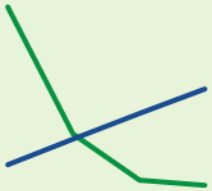
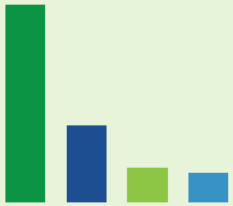
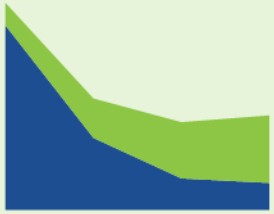




Year	Avg.	Total
2010	2.0	1.3 M
2015	2.2	1.5 M
2020	2.5	1.9 M



Small Area Estimates in Uganda

Data informed decisions where they are most needed

TRACK 20 FP2020

September 2021

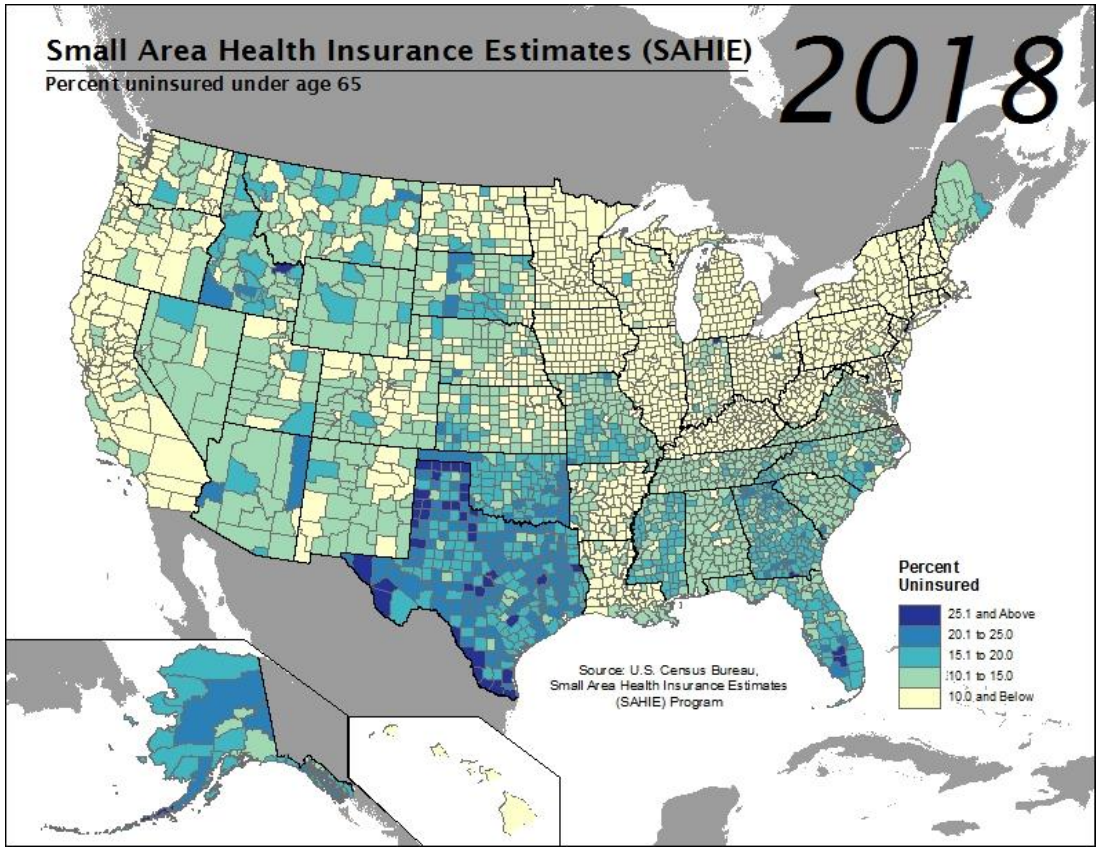
Kristin Bietsch, PhD, Track20

What are small area estimates?

- Small Area Estimates (SAE) are estimate derived from surveys that are for smaller sub-groups than for which the survey was designed

For example:

- National survey conducted
- May have power (sample size and design) for state level estimates
- But what about counties?

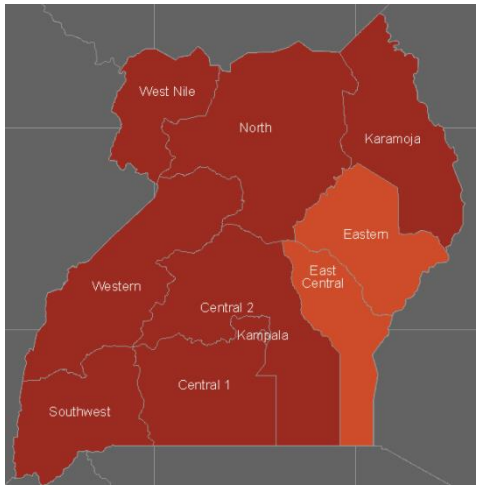


Why do we want SAE?

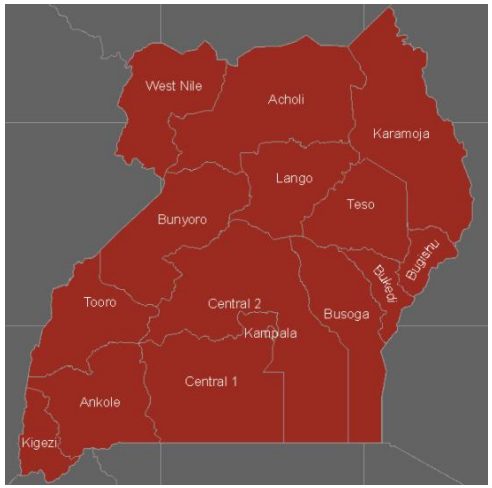
- Decisions are being made at lower administrative levels
- We have current data from service statistics at lower levels
- We want survey data for benchmarking
  - And for running FPET!

Uganda Boundaries Overtime

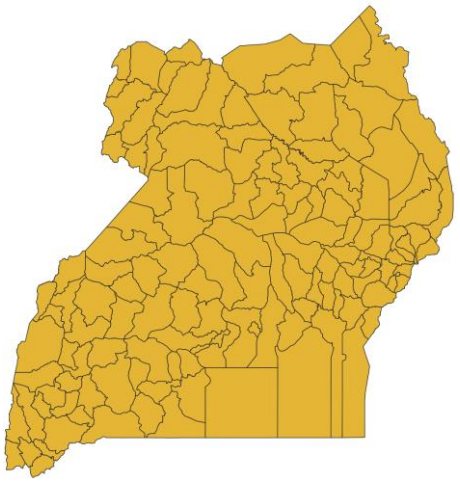
DHS 2006 and 2011



DHS 2016



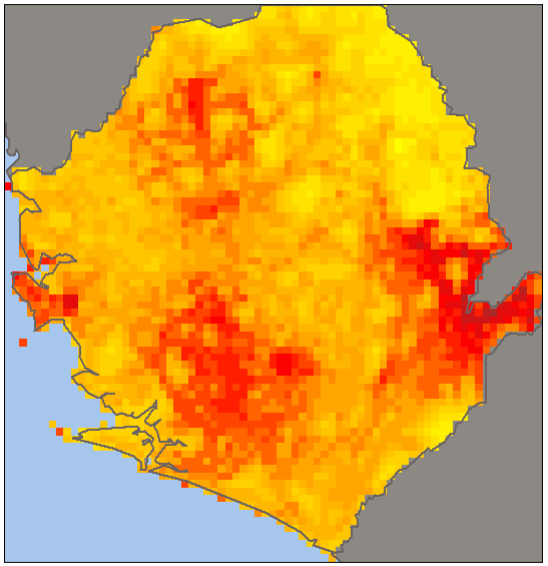
Districts



Different techniques for SAE

- There are many statistical techniques used to calculate SAE
  - Most create smoothed surfaces

Technique
Geo-additive regression
Geographically weighted regression model
Kernel estimator
Spatial empirical Bayes estimation
Inverse distance weighting
Nearest neighbor interpolation
Conditional autoregressive model
Geo-additive Probit and Latent Variable Model
Bayesian generalized linear geostatistical model
Bayesian Kriging
Geo-additive semiparametric Bayesian model
Geo-statistical Bernoulli & Gaussian models
Proportional hazards model with spatially correlated random effects
Zero-inflated Binomial model



- Vary in time needed and computing power needed
- DHS has some modeled surfaces available online
- Track20 uses kernel estimators to create smoothed surfaces more quickly, using free software

How Track20 Creates SAE

Data

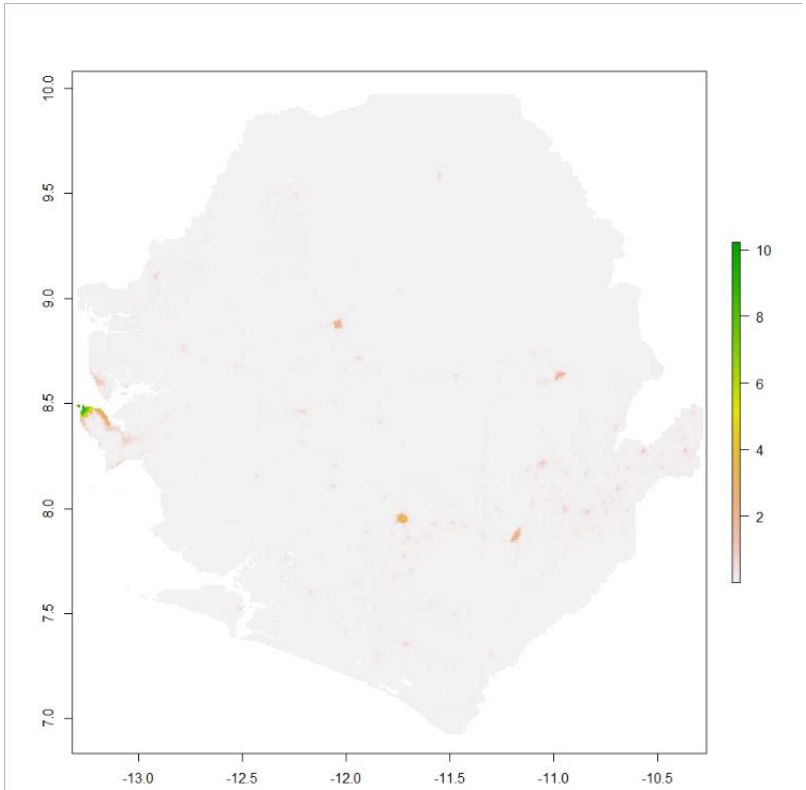
- DHS with geospatial data
- Population estimates
- Administrative boundaries

Software

- RStudio
  - PrevR Package
- QGIS

How Track20 Creates SAE

1. Calculate cluster level prevalence
2. Use kernel estimator technique to create smoothed surface
3. Combine with population data to estimate users
4. Aggregate number of users and total number of women per administrative unit
5. Calculate prevalence



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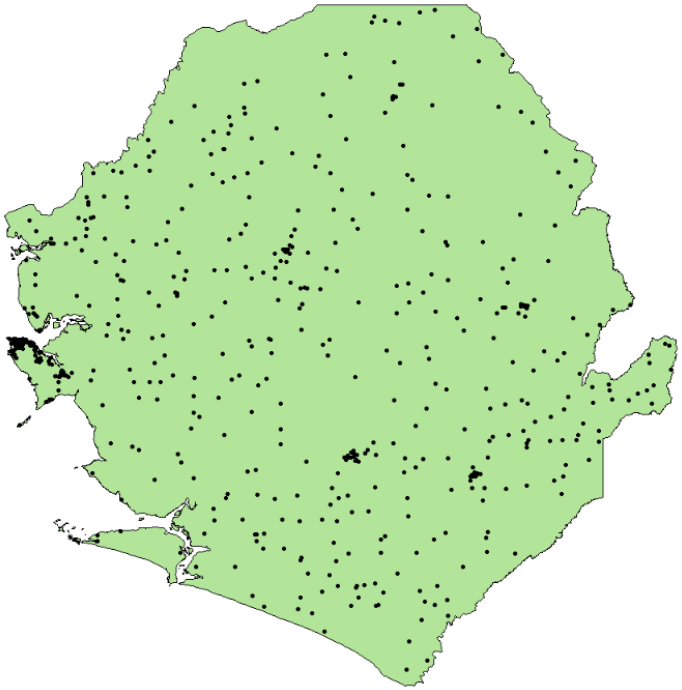

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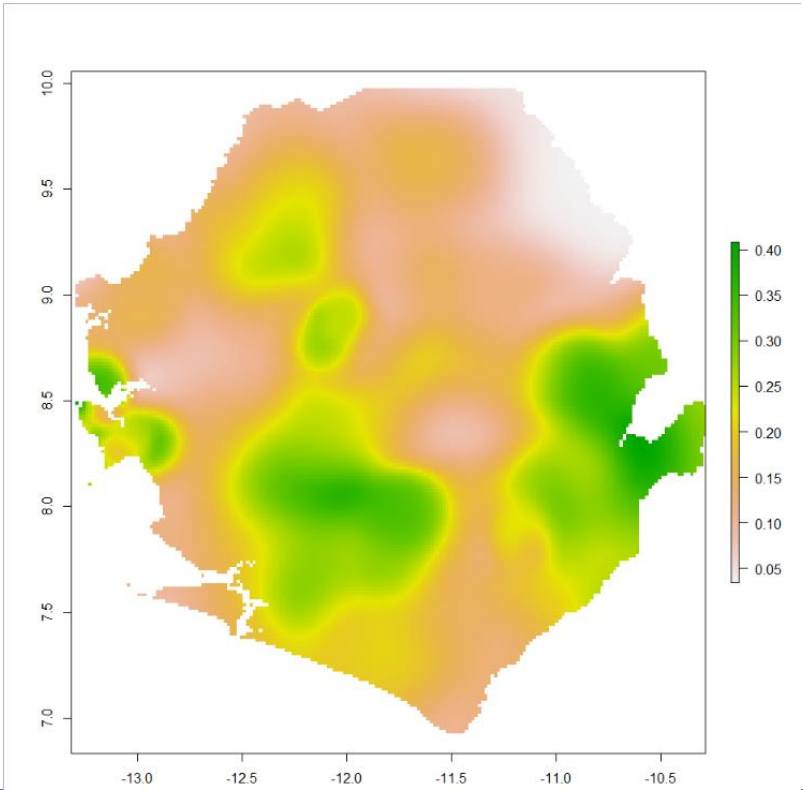

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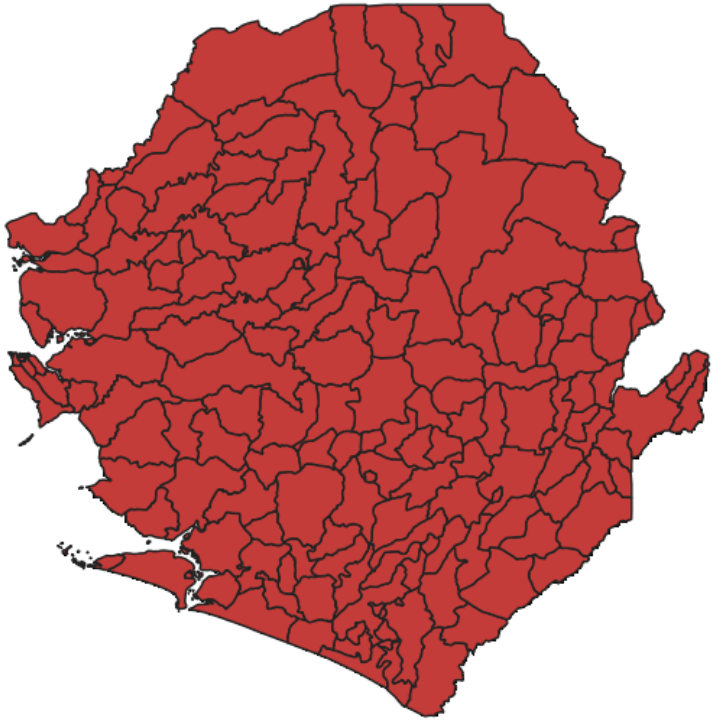

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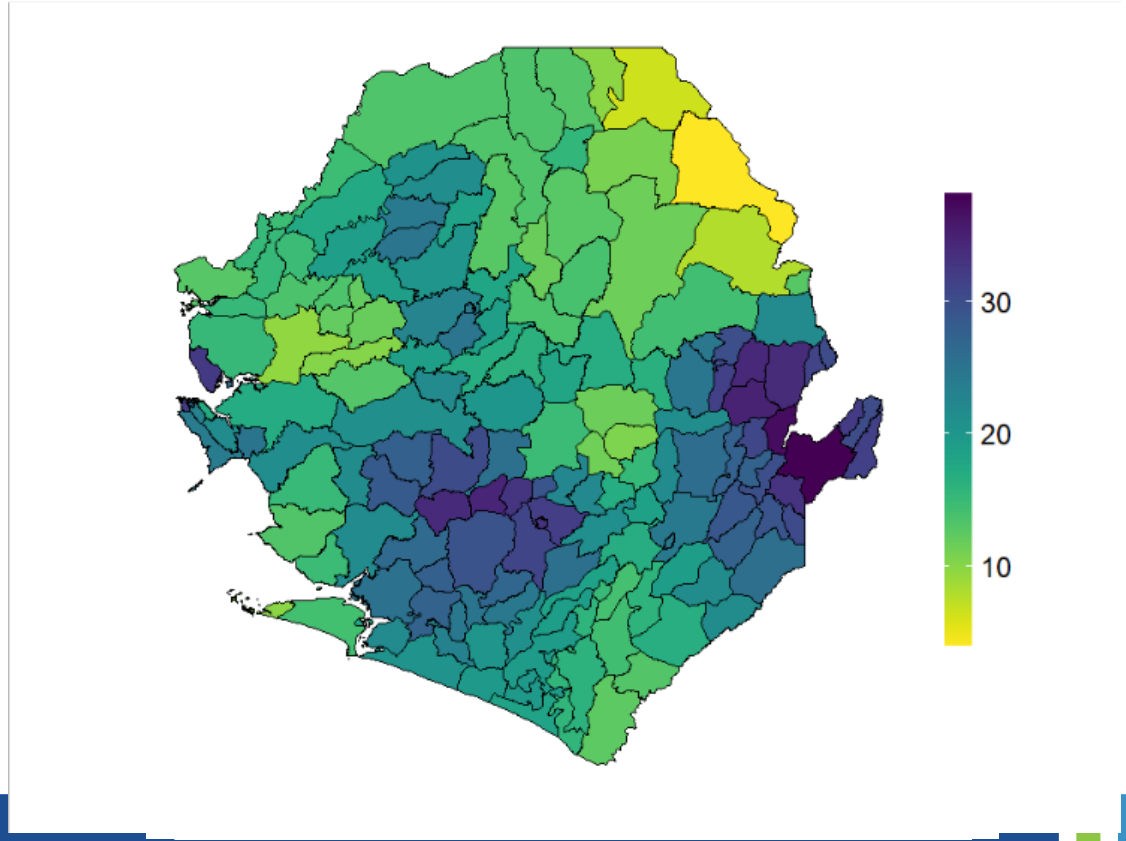
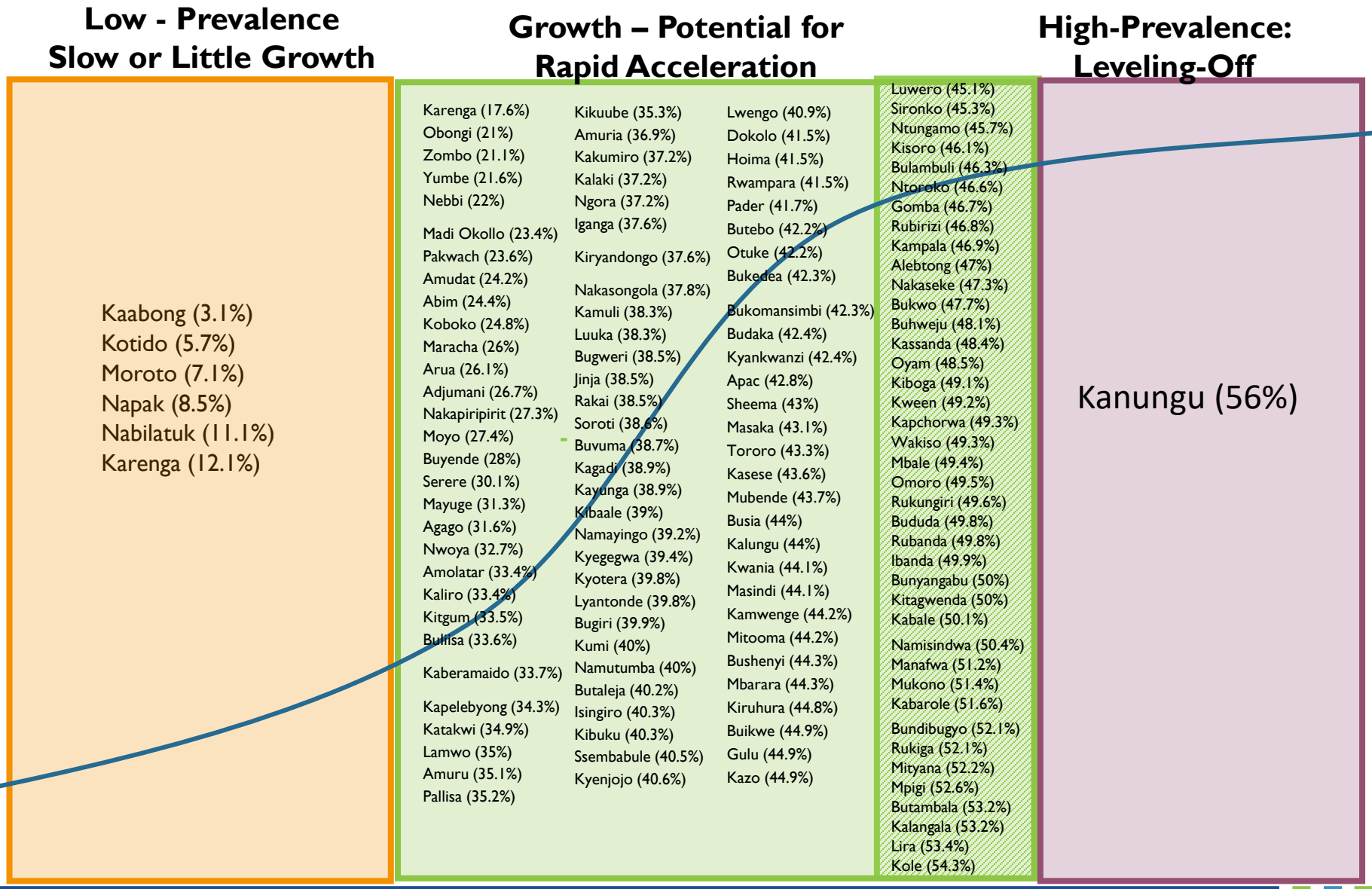
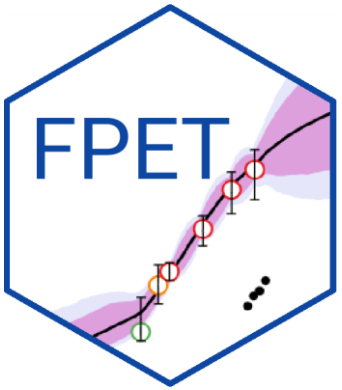


District Level mCPR in 2021



How do we use SAE to benchmark progress?



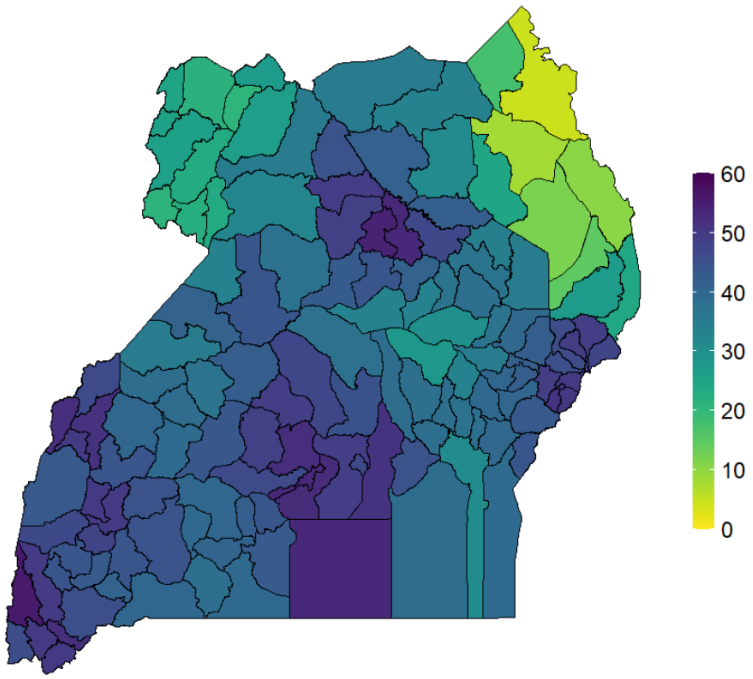
Family Planning Estimation Tool

- Modeling software used to create annual FP2020 estimates
- Incorporates surveys and service statistics
- Used at national and subnational level

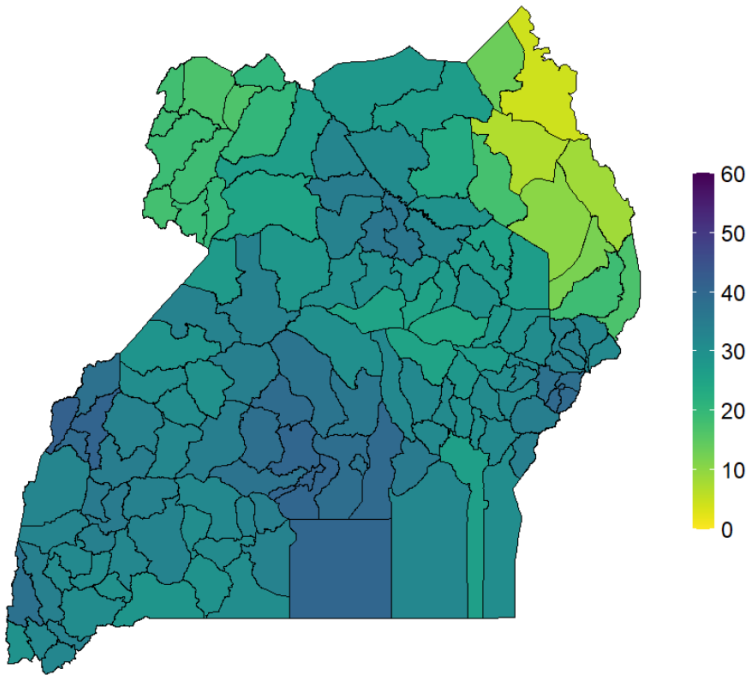
- FPET inputs
  - mCPR, tCPR, unmet need (married and unmarried women)
- SStoEMU prep
  - Since we have service statistics at low levels, we want to use the SStoEMU tool at lower levels

District Level FPET Results for 2021

Married Women



All Women



Next Steps: Adding in Service Statistics

- Service statistics from the DHIS2 transformed into Estimated Modern Users (EMUs)
- EMUs can be integrated in FPET to inform trend after most recent survey