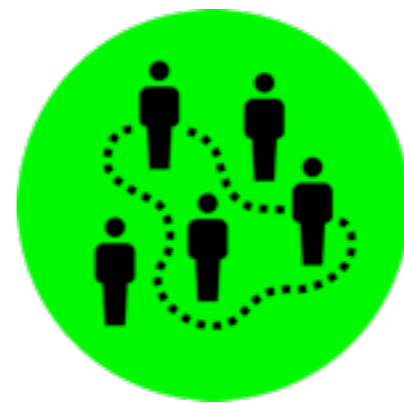


# Epidemic Mitigation through Mobile Micro-measures



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# Overview

The **context** is epidemic outbreaks.

The **problem** is that traditional mitigation measures are insufficient.

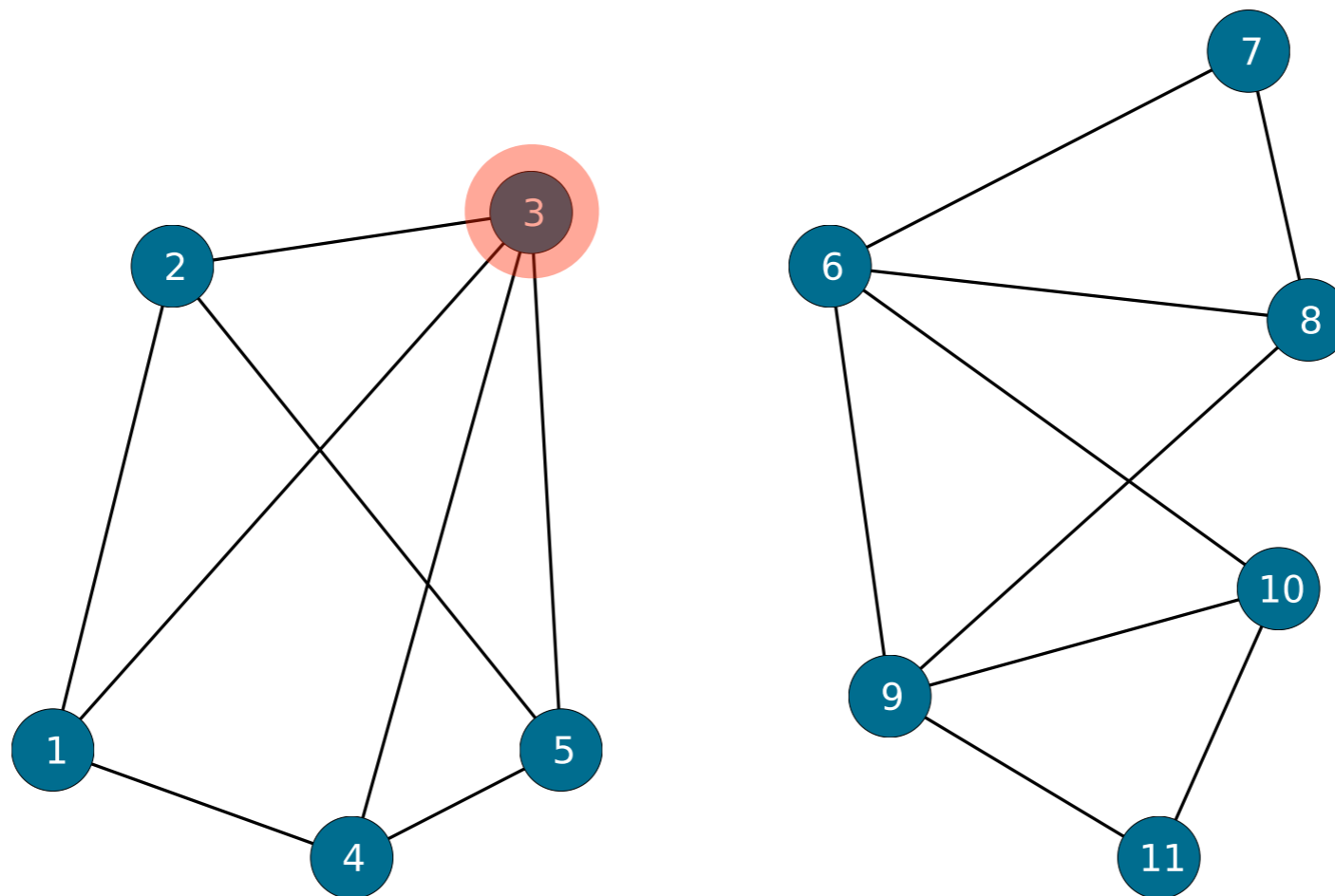
→ idea: **take advantage of mobile technology**

1. personal measurements

2. individualized recommendations

# Motivation

Can **small** adjustments to local interactions **significantly** slow an epidemic?



# Key properties

**Personalized** individuals are differentiated

**Adaptive** measures generated in real-time

**State-independent** don't know if infective

# Models

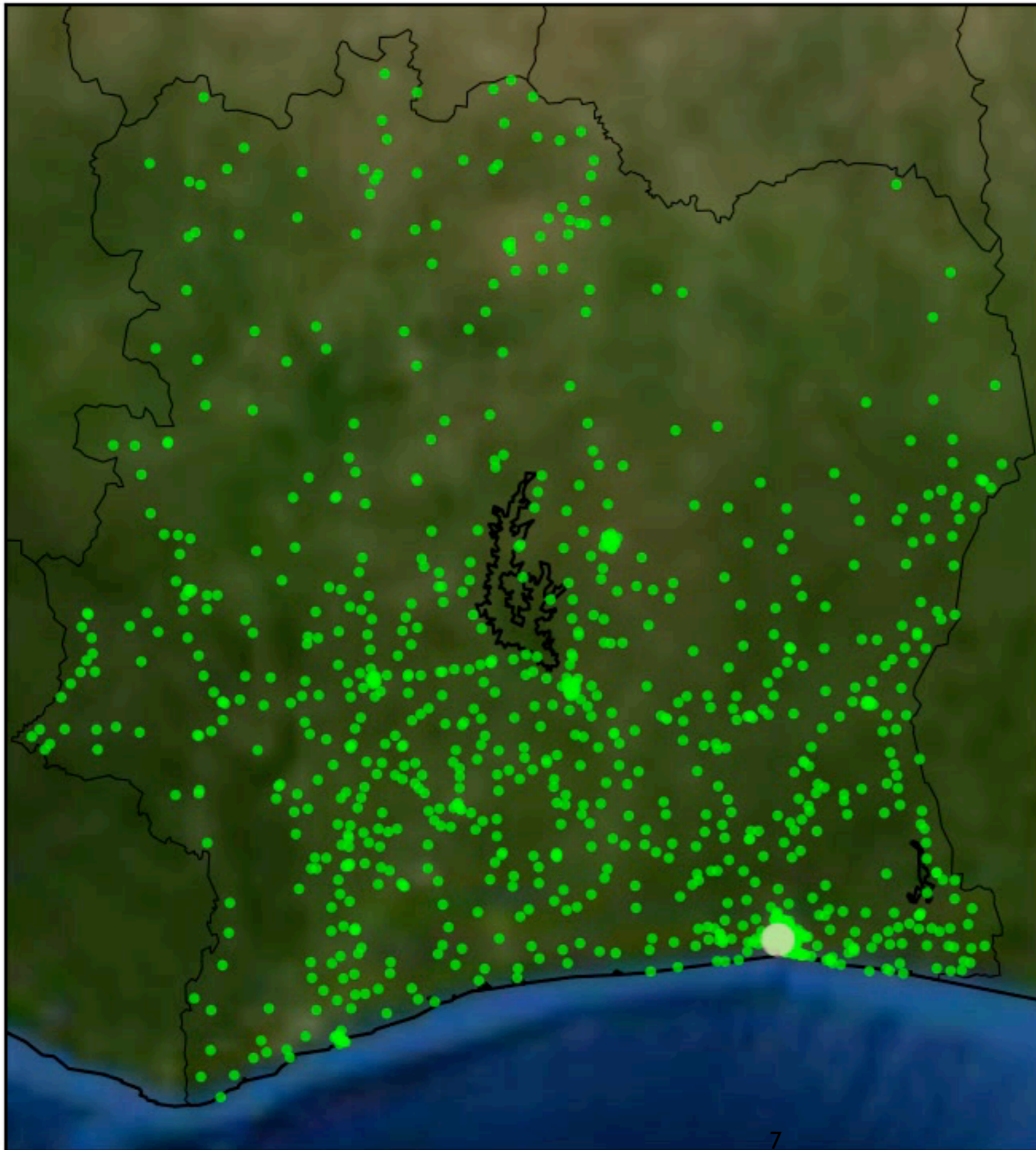
# Models

The **mobility model** depends only on time and home location.

The **epidemic model** is a discrete, stochastic SIR process for each metapopulation.

**Interaction** between metapopulations happens through mobility.

Outcome:  
simulation of  
human-  
mediated  
epidemics **at  
the individual  
level**



# Results



# Strategies



Uncover **mobility communities**  
& restrict cross-community trips






Segment **social communities**,  
rewire accidental contacts.



Send people **home**.

# Results

|   | <b>intuition</b>                  | <b>cost</b>                | <b>benefit</b>       |
|---|-----------------------------------|----------------------------|----------------------|
|   | weakening weak geographical links | 12% of trips               | delay peak by 15%    |
|  | segmenting social communities     | 90% of accidental contacts | delay peak by 20%    |
|  | home is a safe place              | 15% of trips               | reduce spread by 20% |

# Conclusions

Taking advantage of mobile phones opens up **new possibilities** for epidemic mitigation.

Our concrete micro-measures provide a **baseline for future work.**

From quarantines...  
... to micro-measures.

