Research Equity in Global Health: Special considerations for the fields of statistics and data science

CFAR Symposium on Statistics and Data Science in HIV 5 June 2023

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Outline

- Reflections
- Inspirations
- Ways forward



Reflections

What do we mean by equity in global health? Why does collaborative inequity exist? Does collaborative equity matter?



Collaborations between institutions are critical for global health research and training.

Fig 2. Percentage of documents with international collaboration in in the categories of Tropical Medicine, Infectious Diseases, Parasitology, and Pediatrics (2011–2015).



González-Alcaide et al. *PLoS One 2017.*



The field of research is full of commodities.

- Occupations/promotions
- Authorship
- Presentations at conferences
- Training opportunities
- Field recognition/notoriety
- Funding
- Network capital
- Data

Goods that can be bought, sold, traded, earned.

Goods that can be bought, sold, traded, earned in ways that are not always fair, equitable or just.



Dynamics in authorship

BMJ Global Health

Research

Stuck in the middle: a systematic review of authorship in collaborative health research in Africa, 2014–2016 $\fill 0$

Bethany L Hedt-Gauthier¹, Herve Momo Jeufack², Nicholas H Neufeld³, Atalay Alem⁴, Sara Sauer⁵, Jackline Odhiambo⁶, ⁽ⁱ⁾ Yap Boum⁷, Miriam Shuchman³, Jimmy Volmink⁸ Correspondence to Dr Bethany L Hedt-Gauthier; bethany hedt(Alms.harvard.edu

Abstract

Background Collaborations are often a cornerstone of global health research. Power dynamics can shape if and how loce researchers are included in manuscripts. This article investigates how international collaborations affect the representati authors, overall and in first and last author positions, in African health research.





BMJ Global Health Latest content Archive Authors Home / Archive / Volume 4, Issue 5 Article Text Research 人 PDF Who is telling the story? A systematic review of authorship for Article info infectious disease research conducted in Africa, 1980-2016 a XML Rose Mbaye¹, Redeat Gebeyehu², Stefanie Hossmann³, Nicole Mbarga^{4, 5}, Estella Bih-Neh⁶, Lucrece Eteki⁷, Ohene-Agyei Thelma⁸, Abiodun Oyerinde⁹, Gift Kiti¹⁰, Yvonne Mburu¹¹, Jessica Haberer^{12, 13}, Mark Siedner¹⁴, Iruka Okeke⁹, 了 Citation () Yap Boum 7 - 15 Tools Correspondence to Professor Yap Boum; yap.boum@epicentre.msf.org



Figure 5 First and last authors per each of the six diseases and by study types (epidemiological or clinical). Each sunburst displays the repartition of first and last African vs Non-African researchers per type of study (clinical vs epidemiological) for each disease.





Forms of capital that lead to power in research

- Cultural capital
- • "non-economic capital", e.g. cledentials, styles of speech.

 - - Legitimacy.

- Shiffman, IJHPM, 2015









Newsletters

The Atlantic

EDUCATION

How Does Race Affect a Student's Math Education?

A new paper examines the ways "whiteness" reproduces racial advantages and disadvantages.

By Melinda D. Anderson

"Whiteness is impacting how and where we see mathematics ability." Public Health Reports OnlineFirst, June 8, 2022 © 2022, Association of Schools and Programs of Public Health, Article Reuse Guidelines https://doi-org.ezp-prod1.hul.harvard.edu/10.1177/00333549221097653



From the Schools and Programs of Public Health

Racial and Ethnic Diversity Among Students, Graduates, and Faculty in Biostatistics and Epidemiology, 2010-2020

Melody S. Goodman, PhD (D)¹, Jemar R. Bather, MS², Xiangying Chu, MS¹, Marcello Pagano, PhD², Christine M. Plepys, MS³, and Ronnie A. Sebro, MD, PhD⁴

Journal of Urban Mathematics Education December 2016, Vol. 9, No. 2, pp. 49–80 ©JUME. <u>http://education.gsu.edu/JUME</u>

A Framework for Understanding Whiteness in Mathematics Education

Dan Battey *Rutgers, The State University of New Jersey* Luis A. Leyva Vanderbilt University



Does equity in collaborative global health matter?



Better science

- Closer proximity to pressing problems
- Better integration of studies
- More contextually sensitive interpretation of results
- Reduce the learning-to-doing pipeline.



The practice of statistics is not objective, therefore who we engage in our statistical collaborations is important.

HARVARD SCHOOL OF PUBLIC HEALTH TH. CHAN EUGENICS AND STATISTICS: PAST. PRESENT AND FUTURE Friday, Feb 26th 1pm-2pm A panel discussion with: Scarlett Bellamy '01 **Tukufu Zuberi** Moderated by: Introduced by: Melody Goodman '06 **Marcello** Pagano



"... the data doesn't talk. Its you who talk and its you who will talk for the data."

- Tukufu Zuberi, Professor, UPenn

Author of White logic, White methods



Inspirations

Statisticians' power to transform, engage, and lead in this space.





The power to transform.





Melody Goodman @goodmanthebrain

I am so grateful to @DrDHud for kicking off the Community Research Fellows Training Program in NYC with an engaging lecture on public health and health inequities. The evaluations are in, and the best thing about the session was Dr. Hudson.

....



^{10:30} PM · Apr 13, 2023 · 873 Views



The power to engage.

Community Research Fellows Training (CRFT) Program



The Community Research Fellows Training (CRFT) Program is a comprehensive 16-week program designed to create a pool of trained community members who can collaborate with academic researchers and serve on community research advisory boards and institutional review boards. CRFT has three goals: (1) Implement a community-based participatory research training program for community members. (2) Promote the role of



The power to lead.

How Rwanda Managed to Control COVID-19?

CCDD ID Epi Spring Seminar Series



Hosted by the Center for Communicable Disease Dynamics

> Register at hsph.me/epi-series



Muhammed Semakula is working as Senior Statistician and Health Scientific Innovation Analyst at the Rwanda Biomedical Center. He mainly works on observational health data focusing on statistical methodology and estimating inference, monitoring and evaluations, demography and spatiotemporal modeling.

CENTER for COMMUNICABLE DISEASE DYNAMICS









The power of statistical leadership.

De Gruttola closed the event with warm personal remarks. After thanking those who contributed to the symposium and offered well-wishes in a tribute video, he said, "I would suggest that we think about the beautiful opportunity we have to use mathematical ideas, ideas from the computational and algorithmic sciences, genomics, and molecular biology, the opportunity to work in these areas with such wonderful colleagues, and to do it all to protect vulnerable people. That to me is an extraordinary, beautiful experience."



Ways forward

1. Optimize efficiency, just expand your definition of efficiency. 2. Bridge the statisticians/data scientists & implementers. 3. Challenge the system(s)



Recommendation 1: Optimize efficiency, just expand your definition of efficiency.



"This body of work, presented as a collection of four papers, addresses some of these challenges by providing means of maximizing information while minimizing time, cost, and human resources."

- Minimal variance/maximal power (□\$\$?)
- Provides timely results
- Interpretable and accessible
- Required resources are available:
 - \$\$
 - Human resources including statistical resources
 - Implementation resourceS



March 2020: Onset of Partners In Health's COVID-19 pandemic response:



- No information on epidemiology/population effects
- Not enough data to inform response
 - Testing capacity
 - Routine/harmonized data systems
- Secondary effects of COVID on existing patients and other health services



The cross-site collaboration

PIH/Boston Nidia Correa Jean Claude Mugunga Natalie Price PIH/MexicoPIH/PeruZeus ArandaLeonid LeccaDaniel BernalJesus Peinado



Professor, HMS

Jean Claude Mugunga, Deputy CMO, PIH **PIH/Malawi** Moses Aron Emilia Connolly **PIH/Rwanda** Vincent Cubaka Nadine Karema Frederick Katera PIH/Liberia

Emma Boley Rebecca Cook Prince Varney

PIH/Lesotho

Thiane Mohlouoa

Meba Msuva

Melino Ndayizigiye

Patrick Nkundanyirazo

PIH/Sierra Leone

Thierry Binde

Chivembekezo Kachimanga

Foday Boima

Harvard Medical School

Alma Adler

Dale Barnhart

Molly Franke Isabel Fulcher

Bethany Hedt-Gauthier

Megan Murray

PIH/Haiti Peterson Abnis I Faure Mary Clisbee Wesler Lambert Fernet Leandre Jeune Marc Antionne

Interns Katherine Collamore Don Fejfar Anuraag Gopulani Nichole Kulikowski Ananya Tadikonda Kate Tashman Kartik Tyagi Karina Vasudeva Jessica Wang

University of British Columbia Michael Law





Cross-PIH site COVID-19 Research Collaboration:

<u>Goals</u>

- Identify the core and common questions.
- Develop rigorous methods that are contextually appropriate to answer these questions.
- Work collaboratively to implement, and share results and lessons learned across sites.

Core common questions

- What is the burden of COVID-19?
- How is COVID-19 directly affecting health, particularly in high-risk groups?
- How is COVID-19 affecting care and outcomes across the health system?



Surveillance

How can we leverage routinely collected data to improve COVID-19 response?



BIG DATA (noun): data that weighs over 5kg



👗 Dr. Christian Mazimpaka

7:12 AM · Nov 14, 2019



1.1.1



Number of **acute respiratory infection** cases at a facility in Liberia.

Data from Partners In Health Liberia







Data from Partners In Health Liberia





Compare the observed to what we expect.

Do we see any unexpected outliers during COVID-19?

Data from Partners In Health Liberia







Data visualization

Time series	Heat map	Мар
 Captures all data points and uncertainty for entire time frame Difficult to interpret across multiple locations or indicators 	 Deviations across multiple time points Does not show data points or measures of uncertainty Easier for comparison 	 Deviations for a single time point Can be made interactive Spatial perspective
600 400 200 2016 2017 2018 2019 2020	01-202002-202003-202004-2020SinoeImage: Image: Imag	ROVIA BERAGES



Interactive tool for decision making



Cross-country courses

CIHR_training_course



Introduction to time series modeling for syndromic surveillance

View the Project on GitHub isabelfulcher/CIHR_training_course

This project is maintained by isabelfulcher

Time series modeling methods for syndromic surveillance

This course consisted of five 90-minute lecutres followed by 90-minute lab sessions. The goal is to introduce attendees to concepts in time series modeling, with a particular focus on syndromic surveillance using routine health systems data. The contents available here include lecture slides and materials for the lab sessions.

Course instructors

This course is co-taught by Bethany Hedt-Gauthier (Harvard Medical School), Michael Law (University of British Columbia), and Isabel Fulcher (Harvard Medical School). Donald Fejfar and Nichole Kulikowski are the teaching assistants.

Course preparation

Download R and RStudio: If you plan to participate in the lab sessions, please download both R and RStudio (free statistical software) prior to the first session on March 2. Instructions for both Windows and Mac users are available online here (please ignore the third step about SDSFoundations Package). You can also watch this video for step by step download instructions.

Additional resources

- Interrupted Time Series EdX Course
- Cheatsheet: ggplot2
- Cheatsheet: Data manipulation in R

Go to www.menti.com and use the code 6881 1029

Where in the world are you?





Mentimeter

Analysis

BMJ Global Health Disruptions in maternal health service use during the COVID-19 pandemic in 2020: experiences from 37 health facilities in low-income and middleincome countries

Zeus Aranda ^(c), ¹ Thierry Binde,² Katherine Tashman,^{3,4} Ananya Tadikonda,⁵ Bill Mawindo,² Daniel Maweu ^(c), ⁶ Emma Jean Boley,⁶ Isaac Mphande,⁷

Childhood immunization during the COVID-19 pandemic: experiences in Haiti, Lesotho, Liberia and Malawi

Emilia Connolly,^a Emma J Boley,^b Donald Luke Fejfar,^c Prince F Varney,^b Moses B Aron,^a Isabel R Fulcher,^d Wesler Lambert,^a Melino Ndayizigiye,^f Michael R Law,^g Jean-Claude Mugunga^c & Bethany Hedt-Gauthier^d on behalf of the Cross-site COVID-19 Syndromic Surveillance Working Group

Objective To examine changes in vaccination of children younger than 1 year during the coronavirus disease 2019 (COVID-19) pandemic (March 2020–August 2021) in Haiti, Lesotho, Liberia and Malawi.

Methods We used data from health management information systems on vaccination of children aged 12 months or younger in districts supported by Partners In Health. We used data from January 2016 to February 2020 and a linear model with negative binomial distribution to estimate the expected immunization counts for March 2020–August 2021 with 95% prediction intervals, assuming no pandemic. We compared these expected levels with observed values and estimated the immunization deficits or excesses during the pandemic months. Findings Baseline vaccination counts varied substantially by country, with Lesotho having the lowest count and Haiti the highest. We



The impact of COVID-19 and national pandemic responses on health service utilisation in seven low- and middle-income countries

Donald Fejfar, Afom T. Andom, Meba Msuya, Marc Antoine Jeune, Wesler Lambert, Prince F. Varney, Moses Banda Aron, Emilia Connolly, Ameyalli

Open access

BMJ Open Impact of COVID-19 on access to cancer care in Rwanda: a retrospective timeseries study using electronic medical records data

> Placide Habinshuti,¹ Alphonse Nshimyiryo ¹/₂,² Donald Luke Fejfar ¹/₂,³ Anne Niyigena,² Vincent K Cubaka,² Nadine Karema,¹ Jean Bosco Bigirimana,⁴



Original research

Recommendation 2: Bridge the statisticians/data scientists & implementers.



Harvard College's Siona Prasad teaching a Machine Learning Course in Rwanda.



Biostatistician Melody Goodman leading a Community Research Fellows training program.



Epidemiologist Nellie Wadonda Kabondo explaining the integration of the HIVDR surveillance strategy into hospital operations.



The McGoldrick Program, directed by Marcello Pagano, bringing statisticians for extended training/mentorship at Harvard.



Statistician Vedaste Ndahindwa leading a research training in Rwanda.



Biostatisticians Sara Sauer and Muhammed Semakula working together in Rwanda.

2A. Support training/exposure of statisticians in HICs



Sarah Anoke, 2014, Outcomes of diabetes patients at Partners In Health/Rwanda sites

Sarah Sauer, 2017, Use of CB-CC designs to evaluate a neonatal intervention in Rwanda

Izzie Fulcher, 2017, Using program data to evaluate the impact of home visits during pregnancy, D-Tree, Zanzibar





Value of these experiences?

Methodologically

- Identified gaps to explore:
 - How to evaluate the effectiveness of a program when there is no "control" group?
 - Incorporating missingness or poor data quality (misclassification) into the methods
 - "How can we come up with the most accurate + precise estimate possible under practical constraints X, Y, and Z?"

<u>"Soft skills"</u>

- Self-awareness: "It's important not to cross the line from "helping" or "teaching" to forcing your views on other people."
- Learning how datasets come together (and "how messy the process can be")
- Being sensitive to the constraints of the field: "availability of money, of expertise, of things we take for granted here in the US like a vital records system, paved roads, sampling frames, consistent internet connection, the technology needed for data collection, etc"



2B. Support statistics programs/statisticians in LMICs

Session 4: North-South Collaboration: Training programs

<u>Rumi</u> Chunara	Associate Professor of Biostatistics, Associate Professor of Computer Science and Engineering, Tandon, Director of Center for Health Data Science at NYU	Data Science and Social Determinants Training Program
<u>Ann</u> Mwangi	Associate Professor of Biostatistics, School of Science and Aerospace Studies, Moi University	Moi-Brown Partnership for HIV Biostatistics Training
Ziv Shkedy	Hasselt University	Developing sustainable (bio)statistics resources in sub-Saharan African countries: The >eR-BioStat initiative, an E-learning "open- source" platform.
<u>Bryan</u> Shepherd	Vice Chair of Faculty Affairs, Department of Biostatistics, Professor of Biostatistics and Biomedical Informatics	Vanderbilt-Nigeria Biostatistics Training Program (VN-BioStat)



Often times, these programs are hyper extended.







Not everything needs to be within a formal degree program,



but we aren't going to short-course our way out of this.



Learning happens when doing under mentorship.







Recommendation 3: Challenge the systems

We need to work towards fundamentally restructuring:

- Funding models
- Publishing models
- Training models
- Collaboration models
- Conference models
- Academic models



Do (HIC) academic structures perpetuate bad behavior?

"This will ruin your chances for promotion."

40

"We cannot ask our junior faculty to do this type of work."

"We need you to be available for Harvard students."

"You cannot spend so much time out of country."



THE LANCET

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Academic promotion policies and equity in global health collaborations

Bethany Hedt-Gauthier 🖾 Collins O Airhihenbuwa Ayaga A Bawah Katherine States Burke Teena Cherian Maureen T Connelly et al. Show all authors

Published: November 03, 2018 DOI: https://doi.org/10.1016/S0140-6736(18)32345-6 🛛 🦚 Check for updates

Transforming Universities for Equity and Impact in Global Health

CUGH Virtual Satellite Session April 6, 2023, 9am-12pm EDT Registration: <u>Click Here</u> Please Email For More Information: <u>Eve_Estrada@Hms.Harvard.Edu</u>

Eve_Estrada@Hms.Harvard.Edu
► Overview
► Agenda
► Featured Participants
► Proposed Position Statement
► Recommended Readings



Challenge our own engagement – Why do we do what we do?

- To advance science?
- To partner?
- To grow our teams?
- To advance health justice?
- To be challenged?
- To pursue our passions?
- To advance our careers?
- To have fun?



The White Savior Industrial Complex in Global Health Posted on March 11, 2020 by BMJ GH Blogs Introduction:

🗹 f in

Global health, once an obscure field of practice and research, is rapidly gaining prominence. Many training institutions have responded to the high demand for a global health "experience" by providing short-term forays into exotic locales. This phenomenon can be dangerous, feeding into what writer Teju Cole described as the White Savior Industrial Complex (WSIC). Teju Cole potes that WSIC is "not about justice." Pather. "it is about a big

Complex (WSIC). Teju Cole notes that WSIC is "not about justice." Rather, "it is about a big emotional experience that validates privilege." The term "white savior," can refer to any

person or group – regardless of race – possessing an imbalance of power or privilege. For instance, non-white people can perpetuate WSIC by their proximity to whiteness, power or privilege because it relies on these structures to maintain inequality.



Reflexivity in practice

Panel: Actions to advance equity in global health research

Individual and personal level

- Unlearn the notions of absolute scientific objectivity in global health
- Decolonise attitudes and concepts in global health and reflect on inbuilt biases of superiority and inferiority
- Actively learn and valorise respect and humility
- Make promoting fairness everybody's business: global health leaders should inspire through action rather than rhetoric
- Recognise that equity is about more than equality; global health researchers need to prioritise equity in their research and collaborations

Institutional level

- Devolve global health research centres to where the health challenges being addressed are located
- Promote solidarity (South–South and North–South collaborations)
- Institutions need to invest more in researchers from LMICs (protect them, respect them, reward them)

THE LANCET

COMMENT | VOLUME 400, ISSUE 10347, P145-147, JULY 16, 2022

What should equity in global health research look like?

Manasi Kumar 🛛 🛛 Lukoye Atwoli 🛛 Rochelle A Burgess 💿 Naoufel Gaddour 💿 Keng Yen Huang

Published: May 18, 2022 • DOI: https://doi.org/10.1016/S0140-6736(22)00888-1 • 🦲 Check

- Strengthen the ability of institutions in LMICs to manage global health research processes—eg, enhance capacity, skills, and oversight
- Match the requirement of funding institutions for researchers to demonstrate capacity building in grant proposals with equivalent funding for that capacity in indirect costs
- Document and acknowledge capacity strengthening of researchers from HICs in North–South collaborations; the global health community continues to undervalue how these partnerships build up the research portfolios of institutions and researchers based in HICs
- Develop mechanisms that evaluate partnerships in collaborative research, including measures of fairness, and the quality of ethical and culturally responsive engagement
- Redress existing harms from inequitable practices and identify, document, and rectify colonising and unethical practices in global health research

Conclusions

- There is inequity in collaborative global health research, and HIV research is not immune.
- Statisticians have demonstrated critical roles in improving quantitative sciences, health equity, and collaborative equity issues globally.
- We can further advance this field by:
 - Optimizing efficiency, including integration into current systems.
 - Bridging statisticians and implementers, with a focus on training
 - Challenging systems that prevent better collaboration.



Thank you – and reactions welcome.

Some questions moving forward:

- What does equity in global health statistics/data science look like?
- How do our LMIC statistical colleagues perceive the current state of engagement? What are their plans for individual or institutional capacity development? What are their greatest barriers to achieving these plans?
- What are opportunities/challenges to using HIC-LMIC partnerships to build statistics/data science capacity?
 - How do we overcome challenges of what is valued in the academy? Restricted funding?
 - Are there approaches that are more compatible to the current time and competing commitments of all involved?

