

Big Data for Reproductive Health



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Basis of our Work

One-third of women who begin using a modern method of contraception in low-income countries discontinue within the first year, and half within the first two years, putting them at risk for unintended pregnancies as well as maternal morbidity and mortality.¹

Comprehensive data on discontinuation exist, but they are inaccessible to non-technical users. We developed a platform that curates freely available data on reproductive health so that users such as researchers, advocates, and government officials, can develop fresh insights around the factors that influence contraceptive use and discontinuation.

Data Sources

- 1. Contraceptive prevalence and discontinuation data from the Demographic & Health Surveys (DHS) contraceptive calendar reported in monthly intervals over a retrospective 5 year period.
- 2. Publicly available reproductive health and social indicator data from the World Bank, World Health Organization and World Population Prospects reported in 5 year intervals.

Tools:





Google Sites

Objectives

- Identify existing tools for visualizing contraceptive discontinuation and analyze gaps.
- 2. Build an open access, interactive platform to visualize data on contraceptive discontinuation that addresses these gaps in resources available.
- Develop a dissemination plan that includes soliciting feedback from target users and key stakeholders.

Future Work

The 2018-2019 Bass Connections team will continue to build upon the visualization platform and collect user feedback from key stakeholders in the NC Triangle area. We also plan to incorporate machine learning to make inferences about contraceptive use behaviors and conduct a literature review of big data in reproductive health.



Method and Approach

Step 1: Curating and cleaning big data



We have access to 2202 datasets collected in 91 countries over 7 phases.

1.1 Survey Data

		181	1	2
	12 DEC	01	В	
	11 NOV	02	Р	
	10 OCT	03	Р	
	09 SEP	04	Р	
2	08 AUG	05	Р	3) (2)
0	07 JUL	06	Р	
0	06 JUN	07	Р	
3	05 MAY	08	Р	
	04 APR	09	Р	
	03 MAR	10	0	5 8
	02 FEB	11	3	
	01 JAN	12	3	

Respondents are asked to recall their contraceptive use history up until 5 years preceding the survey.

1.2 Encoded Data

vcal_1	vcal_2
333333333333333333333333333333333333333	
888888888888888888888888888888888888888	4
33333333333BPPPPPPP00000000000000000000	
PPPPP000TPP0000003333333333333333333333	2
NNNNNN00333000BPPPPPPP0000BPPPPPPP00011	8 2
000000000000000000000000000000000000000	
333333333333333333333333333333333333333	
	1 4
33300000000000000000000000000000000000	
333333333333333333333333333333333333333	

B: birth Other symbol: P: pregnancy birth control

0: non-use method

The calendar data is stored as 80-character strings (for 80 months) in the available dataset.

1.3 Convert to Long Format and Generate Estimates

month	region	age	discontinuationReason	dpr
2009-01	Central	25-29	Wanted to become pregnant	63.102332
2009-01	Central	25-29	Country-specific reason	36.897668
2009-01	Central	30-34	Other reasons	100.000000
2009-01	Central	35-39	Became pregnant while using	28.616918
2009-01	Central	35-39	Wanted to become pregnant	31.470468
2009-01	Central	35-39	Side effects	15.421782
2009-01	Central	35-39	Infrequent sex/husband away	24.490832
2009-01	Central	40-44	Side effects	100.000000
2009-01	Eastern	20-24	Infrequent sex/husband away	100.000000
2009-01	Eastern	25-29	Wanted to become pregnant	100.000000

Reason for discontinuing

Discontinuation Rate (%)

We convert this dataset into a long format and add external information, such as whether a contraceptive is modern or traditional. We then use this 'clean' dataset to estimate reproductive health indicators, such as contraceptive discontinuation rates.

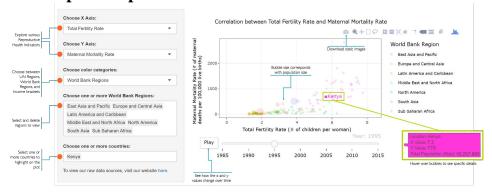


R Shiny Applications

Step 2: Creating informative visualizations



Scatterplot: Explore Correlations Over Time

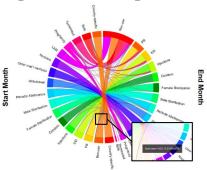


Line Graphs: Explore Yearly & Monthly Trends



Chord Diagram:

Explore Contraceptive Switching and Stopping



Heat Map: Explore Data Geographically

