numbers of joint publications. A collaboration between UMMS and Peking University Health Science Center (PUHSC) was identified as holding the most promise for three reasons. First, leadership at PUHSC includes oversight of its eight hospitals, a model that parallels leadership at the University of Michigan Health System, which has oversight for UMMS and its four hospitals. Second, there was a mutual desire to fund pilot clinical studies as well as core functions to facilitate research. Finally, three focus areas of diseases (i.e., thematic programs) of interest to both institutions were identified: cardiovascular disease, liver disease, and pulmonary disease.

In October 2010, the Joint Institute for Translational and Clinical Research (JI) was inaugurated with the signing of a memorandum of understanding.[10] Seven million dollars of funding was provided by UMMS (from the dean's office and Department of Internal Medicine discretionary funds), and $7 million was provided by PUHSC (from the Office of Research and affiliated hospitals) to be spent within their respective institutions on joint projects and three enabling cores. (Each of the enabling cores was designed and is managed jointly by faculty at UMMS and PUHSC. These cores are overseen by an executive committee at each institution, and the executive committees are coordinated by the codirectors of the JI [J.C.K. and W.F.] who report to an executive board, as shown in Figure 1.) An agreement outlining the governance of the JI decision-making process, authorship, and intellectual property was defined and agreed on by the legal offices of both universities. Furthermore, the goals by which success would be measured at five years were clearly articulated and agreed on by both sides. The overarching goal of the JI is the generation of collaborative studies that can be leveraged for external funding with results that will improve the understanding of diseases of mutual interest.

One of the foundational aspects of the JI is that all decisions are made jointly. For example, the executive board and the executive committee consist of leadership from both institutions and operate with a clear understanding that all decisions, including the dispersion of funds, will be agreed on by both institutions. Another defining element is that collaborations are initiated and take place at the investigator level, most often within the thematic programs co-led by investigators from both institutions (Figure 1). The third defining component is the three enabling cores that have been established to facilitate the research, collaboration, and desired culture of inquiry. As indicated above, each core is co-led by designated faculty (with staff assistance) from each institution; these faculty are separate from the faculty directing the thematic programs or the investigators on funded projects.

Of the total $14 million, 20% was set aside to fund the cores, travel, and administrative expenses. A decision was made to not invest in buildings or jointly owned structures.

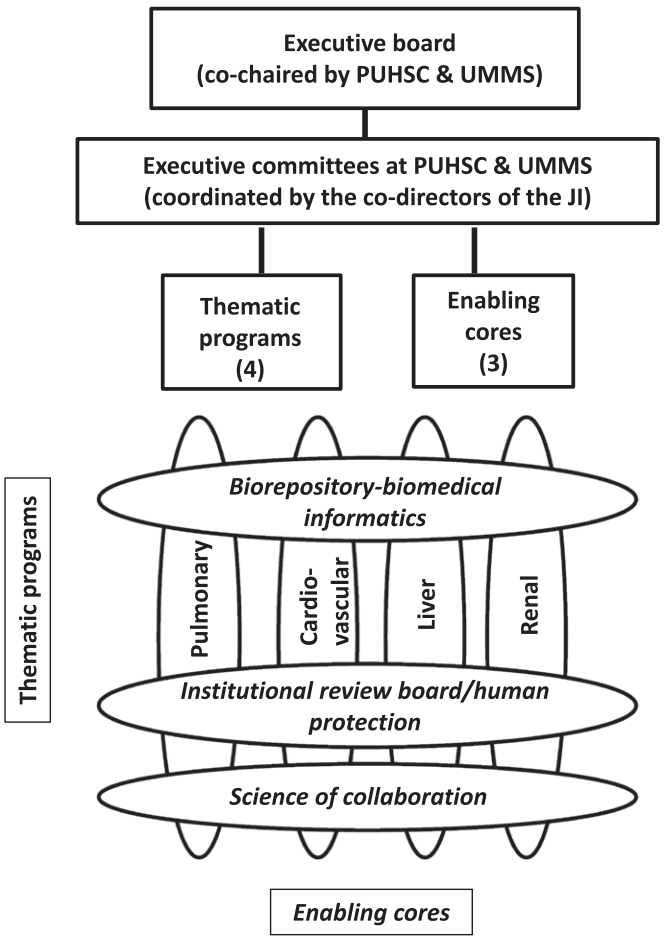

Figure 1 Governance structure, thematic research programs (disease focus areas), and enabling cores of the Joint Institute for Translational and Clinical Research (JI), a collaborative platform between Peking University Health Science Center (PUHSC) and University of Michigan Medical School (UMMS) to facilitate faculty-initiated joint translational and clinical research projects.

Enabling cores

The biorepository and biomedical informatics core defines processes by which research data and biospecimens are collected, stored, and jointly used. One example of this core's work is the installation of computing clusters in China and in Michigan to synchronize data so that they are easily accessible to researchers at both institutions.

The institutional review board (IRB) and human protection core facilitates IRB review and approval processes at each institution. In 2010–2011, leaders from the respective institutions' IRBs made reciprocal visits and held regular videoconferences to exchange processes and familiarize each other with local rules, regulations, and practices.

Perhaps the most instrumental enabling core is the science of collaboration core, which was established to enhance communication, to identify opportunities (i.e., connect faculty with mutual interests), and to work through problems and barriers as they emerge. The work by this core includes the facilitation of regular videoconferences between co-leaders of cores, programs, and projects; coordination of the request for proposals process; oversight of peer-review processes for submitted proposals; coordination of visits and exchanges; and organization of an annual joint symposium that alternates between PUHSC and UMMS each fall.

Funding process

Since January 2011, four calls for proposals have been issued, soliciting applications for full awards (funding up to $800,000 for two years) or discovery awards (funding up to $200,000 for two years). Applications must be jointly submitted by UMMS and PUHSC faculty. Prior to submitting a full proposal, investigators are required to submit an abstract to each executive committee, which will consider whether the concept pertains to a disease of importance to both countries and has the potential to generate pilot results/data that could be leveraged to secure external funding. Because of significant faculty interest at both institutions, renal disease was added in 2011 as a fourth area of focus. In 2012, it was also determined that a limited amount of funding should be set aside for "exploratory areas" outside the four thematic programs.

After the initial abstract review, investigators receive feedback on how to optimize their chances of success and are invited to submit a full proposal. The full proposal is evaluated independently by peer-review boards from the Institute for Clinical and Health Research at UMMS and the Office of Research at PUHSC. The relative merits of the proposal are reviewed, and constructive comments are provided. The investigators then have an opportunity to respond to the comments and improve their proposals before the final rankings are determined by the internal review committees. These rankings are submitted to the leadership of the executive committees, who discuss and reconcile any differences in the rankings and make decisions on funding.

Outcomes

As of November 2015, 52 full proposals have been submitted for review, from which 25 have been selected for funding (Table 1). To date, these JI-funded projects have involved more than 100,000 patients in the United States and China and have generated 13 peer-reviewed publications (for a list of publications, see Supplemental Digital Appendix 1 at http://links.lww.com/ACADMED/A350). In addition, these projects have secured two NIH awards, one collaborative award with the NIH Fogarty Chronic Disease Network, and one industry award, for a total of $3.3 million in U.S. extramural funding. A fifth round of JI funding is under way to disperse the $3.2 million

Table 1

Summary of Projects Funded by the Joint Institute for Translational and Clinical Research[a] and the Outcomes, April 2011 Through November 2015

Thematic program	No. of projects funded: Full awards[b]	No. of projects funded: Discovery awards[b]	JI funding	Research cohort[c]	Publications[d]	Extramural funding secured[e] (source)
Cardiovascular disease	8	2	$4,846,295	13,608	8	$1,090,000 (NIH)
Liver disease	3	0	$1,839,285	1,816	3	$1,476,731 (industry)
Pulmonary disease	2	1	$1,566,150	88	1	$600,000 (NIH)
Renal disease	1	3	$799,489	86,719	1	
Exploratory areas[f]	0	5	$1,028,936	1,610	0	$150,000 (NIH)
Total	14	11	$10,080,155	103,841	13	$3,316,731

Abbreviation: NIH indicates National Institutes of Health.

[a]The Joint Institute for Translational and Clinical Research (JI) is an institution-to-institution collaborative platform to facilitate faculty-initiated joint clinical and translational research projects. The JI partners are the University of Michigan Medical School and the Peking University Health Science Center.

[b]Full award funding is up to a total of $800,000 for two years. Discovery award funding is up to a total of $200,000 for two years. Each institution contributes equally to each award.

[c]The cohort differs for each study, but for the studies in the four thematic programs collectively, 60% of the patients have been from the United States and 40% from China. The five exploratory area studies, however, have not yet involved any patients from the United States.

[d]For a list of publications, see Supplemental Digital Appendix 1 at http://links.lww.com/ACADMED/A350.

[e]This funding external to either institution was secured with data or activities generated by JI pilot funding. Only U.S. and international industry sources are listed because all funding within China ultimately comes from the government in block allocations.

[f]These are areas that were not part of the four thematic programs identified as the priorities for the JI. They include radiology, human genetics, psychiatry, emergency medicine, and surgery.

remaining to be invested in new proposals.

In addition, the JI has established a culture of collaboration by involving approximately 300 individuals—including UMMS and PUHSC faculty, trainees, and students—to explore joint research and education opportunities. These individuals represent a majority of the academic departments at each institution. The JI has also attracted colleagues from other health science schools—including nursing, public health, dentistry, and pharmacy—to engage with JI initiatives. The annual symposium regularly attracts 50 or more visitors from the partner to the host institution. In the area of medical education, cooperation has been carried out through the exchange of students and trainees.

A number of challenges have been encountered and resolved, resulting in numerous lessons learned. For example, it is important to carefully evaluate the investigators' readiness to collaborate in addition to assessing the scientific merit of the proposals. High-quality communication is essential; attention should be paid to format (e.g., a preference for e-mail by investigators at UMMS vs. a preference for phone calls by investigators at PUHSC) as well as to optimal communication channels (e.g., more comfort among UMMS investigators in bringing problems forward to leadership relative to their PUHSC colleagues). Being explicit regarding good communication has been essential for bridging differences in approaches to authorship on joint manuscripts. Finally, obtaining the proper government approvals for transferring biological samples from PUHSC to UMMS requires patience and diligence to ensure that all proper procedures are followed. Only one approved project has been discontinued because of challenges that could not be resolved.

Critical determinants of success include having co-ownership at all levels with coinvestment of resources that remain in the respective countries but whose distribution is mutually determined. A commitment to building trust, working out differences, maintaining transparency, and being willing to see good intentions on both sides is essential. The engagement and participation of "boundary spanners" (i.e., individuals familiar with the language, culture, and practices of academic communities both in China and the United States) are also instrumental. Of the 10 members of our executive board, all 5 from PUHSC have had training in the United States and speak English, but none of the 5 from UMMS are native Mandarin speakers. Of the co-leads, codirectors, and funded PIs, all 36 from PUHSC have had training in the United States (one at UMMS) and speak English, and 18 of 32 from UMMS are native Mandarin speakers. Lastly, the need to define a communication plan up front with a process for resolving the difficulties that will arise cannot be overemphasized. This is in contrast to an approach that attempts to establish processes when a problem has arisen and is already altering the spirit of the relationship.

Next Steps

Both UMMS and PUHSC are committed to continuing their support of the JI with a repeat investment of $7 million from each side for a second five-year period (2015–2020), by the end of which we expect self-sustainability from extramural funds. Transitions in leadership will likely occur during this period, which will test the sustainability of the initiative beyond the enthusiasm of its founding board members. We are optimistic regarding the long-term success of the JI because this model has been deemed valuable by the presidents at both institutions and has gained wide support among faculty. In the future, the executive board will pursue large clinical intervention trials. Expansion into new clinical areas, specifically pediatrics and emergency medicine, as well as an emphasis on data science are also planned. We aim to position investigators to compete successfully for funding opportunities within China and the United States and to advance, through high-impact clinical trials, our mutual understanding of health and diseases that affect the populations in both countries.

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