

**Title:** Student Mobility and Research Capacity: A Global Health Experience

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**Authors Contribution Statement:**

Contributor Role	Role Definition	Authors		
		1	2	NA
<b>Conceptualization</b>	Ideas; formulation or evolution of overarching research goals and aims.	X	X	
<b>Data Curation</b>	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse.	X		
<b>Formal Analysis</b>	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.			X
<b>Funding Acquisition</b>	Acquisition of the financial support for the project leading to this publication.			X
<b>Investigation</b>	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.	X		
<b>Methodology</b>	Development or design of methodology; creation of models	X	X	
<b>Project Administration</b>	Management and coordination responsibility for the research activity planning and execution.			X
<b>Resources</b>	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.			X
<b>Software</b>	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.			X
<b>Supervision</b>	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.		X	
<b>Validation</b>	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.			X
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<b>Writing – Original Draft Preparation</b>	Creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).	X
<b>Writing – Review &amp; Editing</b>	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.	X

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**Discussion Points:**

1. Student mobility plays a crucial role in research education since many medical trainees are interested in research while enrolled in short-term experiences in global health.
2. Student exchanges are a cost-effective and sustainable alternative to facilitate health-related research in low- and middle-income countries from the Global South.
3. To ensure high-quality and external recognition, student mobility programs need to adopt academic principles. This structure is vital to improve the student's research skills before, during, and after the exchange.
4. Student exchange programs are helpful in developing skills related to research methods, ethics, and professionalism.
5. Student mobility fosters more collaborative environments and enhances scientific and networking possibilities.

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## 1 THE EXPERIENCE.

### 3 Introduction

4 Global health (GH) is a field of study, research, and practice that prioritizes the improvement of health  
5 outcomes and the achievement of health equity worldwide.<sup>1</sup> Nevertheless, disparities exist between the Global  
6 North and South, a geopolitical and economical conceptualization that respectively stands for high-income  
7 countries (HICs), such as from Europe and North America, and low- and middle-income countries (LMICs),  
8 such as from South America, Africa, and Asia.<sup>1</sup> Global South countries struggle to train and retain good  
9 researchers and practitioners to address local, regional, and GH challenges.<sup>2</sup> In comparison to other  
10 countries, Brazil has sent forth several scientists abroad with no mechanisms to incorporate these research  
11 skills upon return, which aggravates the brain drain phenomenon, characterized by researchers' substantial  
12 emigration usually to HIC settings.<sup>3</sup>

14 Therefore, it is necessary to train a new generation of Global South scientists adequately, aiming to develop  
15 these LMICs' research capacity that accounts for research workforce, structures, processes, and  
16 procedures.<sup>2,3</sup> In this regard, international student mobility fosters collaboration among institutions and  
17 promotes GH education while building capacity<sup>4</sup>. Student exchanges help share best practices, which  
18 enhances research quality and efficiency.<sup>4</sup> Consequently, it is vital that exchange opportunities in a Global  
19 North-South format contain a framework that ensures bilateral collaboration to promote research balance.

21 The International Federation of Medical Students' Associations (IFMSA) operates the largest student-run  
22 medical exchange program worldwide, providing research exchange programs since 1991.<sup>5</sup> The program  
23 depends on the workflow established by participating IFMSA member organizations that are responsible for  
24 defining their requirements and application process. To ensure a high-quality exchange program and  
25 endorsement from stakeholders, IFMSA promotes activities and materials focused on educational and  
26 academic opportunities.<sup>5</sup> Hence, this article aims to report my experience in IFMSA research exchange as a  
27 Brazilian medical student from the Global South, in Germany, a Global North country.

### 29 Experience Report

30 The 4-week research exchange occurred in February of 2020 at the Medical Faculty of Ruhr Universität  
31 Bochum in Bochum, Germany (Figure 1). I worked in the neurophysiology department, associated with the  
32 University International Graduation School of Neurosciences, where I assisted with research projects that  
33 focused on investigating the mechanisms underlying memory and its dysfunction.

35 All activities were in English and under the supervision of laboratory technicians and students pursuing their  
36 Master's and Doctorate degrees. In terms of assessment, my work was detailed in a logbook, shared with  
37 supervisors, and regularly discussed for providing feedback and tracking progress concerning my  
38 professionalism, collaboration, management, communication, and erudition skills. I was surprised with this  
39 rating system since my summative and formative assessments, most as multiple-choice exams, centered on  
40 theoretical contents from foundational sciences and organ systems by my medical school.

1 This exchange program allowed me to improve my skills in microtomy, histopathology, immunohistochemistry,  
2 and immunofluorescence. Although I was familiar with the techniques and paraffin wax histological slides due  
3 to my experiences in Brazil, the department had stains and cryostats that are financially inaccessible for my  
4 original institution. Moreover, I attended two of the department's journal clubs and lectures provided by the  
5 graduate school to first-year doctoral students. These educational opportunities enabled me to learn valuable  
6 skills including the critical appraisal of journal articles, project management and development, framing a  
7 research question, and a deeper understanding of bioethical issues. I also attended an International  
8 Neurosciences Conference about extinction learning, which occurred at Ruhr Universität Bochum. This was a  
9 topic that I was not acquainted with before my exchange, neither through curricular nor extracurricular  
10 activities (Figure 2).

11  
12 Participating in this research exchange allowed me to improve my cultural awareness, to become sensitive to  
13 the similarities and differences between cultures. Regarding the German scientists, I noticed that they were  
14 more willing to adopt an open and cooperative approach to research. Such perceptions may have occurred to  
15 me since obtaining resources and infrastructure is laborious in my original institution, generating a certain  
16 skepticism on sharing materials and methods with other researchers.

17  
18 As a result of such a positive experience, back in Brazil, I decided to adopt a collaborative role and share all  
19 valuable learning experiences, methods, and protocols that would be useful for my primary group.  
20 Consequently, I noticed that the team improved the outputs from histopathology and immunohistochemistry,  
21 techniques, benefiting our lab projects.

22  
23 Furthermore, the German exchange team organized social programs outside of work in the lab. For example, I  
24 have attended parties, museums, expositions, theater, and local festivities. Through these exposures, I got  
25 accustomed to the country's history, language, food, and various ways that the German people express their  
26 culture. Consequently, the social programs outside the lab made me communicate and interact more  
27 effectively with the neurophysiology department peers.

## 28 **Discussion**

29  
30 International student mobility has been associated with benefits at an individual level by stimulating cultural  
31 awareness and catalyzing personal and professional development.<sup>6</sup> Additionally, exchanges are valuable from  
32 a medical student perspective, since it allows the student to experience the reality and challenges of the  
33 research settings to improve GH education.<sup>4,6</sup> Student mobility plays a crucial role in research education since  
34 many medical trainees are interested in research while participating in short-term experiences in GH.<sup>7</sup> In the  
35 long-term, exchanges are a cost-effective and sustainable alternative to stimulate and develop health-related  
36 research in the Global South, due to soft and scientific skills' development.<sup>8</sup>

37  
38 During the exchange experience, I learned through being exposed to different environments, people, and  
39 scientific methodologies. This resulted in the acquisition and improvement of research-related skills including  
40 research design and implementation, ethics, and professionalism. Whereas the language of training can be a  
41 barrier to student exchange mobility,<sup>6</sup> I am proficient in English, the language spoken at Ruhr Universität

1 Bochum. Being fluent in English was crucial to this exchange experience, allowing me to participate in  
2 research project discussions, learning opportunities and develop friendships with laboratory staff and other  
3 students at the university. Since this article focuses on the experience of a single medical student, further  
4 research should investigate the impact of medical student exchange programs on building research skills and  
5 capacity on a larger scale.

6  
7 **Conclusion**

8 Taking the reported experience into account, student exchange mobility in a Global North-South format  
9 benefits medical trainees by improving research skills. International exchange programs teach skills such as  
10 research methodology, ethics, professionalism and promote collaborative environments.

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1 **FIGURES AND TABLES.**

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3 **Figure 1.** Ruhr Universität Bochum (RUB) campus in Bochum – Germany.



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6 Legend: Authors' own source

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- 1 **Figure 2.** Exchange student participating in the Extinction Learning conference held in the Ruhr Universität
- 2 Bochum campus.



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- 4 Legend: Authors' own source