A Spatial Agent-Based Model of Tobacco Surveillance

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Research Questions

- In a public health context, how is someone trying to quit smoking affected by their environment? (by nearby smokers?)
- How do changes in the environment, as generated by public health interventions, affect the outcomes of the individual?

Public Health Intervention

- Policies (**tobacco-free zones**, **marketing regulations**)
- Programs (enrollment into cessation training)
- Individual-based modules (mobile apps, follow-ups after quitline calls)
- Fiscal (higher taxes)

Model Components

- Environment
  - Abstractions of the built and social environment:
    - Patches correspond to different types of risks
- Individual Agents
  - That smoke >5 cigarettes a day
  - Expressed Interest to Quit

Model Components

- Actions:
  - Smoke
  - Do not smoke
  - Move

Individual-Environment Interactions

- High risk of relapse:
  - Storefront tobacco advertising
  - Nearby individuals are smoking
  - *Socioeconomic characteristics*
- Low risk of relapse:
  - Designated tobacco-free zones
  - Anti-tobacco marketing
  - Nearby individuals are not smoking
  - *Socioeconomic characteristics*

Landscape

- For this model: grid space
- Different types of patches:
  - “tobacco vendors”
  - “anti-tobacco marketing”
  - “tobacco free zones”
  - “ green spaces”
  - *road network*

Replicate ABM Model

- Obseogenic environment framework by Egger and Swinburn (1997)
- Environment: physical, economic, political, and sociocultural
  - Micro (neighborhoods, homes, schools) and Macro (transport, health reg system)
- Individual factors: demographic and socioecnomic factors

Theory Testing

- Which has a greater impact, peer effects or the built environment?
- Theory of Planned Behavior (Peer Effects)
- Nudge Theory (Policy Effects)