Hyperlocal Support of Vaccine Uptake

Our Mission

Make relevant innovations that
save lives, cure patients and prevent disease
available – affordable – accessible
for the world’s most vulnerable and underserved populations.

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Vaccine Uptake: Strengthening Vaccine Confidence

Vaccines do not guarantee vaccinations: As COVID-19 vaccines become more widely available, we must strengthen vaccine confidence to improve vaccine uptake.

J&J GPH is conducting **unbranded research** to improve understanding of vaccine confidence across Sub Saharan Africa and how it is changing over time. This research does not include any information about the J&J vaccine, nor any other vaccines from other manufacturers.

Vaccine Confidence Research is in service of **Vaccine Confidence Campaigns and Risk Communication Plans**. Donors and NGOs can use this research to increase the effectiveness of their Campaigns.

ILLUSTRATIVE EXAMPLES OF RESEARCH:

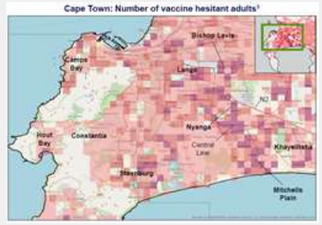
WHY
people aren't getting vaccinated

Insights Report, based on WHO/SAGE 3Cs model

WHICH
Population segments are most resistant

Attitude & Behavior Segmentation

WHERE
to focus geographically within country



Geo-spatial analysis of the 3Cs

WHAT
to say to change attitudes and behavior

"Getting the vaccine is like getting a sturdy umbrella and overcoat during a rainstorm. It makes sure that you avoid the worst of it. The idea is to keep you safe and dry from the rain"

Message Testing

WHO
should the communication come from

Influencer Plan

How can we support local vaccination programs?

For implementation teams across Sub-Saharan Africa

Providing local support to implementation teams[1] by mapping key factors at the **square kilometer level** across across entire countries:

“3C’s” of Vaccine Uptake

We’re leveraging the WHO’s framework of confidence, convenience, and complacency to understand large barriers or facilitators to vaccine uptake

Attitudinal Segments

We have developed accurate estimates of how the population in each square kilometer of the country falls into the 5 attitudinal segments.

Population and Media

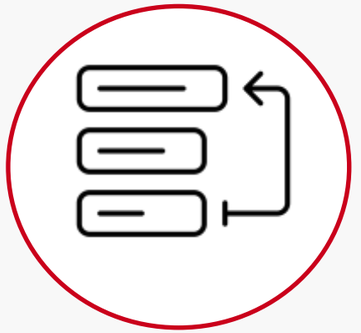
We have also mapped key demographic, sociographic, and economic factors, as well as media consumption patterns at the channel level across social media, TV, newspaper, and radio.

1. Note that this line of work is design to be used in conjunction with the attitudinal segmentation, message testing, and creative development initiatives group J&J GPH

Potential Use Cases

This study provides critical insight into how **vaccine hesitancy may be increasing or decreasing** depending on the population segment and location. This will allow a more nuanced understanding of where, how, and potentially why RCCE interventions may be underperforming or having an outsized impact.

Adapting RCCE and SBC Messaging



Prioritizing Resources and Interventions

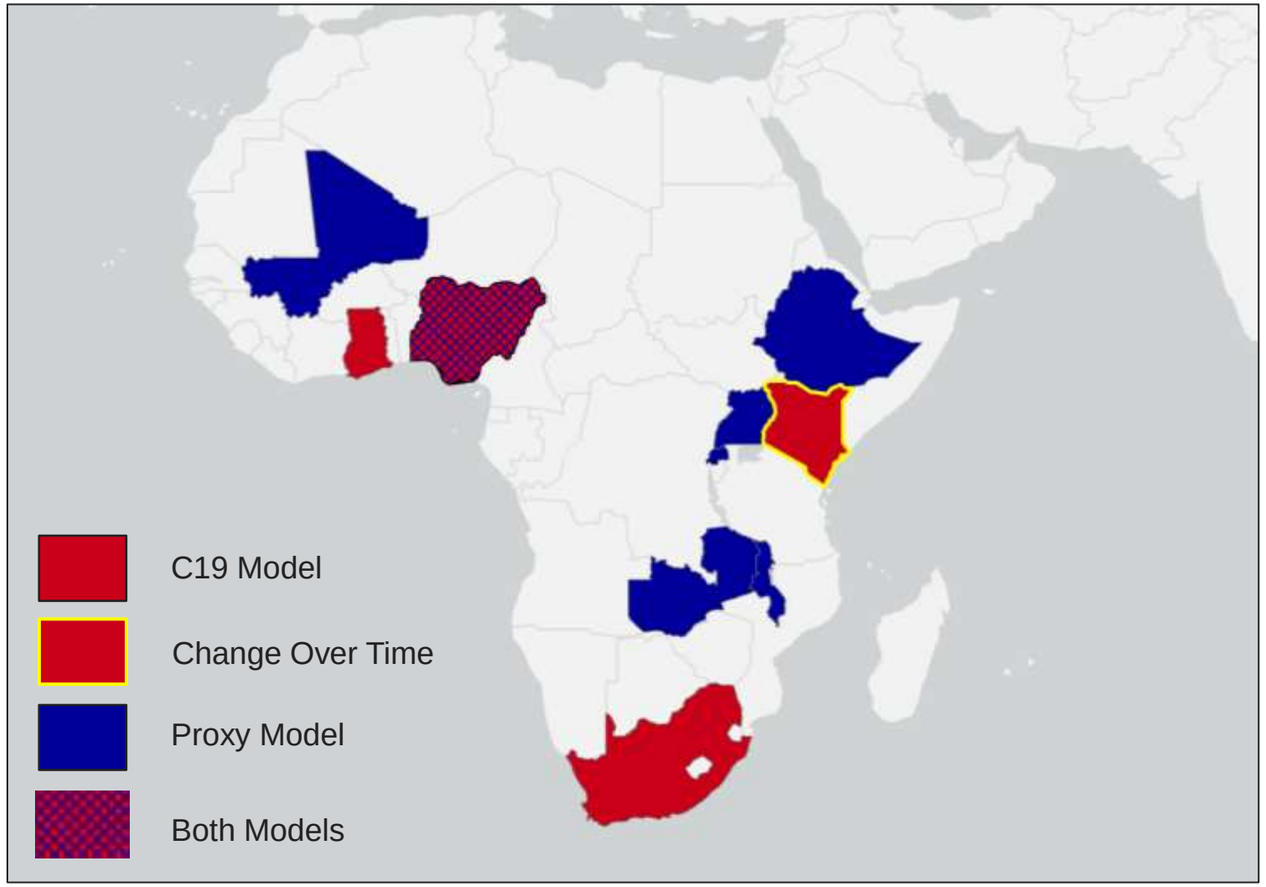
Understanding the Drivers of Vaccination

Impact Measurement of Campaigns

Reach of Project

J&J GPH and Fraym have produced data and analysis in countries using a COVID-19 Model and a Proxy Model.

- COVID-19 Model Countries:
  - Kenya (change over time)
  - Nigeria
  - South Africa
  - Ghana (June)
- Proxy Model Countries:
  - Ethiopia
  - Zambia
  - Uganda
  - Malawi
  - Mali
  - Rwanda
  - Nigeria



Data and Methods

We used **geospatial machine learning** methods to create local understanding of **barriers to vaccine uptake** across the entire country down to the square kilometer.

Data

These reports leverages the 2022 Fraym field surveys (May 2021, Feb 2022, June 2022)

Health facilities in sub-Saharan Africa were sourced from the World Health Organization.[1]

Walking and driving time to health facilities were sourced from the Malaria Atlas Project.[2]

Methods

Machine Learning for Hyperlocal Mapping: The localized maps seen in this report were produced using the proprietary software FUSEfraym™. This software uses artificial intelligence and machine learning (AI/ML) to weave together survey data with satellite imagery and geostatistical datasets.

Note 1: This master list of health facilities was developed from a variety of government and non-government sources from 50 countries in sub-Saharan Africa, accessible here: https://data.humdata.org/dataset/health-facilities-in-sub-saharan-africa
Note 2: Least-cost distance compensates for travel costs, such as slope and terrain, accessible here: https://malariaatlas.org/research-project/accessibility-to-healthcare/

EXAMPLES

How to use this analysis

Paired with WHO's 3C Framework, we've mapped J&J's Consumer Segments to identify where vaccine uptake challenges are likely to occur.

Potential Use-Cases:

- Concentrate communication campaigns and media spending in specific geographic areas
- Target specific messages to niche audiences in prioritized geographies
- Optimize vaccine distribution
- Service & Product Delivery Planning

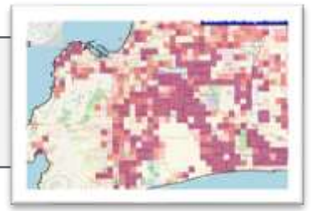
3 Levels of Views

National

Patterns at the country level

Regional

Patterns across counties



Local

Patterns at the Sq. Km

Ex. 1, Kenya: ‘Vaccine Skeptics’ Near Nairobi

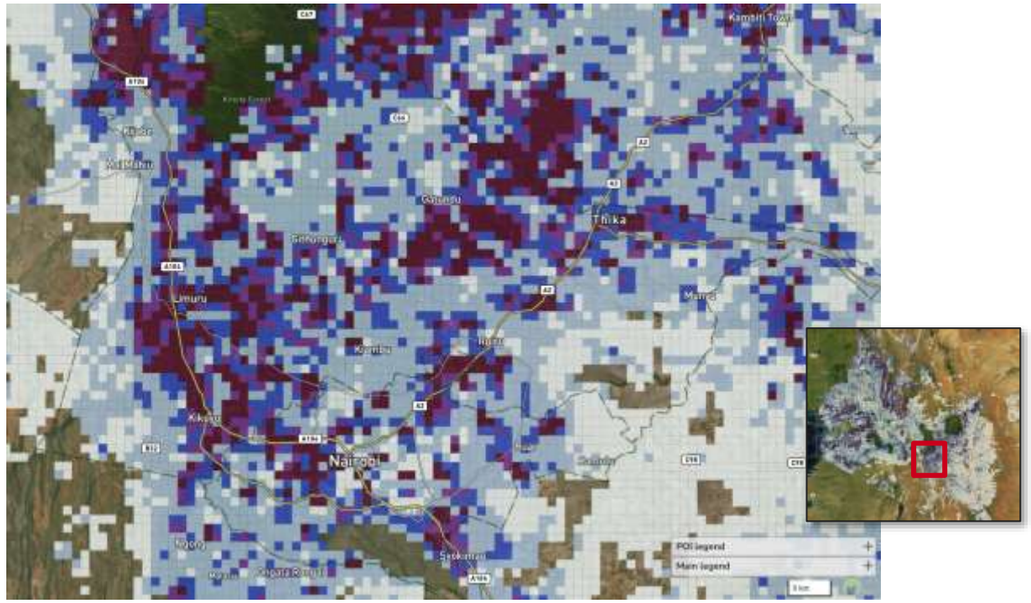
How do we reach those near Nairobi who are worried by COVID but have vaccine concerns?

WHO are we looking for?

	Segment 2 *Vaccine sceptics*
	
Summary	**Convinced of COVID threat, but scepticism around vaccine safety and efficacy inhibits perceived benefit and quick uptake.**
% of population	**25%**
Likelihood to take a COVID-19 vaccine	Moderately low
Speed of uptake	Wait at least 6-12 months
Perceived ease of getting the vaccine	Fairly easy
COVID disease perceptions	High perceived risk and severity

WHERE do we find them?

People in the **vaccine skeptics** segment can be seen in greater numbers in the dark red squares on the map below, around the Nairobi area. They aren’t focused in one place.



HOW do we reach them?

Given their **heavy social media use**, a digital programmatic RCCE campaign via WhatsApp and Facebook might be most effective to reach this Segment, using geolocations as target points.

Media consumption for Vaccine Skeptics around Nairobi

Putting it all together: *In order to reach Vaccine Skeptics near Nairobi, leverage Facebook and WhatsApp platforms to deliver digital communications near the north and north-west part of the city.*

Ex. 2, Kenya: ‘Enthusiastic Pragmatists’ Nationally

How do we reach those who *want* vaccines but don’t think they can get them?

WHO are we looking for?

	Segment 3 *Enthusiastic pragmatists*
	
Summary	**Convinced of COVID threat and merits of a vaccine, but inhibited by practical barriers. Cost-benefit analysis of the process could cause uptake delay.**
% of population	19%
Likelihood to take a COVID-19 vaccine	High
Speed of uptake	As soon as possible
Perceived ease of getting the vaccine	Not easy/not at all easy
COVID disease perceptions	High perceived risk and severity

WHERE do we find them?

People in the **enthusiastic pragmatists** segment are disproportionately located around Nyandaru, Samburu, and Lamu.

HOW do we reach them?

Over 70% of adults report regular watching of **Citizen TV**. These viewers **primarily speak Swahili**.

Putting it all together: *In order to reach Enthusiastic Pragmatists in Kenya, try reaching people watching Citizen TV in Nyandaru country first.*

Ex. 3, Kenya: Understanding Complacency

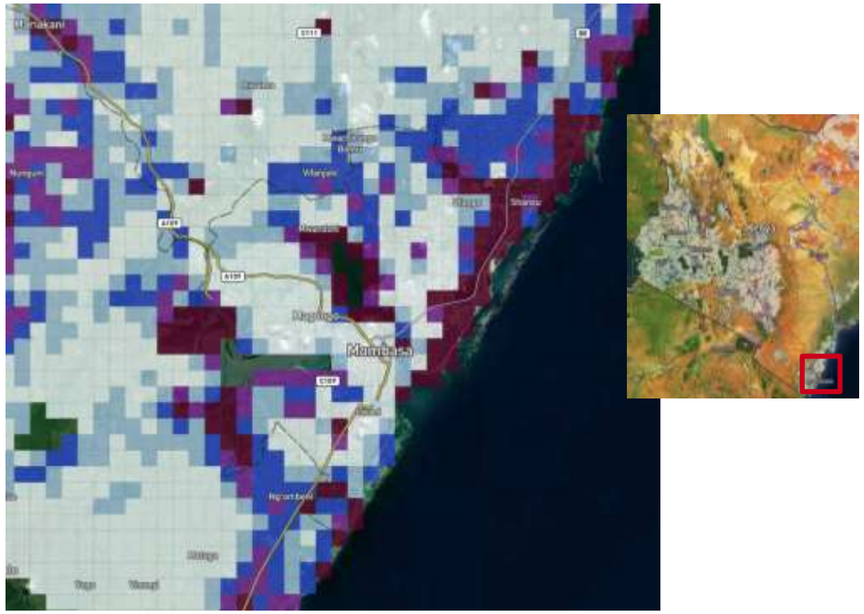
How do we reach those with no accessibility issues but would need to be convinced to get the vaccine?

WHO are we looking for?

	Segment 5 *Vaccine ambivalents*
	
Summary	**Not convinced of the threat of COVID as a disease and lack motivation to seek a vaccine, but few barriers to uptake. Could be moved by social norms and strong messaging.**
% of population	20%
Likelihood to take a COVID-19 vaccine	Moderate
Speed of uptake	Wait at least 6-12 months
Perceived ease of getting the vaccine	Fairly easy
COVID disease perceptions	Low perceived risk and severity

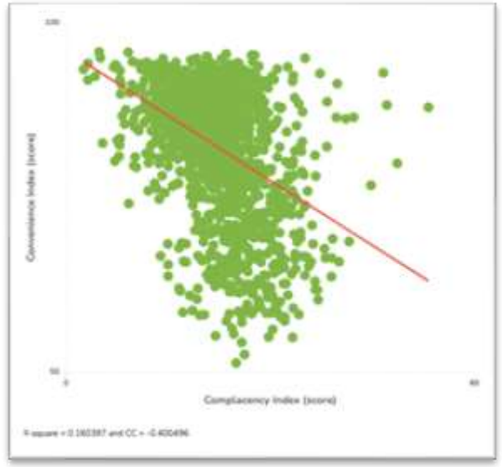
WHERE do we find them?

People in **central Mombasa** tend to be **less complacent**, whereas those in the **suburbs** tend to be **more complacent**.



HOW do we reach them?

Those who are more complacent *in this neighborhood* tend to also have convenience-related challenges



Pop-up vaccination sites north of Mombasa could be used to reach those in complacency ‘hot spots’ where the residents tend to be less motivated to travel for a shot.

Putting it all together: *In order to reach complacent people near Mombasa, try in-person outreach in the Shanzu ward.*

What are other use cases for these data?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APPENDIX

Methods

Multivariate Regression Model

Fraym utilized a regression model to assign uncategorized individuals to their closest predicted segment.

Goal: Classify the uncategorized population of 44% to an Ipsos segment, in order to capture 100% of population using phase 3 data.

Approach: Multivariate regression (MV) models were constructed using the 3C indices as independent variables on all 5 Ipsos segments as dependent variables.

Methodology: The predicted probabilities of being in an Ipsos segment were individually calculated for all 5 Ipsos segments using the MV regression approach. We classified all respondents in our survey to a segment if their predicted probability was greater than the associated cut point prediction for that segment. This was repeated for each segment, then the final segment was chosen based on the maximum predicted probability across that respondents 5 predicted probabilities.

Model Fit: The model has an area under the ROC (AUC) curve of 0.88, where 1 signifies perfect identification of an Ipsos segment. Therefore, we find that this method shows significant predictive power for each segment.

Results: The appropriateness of the model was tested by comparing the results of using the 3C indices for predicting vs using all underlying phase 3 variable for predicting. The 3C indices performed better at predicting due to keeping a large sample size, having a higher AUC, and having prediction proportions more in line with our baseline prediction proportions by segment.