

The Vanderbilt-Nigeria Biostatistics Training Program

Bryan Shepherd

CFAR Symposium

June 6, 2023



VANDERBILT  UNIVERSITY
MEDICAL CENTER



History of the Idea

- Lots of collaborative global health work in Africa and Latin America
- Listening to Misrak Gezmu, Joe Hogan, and others discussing training biostatisticians in sub-Saharan Africa
- Participation in a few biostatistics short courses / workshops
- Some 1-on-1 mentorship with Fogarty scholars within leDEA network (FIMP program)
- In 2021 my collaborators in Nigeria (in particular, Muktar Aliyu) approached me about submitting a D43 proposal.

Muktar's Sales Pitch

- Lots of on-going Vanderbilt-Nigeria collaborations
 - Aminu Kano Teaching Hospital (AKTH)
 - Since 2011, there have been 14 collaborative grants between the institutions:
 - 8 NIH-funded clinical trials (HIV, kidney disease, epilepsy, sickle cell disease)
 - 64 co-authored manuscripts between Vanderbilt and AKTH faculty

Muktar's Sales Pitch (continued)

- We need more biostatistics expertise in Kano, Nigeria
 - Most grants have
 - Vanderbilt PI + Nigerian PI,
 - Vanderbilt data manager + AKTH data manager
 - Vanderbilt biostatistics (me and my team) + _____
 - Research is expanding and lack of biostatistics support is major barrier
 - Additional biostatistics training / support consistently listed as one of the highest priority areas of need by AKTH investigators

Muktar's Sales Pitch (continued)

- Vanderbilt Institute of Global Health has track record of successful training proposals
 - Two capacity building grants:
 - Vanderbilt-Nigeria Building Research Capacity in HIV and Non-communicable Diseases (V-BRCH)
 - Vanderbilt-Nigeria Development of Research Administration and Management Program (V-RAMP)
 - “We’ll practically write the D43 proposal for you.”

What I Did

- I agreed
- I spoke with Misrak Gezmu
- I spoke with the program officer, Geetha Bansal
- I wrote most of the D43 proposal, but with a lot of help Vanderbilt Institute of Global Health administrators and from co-PIs:
 - Muktar Aliyu (Nigeria-born clinician at Vanderbilt)
 - Nafiu Hassaini (Mathematics professor at BUK with interest in modeling infectious diseases)

A little about D43 Proposals

- Fogarty HIV Research Training Program for Low- and Middle-Income Country Institutions
- 5-year training grants funded by NIH
- Focused on areas of HIV research
- Biostatistics is listed as one of the potential training areas
 - Funded D43s in Kenya (Brown / Moi) and South Africa (Stellenbosch)
- Proposals include 25-page “training plan” document, plus all the other usual NIH forms, letters of support,...

Timeline

- Grant submitted in August 2021
 - Reviewed in December 2021
 - Funded in April 2022
-
- My presentation to you really only represents a little over 1 year of experience with the program

Long-term Goals

- Develop strong biostatistics leaders at AKTH / BUK and potentially other institutions in northern Nigeria
 - The type who can serve as co-investigators, co-PIs, and PIs on grants
 - Not just data analysts (but they can do this also)
 - Teaching classes in biostatistics
 - Independence and ability to learn on own
 - Excellent collaborators to boost Nigerian-led medical research
 - Trusted colleagues that I and others can rely on and enjoy working with for many years
- Generate more interest and expertise in biostatistics in general
 - Among researchers / students and at the institutional level

Program Aims

- Aim 1. Bring two Nigerian data scientists per year (total: 10 over 5 years) to Vanderbilt to immerse them in hands-on biostatistics training for one-year fellowships
- Aim 2. Annual workshops in Nigeria to provide mid-level biostatistics training

Aim 1

- Aim 1. Bring two Nigerian data scientists per year (total: 10 over 5 years) to Vanderbilt to immerse them in hands-on biostatistics training for one-year fellowships
 - Eligible trainees: Junior investigators with PhD or “all but dissertation” in statistics or a related field.
 - Recruited from: PhD programs in Nigeria (Bayero University Kano [BUK] and Ahmadu Bello University [ABU])
 - We have relied a lot on Nigerian investigators (especially Nafiu) to identify potential trainees

First Two Trainees

- Ibrahim Yusuf Ibrahim, ABU
 - MS in Statistics, “All but dissertation” for Statistics PhD
 - Dissertation topic: “Study on optimal designs for generalized linear models with multinomial response and linear predictor containing covariate terms and interaction”
- Abdurrahman Abdulhamid, BUK
 - MS in Mathematics, “All but dissertation” for Mathematics PhD
 - Dissertation topic: “Mathematical modeling and analysis of Lassa virus transmission”





Taking Courses

- Ibrahim:
 - 5 courses
 - Study design, survival analysis, Bayesian methods, regression modeling strategies, clinical trials
- Abdurrahman:
 - 6 courses
 - Statistical computing, study design, intro to biostatistics, probability, clinical trials, regression analysis

Applied Projects

- Ibrahim

- Incidence and factors associated with cytopenia among people with HIV in leDEA West Africa
- Partnered with Fogarty trainee, Aminu Abba Yusuf
- Mentors: Bill Wester, Muktar Aliyu, Antoine Jaquet, Bryan Shepherd

- Abdurrahman

- Association between sickle cell anemia trait, APOL-1 genotype and kidney disease among people with HIV in north-central Nigeria
- Mentors: Bill Wester, Muktar Aliyu, Usman Wudil, Bryan Shepherd

Methodology Project

- Ibrahim
 - Sequential randomization designs with application to AKTH randomized controlled trial of treatment to reduce albuminuria in people with HIV
 - Mentors: Robert Greevy, Bryan Shepherd
- Abdurrahman
 - None

Other Notable Activity

- Partial participation in VIRDE program (Vanderbilt Institute for Research Development and Ethics)
- 11 medical and public health professionals attend one-month training course in October
- They receive didactic training and write a research proposal with a Vanderbilt mentor
- Ibrahim and Abdurrahman participated in some of the training sessions
- Ibrahim and Abdurrahman were each paired with scientists in training from AKTH and they helped with power-sample size calculations and with writing a statistical analysis plan

Aim 1 Successes

- Two wonderful trainees with positive attitudes who are eager to learn
- Courses have generally been good for trainees
- Administrative Support
- VIRDE program
- Regular meetings between trainees and Nafiu Hussaini + Nigerian data scientists

Aim 1 Challenges

- Visa issues
 - Takes a long time to secure Visa interviews
 - Abdurrahman arrived a few weeks late into the fall semester and never really completely caught up
- Preparation for program
 - Abdurrahman had very little stats / computing background
 - Ibrahim has been challenged by simulation work
- Fitting into classes
 - To save money, they are auditing biostatistics classes, but expected to do all work/exams, etc.
 - Some confusion by professors / teaching assistants as to how to treat them

Aim 1 Challenges

- Administrative challenges
 - Visas, housing, getting paid, health care, working through kinks between Vanderbilt vs. Vanderbilt-Medical Center, setting up computers, ordering items,...
 - It has been extremely helpful to have a strong admin team working with global health investigators to maneuver the admin hurdles
- Running out of time
 - Research projects are still on-going and will not be finished before July
 - Clearly, this is a long-term commitment – relates to post-training mentorship
 - Hopefully work can be completed as return to Nigeria

Next Year's trainees

- Two women
- Safiya Sada Sani
 - BS and MS in Statistics from ABU
 - PhD student in Statistics at ABU
- Rukayya Sunusi Alkassim
 - BS in Statistics from Kano University of Science and Technology
 - MS in Biostatistics from ABU and Near East University in Cyprus
 - Currently Lecturer II at Kano University of Science and Technology
- Selected Candidates early (early March), but still worried about Visa issues!

Aim 2

- Annual workshops in Nigeria to provide mid-level biostatistics training

First Workshop starts next week!

- Linear, logistic, and ordinal regression models with R statistical software
 - June 12-16
 - Lots of simulations, including power / sample size
 - Hands on analysis of blood pressure / hypertension data from AKTH people living with HIV
- Pre-workshop workshop (being held this week) on R statistical software
 - 2 days
 - Taught by Nafiu Hussaini
 - Mandatory for those without experience in R

Workshop (continued)

- Instructors

- Primarily me and Chun Li (University of Southern California)
- Nafiu Hussaini and Muktar Aliyu will also be present and have various roles

- Trainees

- 23 confirmed attendees (5 women)
- Approximately 50 completed applications judged by me, Nafiu, and Muktar
- PhD in Statistics (5), MS in Statistics (10), PhD in Mathematics (4), MS in Mathematics (2), PhD in Computer Science (1), BS in Computer Science (1)

Workshop (continued)

- I'm not exactly sure what to expect
- Starting with simple topics (e.g., logistic regression) so we hopefully won't lose anyone at the beginning
- But ending with fairly complicated topics (e.g., semiparametric linear transformation models) and interspersing potentially new topics (e.g., natural splines) throughout
- I am guessing the R coding will be new
- Focus on simulations will also likely be instructive
- We hope that this creates/adds to biostatistics community in northern Nigeria
- We hope to use this to identify and recruit future trainees

Thanks!

- Acknowledge funding support from NIH: D43 TW012268