

Bwindi Community Hospital

Identifying New Insurance Members

Capstone Project

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Healthcare in Bwindi



BCH is a not-for-profit hospital in rural Uganda

- Provides healthcare on an equal basis
- Cares for over 80,000 people in the area

BCH Funding:

- 8% running costs from government
- Remainder made up by:
 - Fundraising
 - Patient charges

eQuality Health insurance aims to:

- Provides affordable healthcare
- Helps to reduce charges

Looking for More Members



BCH want to add more eQuality subscribers:

- Improve individual health
- Improve overall community health

SMS targeting of candidates

- Remoteness of the location
- Widespread use of mobile phones

**Identify key features of people that are
likely to sign up to eQuality**



eQuality and Bataka Groups

How does eQuality work?

- Households pay 15,000 UGX per member for a fixed duration (~ 4 months)
- A member can get BCH treatment at greatly reduced rates under eQuality

What are Bataka groups?

- Started with HIV epidemic
- Now used for community politics
- Nearly every household is part of a group

How do members join?

- Members join eQuality via Bataka groups
- Members in each group vote
- Entire Bataka group joins or not

Available Data



BCH has a rich dataset of multiple databases

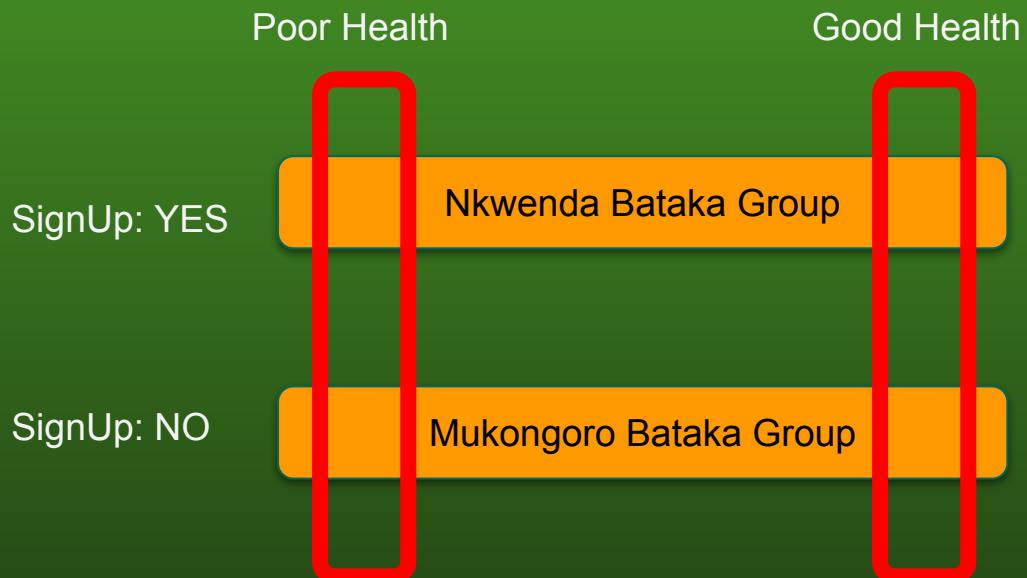
The database used for this task contained:

- 70 tables
- 550 Bataka groups
- 80,000 members
- Characteristics recorded
 - Gender
 - Age
 - Births/Deaths/Children count
 - Income
 - Village/Parish/Subcounty/XYZ
 - Health
- After cleaning and EDA:
 - 44,000 members
 - 420 Bataka groups

Data Cleaning and Targets

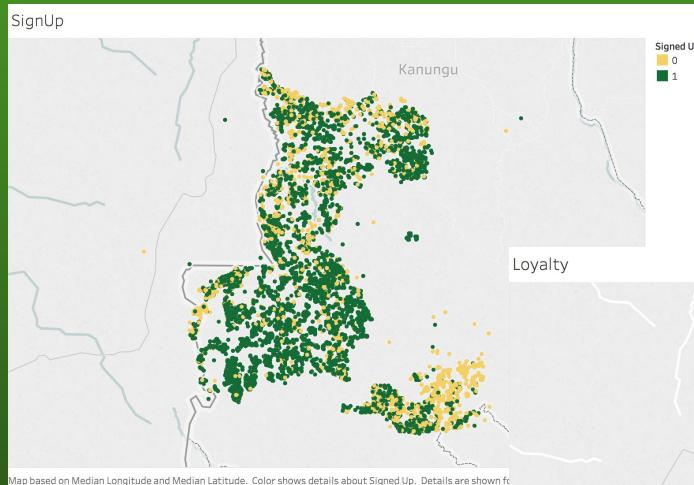
- Data required a lot of cleaning and domain knowledge
 - What data means
 - How data was recorded
- Created two targets
 - SignUp: YES or NO
 - Loyalty: HIGH or LOW
- Challenge
 - Target Correlations $\sim 0.01 !!!$
- Solution
 - Aggregate on Bataka Group
 - Dictated by voting structure
 - Data from 44,000 to 420 entries

Why do the targets not correlate?

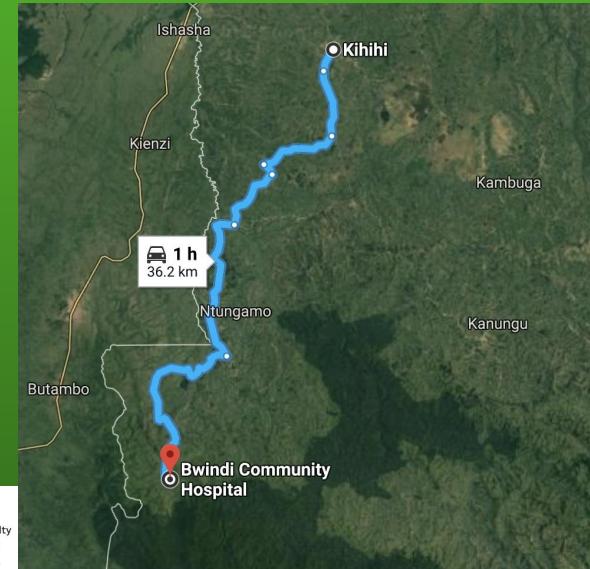
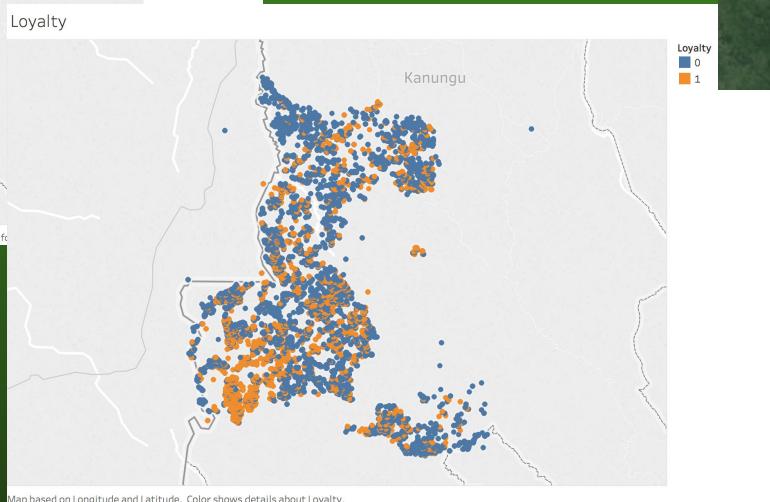


Mapping the Targets

SignUp



Loyalty

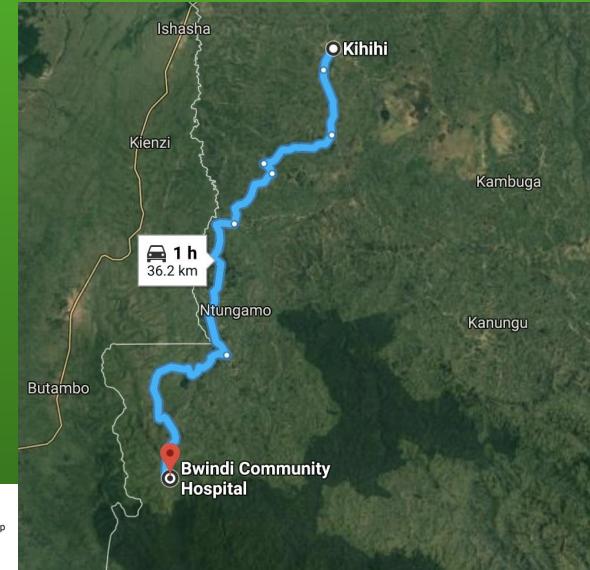
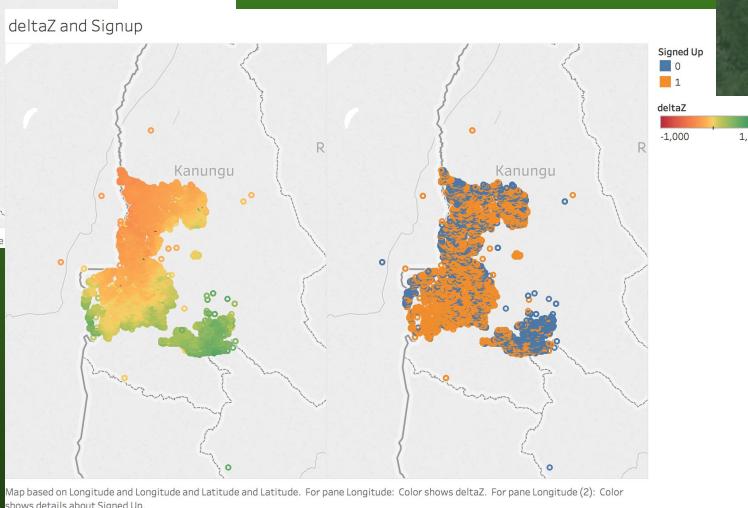
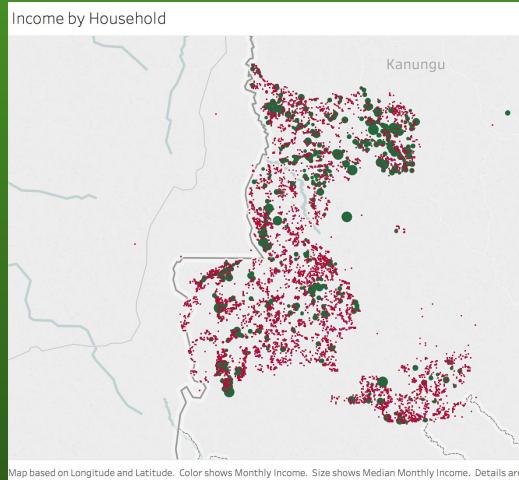


Bwindi
Impenetrable
Forest



Some Visualisations

Monthly Income

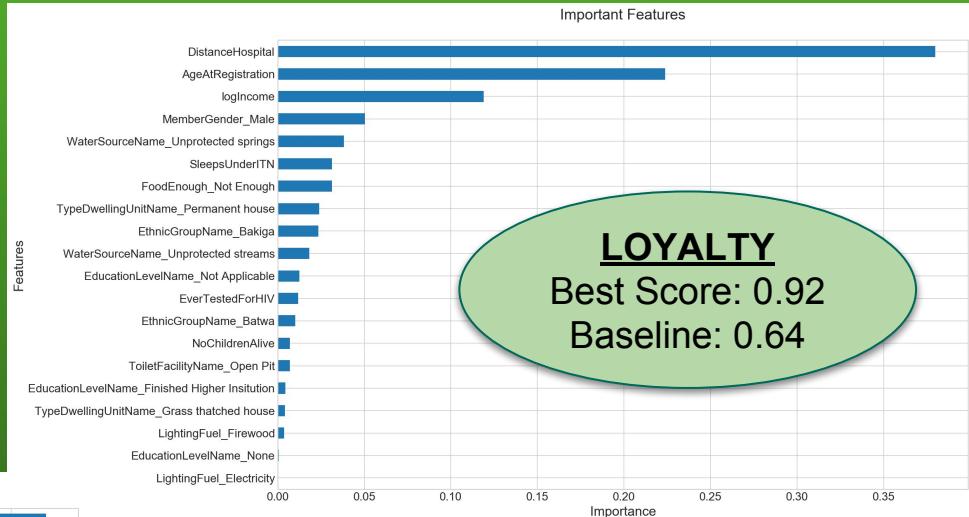


Bwindi
Impenetrable
Forest

Important Features

MODELS

Logistic Regression
Random Forest
Stochastic Gradient Descent
Extra Trees Classifier



Conclusion

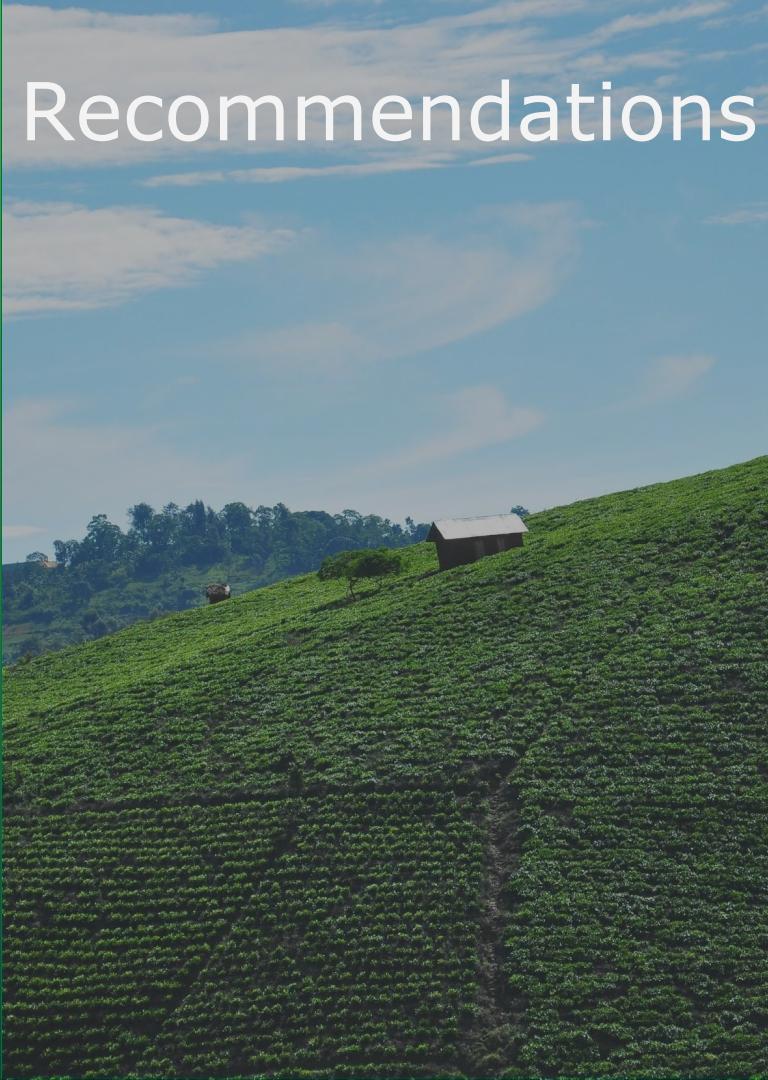


BCH provides healthcare on an equal basis

Care must be taken selecting features to not discriminate

- Stronger candidate Bataka groups might convince neighbour groups to join
- Models used to identify features performed well and gave confidence in the features
- Need to retain existing groups
 - Loyalty duration is 25%
 - Increasing Loyalty is more important

Recommendations



- BCH should focus on increasing Loyalty and retaining existing eQuality subscribers
- BCH should seek Bataka groups:
 - High Monthly Income
 - High median age
 - Rain water or protected springs
 - Ownership of detached dwellings
 - Live close to the hospital
 - Live in valleys (not hilltops)