

The Importance of Collaboration in Global Neurosurgery

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Collaboration, the kind built upon mutual respect, trust, and a shared vision, is the only reasonable approach to the immense challenges faced by the field of global neurosurgery. We must develop collaborations that foster the free flow of knowledge and resources to ensure that all patients, regardless of geographic location, have access to timely, safe, affordable, and effective neurosurgical care. Developing global, multi-institutional collaborations requires that all parties confront the realities of racism, colonialism, paternalism, and many other isms along with the true magnitude of the problem. Over the past two decades, our Duke Global Neurosurgery and Neurology (DGNN) team has strived to live up to these ideals. We are constantly adapting and evolving our collaborative approach.

DGNN's initial collaborative work brought together Makerere University College of Health Sciences, Mulago National Referral Hospital, and Duke Health to provide direct neurosurgical care to patients in Uganda. Our shared principles of twinning guided our care delivery (pairing team members for bilateral knowledge exchange), training (developing new neurosurgeons in Uganda), and technology (providing the necessary equipment to perform neurosurgery) (1). This approach has led to 25 neurosurgery camps, over 500 total camp operations, over 5 tons of donated medical equipment and consumables, the establishment of neurosurgery residency programs, three neurosurgery units, and has more than tripled the number of neurosurgeons in Uganda, to date (2,3). Building, maintaining, and strengthening trust is the most important factor that underpins our collaboration's success. Trust has been built through open and honest conversations, shared decision-making responsibilities, consistency over the years, and the shared vision of improving access to neurosurgery for all Ugandans.

In the early part of the 2010s, we noticed that we needed a broader focus on the health system factors that influenced the day-to-day realities we faced in providing neurosurgery care. The official establishment of DGNN in 2014, as a Department of Neurosurgery at Duke University Division, was lead for that reason. DGNN was the first division of its kind in the United States solely focused on global neurosurgery and neurology. We created a vision and mission statement, outlined our shared values, and structured our approach using three pillars (Service, Training, and Research). Service encompasses our neurosurgery camps, medical equipment and consumable donations, and monetary contributions. Training has expanded beyond neurosurgery residents to include the training of biomedical technicians to maintain surgical equipment, advanced nursing to care for complex patients, and neurologists to aid in patient management, specifically epilepsy patients. The research was the newest addition to our collaborative work. It was added to explore ways to contribute both programmatic and technical knowledge to the broader global neurosurgery community while using the research results for advocacy and quality improvement efforts in Uganda.

Our collaboration has undergone additional transformations in the past few years while maintaining our original mission and vision. Ugandan neurology colleagues alerted us that upwards of 60% of their patients on general neurology clinic days were patients with epilepsy. They also shared the barriers they faced in treating epilepsy patients and the large treatment gap (4). Given our mission and the second "N" of DGNN being Neurology, we began brainstorming how to collaboratively address epilepsy care in Uganda while in tandem setting the stage for increased availability of epilepsy surgery for those that would benefit. We used the same three pillars of service, training, and research to guide our strategic planning, which led to establishing additional collaborations outside of Uganda. These different collaborations led to multiple research projects and the publication of a special issue dedicated to epilepsy care in Uganda (5), numerous providers training in advanced management of epilepsy and electroencephalography usage, and the opening of a dedicated epilepsy clinic in Western Uganda that has seen over 1,500 epilepsy patients since opening in 2019.

One of our first research projects involved digitizing ten years' worth of neurosurgery patient data in Uganda and developing a prospective neurosurgical patient database; this has allowed our group to examine patient outcomes (6), explore delays to care (7) and understand patient outcomes post-hospitalization (8). There are now over 3,000 patients in our prospective database, which has allowed us to perform complex analyses for traumatic brain injury (TBI) patients and utilize recent advancements in predictive modeling and machine learning (9). Within DGNN, we have developed a team dedicated to advanced computation, which has begun developing models and implementation strategies to improve TBI care globally.

Our collaboration began to provide direct neurosurgical care to patients in Uganda and has morphed into a multidisciplinary health system strengthening cooperation. The primary goal of improving access and quality of neurosurgery has remained our work heart, as we have expanded to epilepsy, advanced computation and predictive modeling, and most recently, advancing neurorehabilitation. While our collaboration is just one of the many amazing collaborations in global neurosurgery, our journey reflects the shifting dynamics in the field. It provides helpful insights into building long-term and sustainable collaborations.

We want to challenge global neurosurgery to focus our attention and resources towards the building and strengthening of collaborations. This work can and should start with developing solid bilateral collaborations within individual programs and initiatives. During this process, we must not lose sight of the created needs to a broader collaboration system within the field that allows for sharing of knowledge and resources. Without this expansive view of collaboration, our individual efforts will eventually crumble under the weight of global inequities, making it impossible to provide everyone the access they deserve to neurosurgical care.

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