

Applying System Dynamics Modeling to Older Adult Fall Prevention



Safe States Student Showcase

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“If people had a holistic worldview, it is argued, they would then act in consonance with the long-term best interests of the system as a whole...”

SYSTEM DYNAMICS HELPS US UNDERSTAND COMPLEX SYSTEMS

BUSINESS DYNAMICS: SYSTEMS THINKING AND MODELING FOR A COMPLEX WORLD

BY JOHN STERMAN

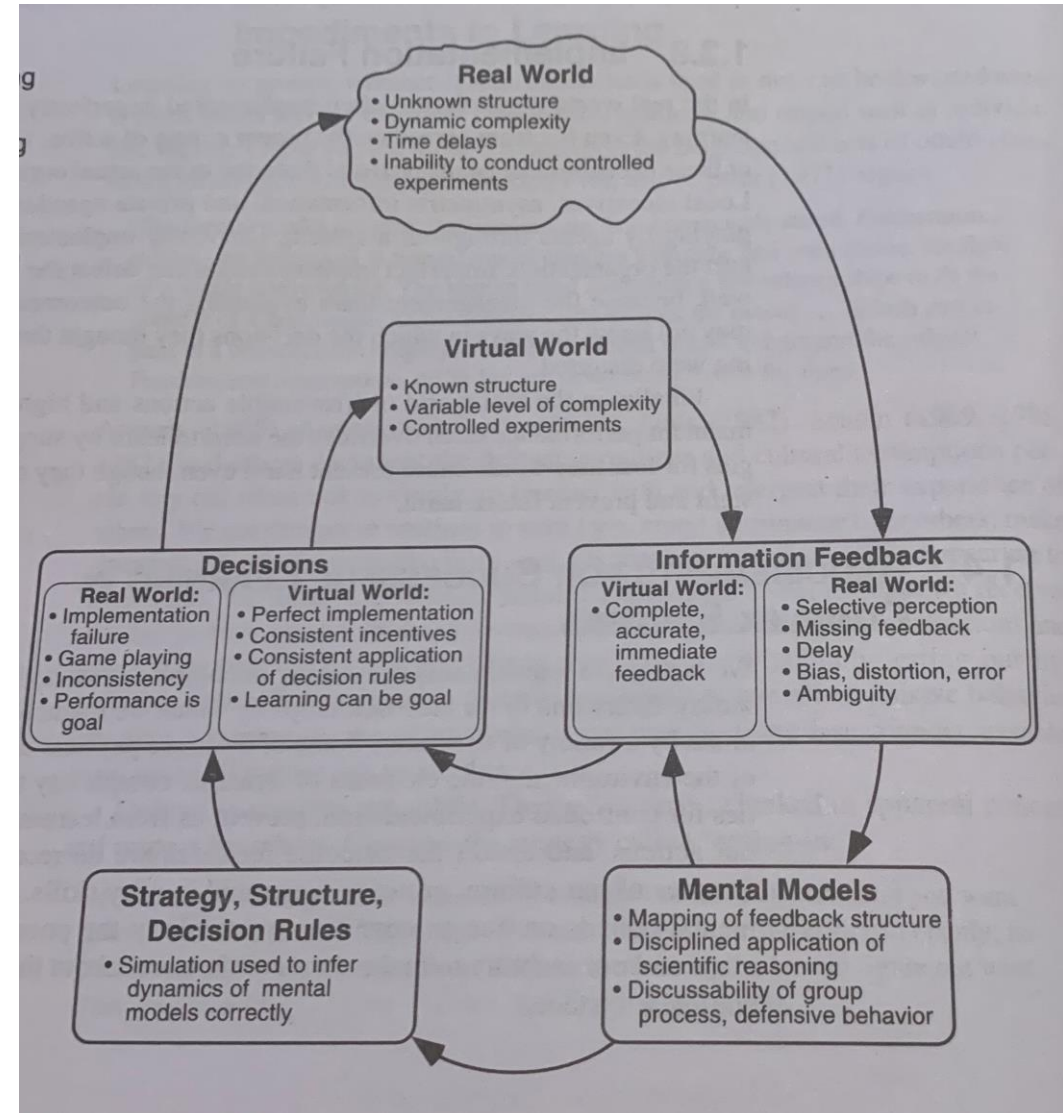
What Does Modeling Help Us Do?

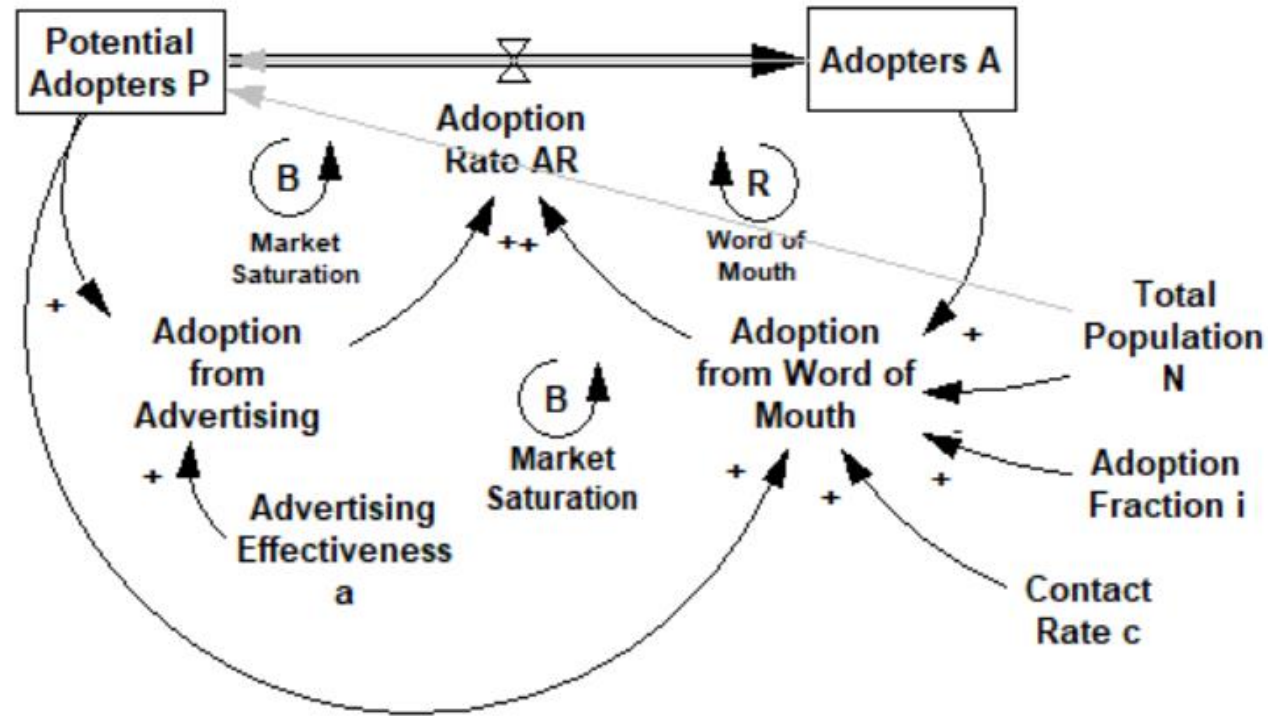
Creates simulated “worlds” where decision-makers can conduct experiments

i.e. Flight Simulators

Pitfalls from flaws in our:

- Mental models
- Scientific reasoning skills
- Group processes

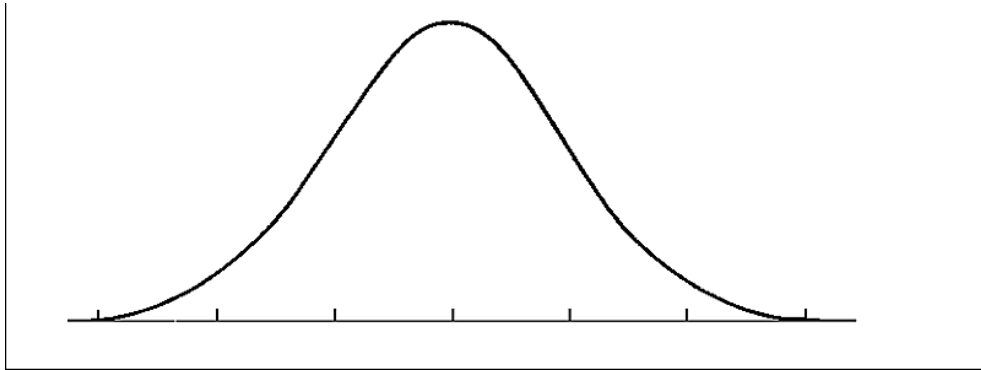




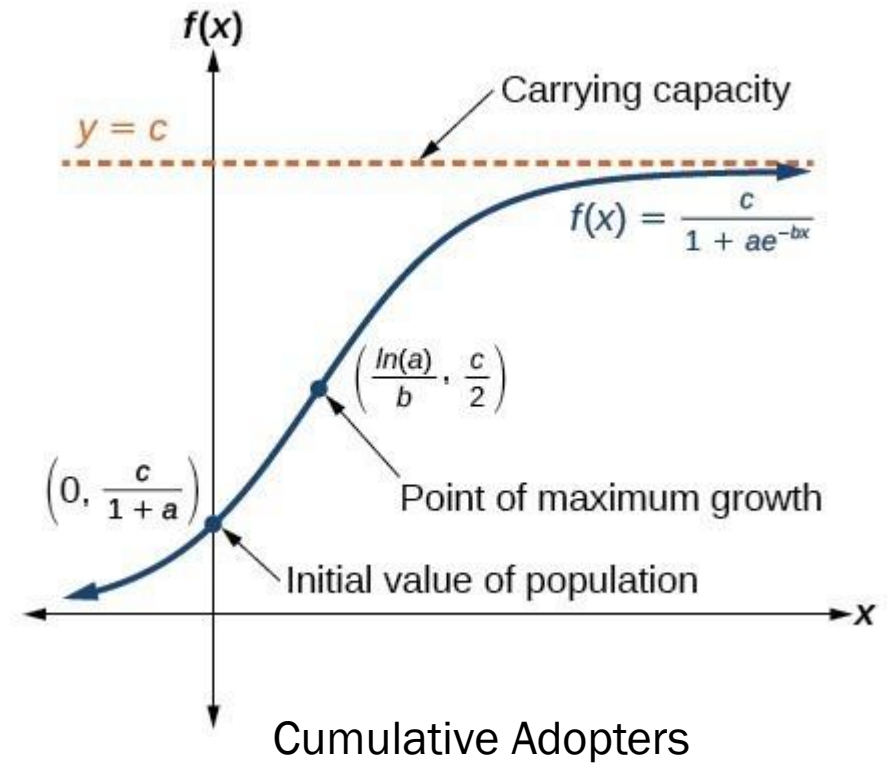
Business Dynamics: Systems Thinking and Modeling for a Complex World by John Sterman

What Does it Look Like?

Diffusion of Innovation Model (Bass Model)



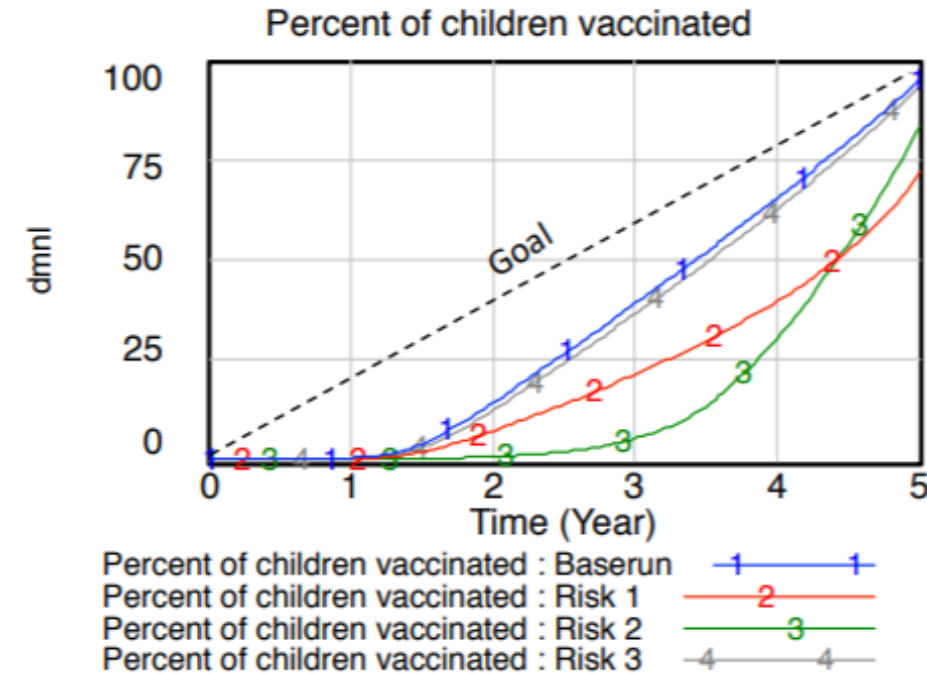
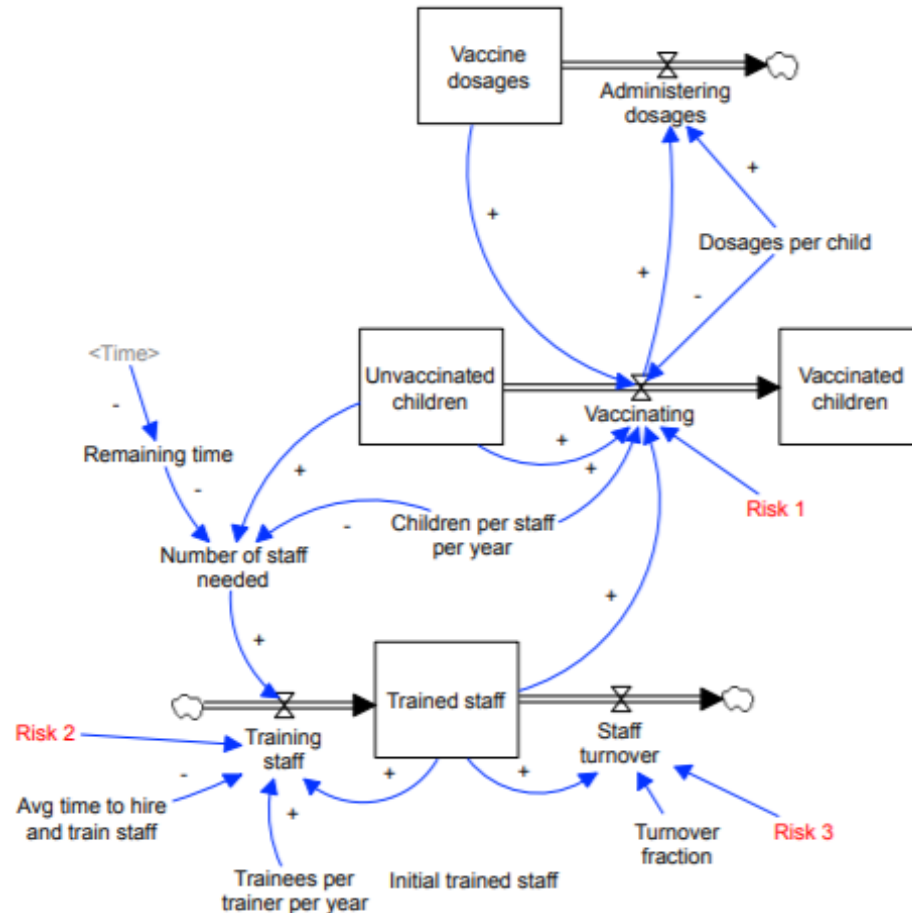
Adopters at a time point



Cumulative Adopters

Diffusion of Innovation Model

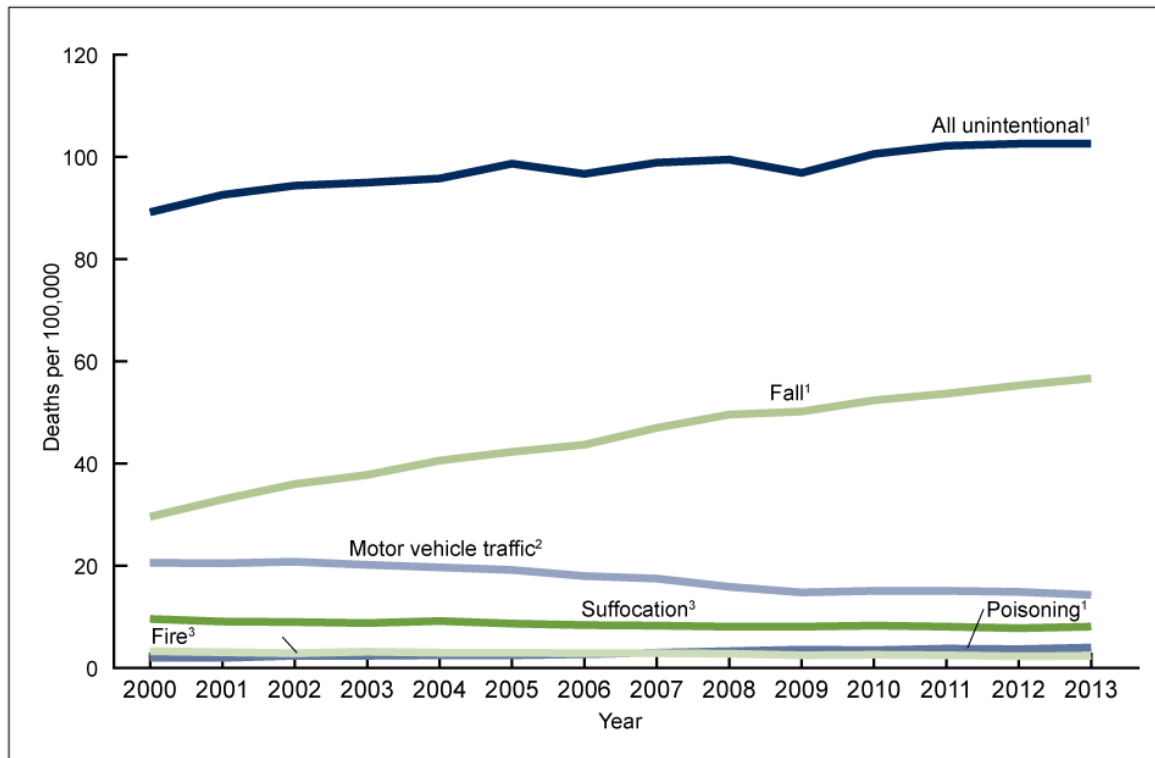
System dynamics concept model* of a scaling-up a child vaccination program for Salud Mesoamérica 2015 initiative (*Peter Hovmand*)



* A concept model is a model that is used to introduce the basic elements of system dynamics within the problem context. Concept models are designed to be incomplete to encourage participants in a group model building session to develop generate critiques. See Richardson, G. P. (2006). *Concept models*. Paper presented at the Proceedings of the 24th International Conference of the System Dynamics Society.

Problem: Older Adult Falls

Figure 2. Age-adjusted death rates, by cause of death among adults aged 65 and over: United States, 2000–2013

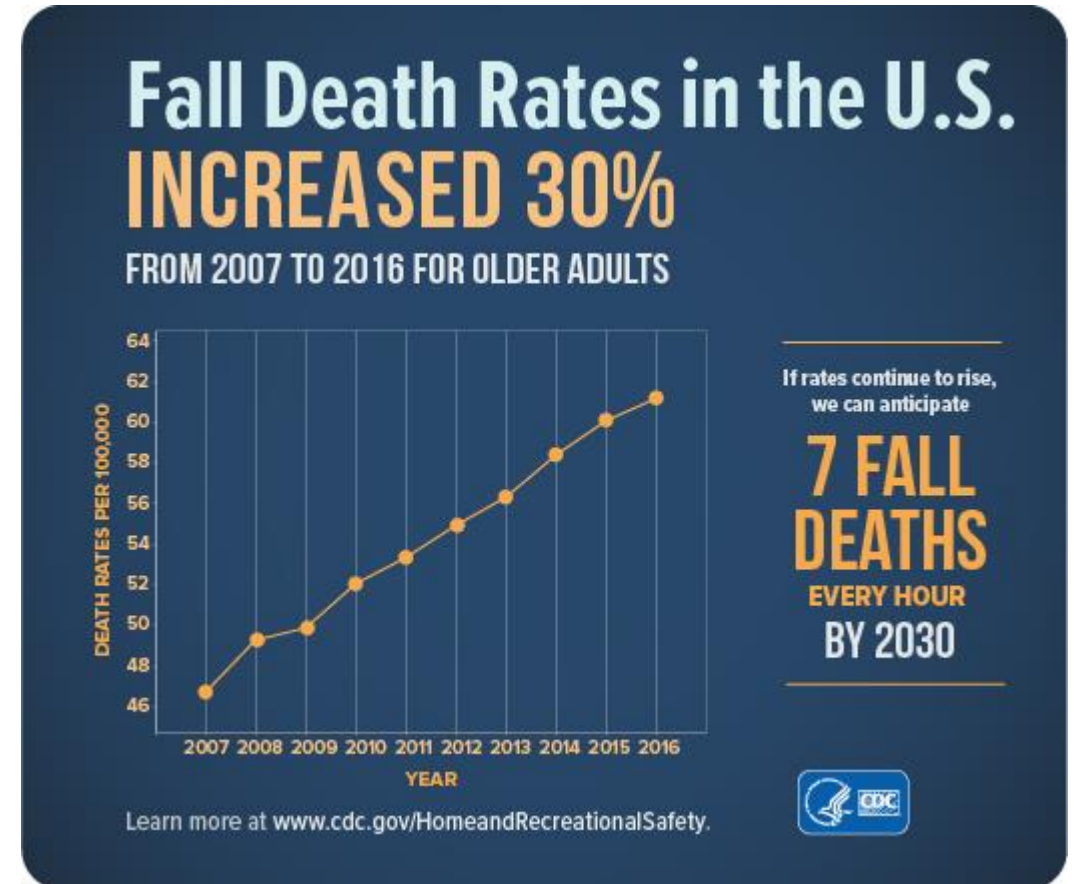


¹Significant positive linear trend ($p < 0.05$).

²Significant negative linear trend from 2000 to 2009 ($p < 0.05$).

³Significant negative linear trend ($p < 0.05$).

SOURCE: CDC/NCHS, National Vital Statistics System, Mortality.



Getting Started: A NY Example

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Prevention Agenda 2019-2024: Promote a Healthy and Safe Environment Action Plan

Focus Area 1. Injuries, Violence and Occupational Health

Goal 1.1 Reduce falls among vulnerable populations

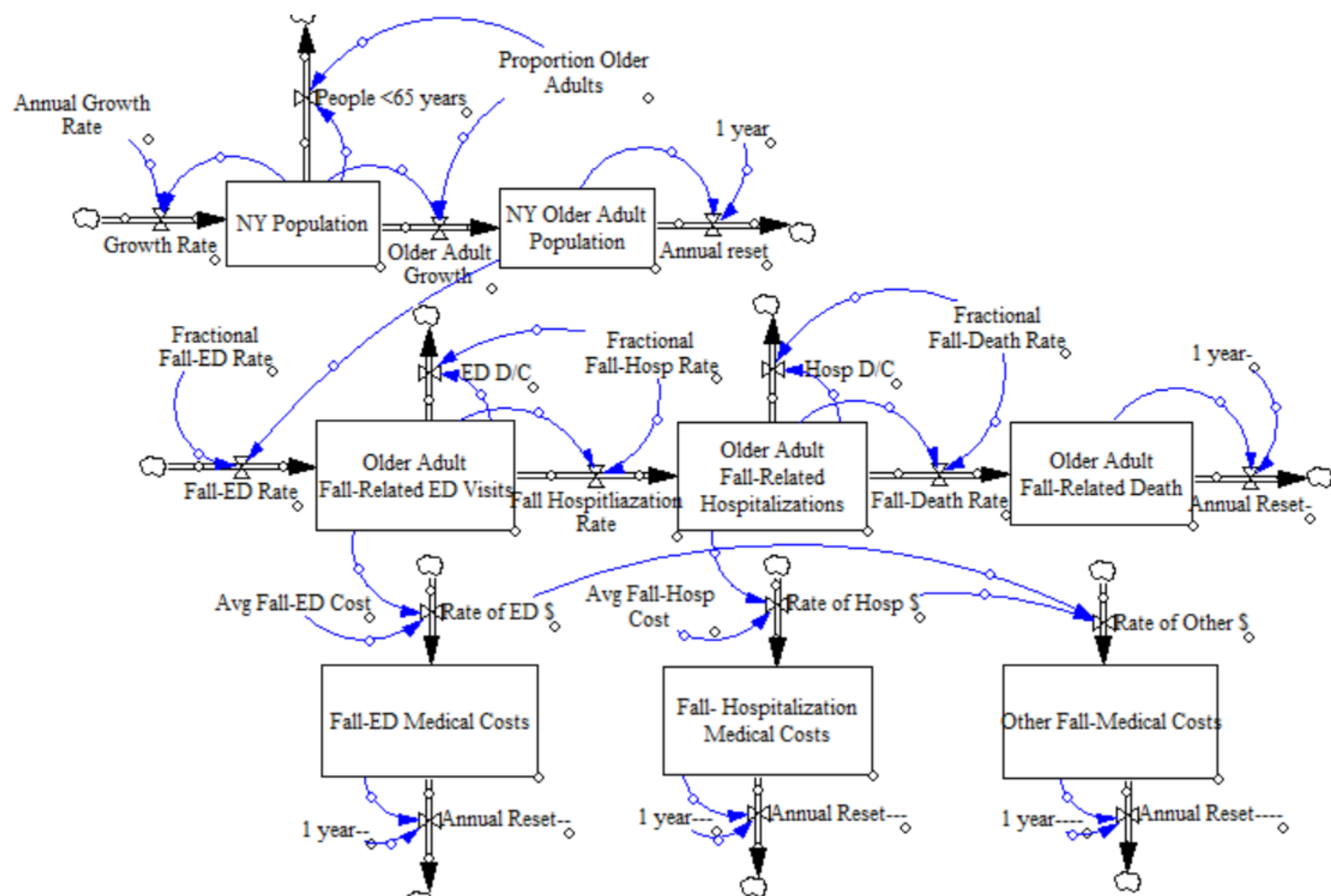
☐ Objectives: By December 31, 2024

☐ Objective 1.1.a. Stop the annual increase in the rate of deaths due to falls among residents ages 65 and over by maintaining the rate at 4.1 per 10,000 residents

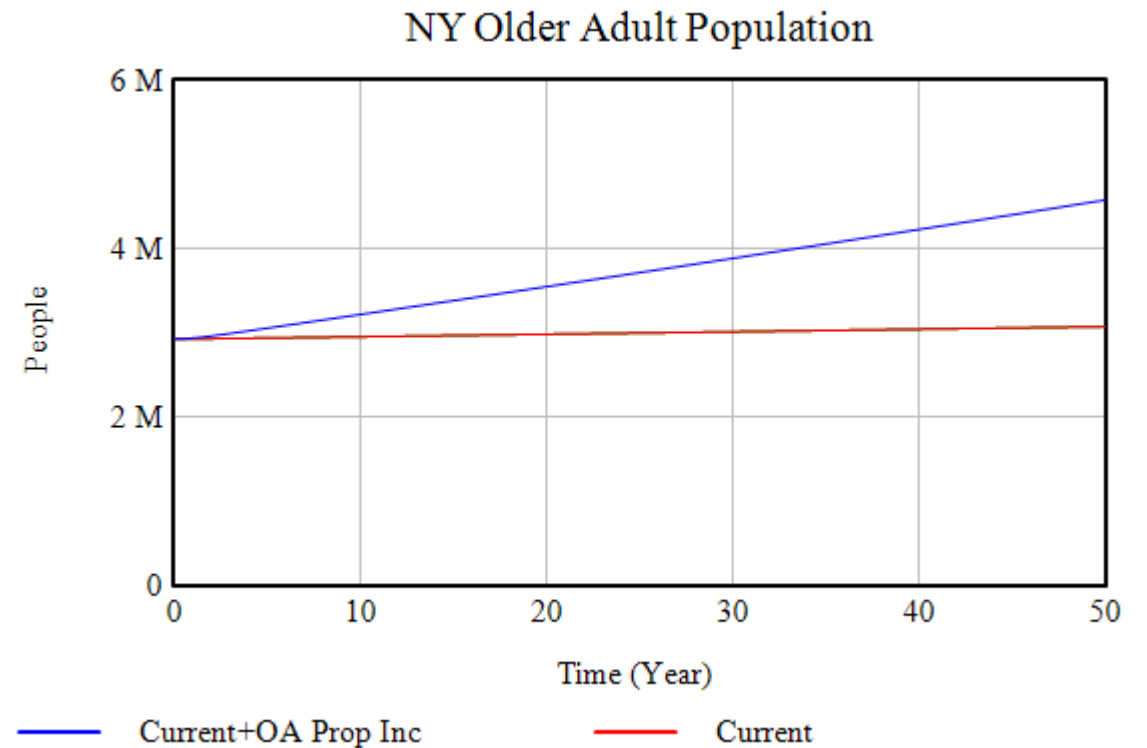
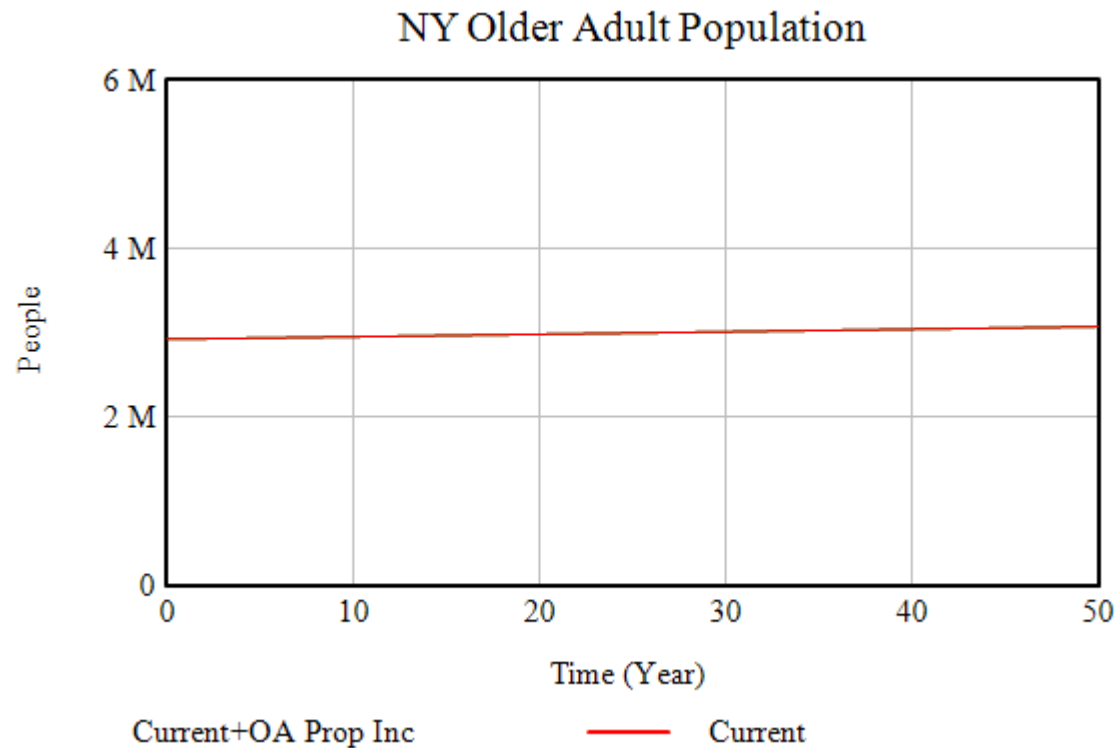
Target	4.1 per 10,000
Baseline	4.1 per 10,000
Baseline Year	2016
Data Source	Vital Statistics Death Files
Data Level	state, county level

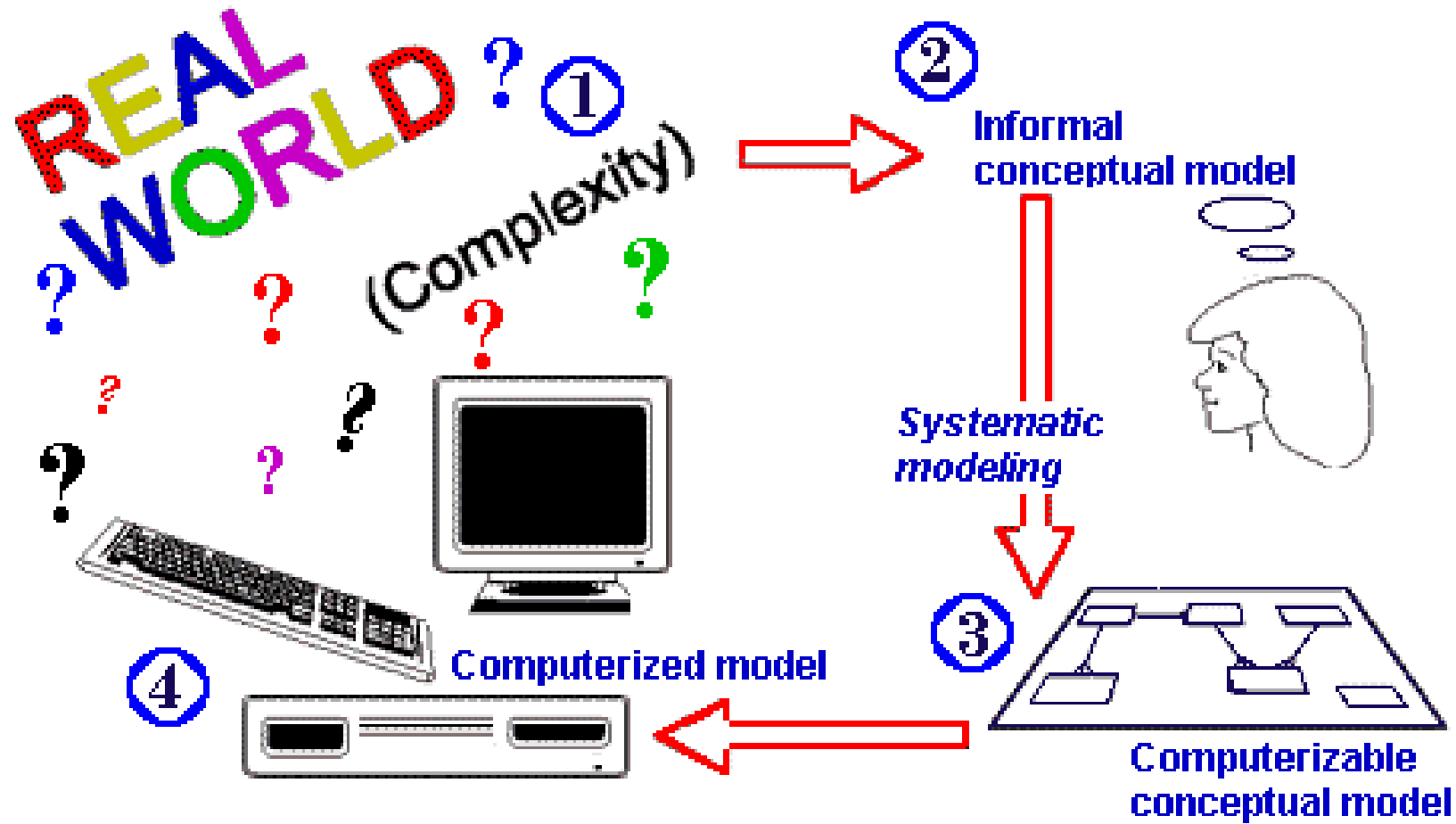
☐ Objective 1.1.b. Decrease the annual rate of hospitalizations due to falls among residents ages 65 and over by 5% to 173.7 per 10,000 residents.

Target	173.7 per 10,000
Baseline	182.8 per 10,000
Baseline Year	2016
Data Source	NYS SPARCS Data
Data Level	state, county level



Proportion of Older Adult Population Increasing





Models in Progress

Let's Take A Look!

Thank You!

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