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Course Objective: This year's team sought to develop novel models to evaluate reproductive health challenges using data science in partnership with IntraHealth International's digital health team and the Center for Global Reproductive Health's Kenya-based research team.

Project 1: Analyzing access to modern contraception among women with developmental disabilities in North Carolina: A mixed-methods study

ABSTRACT

- Women with intellectual and developmental disabilities (IDD) have similar age-specific fertility rates¹ and are more likely to engage in unsafe sex.² However, significant barriers to accessing contraception exist.³
- Comprehensive data regarding contraceptive access in North Carolina is currently lacking, public surveys may exclude individuals who live in institutional settings, and little is known about the landscape of reproductive health within residential facilities.
- This study aims to identify differences in contraceptive access among women with IDD by procedure type and contraceptive type, as well as understand barriers to care.
- We will apply big data techniques to NC Medicaid claims data and conduct interviews with staff at six public and private residential facilities.
- Analysis will be conducted from February to July 2022, with the final goal of a manuscript to inform policy initiatives.

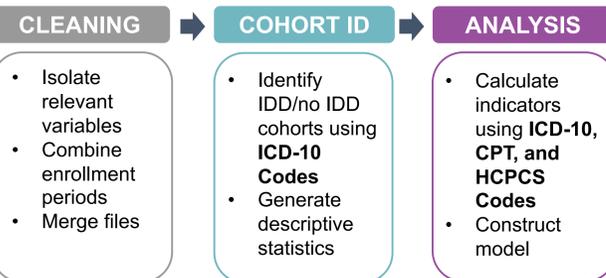
QUANTITATIVE METHODS

PRIMARY AIMS

Characterize contraceptive by procedure utilization and contraceptive type

Identify associations between IDD and utilization through regression analysis

PROCESS OVERVIEW



PRIMARY INDICATORS

- Comprehensive receipt of contraceptive health care encounters
- Receipt of encounters by procedure type, contraceptive type, and facility type
- Multivariate logistic regression (response = Y/N receipt; predictor = IDD status)

QUALITATIVE METHODS

PRIMARY AIMS

Compare staff perspectives about contraceptive provision and utilization at residential facilities

PROCESS

1. Develop IDI guide and seek expert feedback
2. Obtain Campus IRB approval
3. Network and recruit facility staff

INTERVIEW THEMES

- General practices
- SRH care provision
- Contraceptive offerings/utilization
- Perceptions of needs

NEXT STEPS

4/22-5/22: Finalize quantitative analysis

6/22: Recruit participants and conduct interviews

7/22-8/22: Compare and interpret analyses

9/22-11/22: Prepare manuscript

1. Brown, H. K., Lunsby, Y., Wilton, A. S., Cobigo, V., & Vigod, S. N. (2016). Pregnancy in Women With Intellectual and Developmental Disabilities. *Journal of Obstetrics and Gynaecology Canada*, 38(1), 9–16.
2. Baines, S., Emerson, E., Robertson, J., & Hutton, C. (2018). Sexual activity and sexual health among young adults with and without mild/moderate intellectual disability. *BMC Public Health*, 18(1), 667.
3. National Partnership for Women & Families & Autistic Self Advocacy Network (2021). Access, Autonomy, and Dignity: Contraception for People with Disabilities.

*Project data made available through partnership between Duke Population Health Sciences and the North Carolina Department of Health and Human Services

Project 2: Analyzing the Association Between Armed Conflict and Contraceptive Use In Mali, Zimbabwe, and Nigeria

ABSTRACT

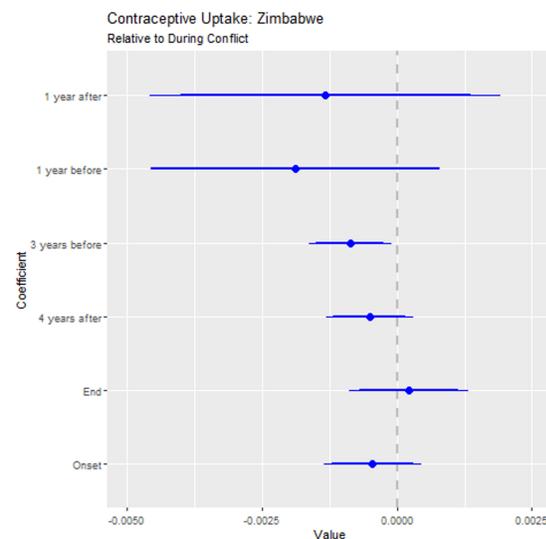
- What is the impact of armed conflict on women's contraceptive use?
- Contraceptive use is a key indicator of women's access to family planning resources; filling this knowledge gap can benefit interventions to aid women's health in times of armed conflict
- We sought to understand how armed conflict impacts contraceptive use before, during, and after conflict in Mali, Zimbabwe, Nigeria

METHODS

- We incorporated geo-located data from Demographic and Health Surveys (DHS), and Uppsala Conflict Data Program (UCDP), which allowed us to investigate contraceptive use among women within 15 kilometers of conflict sites. We also used Organisation for Economic Co-operation and Development (OECD) data to control for the amount of foreign aid these countries received for family planning each year.
- Linear regression model
- Outcome variables include abortion rate, conception rate, contraception start rate, contraception switch rate, and discontinuation rate

RESULTS

We registered zero effects across all 3 countries, implying that there is no difference in abortion rate, contraceptive rate, contraception start rate, switch rate, or discontinuation in conflict regions in the time periods before, during, and after conflict. Results for Zimbabwe are below:



The thin blue line represents the 90% confidence interval, and the thick blue line represents the 95% confidence interval.

DISCUSSION

- In each of the 3 countries studied (Mali, Zimbabwe, and Nigeria), intensity and nature of conflict do not affect family planning use and uptake by the population living within 15 kilometers of the conflict site.

Next Steps

- Future research should incorporate more control variables and account for cultural factors.

Project 3: Using Natural Language Processing (NLP) Techniques to examine Stigma with Cervical Cancer in Kenya

ABSTRACT

- Does Latent Dirichlet Allocation (LDA), when optimized according to Cv topic coherence criterion, generate the same topics (in both quantity and kind) as hand-coding for stigma interview data? If not, do they differ in quantity, kind, or both?
- We hypothesize that
 - NLP will produce fewer topics whose qualitative similarity to topics generated by hand-coding will vary
 - NLP will be most likely to miss or misclassify more nuanced topics, such as stigma

METHODS

Due to a lack of research on the application of NLP with stigma data, we used 26 in-depth interviews conducted among Kenyan women (both HIV-positive and negative), community health volunteers (CHVs), and healthcare providers in Kisumu, Kenya in 2019 as part of a study attempting to develop a stigma framework due to the stigma associated with HPV and cervical cancer in Kenya

3 predetermined document sizes:

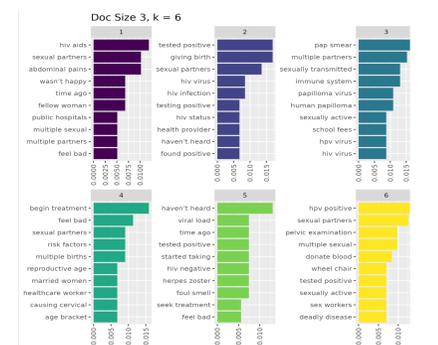
- (1) an individual's response to one segment of the interview question
- (2) an individual's response to the entire interview question
- (3) an individual's entire interview

PROCESS:



RESULTS

- Bigrams (two-word tokens) for 3 topics over entire interviews yielded the most easily interpretable results
- In most instances, the probability of a topic given a token was either zero or one



DISCUSSION

- Rudimentary NLP is not adequate for identifying stigma in qualitative data
- Stigma categories (enacted, anticipated, internalized) are determined by specific nuances that cannot be found in groups of bigrams

Next Steps

- Look into applying NLP techniques on larger datasets with varied forms of stigma, such as social media discussions
- Use additional NLP techniques outside of topic modeling to draw insights on stigma in qualitative data