

Alliance Initiatives for Pandemic Preparedness

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Dept of Global Health External Advisory Board Meeting
November, 2020

Recent Initiatives

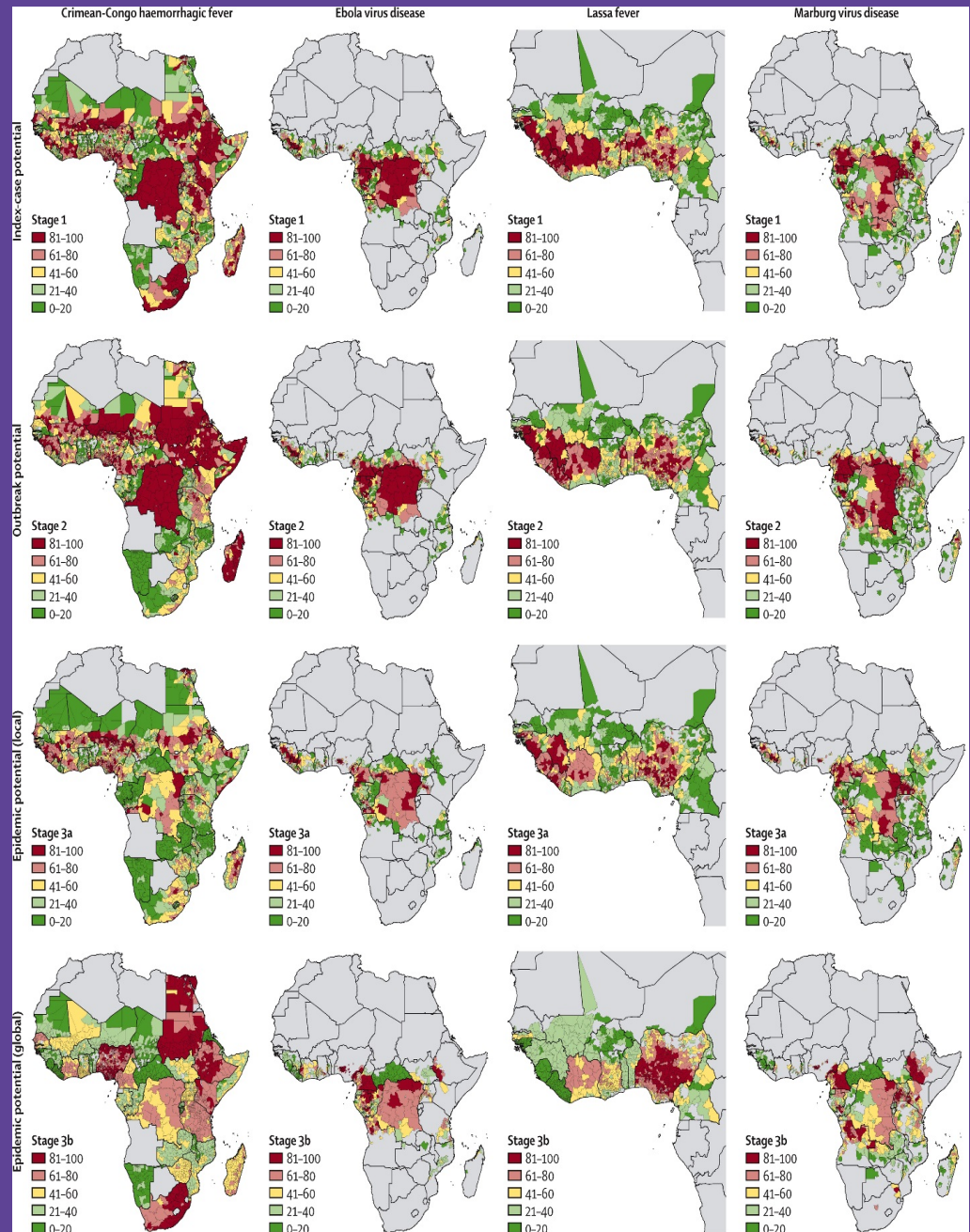
- Outbreak vulnerability mapping
- UWARN/CREID Emerging Infectious Disease Research Network

Potential “Value Added” of Initiatives

- Provide fine scale data across regions for pandemic preparedness, including environmental change
- Align cutting edge biomedical capacity with local pandemic response.
- Demonstrate value of integrated approach

Hemorrhagic Fever Vulnerability in Africa:

Single Cases (Stage 1)
Outbreaks (Stage 2)
Epidemics (Stage 3)

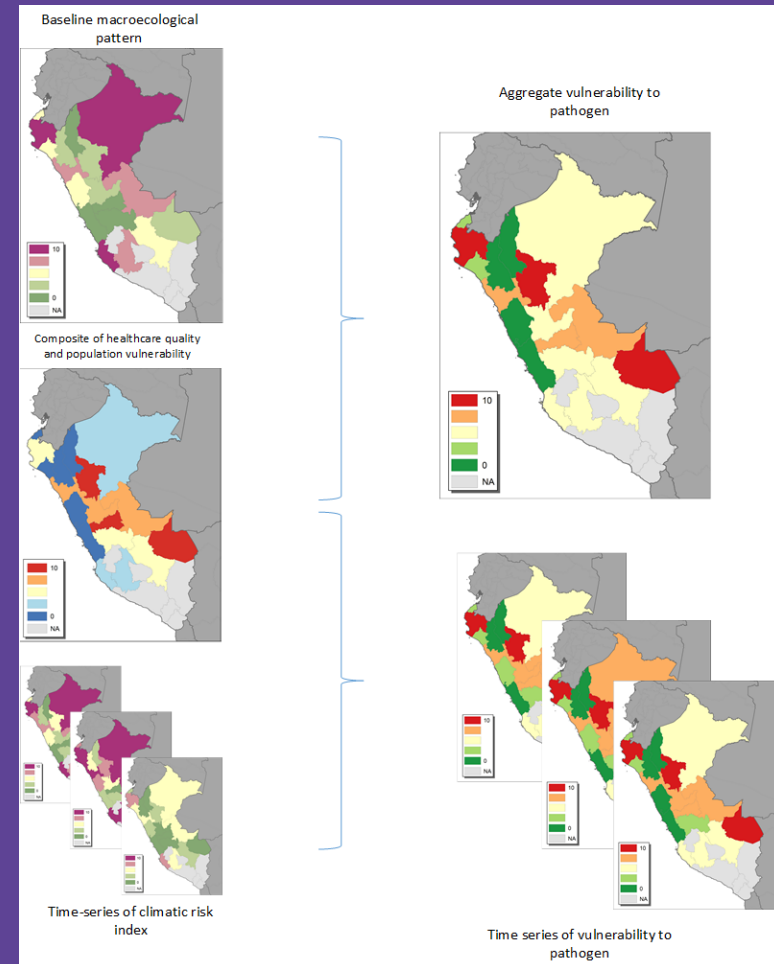


Pigott et al
Lancet 2017

Peru Proof of Concept Project

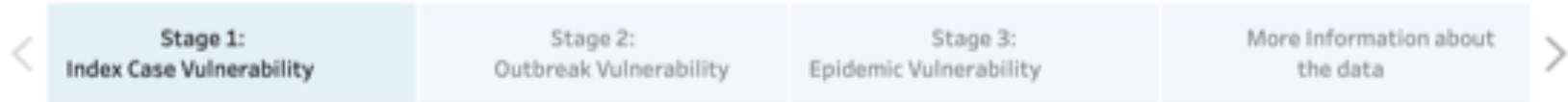
Goals:

- Map vulnerability (stages 1,2,3) for dengue across the country at district level (N=1800)
- Include seasonal and climate change scenarios
- Test usability of visualizations for prioritization and other actions



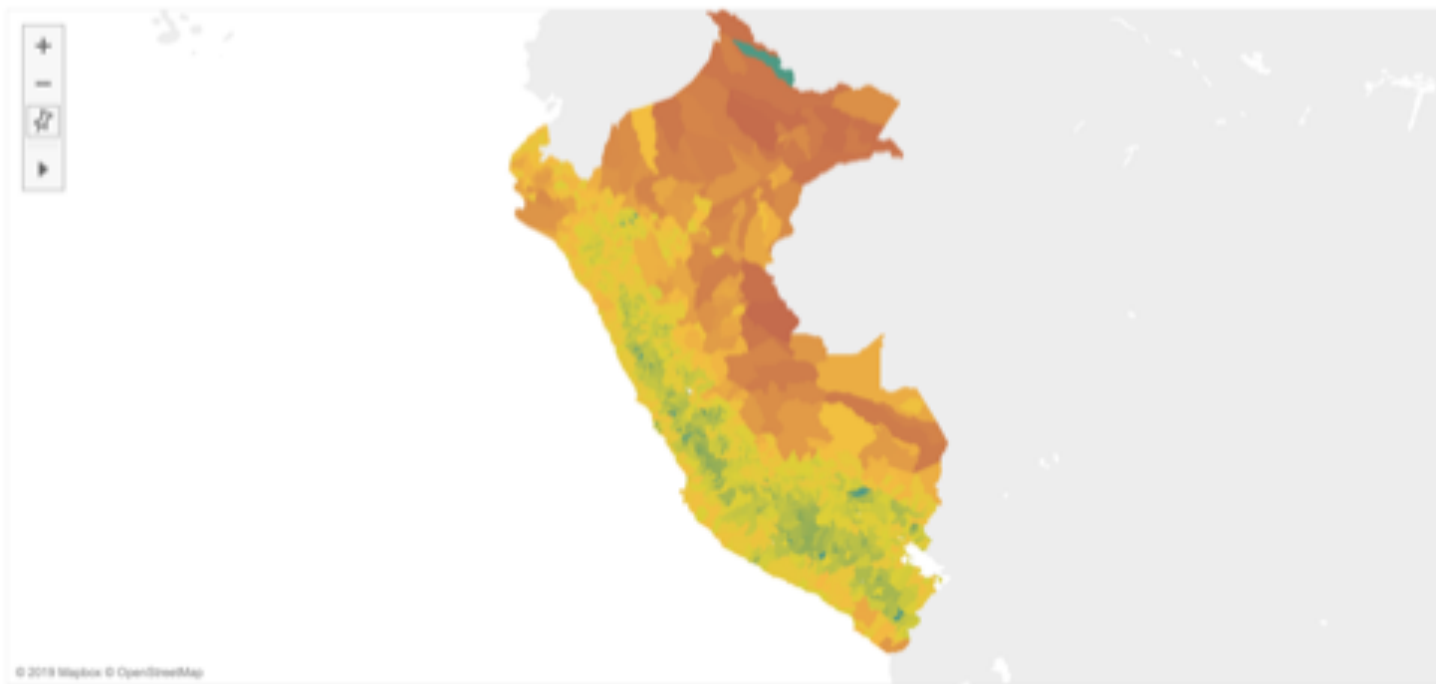
Single (Index) Case Vulnerability

Visualization Tool for Dengue Vulnerability Mapping in Peru.



1. Index Case Vulnerability

Stage 1 Index Case Vulnerability: The index case is the first case in any potential epidemic. In the first scenario of the map, the vulnerability score is modeled using dengue survival, climate, and population counts at the district level.



Search for District:

Highlight Name of District

Please select the season

- Cold Season (April - September)
 Warm Season (October - March)

Please select the type of year

- El Niño
 Non El Niño

Please select the temperature

- +2C
 current average

The spread of mosquito-borne diseases, including dengue, depends to a large extent on a number of factors, such as the environment, infrastructure and health services.

In this interactive map, we will look at some of these factors to understand which areas of Peru are most vulnerable to dengue. It is important to note that the scores and color scales are independent to the different stages (1, 2, and 3).

Lower Vulnerability

Higher Vulnerability

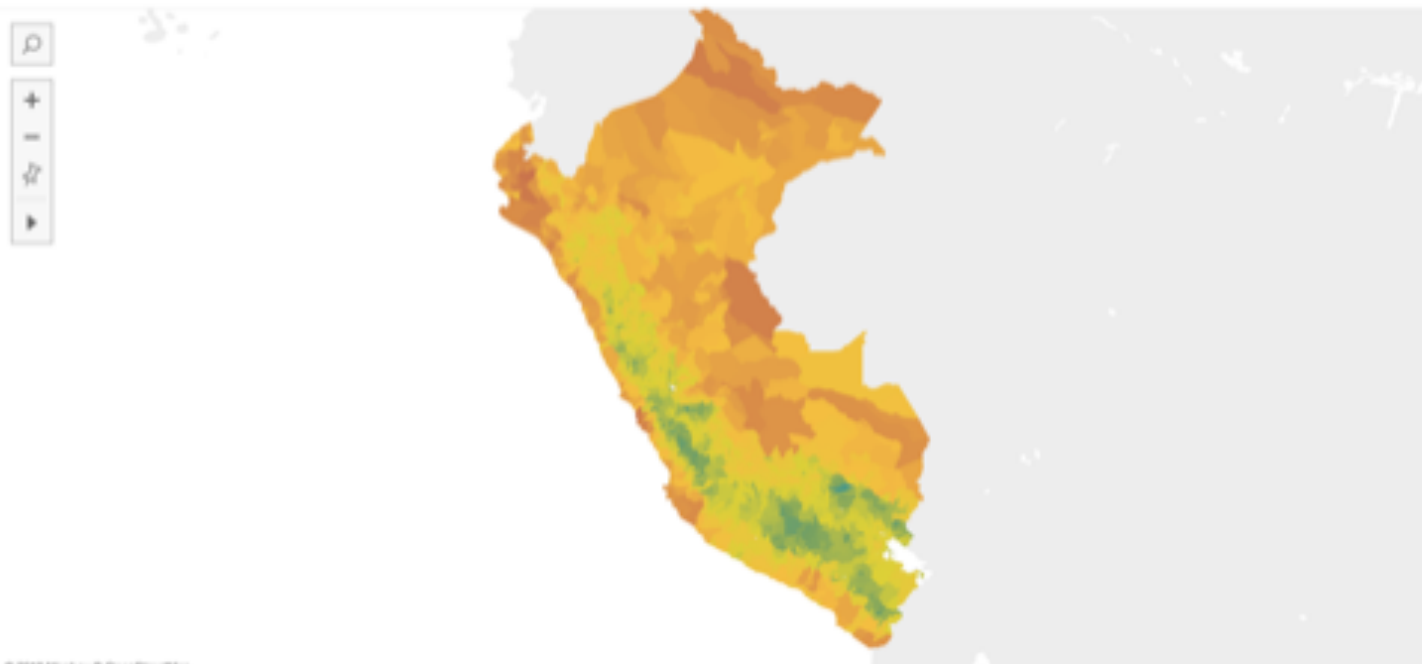
Localized Outbreak Vulnerability

Visualization Tool for Dengue Vulnerability Mapping in Peru



2. Outbreak Vulnerability

Stage 2 Outbreak Vulnerability: In the next stage, we are building on the index case vulnerability to understand vulnerability of an outbreak. For this model, we have included travel time to a health facility, vaccination rates, and under 5 mortality.



Search for District

Please select the season

Cold Season (April - September)

Warm Season (October - March)

Please select the type of year

El Niño

Non El Niño

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current average

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Widespread Epidemic Vulnerability

Visualization Tool for Dengue Vulnerability Mapping in Peru



3. Epidemic Vulnerability

Stage 3 Epidemic Vulnerability: The final stage of the vulnerability shows the estimated potential for an epidemic. It builds on the outbreak stage by adding travel time to a city with a population of 50,000 or more.



Search for District

PURUS x

Please select the season

- Cold Season (April - September)
- Warm Season (October - March)

Please select the type of year

- El Niño
- Non El Niño

Please select the temperature

- +2C
- current average

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Lower Vulnerability

Higher Vulnerability

Usability testing with stakeholders



Focus groups



Results

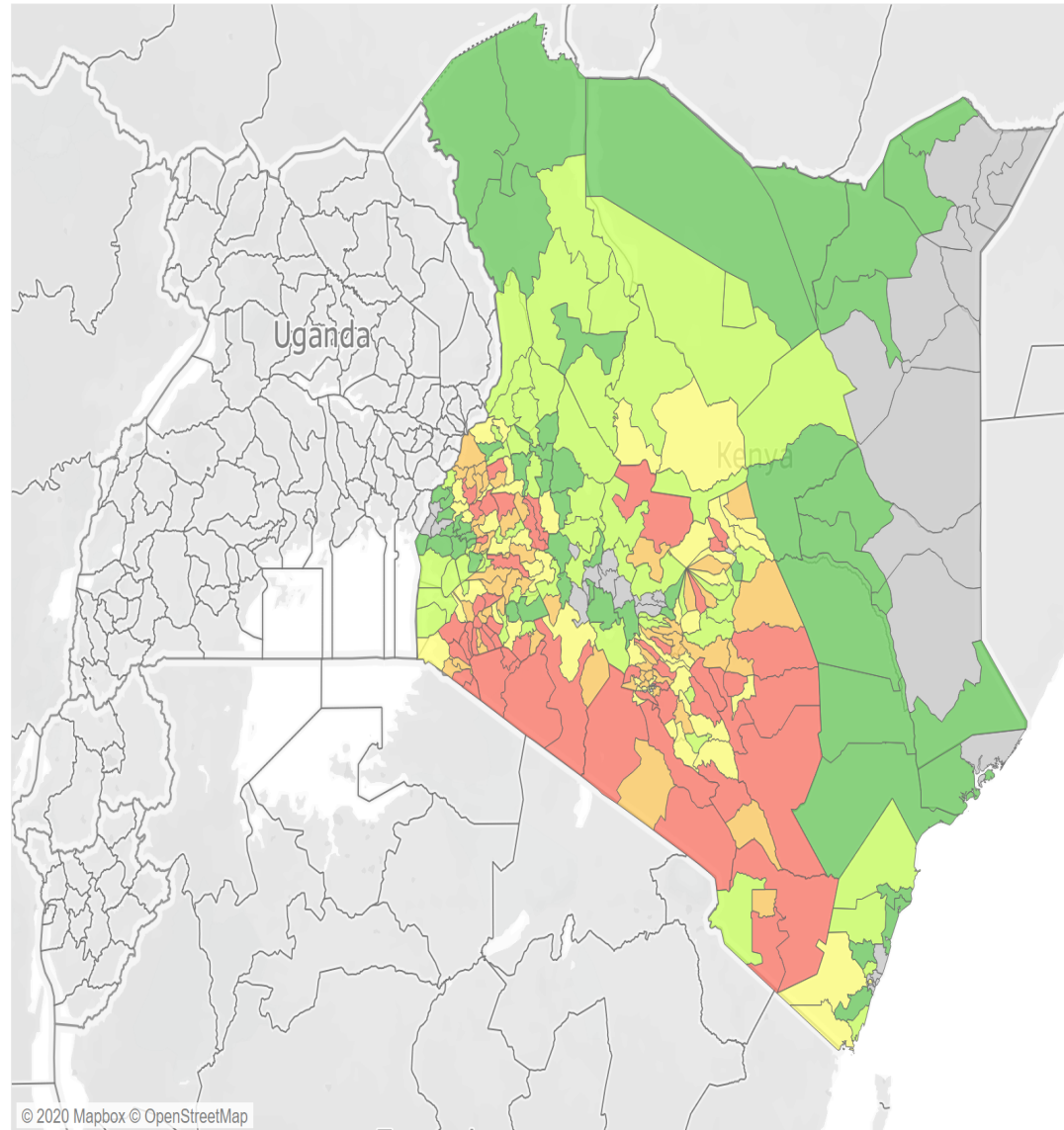
- **Enthusiasm for mapping**
- **Interest in comparing model vs. real data (vector sampling, surveillance case reports)**
- **Interest in additional data sets to characterize health system resilience**
- **Interest from Ministry of finance**
- **Interest in transition to local server**
- **Interest in climate projections- longer time horizon**

Kenya Vulnerability Mapping for RVF

ITECH Kenya

Rift Valley Vulnerability in Kenya

Stage 1: Index Case



Species

- human
- livestock

Year

- Current
- Future

Month

Mar

Search County
No items highlighted

Search Sub County
No items highlighted

Relative Qtile

- 1 (lowest relative vulne..)
- 2
- 3
- 4
- 5 (highest relative vulu..)
- No Vulnerability

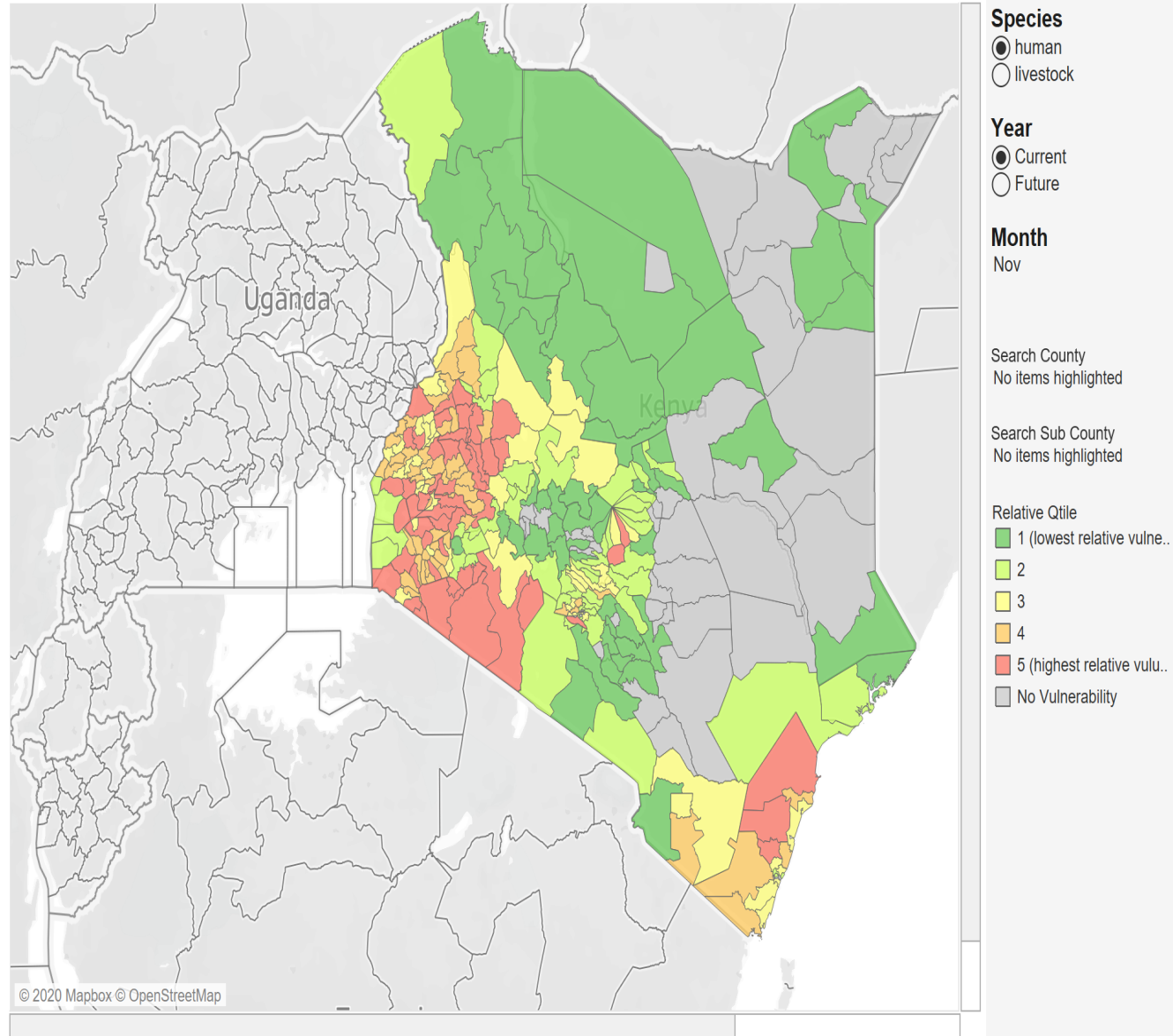
Stage 1:
Vulnerability to
INDEX CASE of
RVF: March

The spread of Rift Valley Fever depends to a large extent on a number of factors, such as the environment, infrastructure, animal, and health services. In this interactive map, we will look at some of these factors to understand which areas of Kenya are most vulnerable to RVF. Some of the factors that was used in this model can be found here: <https://vizhub.healthdata.org/lb/vaccines>

Rift Valley Vulnerability in Kenya

Stage 1: Index Case

**Stage 1:
Vulnerability to
an index case of
RVF: NOVEMBER**

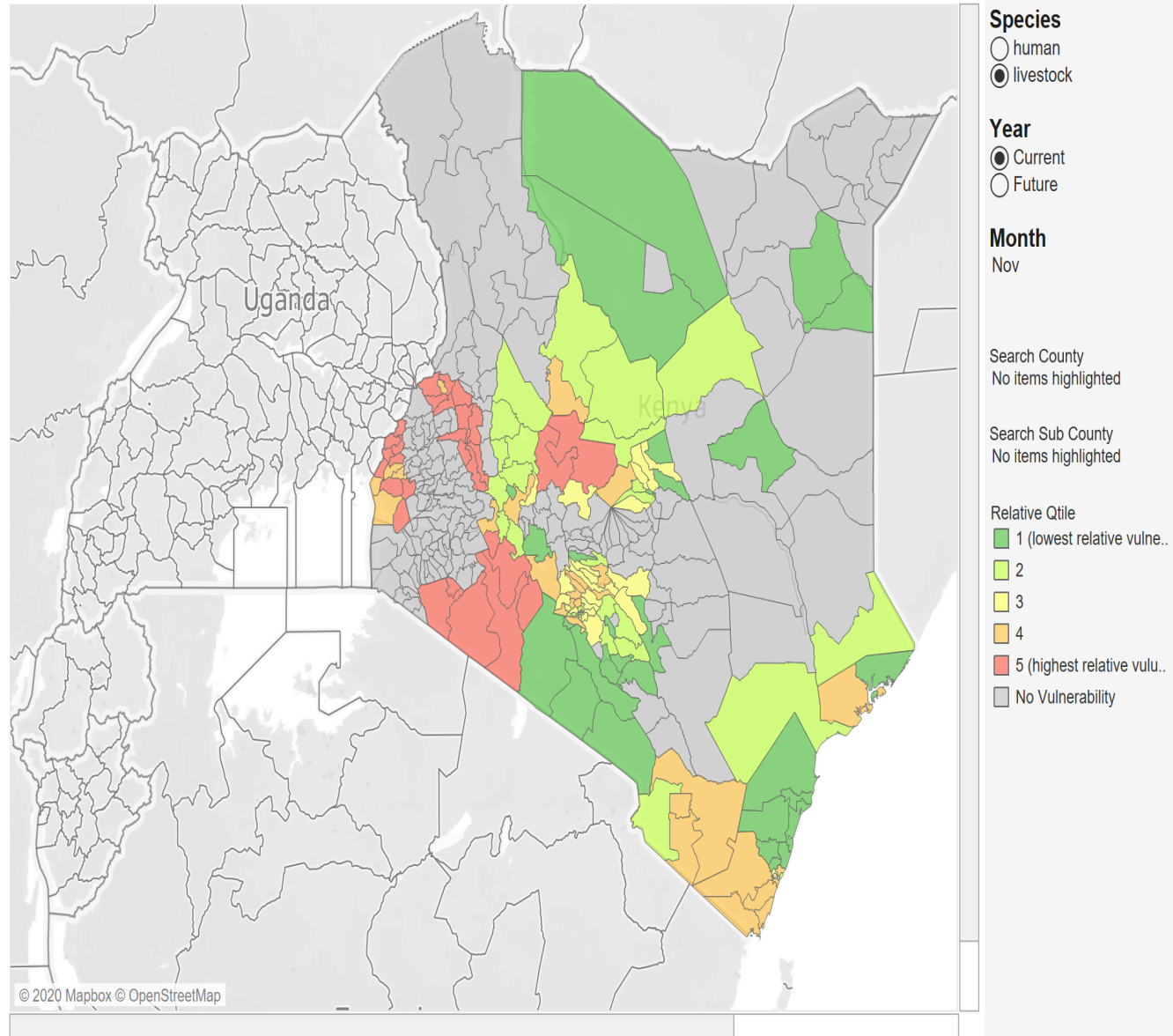


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Rift Valley Vulnerability in Kenya

Stage 2: Outbreak

**Stage 2:
Vulnerability to a
LOCAL OUTBREAK
of RVF: November**

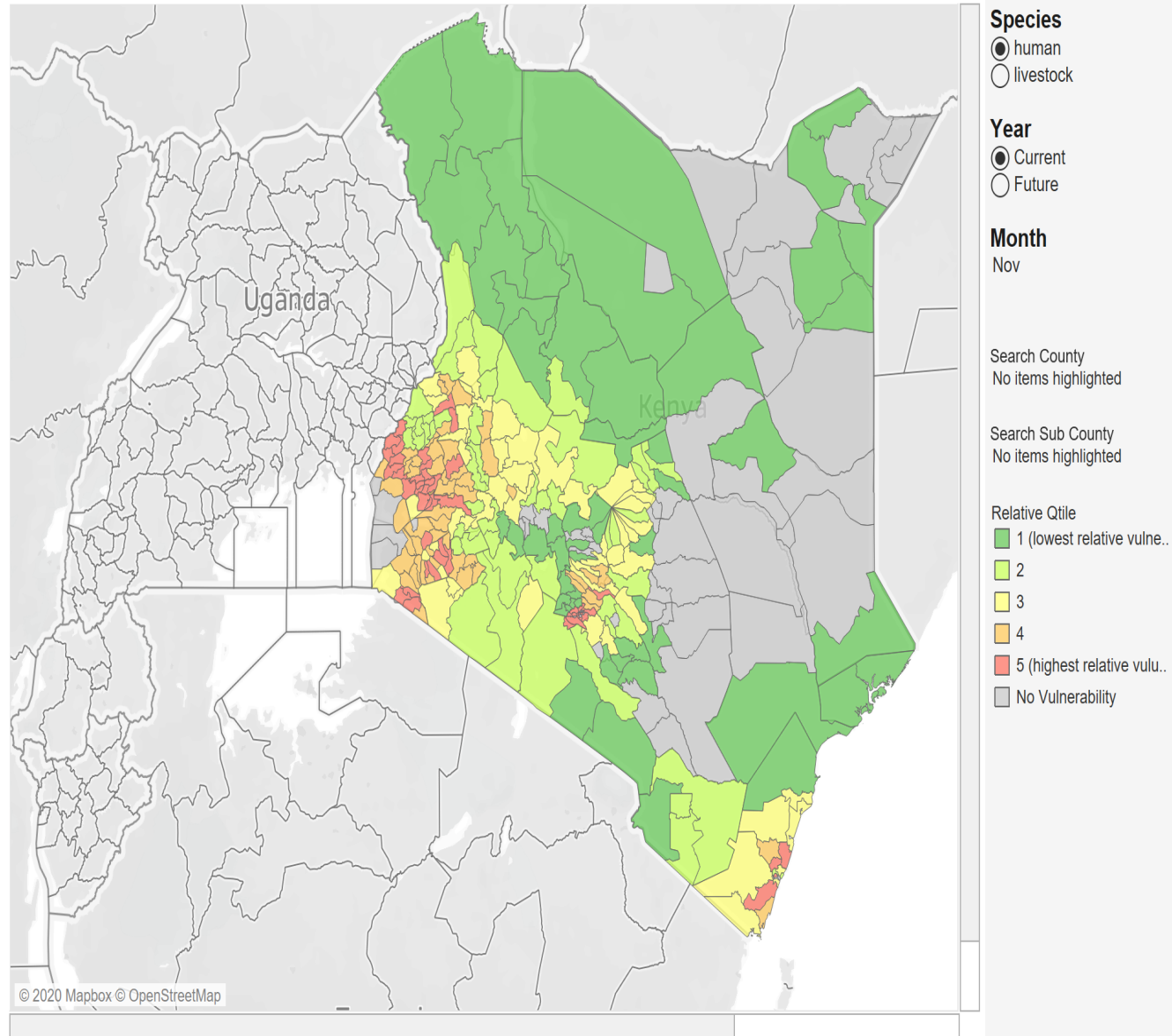


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Rift Valley Vulnerability in Kenya

Stage 3: Epidemic

**Stage 3:
Vulnerability to an
EPIDEMIC of RVF:
November**

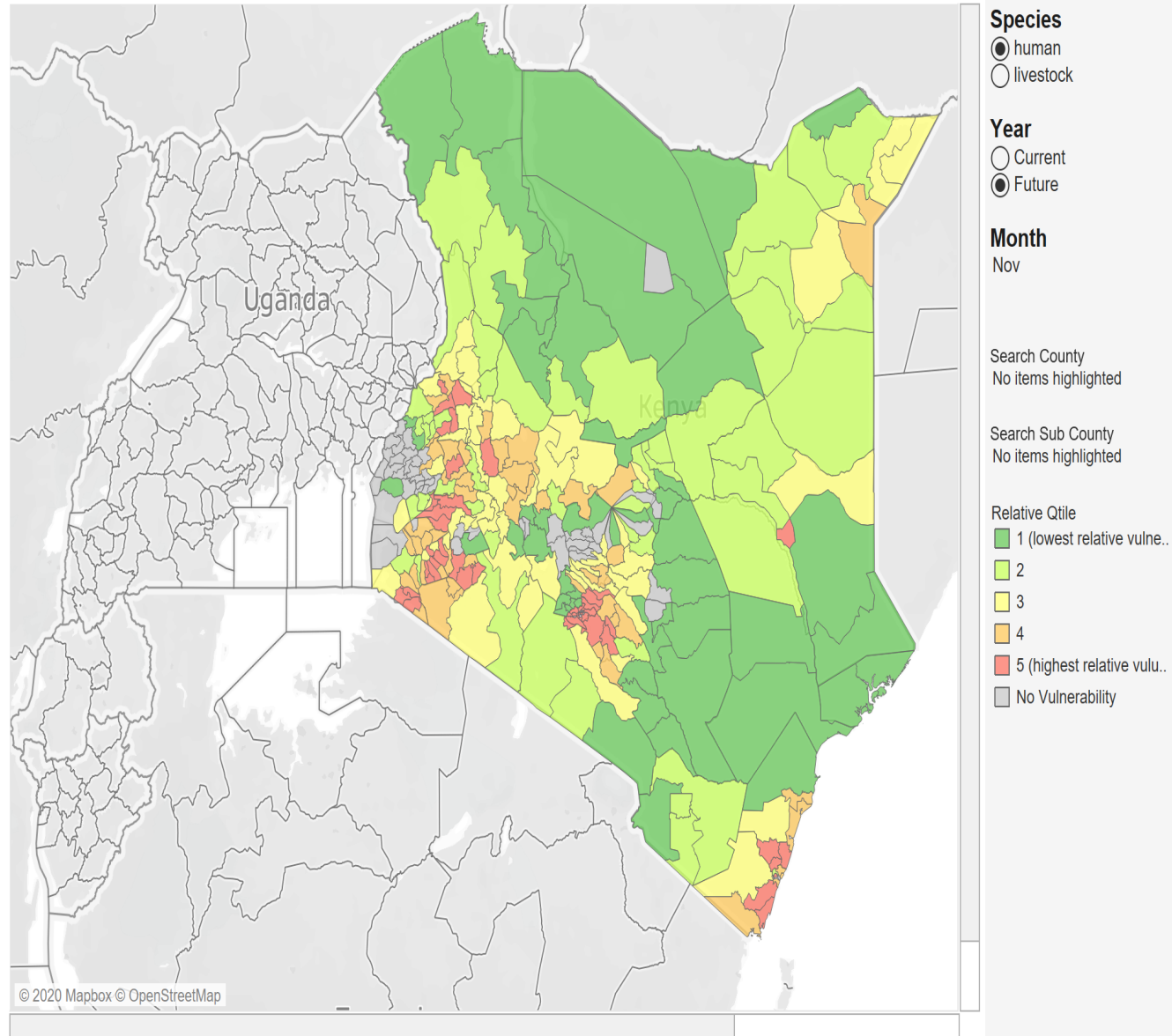


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Rift Valley Vulnerability in Kenya

Stage 3: Epidemic

**Stage 3:
Vulnerability to an
epidemic of RVF:
November
FUTURE WITH
CLIMATE CHANGE**

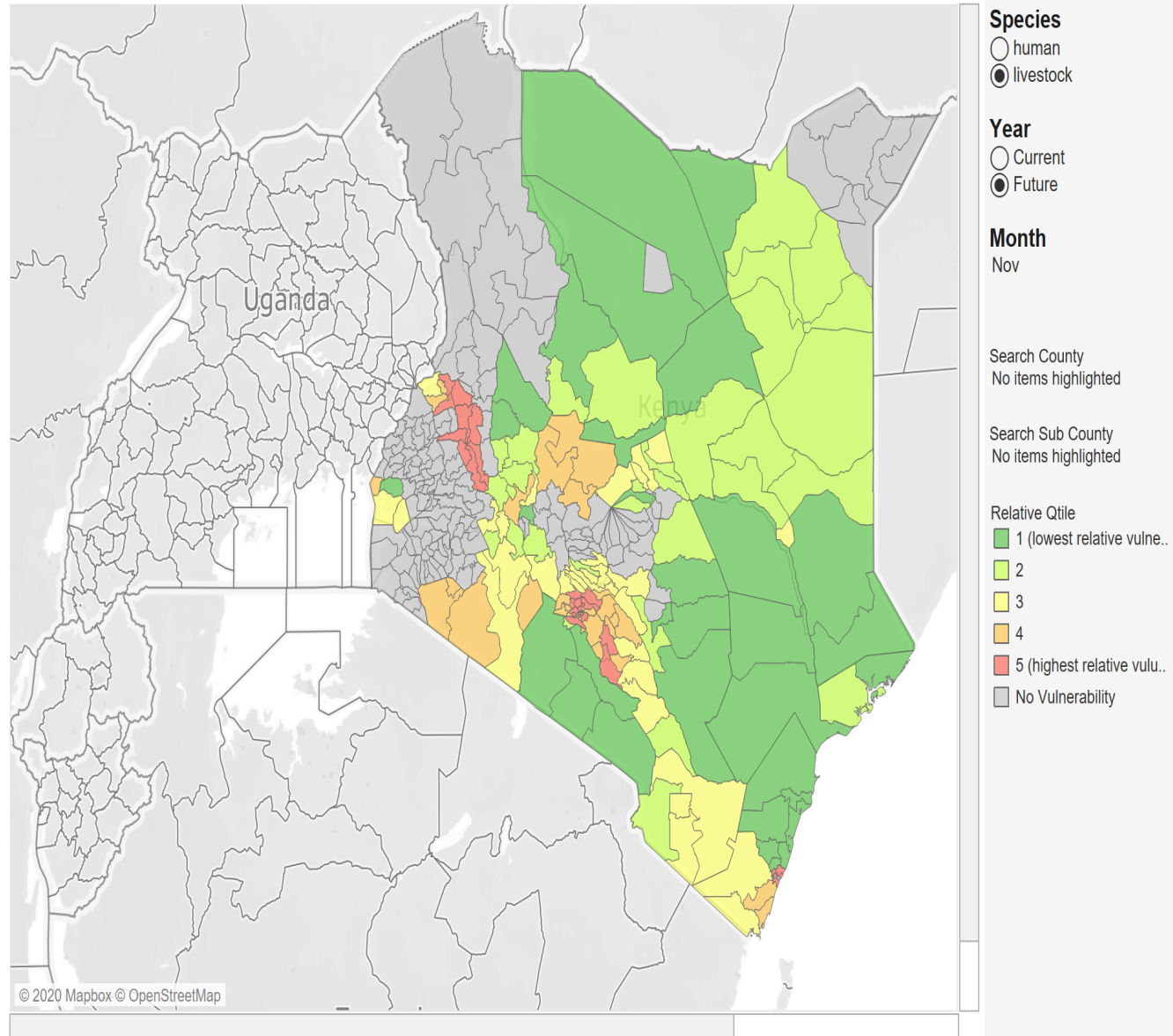


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Rift Valley Vulnerability in Kenya

Stage 3: Epidemic

**Stage 3:
Vulnerability to a
LIVESTOCK epidemic
of RVF**



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United World Antiviral Research Network: UWARN



Multiple Principal Investigators:

The University of Washington

Center for Emerging & Re-Emerging Infectious Disease (CERID)

MPI: Wes Van Voorhis MD PhD

Department of Global Health

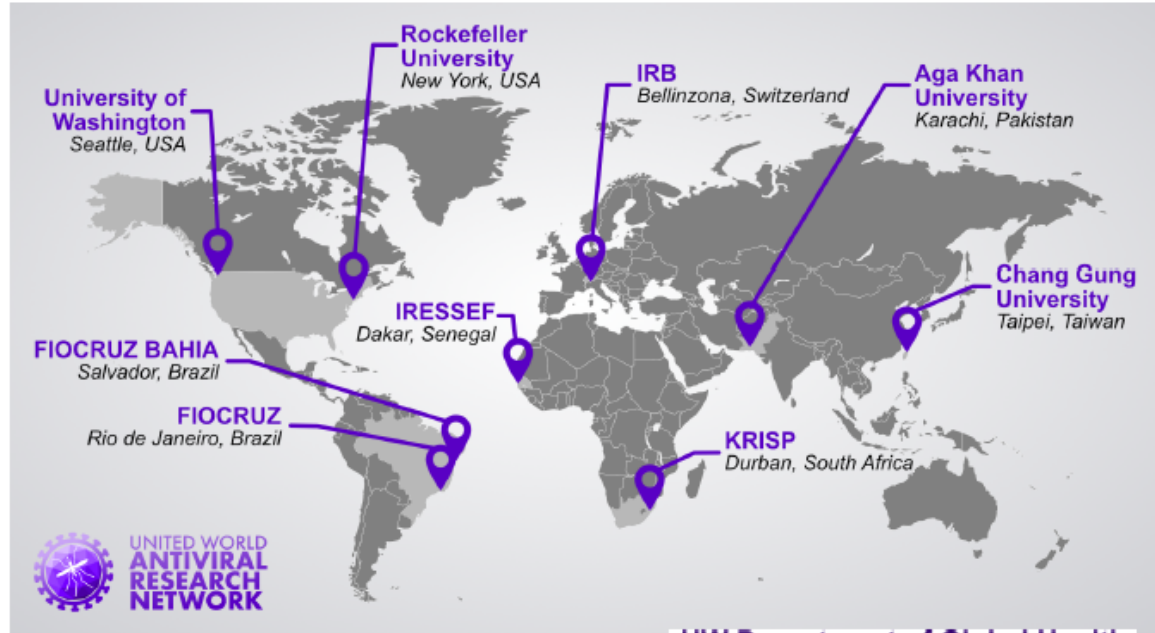
MPI: Judy Wasserheit MD MPH

Center for Innate Immunity and Immune Disease (CIID)

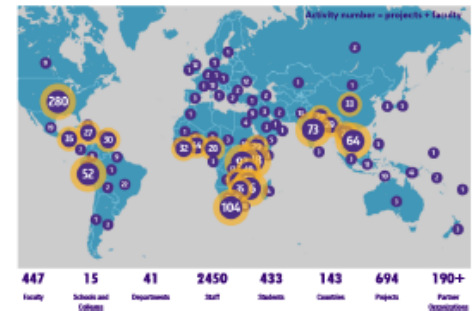
MPI: Michael Gale Jr. PhD

Center of One Health Research (COHR)

MPI: Peter Rabinowitz MD MPH



UW Department of Global Health



Arbovirus Research

UWARN: surveillance for Arboviruses and other emerging pandemic viruses, research on diagnostics, therapeutics, and viral immune responses

- **AIM 1:** Laboratory capacity and clinical cohorts in South America, West and South Africa, and South and East Asia
- **AIM 2:** Develop specific human neutralizing monoclonal antibodies (Hu-nMabs) for arboviruses
- **AIM 3:** Develop *de novo* Latching Orthogonal Cage–Key pRotein (LOCKR) switches for point-of-care (PoC) assays
- **AIM 4:** Molecular basis of arbovirus innate immunity antagonism, identifying genes and gene networks

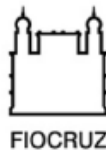
SARS-CoV-2/COVID-19 Research

UWARN: surveillance for SARS CoV-2, research on diagnostics, therapeutics, and viral immune responses

- **AIM 1:** Understand SARS-CoV-2 using genomic approaches
 - Establish specimen and information sharing networks
 - Leverage UW Global Health and CREID institutions
- **AIM 2:** Therapeutic Hu-nMabs for SARS-CoV-2
- **AIM 3:** LOCKR for PoC diagnostics for spike protein (virus) and antibody detection
- **AIM 4:** Molecular basis of SARS-CoV-2 innate immunity antagonism, identifying genes and gene networks over time and with differing disease outcomes

ZIBRA-2 project - Zika In Brazil Realtime Analysis

- ◎ Unique South-South collaboration between **FIOCRUZ**-Brazil (Dr. Alcantara) and **KRISP**-South Africa (Dr. de Oliveira)
- ◎ Mobile laboratory: map and elucidate the etiologies and genetic variation of viral outbreaks to inform public health intervention
- ◎ UWARN aims to establish a similar mobile lab surveillance system within Senegal.



4



UNITED WORLD
ANTIVIRAL
RESEARCH
NETWORK

Potential “Value Added” of Initiatives

- Provide fine scale data across regions for pandemic preparedness, including environmental change
- Align cutting edge biomedical capacity with local pandemic response.
- Demonstrate value of integrated approach

Questions for the EAB

- **Is the APP approach appropriate & strategic?**
 - What are its strengths & weaknesses?
 - How could we improve it?
- **What foci/activities should APP prioritize** as you think about the intersection of:
 - the most potentially high impact unmet PDP needs & opportunities, and
 - the broader UW capabilities?