

Capacity Building Using a Bi-Directional Model: University of Hawai'i at Manoa and the Federal University of Rio Grande do Norte - Santa Cruz Campus

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Health research is essential to improving population health, including by improving health service organization and delivery. However, global inequalities in health research capacity exist. In countries where there is substantial need for health improvements and health services, there is often insufficient infrastructure, money, and human capacity to develop such research assets.¹ This phenomenon is known as the 90/10 gap, where 90% of the health research products are from countries with 10% of the world's problems.²

To resolve internationally-connected health issues, such as the recent Zika outbreak, and to address global health inequities, it is urgent that efforts are made to build research capacity across the 90/10 divide. These can include improving scientific mentorship, and building sustainable scientific collaborations. Such efforts can include groups of colleagues working together on grant-funded projects and/or co-authorship of scientific articles. Other models to strengthen capacity through international collaboration range from graduate or post graduate fellowship programs to institutional collaborations within and between research institutions.³ Collaborative research is a potential way to improve health, scientific development, and reduce inequalities, particularly in many low and middle income countries.⁴

In this article, we describe a capacity building initiative using a bi-directional model between the University of Hawai'i at Manoa (UHM) in Honolulu, Hawai'i and the Federal University of Rio Grande do Norte Santa Cruz campus (UFRN-FACISA) in Santa Cruz, Northeast Brazil. This project was designed to improve the knowledge about the relationship between adolescent pregnancy and adverse health outcomes in older aged adults in Northeast Brazil. It specifically includes a research infrastructure capacity-building aim, including training of masters and PhD students. The bi-directional model, in this case, is when there are fully open lines of communication and collaboration between two sites (Hawai'i and Brazil), where leadership, resources, and capacity are shared, including students' efforts and professors' knowledge. This article focuses

specifically on the perspective of four of the students involved in this project.

Capacity Building and International Collaboration between Northeast Brazil and Hawai'i

In 2017, Dr. Catherine Pirkle at the UHM and Dr. Saionara Câmara at the UFRN-FACISA obtained a Fogarty International Center grant to study adverse life outcomes from adolescent pregnancy in Northeast Brazil. This partnership between UHM and UFRN-FACISA has its roots in an enduring relationship between senior researchers from the Physiotherapy Department at UFRN and the Université de Montreal in Canada, where both Drs. Pirkle and Câmara had mentors. Due to this previous partnership, Dr. Pirkle and Dr. Câmara started working together as students. These two researchers, now both junior professors, have published papers about issues in women's health^{5,6} and were well poised to work together on an NIH grant. The current research project in the field of maternal and child health has a dual purpose: bolster capacity using a bi-directional model and conduct a pilot study on adolescent pregnant women.

UFRN and FACISA

UFRN is located in Northeastern Brazil, one of the most impoverished areas of Brazil. Similar to the geographic challenges faced by those in Hawai'i's rural communities, many students in Northeast Brazil struggle to attend university because of the distance and cost of going to school in the major city of Natal, where the main UFRN campus is situated. To deal with this issue, the Brazilian government has created satellite campuses in rural regions across Brazil to support educational opportunities. This is part of a policy that aims to spread teaching capacity across the country, as well as to generate employment and reinforce the health system in the countryside. One satellite campus is located in Santa Cruz, a small city in the state of Rio Grande do Norte, about 122 km from the state capital, Natal. Since

its inception in 2008, FACISA offers undergraduate courses in nursing, physiotherapy, psychology and nutrition. In 2016, they added two new master's courses: one in public health and another one in rehabilitation sciences.

Another important service located in Santa Cruz is the University Hospital, Ana Bezerra, that receives patients from Santa Cruz and the neighboring regions for obstetric and pediatric care. It also receives UFRN students from different health fields for clinical experiences. Currently, the maternity ward has around 51 registered beds and it receives patients from other communities as it is a referral hospital for maternal health and pediatrics.

University of Hawai'i at Manoa

The Office of Public Health Studies (OPHS) at UHM is located on the island of O'ahu, in the city of Honolulu. Similar to UFRN, the UHM is a part of a wider academic system, with community colleges and satellite campuses on neighbor islands. Diversity and international relations are two important university resources, hosting students from all 50 states and over 150 countries. OPHS also hosts students and faculty from across the world, offering its students both international opportunities and opportunities to work in local communities. In this way, the two institutions involved in this collaboration have important overlaps with regards to student learning opportunities.

Our Bi-directional Model — A Student Perspective

In the bi-directional model, students from both universities working on this project were given the opportunity to do an international exchange. The project started off by including two students as research coordinators, one from each university, to help with daily tasks and keep the project moving forward. Additional activities to increase capacity and involve students included professors from both universities, including a PhD student from Brazil, teaching a class of about 30 students at UFRN-FACISA in basic epidemiology, research methods and ethics, interview methods, and how to take clinical, anthropometric, and biomarker measures. At the end of the course, five students from this class were selected as interviewers for a research study about adolescent pregnancy. The rest of the students will be tracked to assess if and how the class has increased their academic and professional opportunities.

A team meeting was held in March 2017 where the researchers and students involved in the project could collaborate, network, and have a chance to see the study site and the surrounding area. Researchers from Canada, Hawai'i, Natal, Santa Cruz, and other parts of Brazil, all with diverse experiences in epidemiological studies and various scientific backgrounds, participated in this meeting. The team discussed many aspects of the grant, including the study questionnaires, translation nuances, recruitment and retention strategies for the pilot study, new directions for biomarker development, module development for training, learning from other studies like the Pelotas birth cohort,⁷ and the International Mobility in Aging Study,⁸ student involvement in

the project, branding and marketing, and action points and next steps. Students were intimately involved in this team meeting and could give input from past experiences in projects, learn how to run a team meeting and coordinate multiple site visits, and present in front of the large team.

For travel to UFRN and to UHM, students received some funding from the Fogarty grant. Additional support was received from the graduate office of UFRN, which helped provide some overhead to cover the March 2017 team meeting. The Brazilian government also provided support for one of the PhD students to study at UHM for 6 months as a short-term visiting scholar. OPHS helped support one Master's student's visit to the team meeting in UFRN through a travel scholarship awarded by the Budget Committee. Because of this funding, students were able to experience new countries and schools and meet people with whom they may have life-long professional and personal connections.

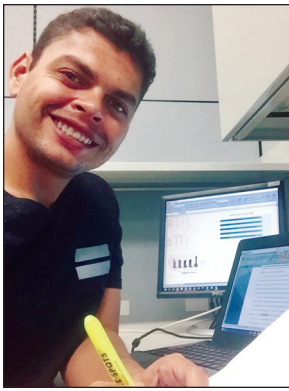
Future Bi-directional Model Applications

Using a bi-directional model for increased capacity building and networking can be helpful in other rural environments where health research capacity is limited. This model is most important in regions that have educational infrastructure, but lack resources such as adequate research funding and human resources around research to develop that specific capacity without additional input. A bi-directional model can easily be adapted into a multi-directional model with the introduction of more researchers and more collaboration opportunities. With the introduction of more researchers and collaborators, networks are expanded, as is the potential to build capacity. Under such models, students have the chance to be mentored by researchers with different backgrounds and a diversity of experiences. This project has included additional mentorship from researchers at The Hospital for Sick Children in Toronto Canada and the Federal University of Pelotas (UFPEL), Rio Grande do Sul, Brazil.

We now describe some of what each of the authors have gained specifically from the bi-directional model.

Cristiano Gomes

I am a PhD student in physiotherapy and short-term visiting scholar from UFRN staying at the University of Hawai'i for six months, under the direction of Dr. Catherine Pirkle within OPHS. As a PhD candidate, this program has offered me a multitude of great experiences. I have worked with a local team and have attended classes taught by UH professors, including courses on epidemiology, health policy, computer applications in statistics, and infectious diseases. Those courses are also taught at my home university, but from a different perspective. It was very interesting to be exposed to different teaching methodologies. The topics discussed in the infectious disease course were specifically useful, as Brazil is a tropical country where diseases like Dengue, Zika, and Yellow Fever are common. I hope to apply everything I have learned here with my own students when I return to Brazil.



Cristiano Gomes working on a literature review and data analysis at the OPHS office at UHM during his six month stay in Hawai'i.

At a personal level, taking part in this program also has its challenges. Finding yourself alone in another country can be hard; however, at the same time, it also gives you the chance to grow. This kind of program is about exchanging life experiences, meeting new people, learning a different language, and opening your mind to new cultures, flavors, colors, etc. Hawai'i has a very rich and unique culture, which offers an opportunity to rethink your own life, choices, and get stronger.

Jessica Filippoli

I recently completed an MPH in Epidemiology from UHM and the Office of Public Health Studies. I also worked as a research coordinator on this project. I had the opportunity to go to Brazil for a week through this project to visit the main campus of UFRN in Natal and the satellite campus in Santa Cruz (FACISA). I was lucky enough to stay with one of the PhD students working on the project. This experience gave me a different point of view of Brazil than I would have gotten as a tourist living in a hotel for the week.

My experience in Brazil, especially during the team meeting, helped to focus the experiences and learning I garnered during the previous 6 months collaborating with Dr. Pirkle and Dr. Câmara. Through my involvement, I have learned what it takes to build a research project from scratch and with an international component. It has made me want to continue to pursue a career in academia and research and has solidified my excitement and passion for public health. Engaging in the team meeting, pitching ideas to a room full of well-respected researchers, and having those ideas accepted is one of the best feelings a Master's student can have.



Jessica Filippoli with the research team in Natal, Brazil.

Ingrid Guerra

Being able to experience another culture is always enriching. This international exchange program has broadened my horizons and perceptions, and has given me the ability to learn about other languages, behaviors, and different social, political and economic issues. Having the chance to be a part of an international experience in the health field was enlightening because it gave me the opportunity to be informed about a new medical system. In addition, this type of international exchange opens the door to collaborate and learn scientific and personal skills from a diversity of experts in a different setting. And, I believe the opposite may be also true in that others may learn from me. Furthermore, new research partnerships and international collaborations have emerged with this experience, strengthening science and hopefully improving the health of different populations across the globe.

Undoubtedly, being a part of this kind of collaboration has brought me meaningful and enriching experiences in many areas-- personal, academic and professional. Plus, regarding public health, it offered me an overview of questions related to health and its determinants, as well as socio-economic, physical and individual environments.



Ingrid Guerra during her June 2017 visit to the University of Hawai'i.

Juliana Fernandes

I am a PhD student in the Physiotherapy Department at UFRN. I am working on this project as a research coordinator in Santa Cruz under direction of Dr. Câmara and Dr. Pirkle.

For me, being part of this team is a huge learning opportunity. In these last few months, I have been following the development of this bi-directional project, and for me it is a big responsibility to be part of this process. The PIs are very engaging and the way that they deal with adversity in this project is inspiring.

Because of this project, I have the chance to meet remarkable researchers in public health. Also, I attended a progress report meeting run by the Fogarty International Center for grants in Washington, D.C. in May 2017 that was assessing the progress of the projects over their first year. This meeting was a good opportunity to get to know different researchers from around the world and see what they are doing in the public health field. It



Juliana Fernandes at the NIH progress report meeting in Washington DC, beside the poster of the bi-directional model for the conference.

was a moment that showed me possible future paths. All these moments that I am living make me try to do my best and has confirmed my feelings about wanting to work more in public health research. This international experience has broadened my vision and widened my horizons in global health research. It is an honor to be part of this exciting project and I know that more amazing experiences will come.

Each of our experiences had one thing in common, building lasting relationships and networks with people from around the world who have helped to shape our academic careers. It is also clear that mentorship from wonderful professors such as Dr. Pirkle and Dr. Camara is essential in building and fostering these relationships. We have found that international travel, while not necessary, it is a valuable tool in understanding cultures, learning new practices, and growing as an academic. All of us have traveled internationally multiple times for school and it is unanimous that having those opportunities has broadened our perspective on cultures and people.

If someone were to ask how success would be measured from this project, we all would agree that success is in the friends we have gained, the mentoring that we have absorbed from all of the researchers, and being able to apply our knowledge from so many different backgrounds to help a research project flourish and learn so much in the process. Overall, one challenge that we came across that many other projects do is the financial aspect. There is never enough money to do exactly what we would dream to do in a project; however, the principle investigators have made it a point to make sure that the students involved have ample opportunity to travel for as low of a cost as possible because they both see that its very valuable to give us these experiences.

Conclusion

Bi-directional research creates opportunities for participants to learn, prosper, and work with others to solve shared problems. Exchanges create future leaders who instinctively appreciate the value of international collaboration, understanding, and empathy. Evaluations consistently show that foreign exchange participants

complete their academic programs with a better impression of their host country and its people. In turn, the communities who host the exchange participants build international partnerships of their own and gain a better appreciation of foreign cultures and values. All people involved in exchange programs, both participants and hosts, can then engage with those around them with regard to their new international exposure, creating vast lifelong benefits for all participants. Our experience demonstrates how universities in two different academic worlds can foster and participate in reciprocal collaboration and how bidirectional and multidirectional research models can help students grow and excel in academic and real-world settings. All of the students involved will be continuing to help out with the project, including staying in contact with each other on a professional and a personal level. There are some publications in process, which include all of the students and their specific interests in the project as well as some conference poster presentations in the United States and in Brazil. Even though we are located around the world, this project has worked well because there is a real drive to learn and grow across diverse perspectives from study leadership, students, and other collaborators. .

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References

1. Atkins S, Marsden S, Diwan V, Zwarenstein M, & for the ARCADE consortium. North-south collaboration and capacity development in global health research in low- and middle-income countries—the ARCADE projects. *Global Health Action*. 2016;9(1):30524. <https://doi.org/10.3402/gha.v9.30524>.
2. Kilama, W. L. (2009). The 10/90 gap in sub-Saharan Africa: Resolving inequities in health research. *Acta Tropica*, 112, S8–S15. <https://doi.org/10.1016/j.actatropica.2009.08.015>.
3. Vasquez EE, Hirsch JS, Giang LM, Parker RG. Rethinking health research capacity strengthening. *Global Public Health*. 2013;8(sup1):S104–S124. <https://doi.org/10.1080/17441692.2013.786117>.
4. Godoy-Ruiz P, Cole DC, Lenters L, McKenzie K. (2016). Developing collaborative approaches to international research: Perspectives of new global health researchers. *Global Public Health*. 2016;11(3):253–275. <https://doi.org/10.1080/17441692.2014.999814>.
5. Camara SMA, Pirkle C, Moreira MA, Vieira MCA, Vafaei A, Maciel, ACC. Early maternal age and multiparity are associated to poor physical performance in middle-aged women from Northeast Brazil: a cross-sectional community based study. *BMC Women's Health*. 2015;15(1). <https://doi.org/10.1186/s12905-015-0214-1>.
6. Camara SM, Pirkle C, Moreira MA, Vieira MC, Vafaei A, Maciel AC. Early maternal age and multiparity are associated to poor physical performance in middle-aged women from Northeast Brazil: a cross-sectional community based study. *BMC Women's Health*. 2015;15:56.
7. Horta BL, Gigante DP, Goncalves H, dos Santos Motta J, Loret de Mola C, Oliveira IO, Victora CG. Cohort Profile Update: The 1982 Pelotas (Brazil) Birth Cohort Study. *International Journal of Epidemiology*. 2015;44(2), 441–441e. <https://doi.org/10.1093/ije/dyv017>.
8. de Souza Barbosa, JF, Zepeda MUP, Béland F, Guralnik JM, Zunzunegui MV, Guerra RO. Clinically relevant weakness in diverse populations of older adults participating in the International Mobility in Aging Study. *AGE*. 2016;38(1). <https://doi.org/10.1007/s11357-016-9888-z>.