Approaches to community surveys for typhoid burden estimation: Experience from SEAP

Coalition against Typhoid

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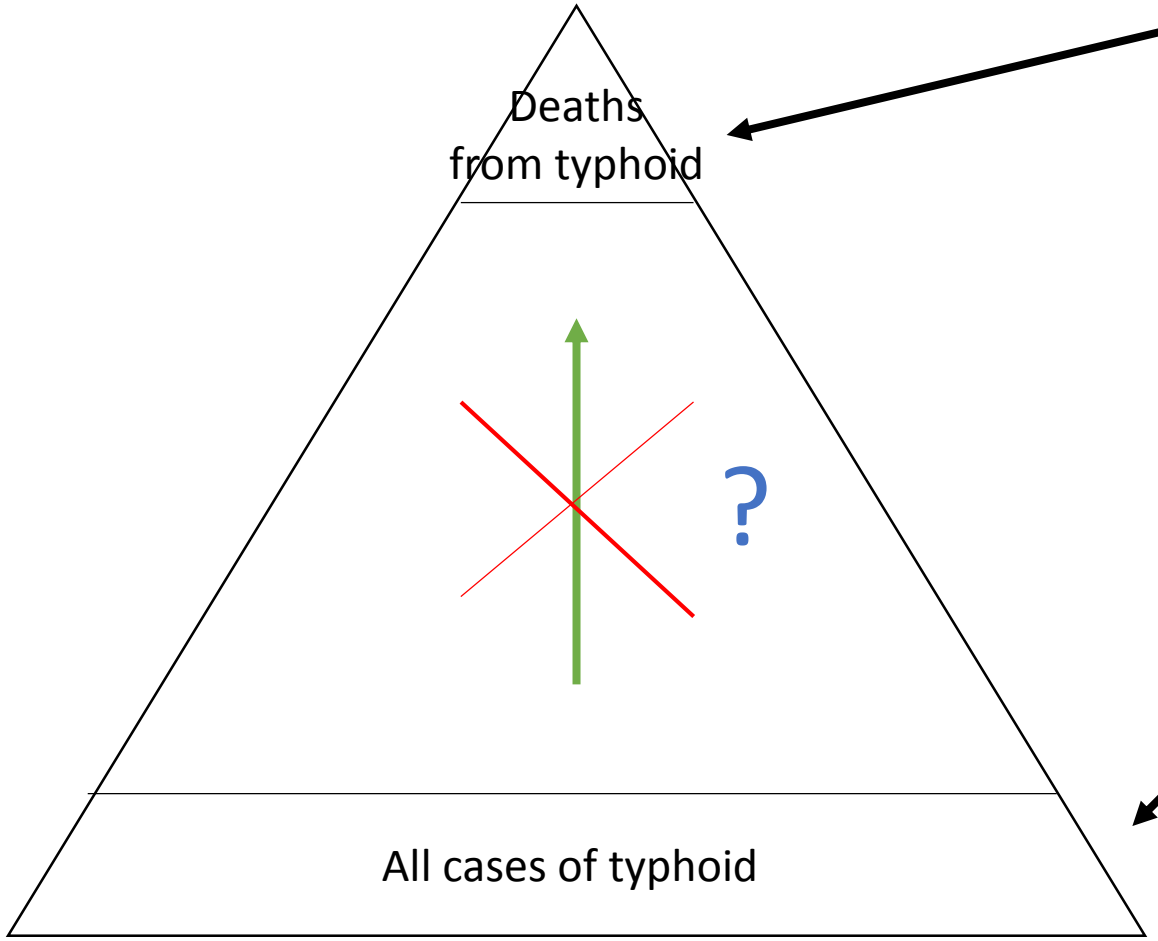
Outline

- Different surveillance strategies for typhoid burden estimation
- Description of the healthcare utilization study, sampling and maps
- Preliminary data
- Challenges

Approaches to estimating Typhoid incidence



Approach 2: Facility based surveillance

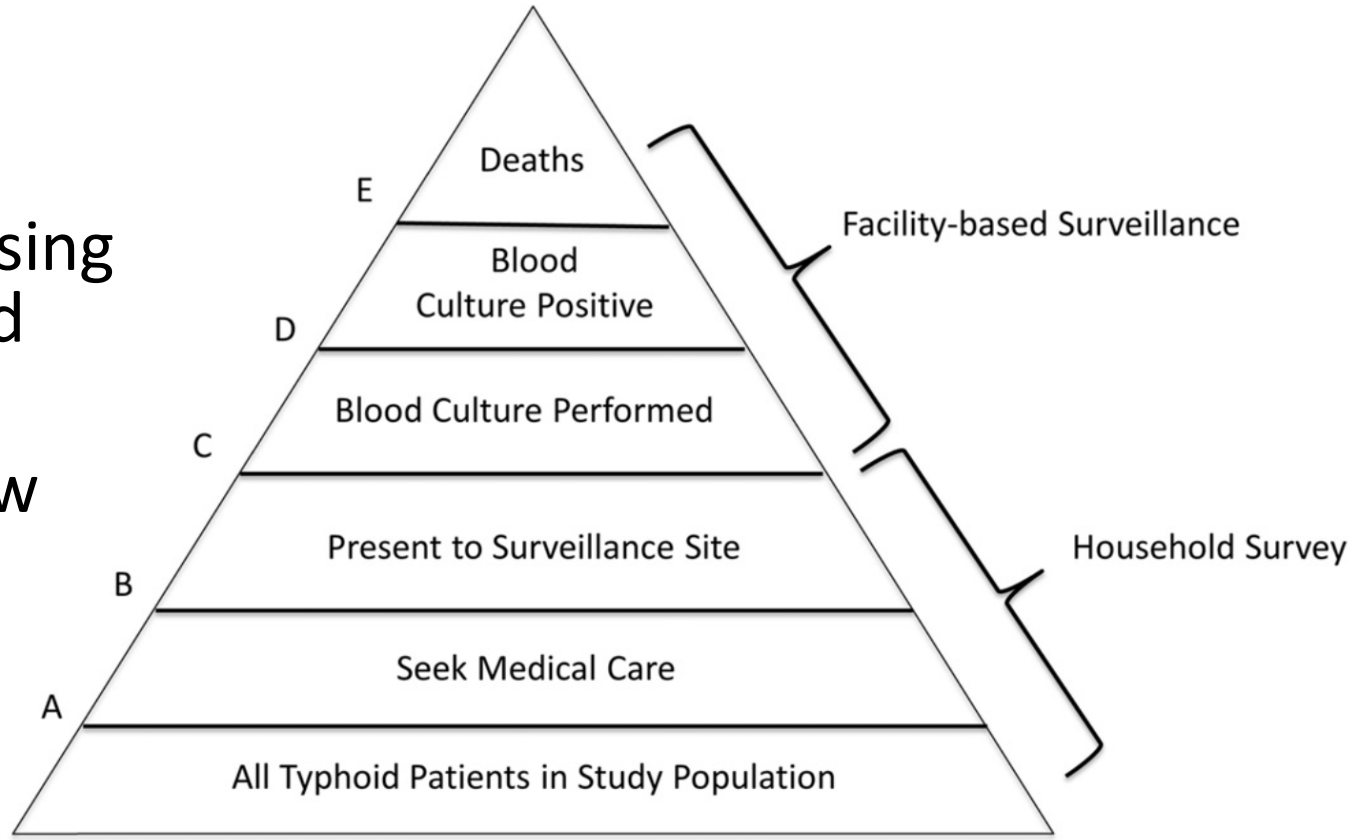
- Capture all patients who come to facility with fever
- Collect blood and test for typhoid
- Follow outcomes
- **Advantages and disadvantages exist**

Approach 1: Community-based active surveillance

- Establish large cohort
- Actively follow 1-2x /week and track fevers
- Collect blood and test for typhoid
- **Advantages and disadvantages exist**

A hybrid approach to typhoid surveillance

- Use facility-based surveillance
- Understand bottom of pyramid using a household survey to understand healthcare utilization
- Estimate incidence once you know the multipliers



Luby S., Saha S., Andrews J., Vaccine 2015

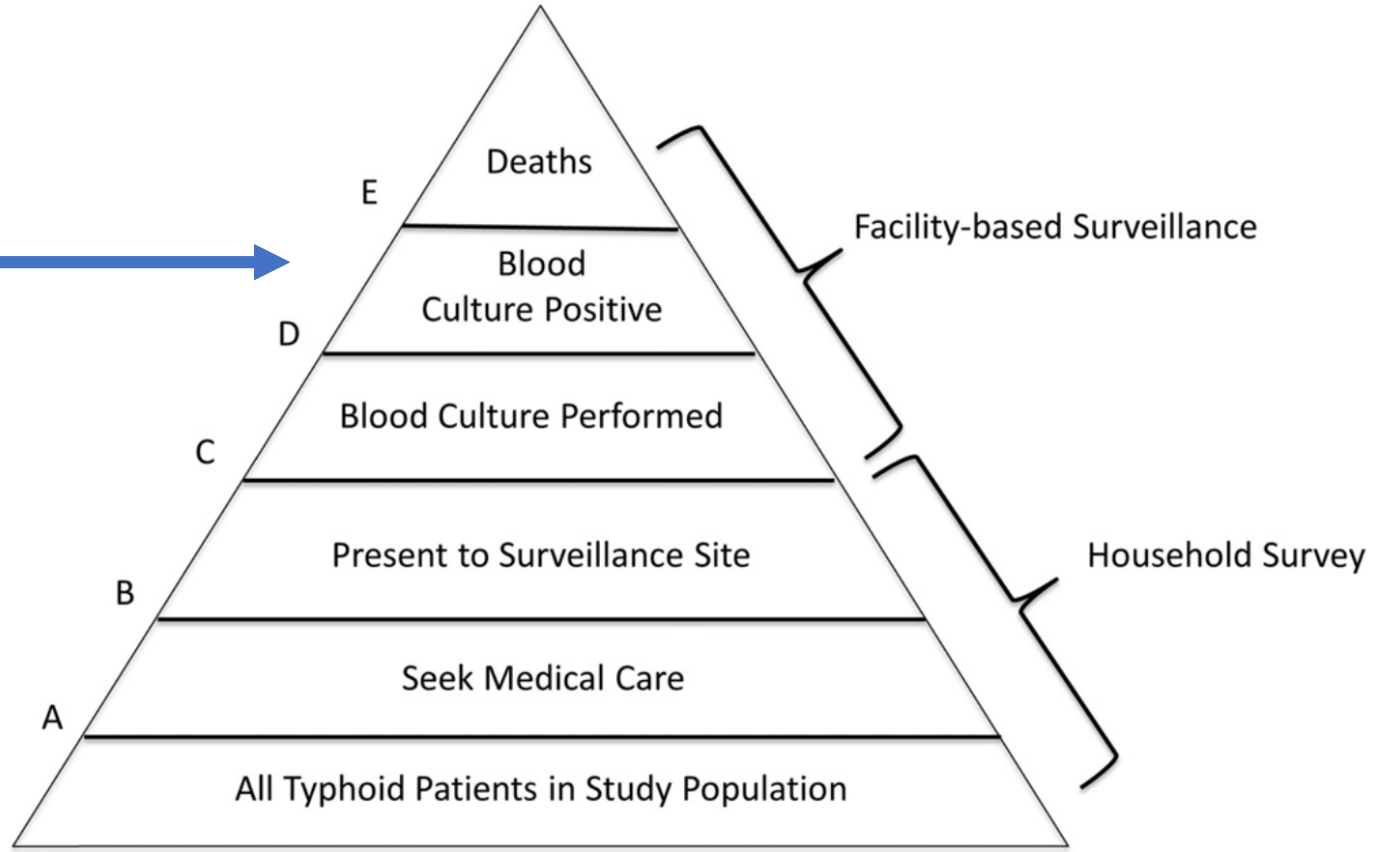
Estimating incidence using the pyramid

50

Crude incidence estimate =
50 / 100,000

X

100,000



Catchment area total population

Estimating incidence using the pyramid

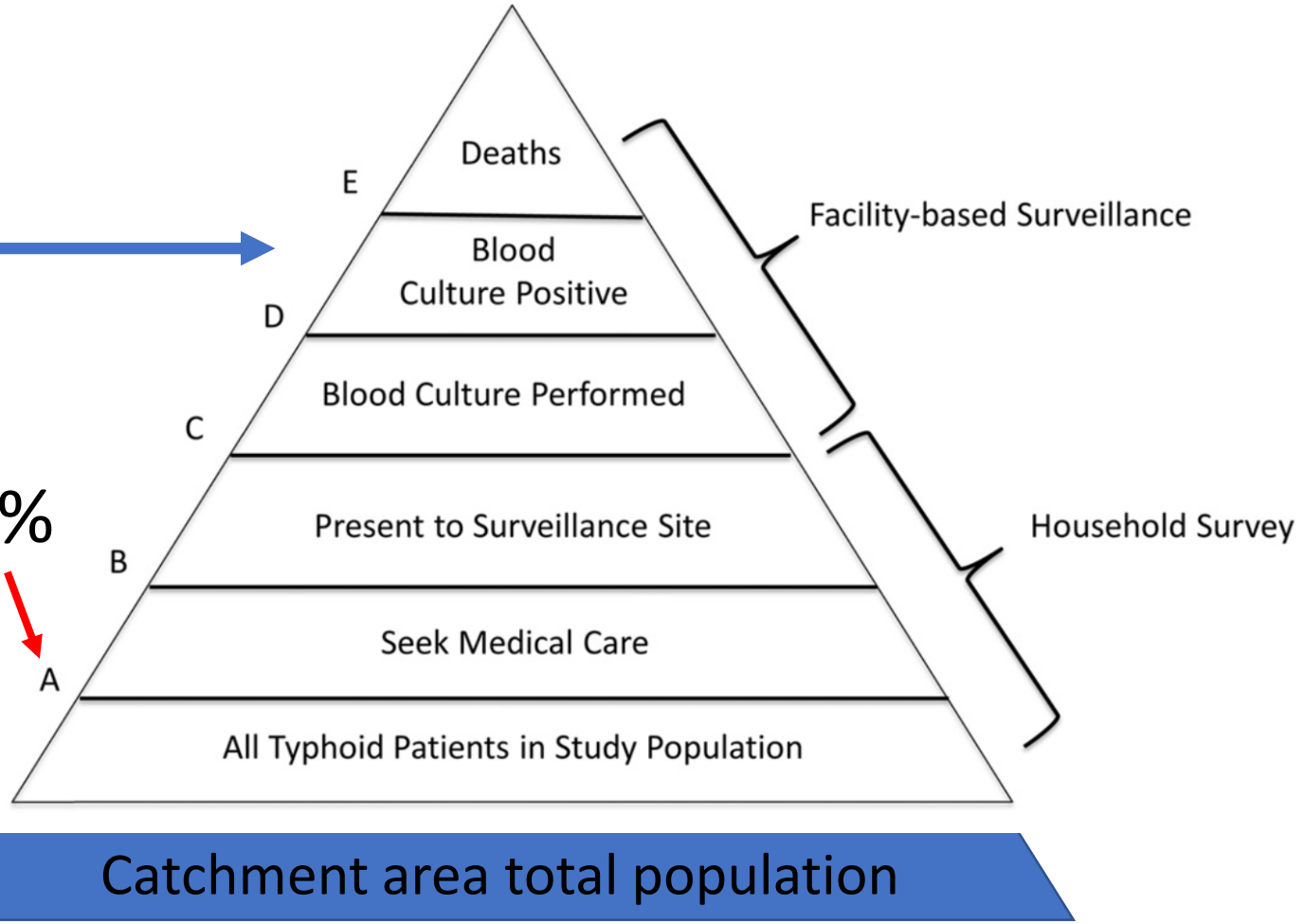
50

Adjusted incidence estimate =
50 *5 / 100,000 =
250 per 100,000

20%

X

100,000



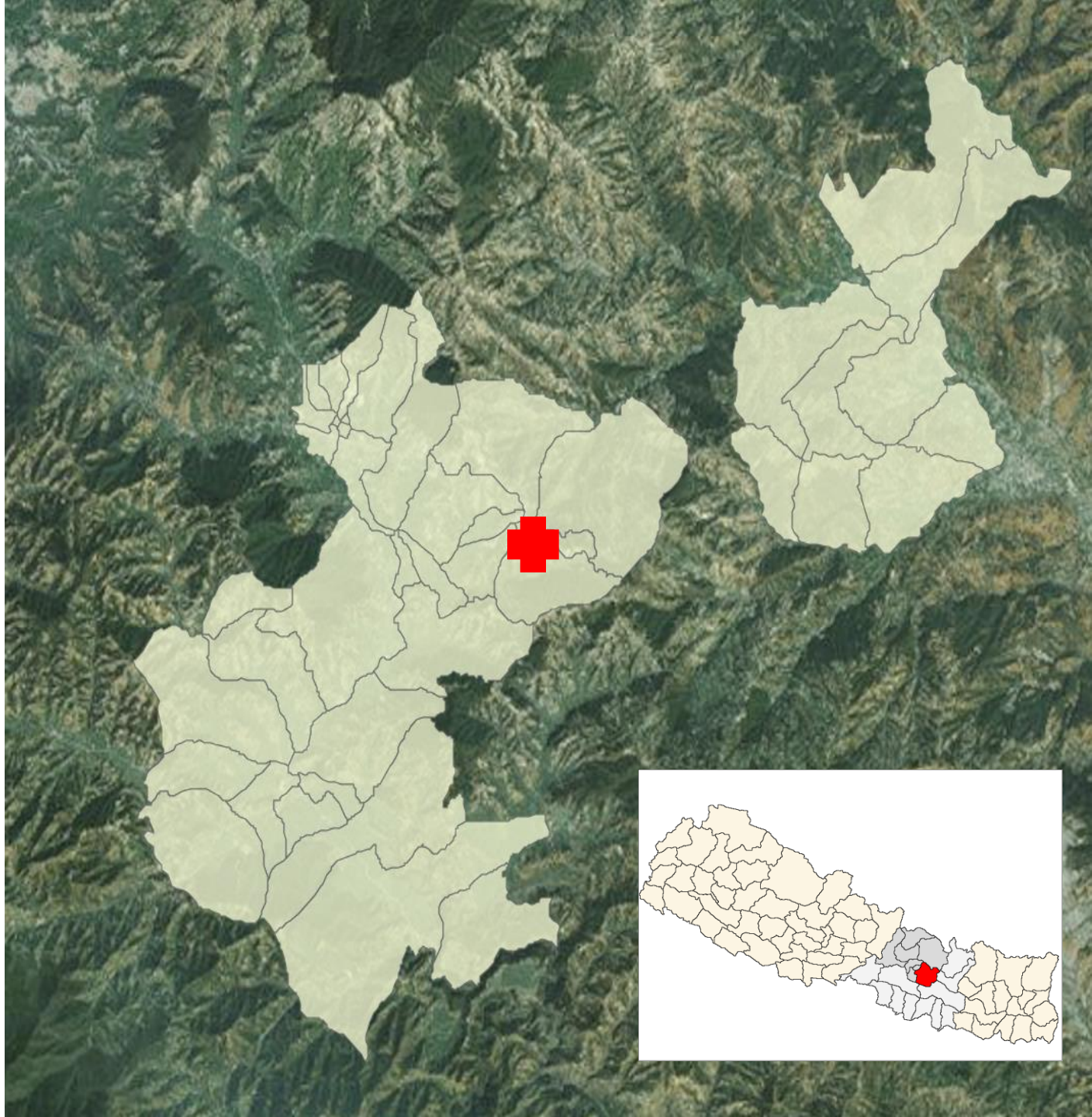
Hybrid (Pyramid) Approach

- Advantages:
  - Less resource-intensive
  - Captures severe cases and complications
  - Better estimate of population case rate
- Disadvantages:
  - May fail to capture more mild cases
  - Introduces uncertainties (potential biases in measuring healthcare utilization, etc)
  - Still requires blood cultures, laboratory infrastructure

Healthcare utilization Study

- Cross-sectional household survey
- Understand proportion who:
  - Seek care when febrile
  - Seek care at our facilit(ies)

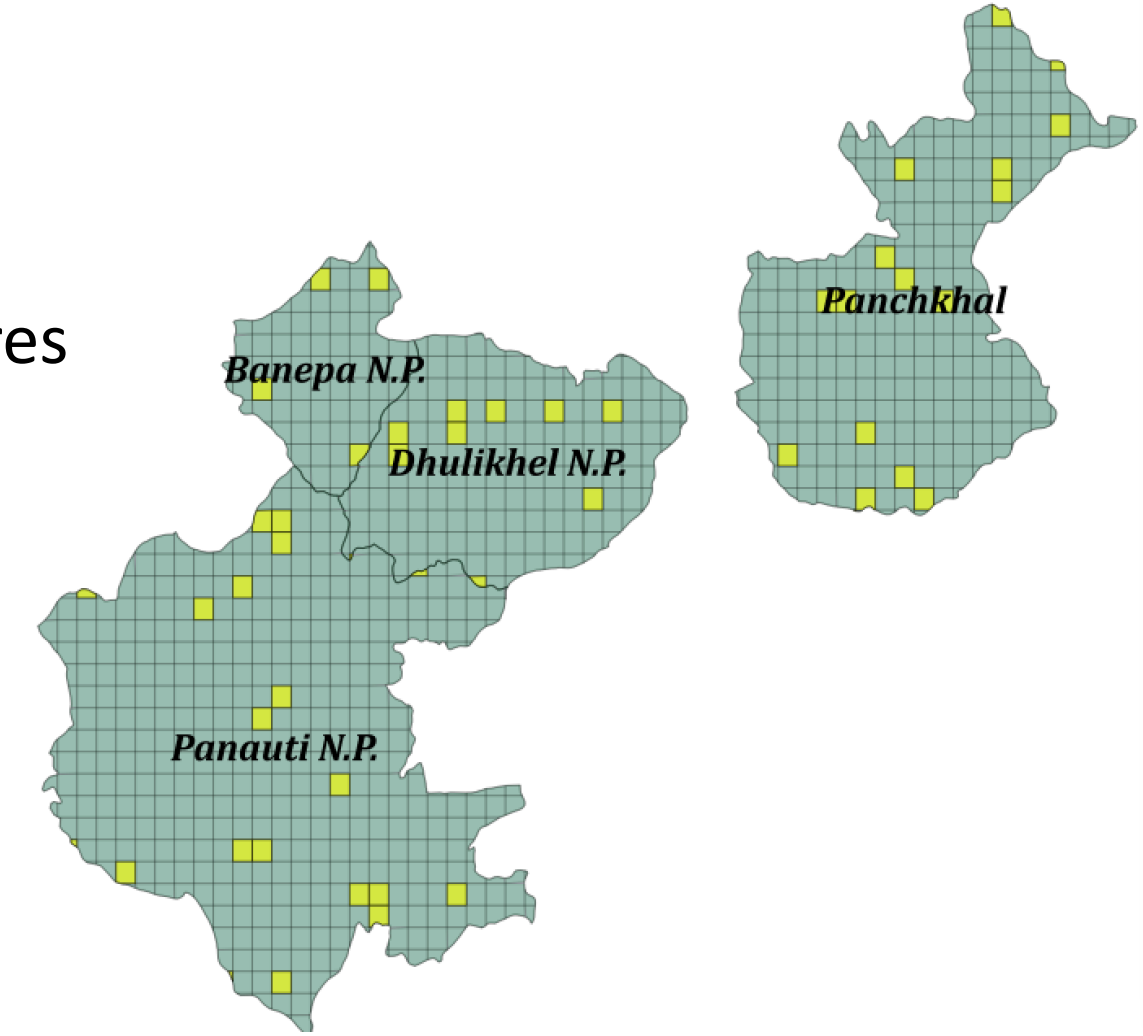
- Determining catchment area for survey:
  - Retrospective review
  - Identify where 60-80% of cases originate



Map of Kavrepalanchok district

Random cluster sampling

- Overlay a grid with equal sized squares
- Randomly choose clusters



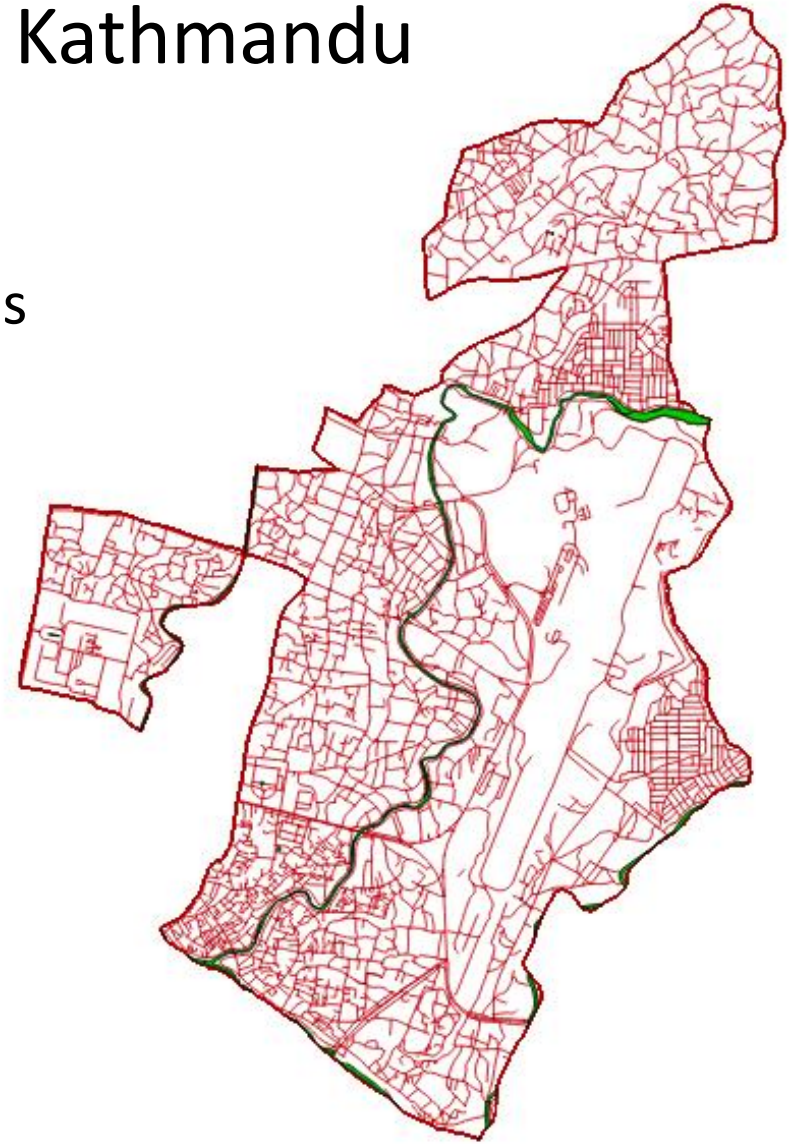
Sampling within clusters

- Goal is to sample every house
- Three attempts for each house
- Keep track of progress
  - Real-time GPS
  - Sync between surveyors

Different approach in Kathmandu

- Far greater density
- Grid with squares creates arbitrary boundaries
- Can use streets for natural boundaries

Kathmandu city
Red lines = streets
Green = water

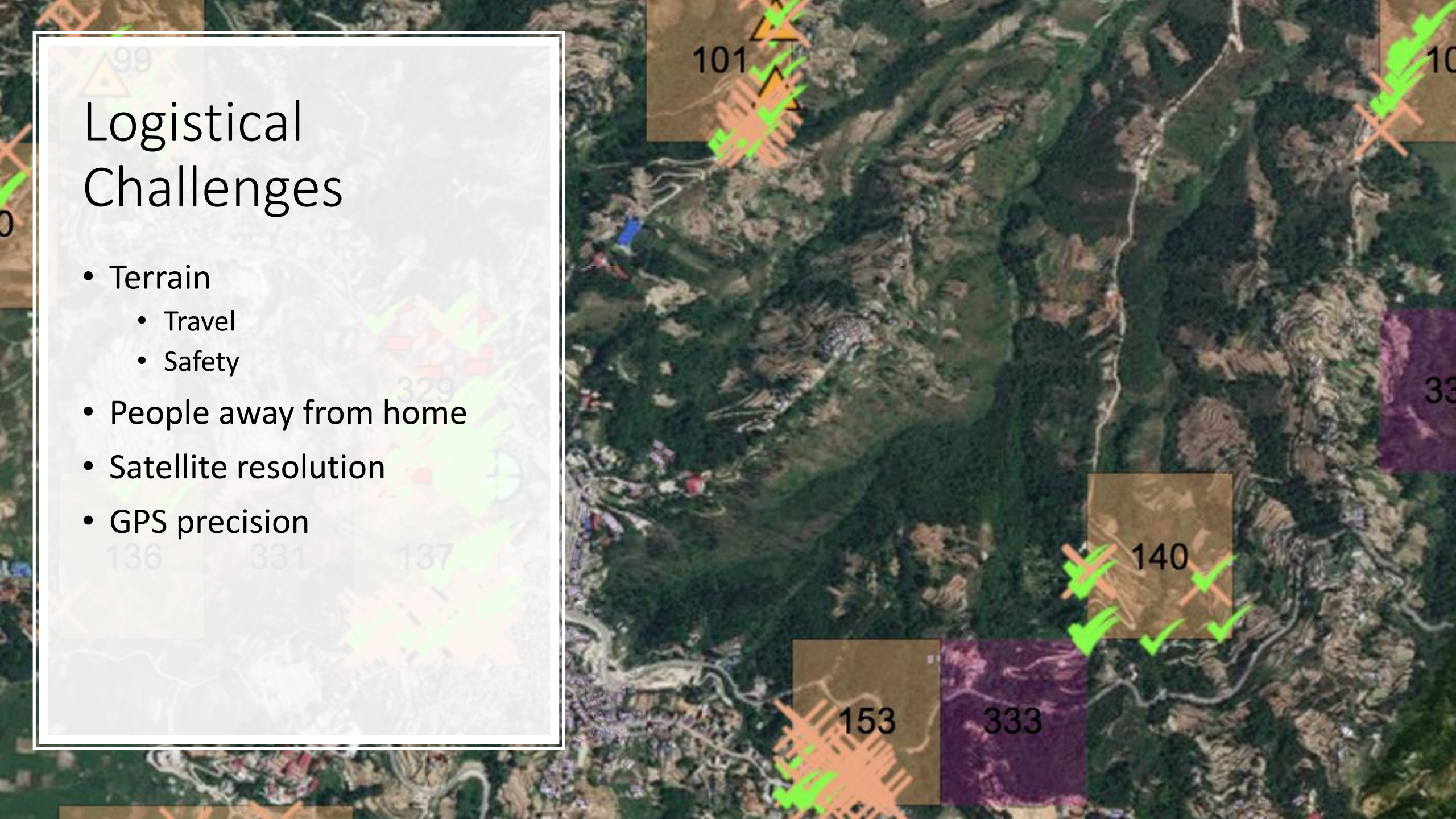


Overview of Kathmandu catchment area

Zoomed view of street boundaries

Logistical Challenges

- Terrain
  - Travel
  - Safety
- People away from home
- Satellite resolution
- GPS precision



Biases and sampling issues

- Potential biases in responses:
  - Longer recall period (8 weeks) makes survey more efficient but could introduce recall biases
  - If surveyors identify as being from an institution, they risk biasing responses
  - Female head of household primary respondent for all members of household
- We may be sampling less severely ill patients
  - Attempts to adjust for severity

Preliminary data

- Completed 2234 houses from January 26-March 26th 2017
- 35 declined (1.5%)
- 16 unreachable after three attempts (0.7%)
- 67 return pending (3%)

- Response rate of 95% approached

Proportion of population with fever, by age and sex

Age	Number sampled	Proportion of age group with fever
0 to 4	434	13%
5 to 14	1195	4%
15 to 29	2376	2%
30 to 49	2052	3%
50+	1449	4%
All ages	7506	4%

	Percent of sampled population	Cases of Fever	Proportion with fever, by sex
Male	48%	115	38%
Female	52%	189	62%

- Of those who had a fever, 81% were taken to a healthcare facility.
- Of those, only 16% were taken to Dhulikhel hospital.

Kavre district preliminary data, January 26-March 21st

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