Contextually Aware Risk Analysis of Sensors

Contextually Aware Geopositiong Update

- Working on higher-fidelity theft detection.
- Changed monitoring period from 30 minutes to 5-10 minutes
- Issue for HMM,
  - Time-complexity increases significantly.
    - Risk Prediction is real-time
    - Training will need to be done when phone is not in use;
      - Do more general military sensors have such periods.
      - Move to cloud?
  - Lose predictability in data. ROC curves are much worse
  - Trying to impose initial structure in HMM to improve ROC curve.

Contextually Aware Bluetooth Update

- Normalized Risk Metric so that it seemed to give reliable risk.
- Issue: We don't know if individuals felt at risk or not based on data. We are giving best estimates.

SVM for global risk predictor.

- In implementation on phone, working on first run of data.
- No data yet

LOOKING AT MALWARE SPREAD

- Infection Style: Parallel Vs. Serial
- Exposure Time - Viral Spread Speed
- Susceptibility - Different phone hardware/software
- Broadcast Radius - 802.11g vs. 802.11n

LOOKING AT MALWARE SPREAD

1. Realistic Mobility Model - UdelModels

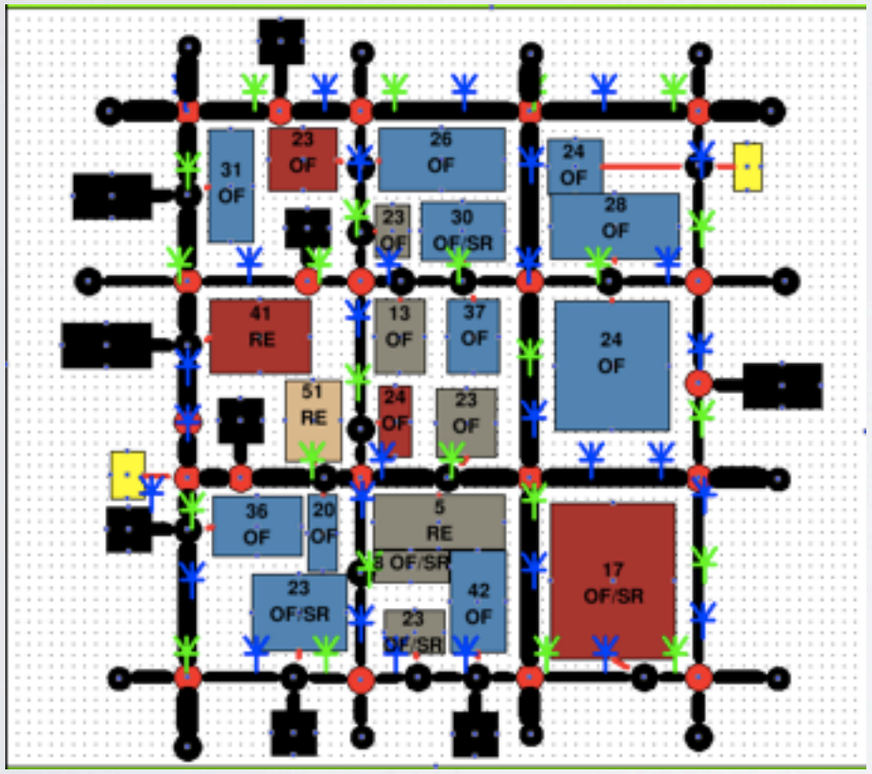
- High Spatial Fidelity
- High Temporal Fidelity
- Accurate Population Density

Example UdelModels Simulation [UdelModel]

- [Channakeshava09] uses similar approach

LOOKING AT MALWARE SPREAD

2. Target Geographical Area -- CHICAGO



[UdelModel]

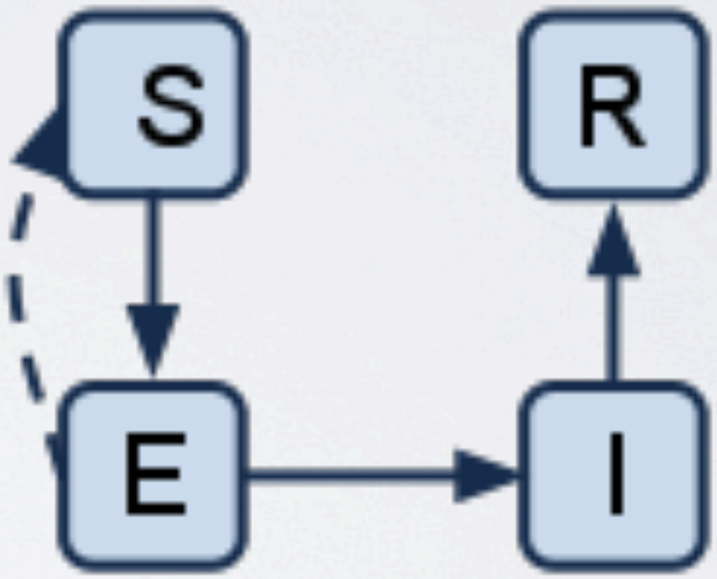
Population
9056
[Landscan]

[USGSMap]

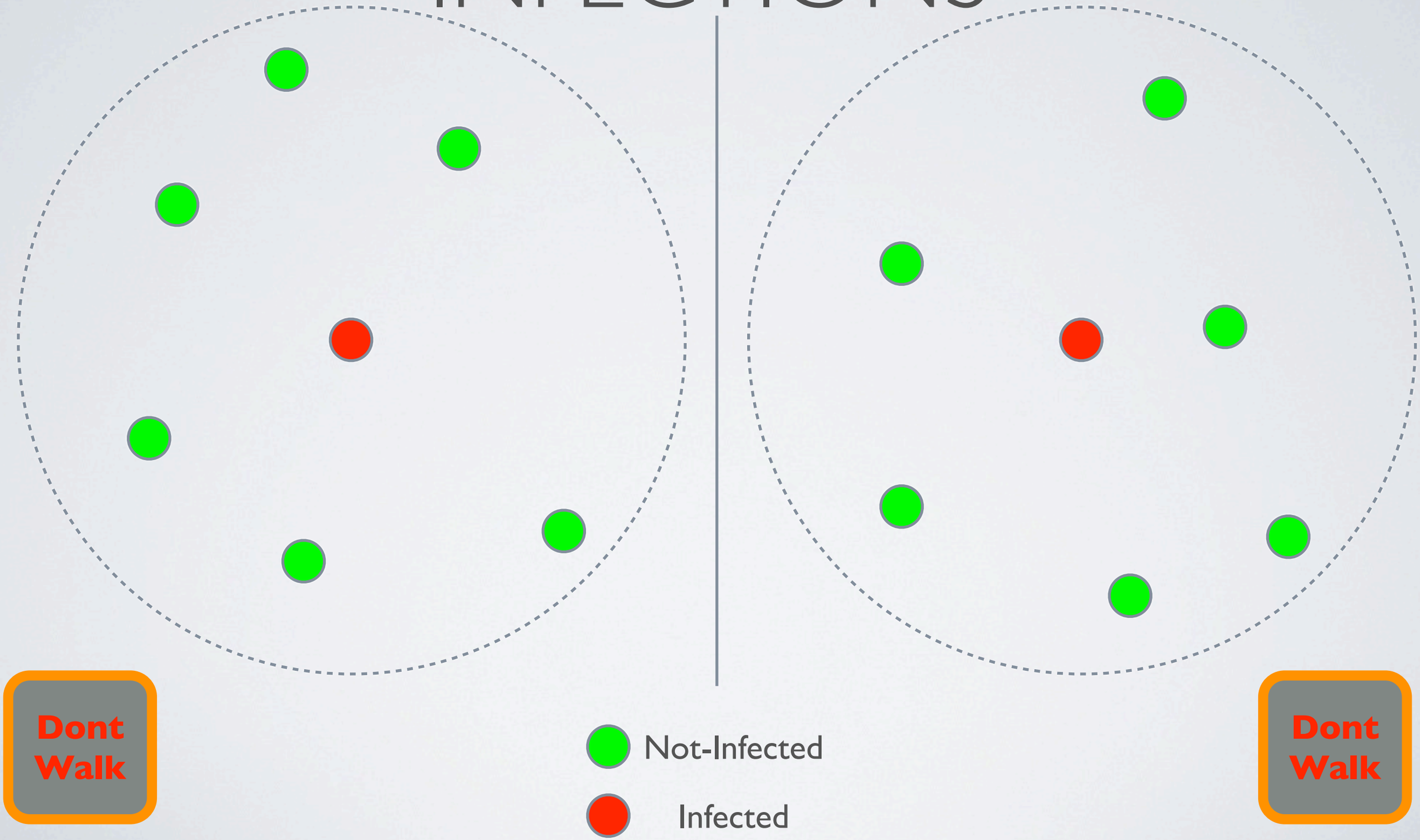
LOOKING AT MALWARE SPREAD

3. Epidemiological Model

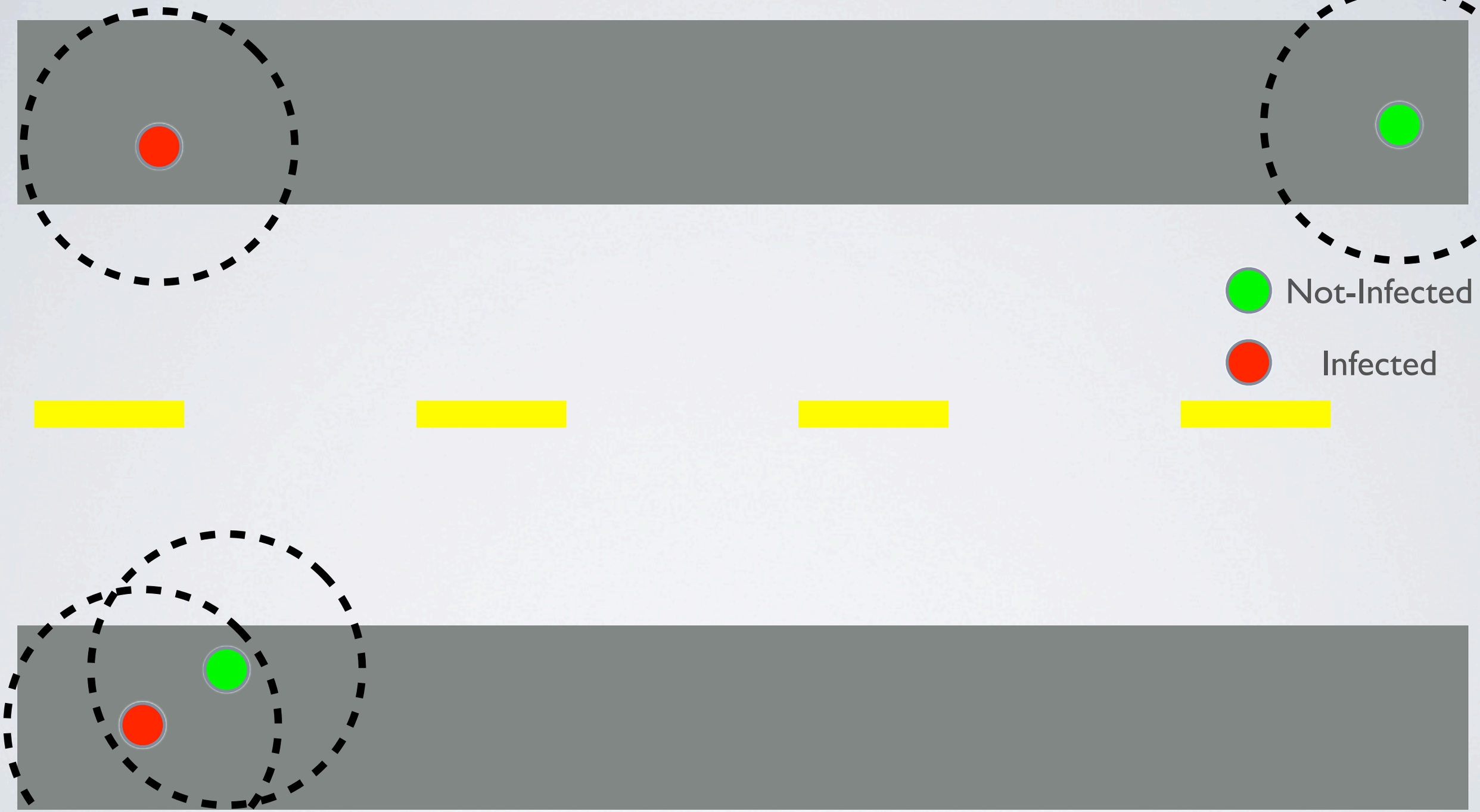
- S-E-I-R Model
- Susceptible
- Exposed
- Infected
- Recovered



SERIAL VS. PARALLEL INFECTIONS



EXPOSED POPULATIONS



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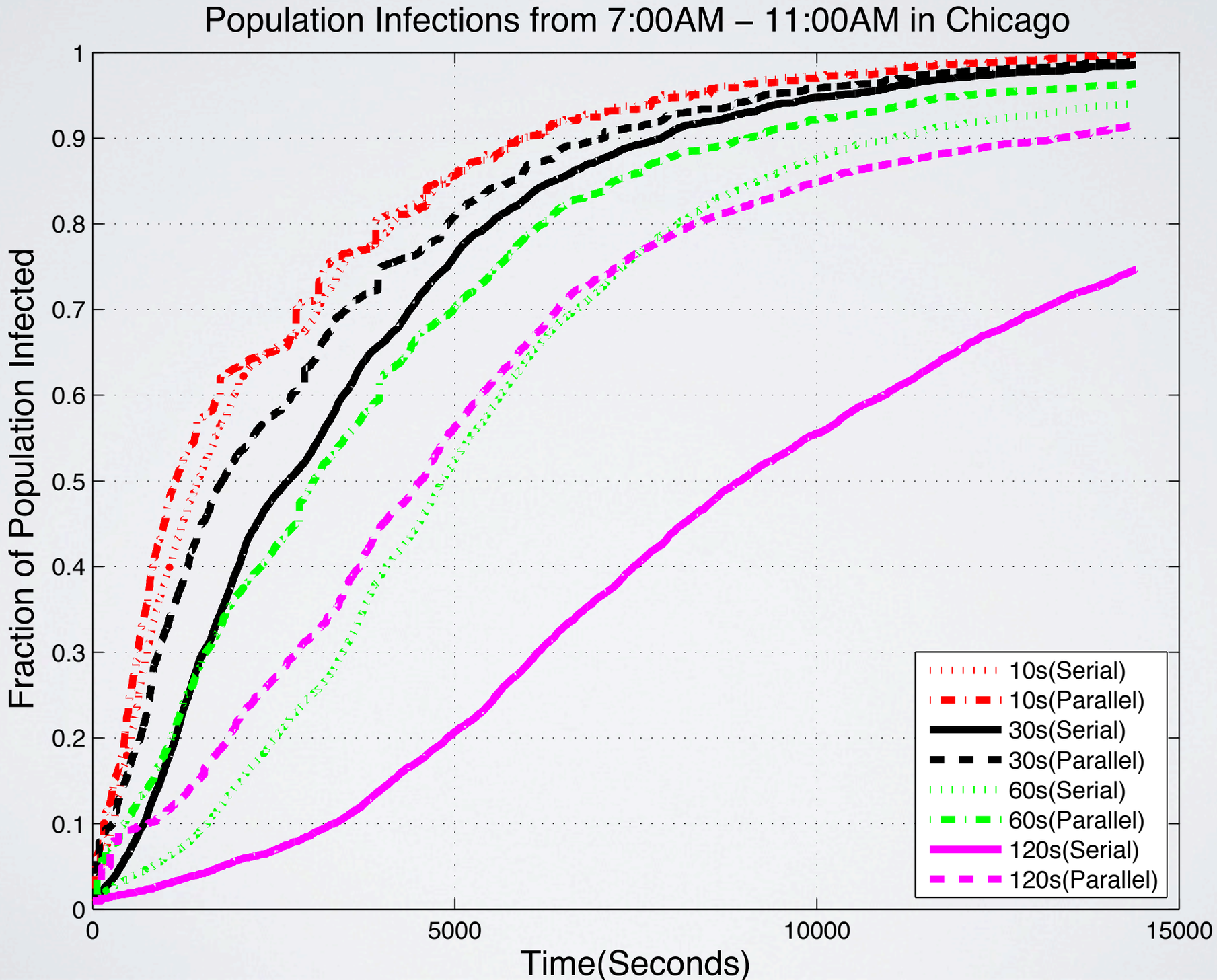
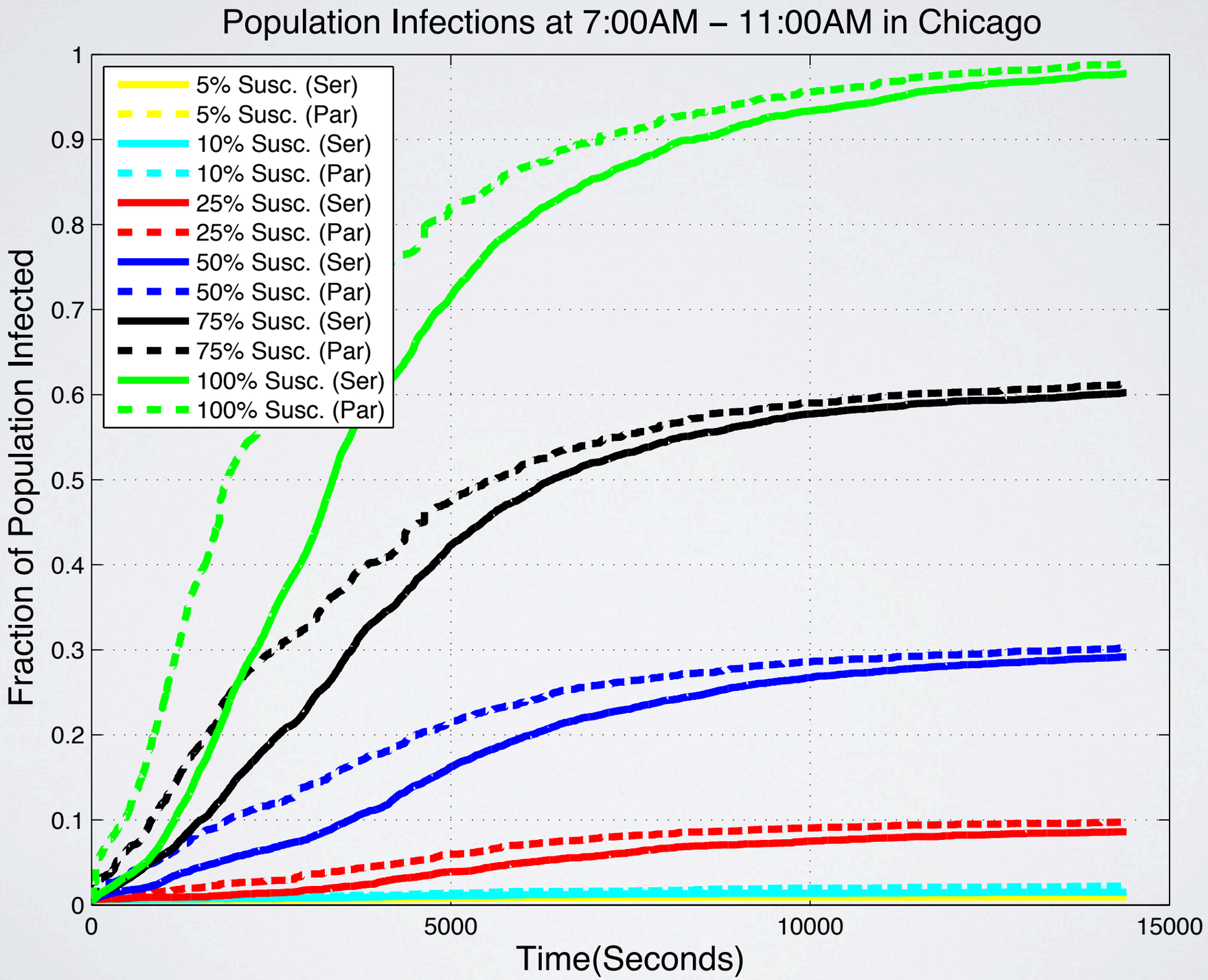
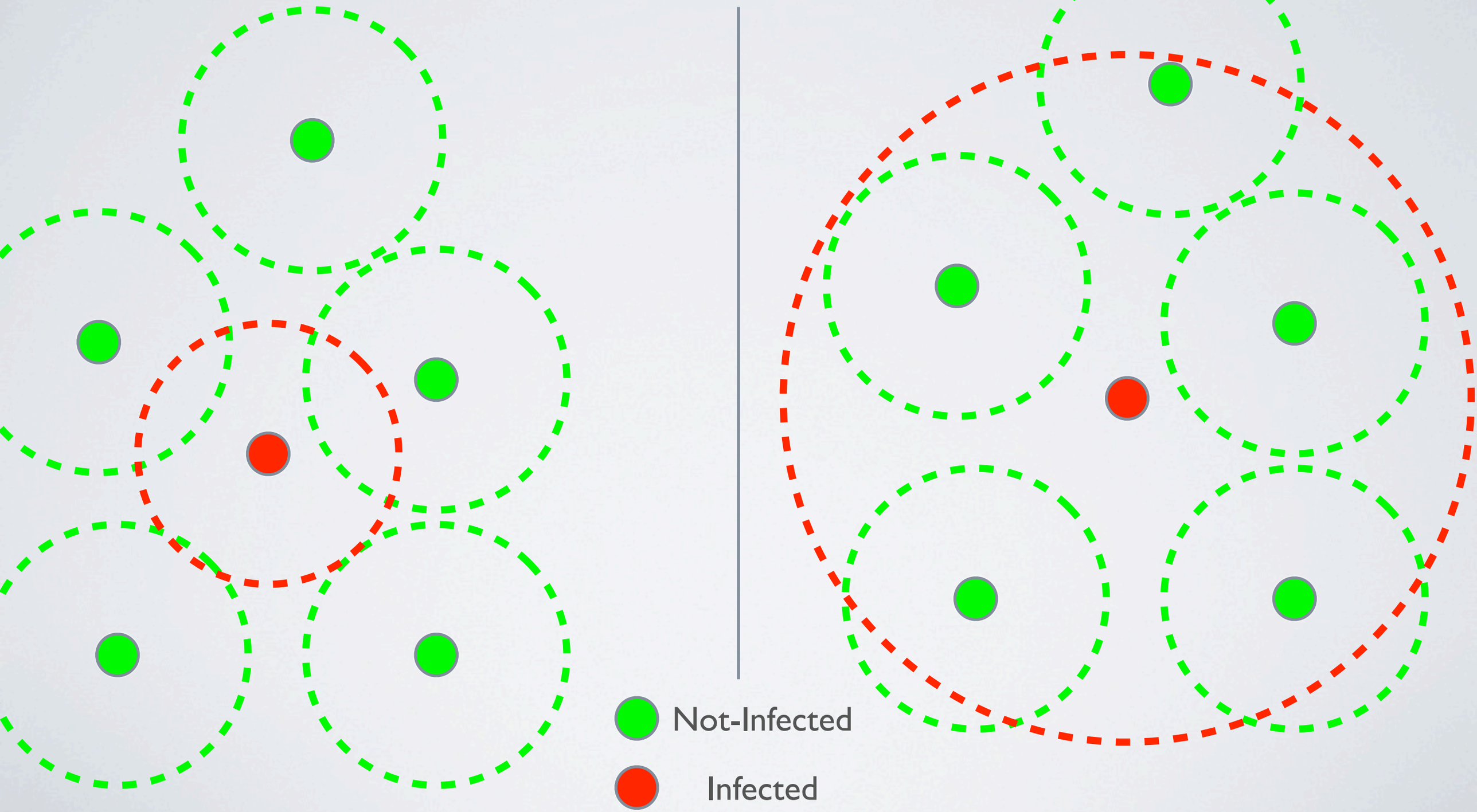


SUSCEPTIBLE POPULATIONS



BROADCAST RADIUS INCREASE



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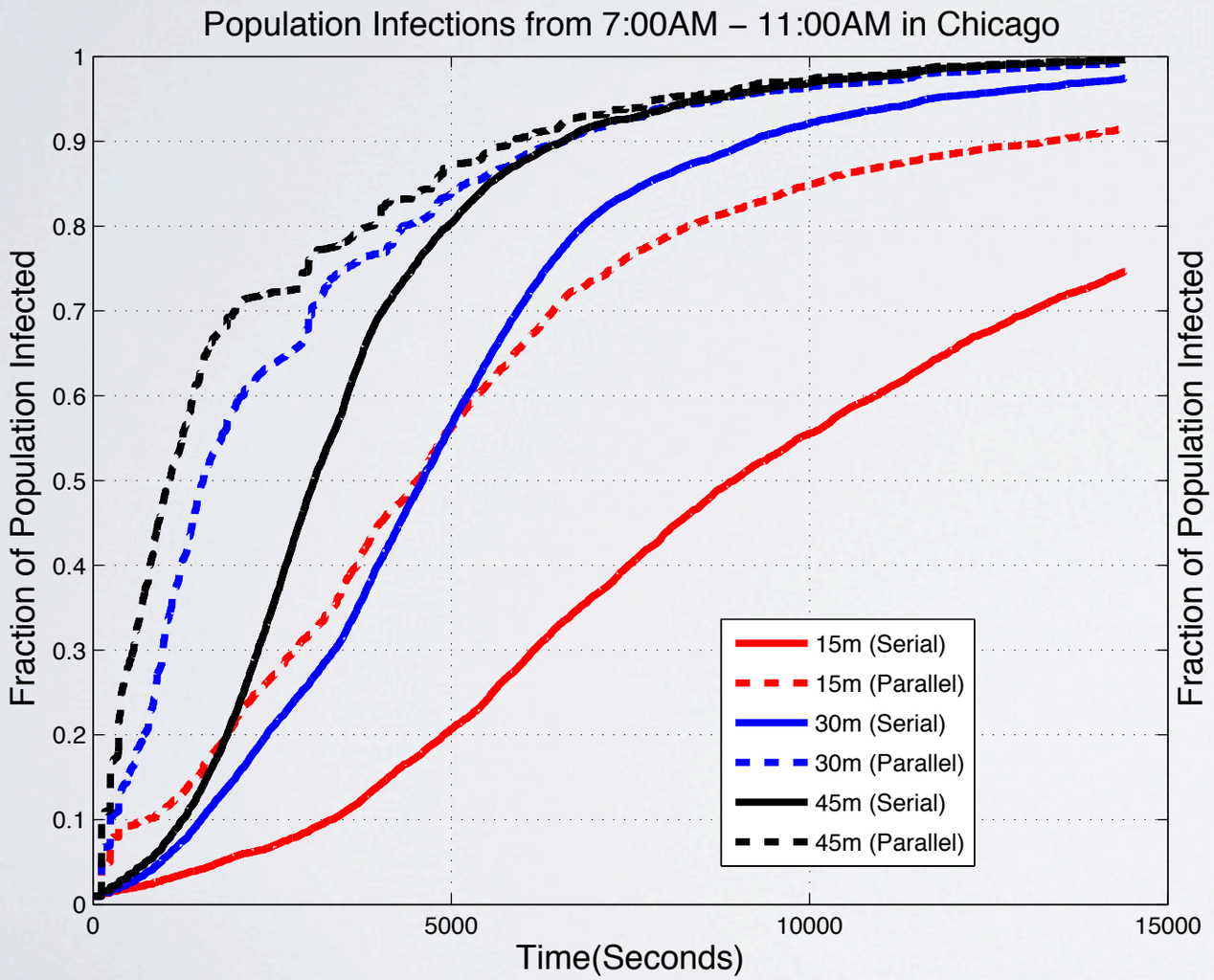
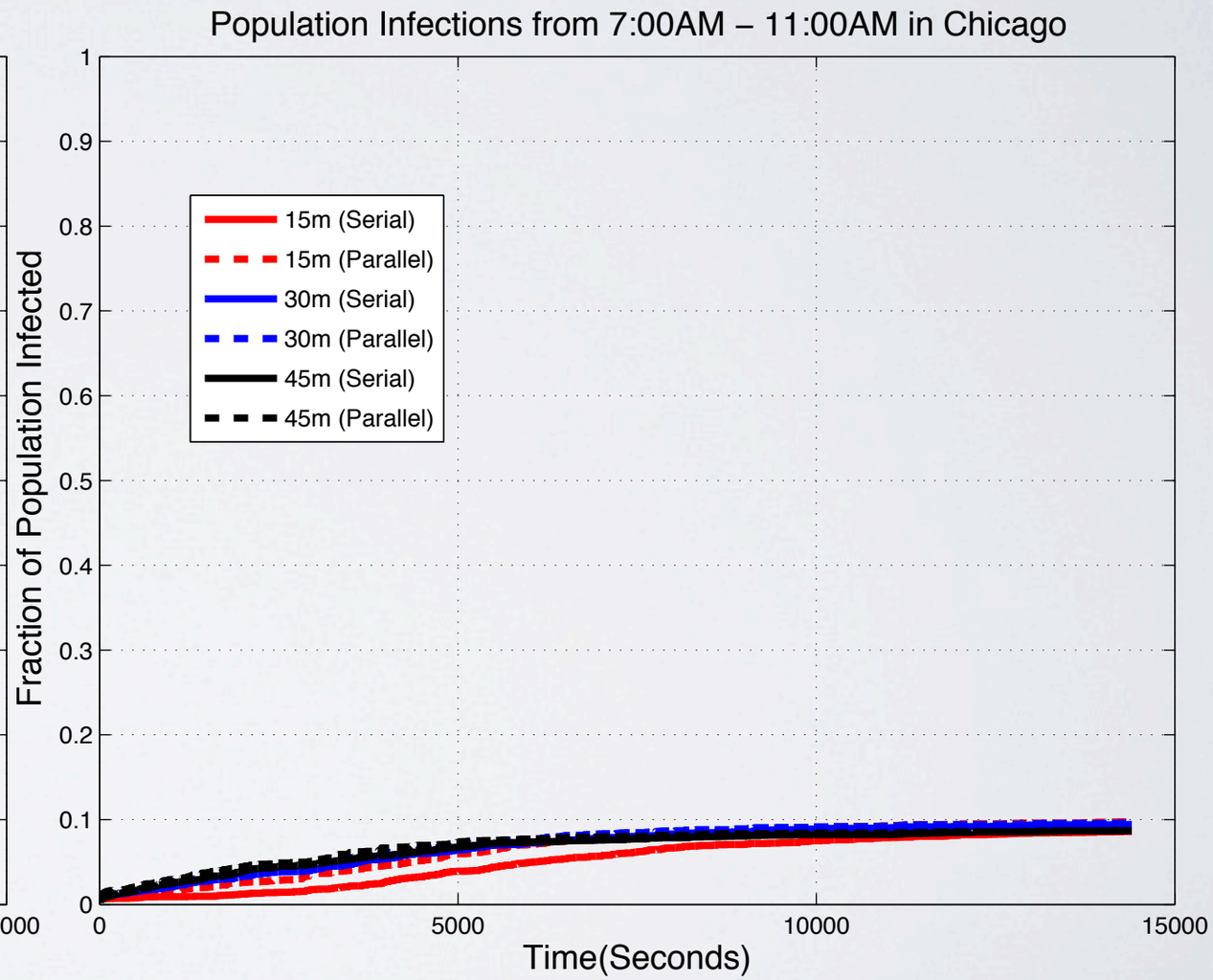


100% Susceptible



25% Susceptible