

Consortium on Law and Values in Health, Environment & the Life Sciences 2017-18 Student Proposal Cover Page

Applicant Information

Applicant name(s):	Kimberly Bonner	Email:	Bonne255@umn.edu
Project title:	Drivers of vaccine acceptance among future healthcare professionals in Uganda		
Department:	Epidemiology and Community Health	College:	School of Public Health
Degree program:	PhD		
Faculty advisor:	Nicole Basta, PhD, MPhil	Faculty advisor email	nebasta@umn.edu <input type="checkbox"/> No advisor
Dept. Head:	Dianne Neumark-Sztainer PhD, MPH, RD	Dept. Head's email:	neuma011@umn.edu
Dean:	John R. Finnegan Jr., PhD	Dean's email:	sphdean@umn.edu

How did you hear about this funding opportunity?

Consortium e-mail Consortium website The Brief Dept. email/newsletter Other (specify)

Funding

Total amount of funding requested: \$

Executive summary (maximum 200 words)

This interdisciplinary study applies an innovative experimental design originating from mathematical psychology to an epidemiologic question with direct implications to health. This proposal seeks to investigate vaccination decision-making in future medical professionals in Uganda where evidence about the drivers of vaccine acceptance and access is lacking.

Using primary data collection and an innovative study design, this study explores the interplay of motivations on a vaccination decision to assess their relative weight in decision-making. This study represents one of the first applications of the discrete choice experiment to vaccination in a low resource context.

Approvals

Check all appropriate approvals required for your proposal. It is not necessary to have all approvals at the time of proposal submission; however, approvals must be obtained prior to receipt of funding. If you have applied for approval but have not yet received it, indicate that below.

IRB Yes No NA Application pending

Other Yes No NA Application pending Specify:

Checklist—for reviewer use

- The proposal is 1000 words or less excluding budget, biographies, references and citations.
- The proposal includes a work plan with a specific timeline using months or quarters to identify work to be done and completion dates.
- The proposal includes a 1-2 paragraph biography of the applicant and all co-investigators.
- The budget form is complete including the funds sought for this project, other pending applications for this project, and the amount/source of matching or other funds.
- The applicant's faculty advisor is copied on the application email. Professional students w/o advisors check No Advisor.
- All necessary approvals are pending or received.

Drivers of vaccine acceptance among future healthcare professionals in Uganda

Personal choices have immense consequences for population health. However, public health programs frequently lack information on the complex reasoning that underlies individual decision-making. In low-resource contexts, there is a paucity of information on the key considerations individuals weigh in decision-making about their healthcare, particularly for vaccination.

Both vaccine hesitancy and physical access to vaccinations have been identified as the key barriers to high vaccination coverage.(1) The World Health Organization (WHO) defines vaccine hesitancy as a “delay in acceptance or refusal of safe vaccines despite availability of vaccination services.”(2) In a survey of national immunization managers, Uganda reported the highest vaccination hesitancy out of the thirteen countries surveyed.(4) Previous studies have found that misinformation, complacency, convenience and confidence in health systems influence vaccination decisions, but these motivations are rarely explored in comparison to each other to assess their relative weight in decision-making.(3)

Since medical professionals are often seen as the most trusted source for vaccination decision-making(6), it is critically important to understand the **underlying vaccination perceptions among future medical professionals**. An international review of vaccination hesitancy among practicing health care providers found that providers’ willingness to be vaccinated themselves was strongly associated with their vaccination recommendations to patients.(6) The findings from these contrasts can be used to identify targeted interventions to overcome vaccine hesitancy in this population.(1)

The study utilizes an interdisciplinary approach by applying the discrete choice experimental design from psychology to an epidemiologic question. The discrete choice experiment will present study participants with a particular profile for a vaccine (e.g. a vaccine against an epidemic disease, with low population coverage, and strong indirect protection). Participants will be asked if they would opt to be vaccinated if they faced with an access constraint: wait time, measured by willingness to undergo a return visit and wait to receive a vaccine. The participant will decide whether or not to be vaccinated in this hypothetical scenario. By collecting these responses across a range of vaccination scenarios, the relative contribution of each variation in vaccine profile for making a vaccination decision will be quantified.

This study will quantify how future medical professionals at Makerere University weigh different characteristics of the vaccine. We will assess how willingness to be vaccinated differs between:

1) Vaccines against acute, epidemic diseases (e.g. measles or Ebola) vs. vaccines against endemic diseases that develop over many years (e.g. HPV vaccine for cervical cancer)

Hypothesis: future medical professionals will have equal levels of vaccine acceptance for both vaccine types, whereas non-medical students will have higher vaccine acceptance for the vaccine against an epidemic disease relative to a more common chronic disease.

2) Situations where vaccine is readily accessible vs. where significant physical access challenges exist.

Hypothesis: Vaccine access will be a stronger driver of vaccination preferences than vaccine hesitancy.

3) Low community coverage vs. high community coverage (e.g. the influence of social norms)

Hypothesis: Both future medical professionals and non-medical students will be more likely to receive a vaccine with high coverage compared to a vaccine with low coverage.

4) Whether the vaccine primarily protects others vs primarily protects only the individual receiving the vaccine (e.g. a hypothetical HIV vaccine that protects children, but not their mothers against HIV)

Hypothesis: Both future medical professionals and non-medical students will be equally likely to receive a vaccine that provides community as compared individual protection.

Recruitment to study: Current students at Makerere University will be recruited into the study through an email survey. If needed, the study team will explore SMS and WhatsApp-based recruitment, in addition to the in-person study recruitment methodology that already occurs Makerere medical school.(8) Recruited participants will self-administer the survey online accessible via a link either on their personal computers or using tablets provided by the study team.

Study population: Consenting students enrolled at Makerere University ages 18 and above will be eligible. Students enrolled in medical and nursing schools will be classified as ‘future medical professionals’ and students enrolled in any of the other schools at Makerere University will be classified as ‘future non-medical professionals’.

Measurement

Vaccine hesitant. For each scenario described above, participants will be asked to confirm whether they would or would not accept vaccination, with refusals classified as vaccine hesitant.

Vaccine access will be measured by proxy as the amount of time that participants would be willing to wait to receive a vaccine on the return visit.

Sample size: Approximately 800 participants will be recruited for this study. While no standard method exists for sample size calculation in discrete choice experiments(7), we will seek at least 200 participants in each of the four strata: age, sex, academic discipline and vaccination status, requiring at least 800 participants out of the 40,000 students at Makerere University.

Informed consent will be documented prior to the survey either electronically or in paper format.

Significance and Innovation

This study utilizes a novel methodology to decompose the reasons for vaccination hesitancy among future health professionals in Uganda to shed light on how vaccination preferences may differ. This study offers a unique and quantifiable contrast between the major drivers of non-vaccination. Understanding these relationships can guide targeted interventions to overcome vaccine hesitancy.

Contribution to interdisciplinary work

This study represents one of the first applications of the discrete choice experiment to vaccination in a low resource context. This interdisciplinary study applies an innovative experimental design originating from mathematical psychology to an epidemiologic question with direct implications to health. This research will be an element of my dissertation.

Timeline

	2018						2019					
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June
IRB submission: Makerere U. & UNCST	█											
Develop SOPs			█									
IRB submission to UMN				█								
IRB clarification					█							
IRB approval						█						
Administer survey							█					
Data cleaning							█	█				
Data analysis								█	█	█		
Draft manuscript										█	█	█

Biography of investigators

Kimberly Bonner, MPA (PI). I am a second-year PhD student in the Division of Epidemiology and Community Health in the School of Public Health at the University of Minnesota, Twin Cities. For my PhD training, I work under the supervision of Dr. Nicole Basta in her ongoing collaboration with Dr. Cecily Banura of Makerere University on barriers to HPV vaccination. In 2017, we undertook a study in rural Uganda to describe health facility participation in the national HPV vaccination program. My long-term research interests involve the development of a comprehensive understanding of the barriers to vaccination and interventions to improve vaccination coverage in low-resource settings.

Nicole Basta, PhD, MPhil (advisor/co-I). Dr. Basta is an assistant professor in the Division of Epidemiology and Community Health at the University of Minnesota's School of Public Health. Dr. Basta is an infectious disease epidemiologist who specializes in vaccination and infectious diseases. She has undertaken research on influenza, meningitis A and B vaccines, and Human Papillomavirus vaccine in the United States, Mali and Uganda. Since meeting Dr. Basta in 2013 at Princeton University, her commitment to both mentoring and research has always shone. As her advisee, I have found that Dr. Basta's guidance in research has been the single biggest contributor to my growth as an epidemiologist, particularly in study design, implementation, and analysis. Dr. Basta has demonstrated extraordinary commitment to mentorship, and I am confident that this strong working relationship will continue.

Dr. Cecily Banura, MD, PhD (co-I). Dr. Banura is a senior lecturer in the Child Health and Development Center at Makerere University College of Health Sciences, School of Medicine in Kampala, Uganda. Dr. Banura is a cancer physician and epidemiologist who has worked on sexually transmitted infections, HPV, HPV vaccine and cervical cancer throughout her career. Dr. Banura and I have worked together since August 2016 on a study on barriers to HPV vaccination in rural Uganda. She supervised my first experience in primary data collection and, when I lived in Kampala in the summer of 2017, she met with me regularly to provide feedback and advice on both our ongoing research collaboration as well as next steps for my future research endeavors. She has provided substantive feedback at every stage of my research process this year.

Judith Mueller, PhD (co-I). Dr. Mueller is the group leader for the Epidemiology of Emerging Diseases Group at the Pasteur Institute in Paris, France. She has extensive experience in bacterial meningitis, particularly in Burkina Faso, and she is a methodological expert in the study design outlined in the research proposal. Dr. Mueller has already shared the details of her complementary discrete-choice study in France, and she has provided excellent feedback on this research project. With Dr. Mueller's expertise in discrete-choice experiments, and her experience conducting research in Burkina Faso, she has the contextual familiarity with low-resource environments to advise on how her survey methodology can be adapted to Kampala, Uganda.

Consortium on Law and Values in Health, Environment & the Life Sciences
 2018 Student Proposal: Kimberly Bonner (bonne255@umn.edu)
 Drivers of vaccine acceptance among future healthcare professionals in Uganda

Project Title: Drivers of vaccine acceptance among future healthcare professionals in Uganda

Provide justification along with costs.		Requested funding	
	Category & instructions	Justification	Amount
1	Your stipend <i>Maximum of \$5,000</i>		\$0
2	Speaker honoraria (for colloquia)	___ speakers x \$ _____ honorarium	\$0
3	Supplies & Services <i>Identify and explain use here or in the body of your proposal.</i>	<i>Research incentive: \$100 several small cash incentives for participants Research assistant: \$800 for IRB submission, recruitment, and data collection Internet costs for survey administration: \$200 for four tablets during data collection IRB submission fees: \$300 for Uganda National Council of Science and Technology IRB submission fees: \$150 for submission and amendment cost for Makerere University Office supplies/printing: \$100 Journal fee for open access publication: \$2,000</i>	\$3,450
4	Equipment <i>Identify and explain use. Allowable only if the equipment is necessary for this project. All equipment must be given to your dept. at the completion of your project.</i>	<i>Tablets for administering survey (2): \$350 each</i>	\$700
5	Travel <i>Indicate the purpose of the travel, estimated dates of travel, transportation, housing and allowable per diem costs (see travel.umn.edu).</i>	<i>Roundtrip flight to Uganda: \$2000 Lodging in Uganda \$30/night for 15 nights: \$450 Per diem in Kampala, Uganda \$15/day for 15 days: \$225</i>	\$2,675
Subtotal research expenses (2-5)			\$6,825
TOTAL BUDGET			\$6,825

Other funding: List other or matching funding you have requested for this project.

Funding source	Amount
Fogarty Global Health Fellowship (application pending): applied for funding to undertake one year of research in Uganda. The Fellowship provides living expenses and \$10,000 in research funding.	\$32,000

Bibliography

1. Rainey JJ, Watkins M, Ryman TK, et al. Reasons related to non-vaccination and under-vaccination of children in low and middle income countries: findings from a systematic review of the published literature, 1999-2009. *Vaccine* 2011;29(46):8215-21.
2. WHO. Summary WHO SAGE conclusions and recommendations on Vaccine Hesitancy. 2015.
3. Seanehia J, Treibich C, Holmberg C, et al. Quantifying population preferences around vaccination against severe but rare diseases: A conjoint analysis among French university students, 2016. *Vaccine* 2017;35(20):2676-84.
4. Larson HJ, Jarrett C, Schulz WS, et al. Measuring vaccine hesitancy: The development of a survey tool. *Vaccine* 2015;33(34):4165-75.
5. Team GFCE. Gavi Full Country Evaluations: 2016 Dissemination Report, Uganda. Seattle, WA: IHME, 2017.
6. Paterson P, Meurice F, Stanberry LR, et al. Vaccine hesitancy and healthcare providers. *Vaccine* 2016;34(52):6700-6.
7. Bridges JF, Hauber AB, Marshall D, et al. Conjoint analysis applications in health--a checklist: a report of the ISPOR Good Research Practices for Conjoint Analysis Task Force. *Value Health* 2011;14(4):403-13.
8. Mubuuke AG, Oria H, Dhabangi A, et al. An exploration of undergraduate medical students' satisfaction with faculty support supervision during community placements in Uganda. *Rural Remote Health* 2015;15(4):3591.
9. Reagan-Steiner S, Yankey D, Jeyarajah J, et al. National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13-17 Years - United States, 2015. *MMWR Morb Mortal Wkly Rep* 2016;65(33):850-8.
10. LaMontagne DS, Bloem PJN, Brotherton JML, et al. Progress in HPV vaccination in low- and lower-middle-income countries. *Int J Gynaecol Obstet* 2017;138 Suppl 1:7-14.
11. UNESCO IoS. Glossary. 2017.
12. UNESCO IoS. Policy paper 27/Fact sheet 37. 2016.
13. WHO. Guide to Introducing HPV Vaccine into National Immunization Programmes. 2016.
14. WHO. Scaling-Up HPV Vaccine Introduction. In: WHO, ed, 2016.
15. Watson-Jones D, Mugo N, Lees S, et al. Access and Attitudes to HPV Vaccination amongst Hard-To-Reach Populations in Kenya. *PLoS One* 2015;10(6):e0123701.