

Cities as an incubator for tobacco harm reduction

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- Note to readers: This version of the slide show does not include the files that show the animated social dynamics from slides 15, 19, and 22
- For those who wish to see those animations in action, please watch one of the video versions:
 - <https://www.youtube.com/watch?v=wcdHwyOGhV0> (the original live presentation at City Health 2012)
 - <http://ep-ology.blogspot.com/2012/10/agent-based-model-of-thr-adoption-and.html> (voiceover presentation of the slideshow, with a bit of additional content)

- Smoking tobacco is generally considered the most harmful (to one's physical health) act that a large portion of the population chooses to do
- Heavily studied and discussed
- Yet there is remarkably widespread ignorance about why it is a health problem

It is not the tobacco (or nicotine)
that causes the harm

it's the *smoke!*

Perfect harm reduction opportunity: the harm does
not come from the same source as the benefits

Tobacco Harm Reduction (THR)

- Substitution of low-risk (smoke-free) alternative products for cigarettes/smoking
 - (or policies and actions to encourage such substitution)

The most promising unrealized health intervention in the Western world today

Tobacco Harm Reduction (THR)

- Low risk alternatives:
 - smokeless tobacco (aka “snus”)
 - e-cigarettes
 - almost any any other smoke-free nicotine/tobacco product
- Substitution is almost as good as abstinence (from health perspective)
- or better (from the perspective of consumers who choose it)

THR works!

- Demonstrated low risk
 - extensive epidemiology on Swedish and American smokeless tobacco
 - about 1/100th the risk from smoking
 - chemistry / biomarkers research on e-cigarette
 - perhaps not as low-risk as snus, but seems to be close
- Demonstrated effectiveness

Demonstrated effectiveness

- Snus
 - Sweden (long-established success)
 - Norway (recent explosion of success)
 - USA (strong ongoing trend)



Demonstrated effectiveness

- E-cigarettes

- USA, UK, Germany, France, Poland, etc.–rapid growth
- elsewhere – mixed



Why THR?

- HEALTH PRAGMATISM: In spite of massive abstinence-promotion efforts, many people continue to smoke
 - THR is the only proven method of reducing smoking below about 1/5th of the population once smoking becomes popular
 - Moreover, switching to snus and never quitting has less risk for the average smoker than smoking *for just two more months*
- ETHICAL/ECONOMIC: Better to improve people's welfare than just coerce them to abstinence

Like it or not, THR is happening

- Not because of any efforts by those who call themselves “public health”,
indeed, it is *despite* their efforts.
- Tobacco control activists are fighting THR
– many anti-THR claims

One claim is that smokers are not interested
because THR adoption to date has been modest

THR is a social process

- Some smokers will adopt low-risk alternative based entirely on written (etc.) public health education
- But most will not act without the education and cues that come from social interaction
- Adoption of e-cigarettes in particular (a socially visible form of THR) depends on social dynamics

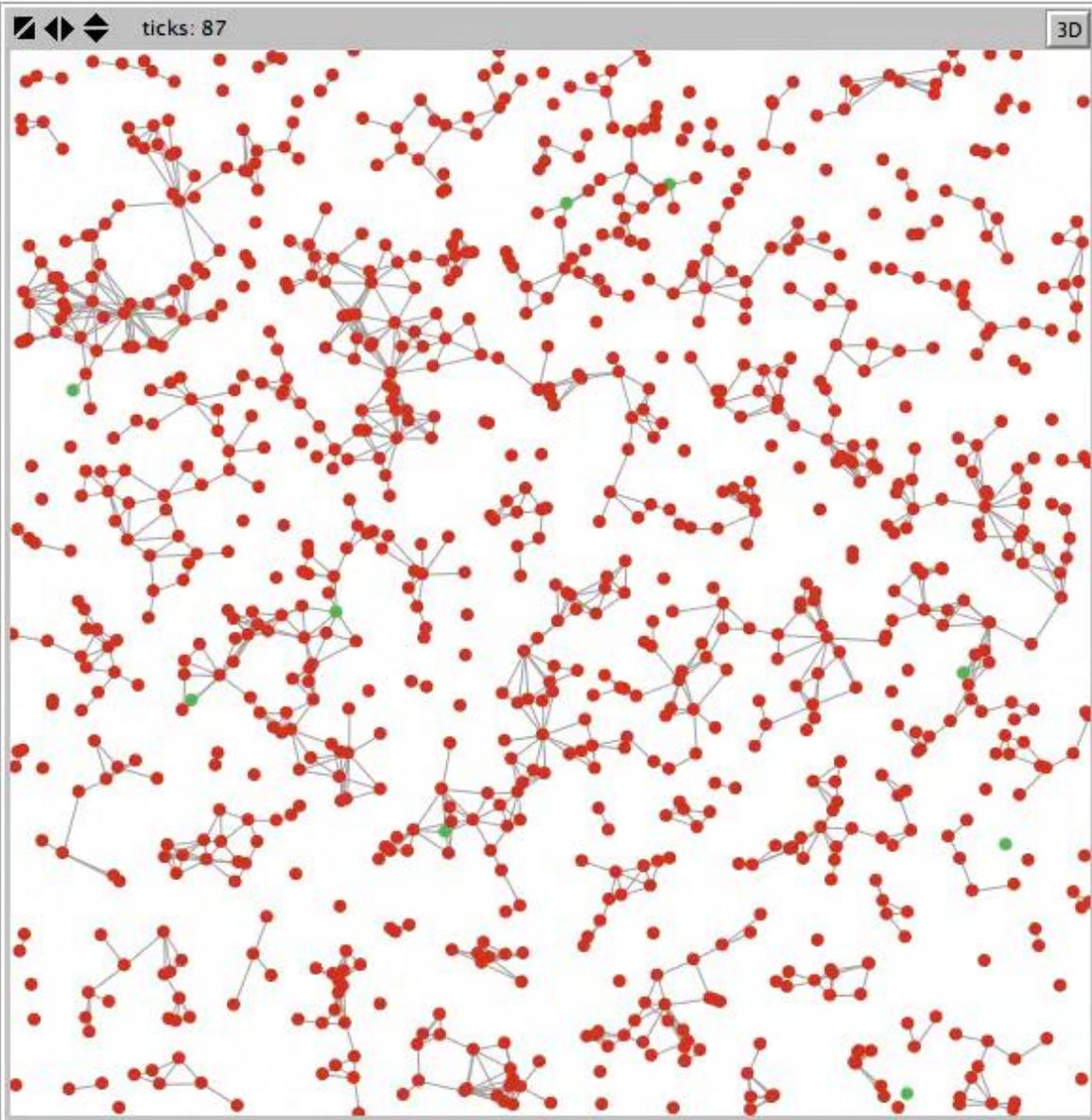
Social dynamics model

- Population of smokers, starting with a few who have switched to THR
- Social networks (subsets of people who have great influence on one another)
- Random interaction with society as a whole
- Education from network, society as a whole, and mass education
 - encountering more THR increase pro-THR knowledge
 - and lower utility from smoking
 - possible pro- or anti-THR pressure on everyone
- Smokers adopt THR when utility exceeds smoking

Social dynamics model

Notes on current version's simplifications:

- Based on an abstract space
- Dynamics are based on what is perhaps a 1:100 scale representation of a real population
- No switching back to smoking
- Switching is instantaneous
- No “pubs” (concentrated gathering places)



THR Adoption Contagion Model

Smokers

THR users

Initialise

Run Model

ongoing-education 0.00000

Pro or Anti THR Campaign

mass-education-change 0.2



%THR	Time Taken
0.92307	0

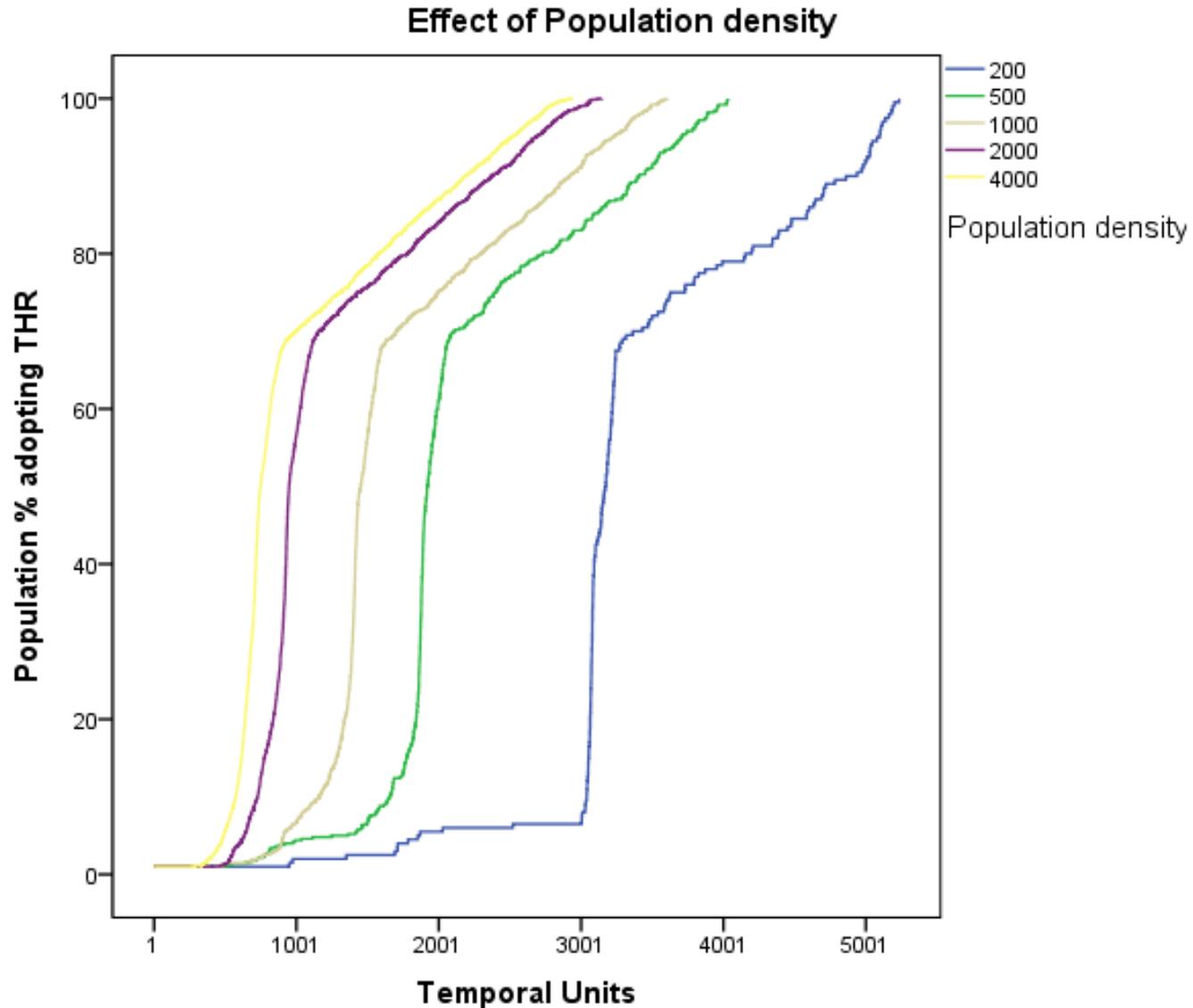
Significance of this model

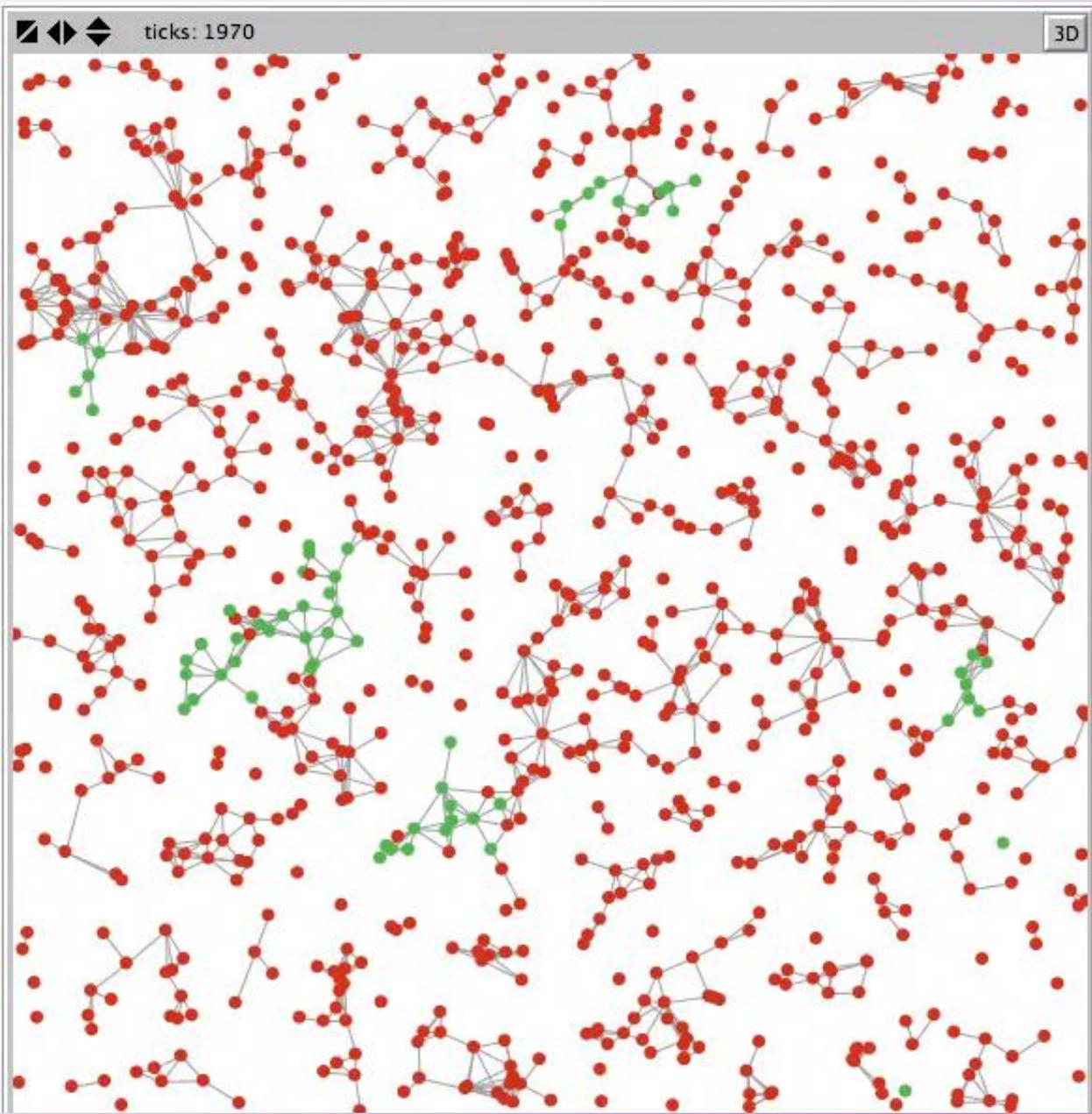
- Illustrates the social dynamics – this is how THR happens
- Yes, just a simulation that offers limited empirical information, but:
 - Tipping phenomenon robust across parameters and model configurations – i.e., almost no matter what you do, it happens
 - this is made possible by a latent growing appreciation of THR
 - and launched by reaching a critical mass of the population that THR leaps social group barriers

Why is this a matter of *city* health?

- Density matters
 - a sparse population will not have much learning
 - more people = more learning
 - more people = denser networks = more learning

Why is this a matter of *city* health?





THR Adoption Contagion Model

Smokers

THR users

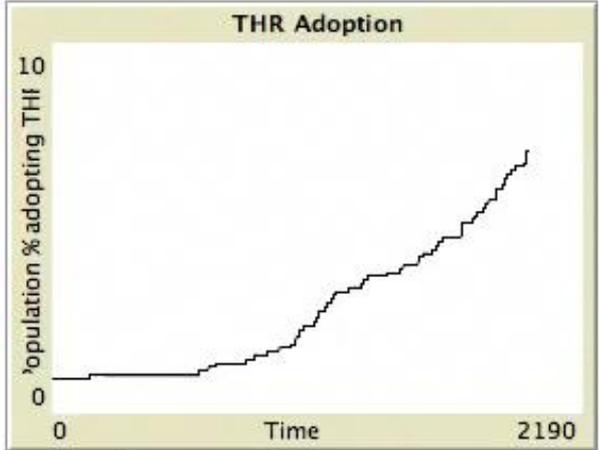
Initialise

Run Model

ongoing-education -8.0E-5

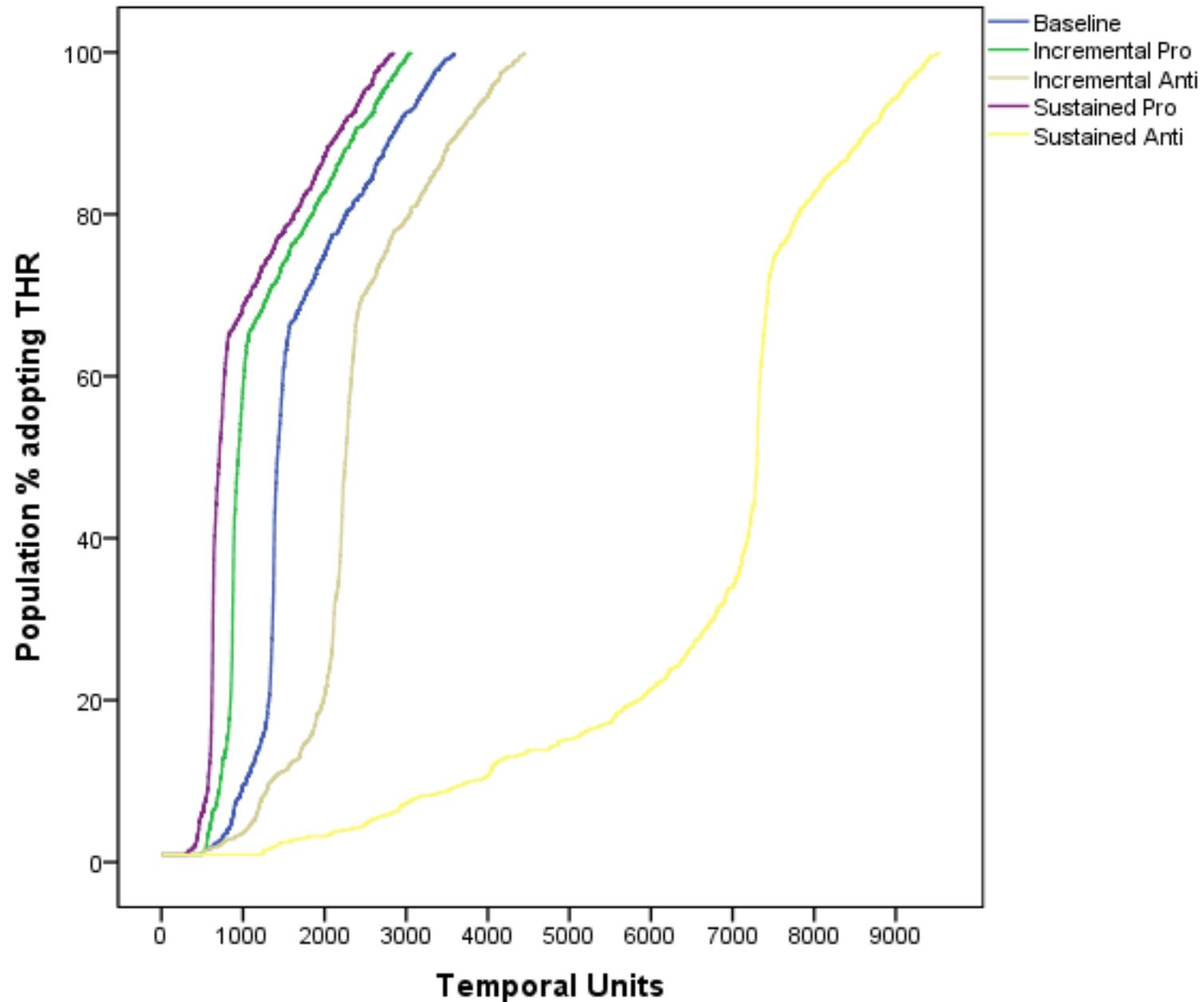
Pro or Anti THR Campaign

mass-education-change 0.4



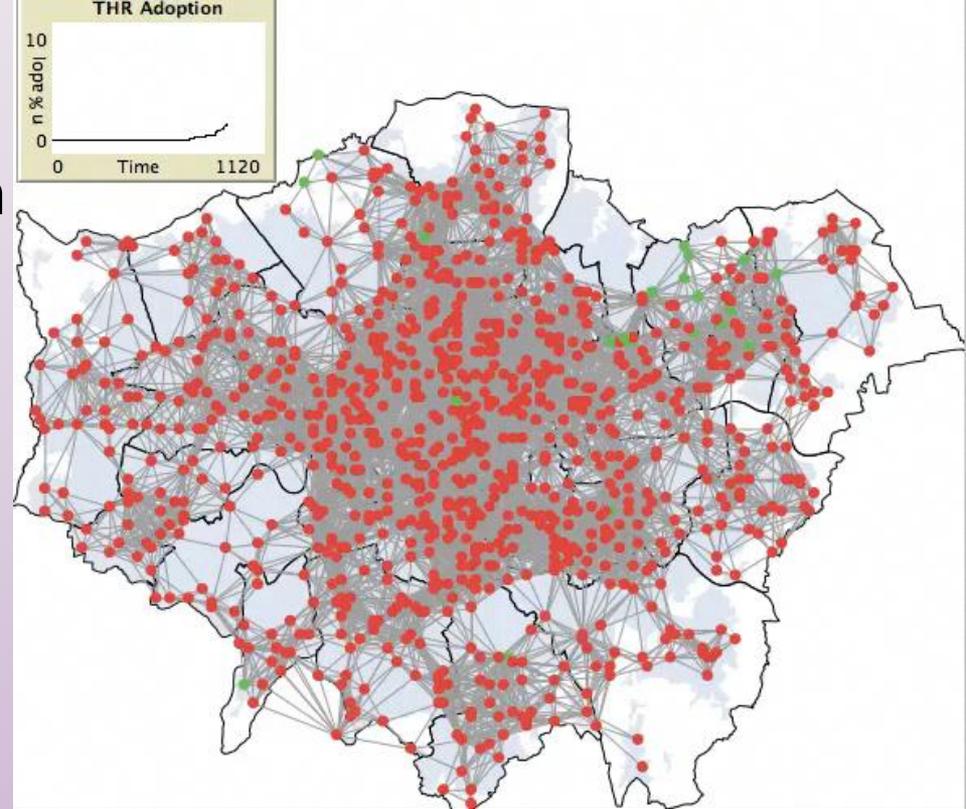
%THR
7.07692

Effect of Pro and Anti THR Interventions



- THR is a social movement
 - self-sustaining, populist
 - with the free market playing a crucial role (consumer choice, product innovators)
 - with help from advocates/researchers
- Tipping seems very likely to occur
- In USA and UK we seem to be in the upswing but pre-tip range
 - i.e., change looks limited now, but really is not
- Constant anti-THR dis-education can dramatically slow reaching the tipping point

- Thanks to Neeraj G Baruah (Department of Geography, Cambridge University and *Populi* Health Institute) for creating the agent-based software program
- CVP (not NGB) is responsible for all analysis and commentary/politics re THR, as well as any errors in the presentation.



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