Improving veterans' access to influenza vaccination: Modeling effectiveness of public-private partnerships

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Presenter Disclosure

Patrick Finley

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:
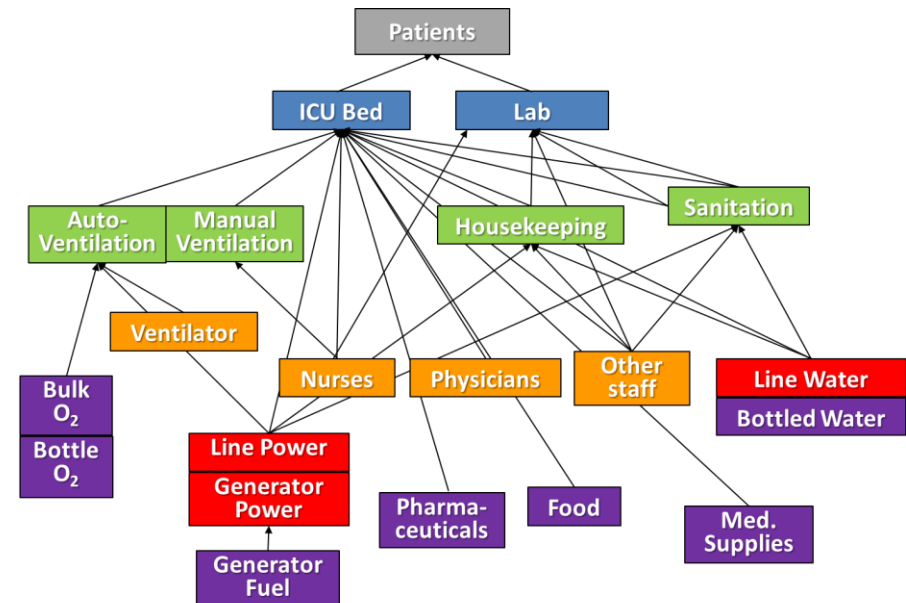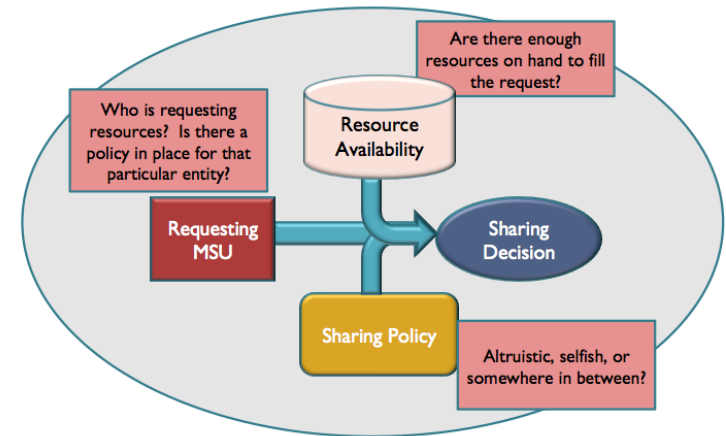
No relationships to disclose

Today's talk

- Why Model?
- Veterans access to services
- Modeling vaccination access
- Results
- Applying what we learned

Models to better understand healthcare systems

- Make intelligent choices
    - Best bang for buck
    - Minimizing risks
- When are models useful
    - Insufficient data
    - Partial understanding of system
    - Need to examine alternatives
- Benefits
    - Improve understanding
    - Where do we need more data?

Challenges in providing access to veterans

- Veterans Health Administration (VHA) provides comprehensive care to 9 Million veterans across the country

- Veterans Access, Choice and Accountability Act provides additional opportunities for veterans to seek care that is quicker and closer than traditional VHA delivery

- Public-private partnerships may provide alternative delivery modes for routine healthcare needs

- Question: How are public-private private partnerships likely to affect veterans access?
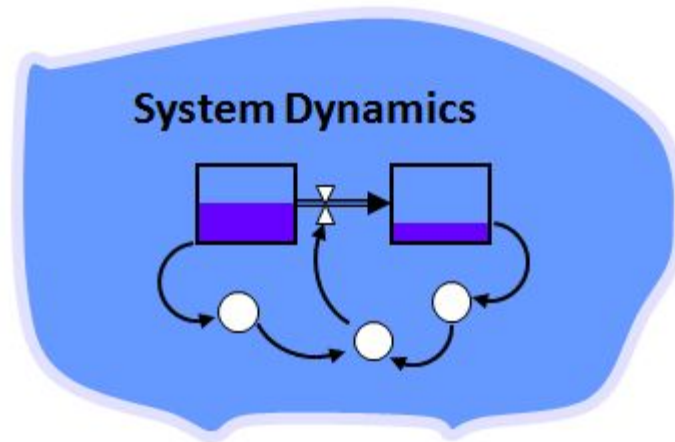
Test case: Flu vaccination services

Three questions we asked

- Are public-private partnerships likely to improve vaccine delivery to veterans?

- Can a veteran's positive experience from convenient vaccination make him or her more likely to seek other services from the VA?

- Can the experience of working together on vaccination prepare VA and private providers for teaming on future pandemic response?
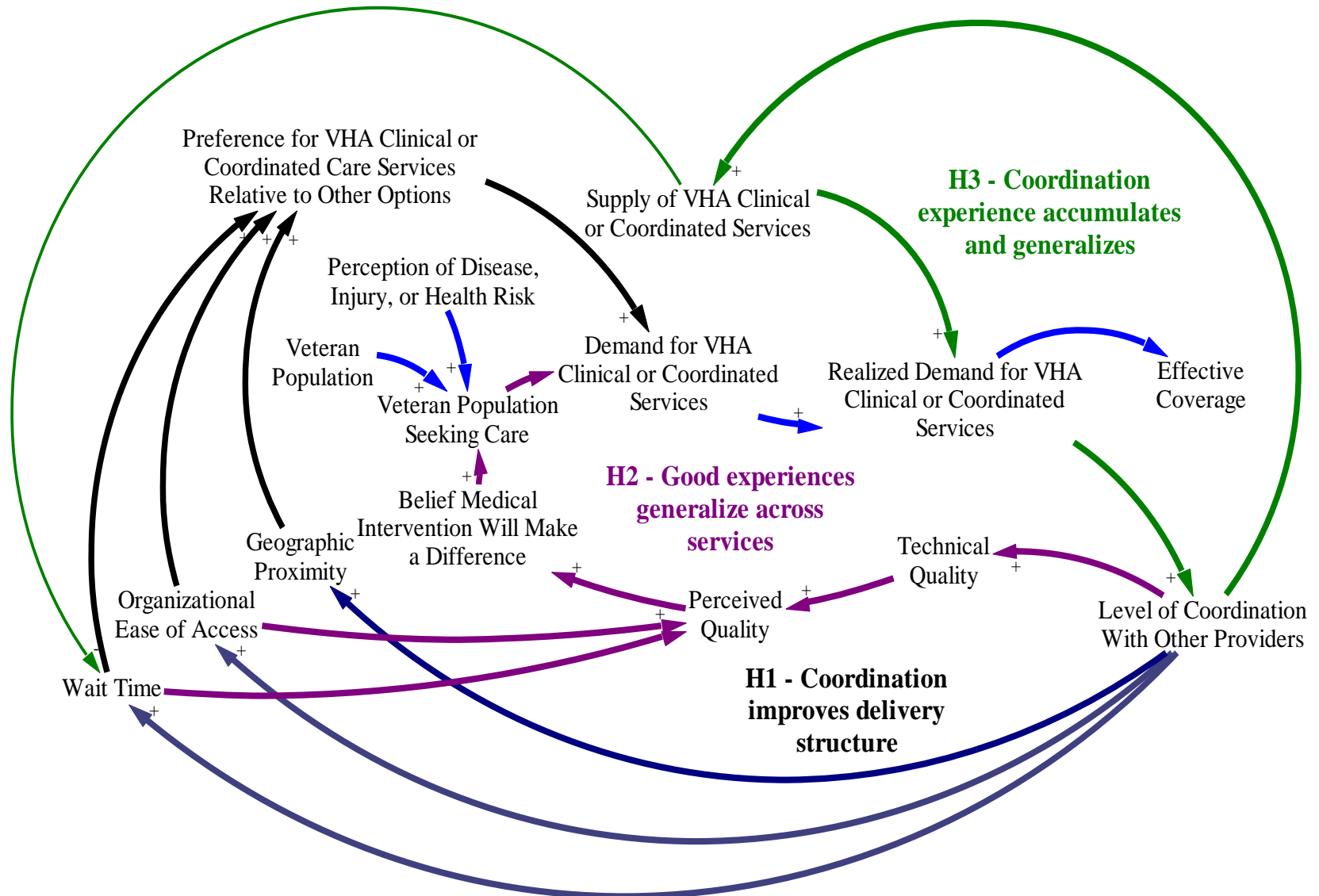
How to model with few data

- Most models start with data, and try to generalize and predict
- But very few data on public-private partnerships outcomes
- System Dynamics Modeling
  - Coupled differential equations for complex systems
  - Popular in economics, ecology and environmental design
  - Focuses on the how different processes interact in a system

System Dynamics

Model Structure

Model Inputs

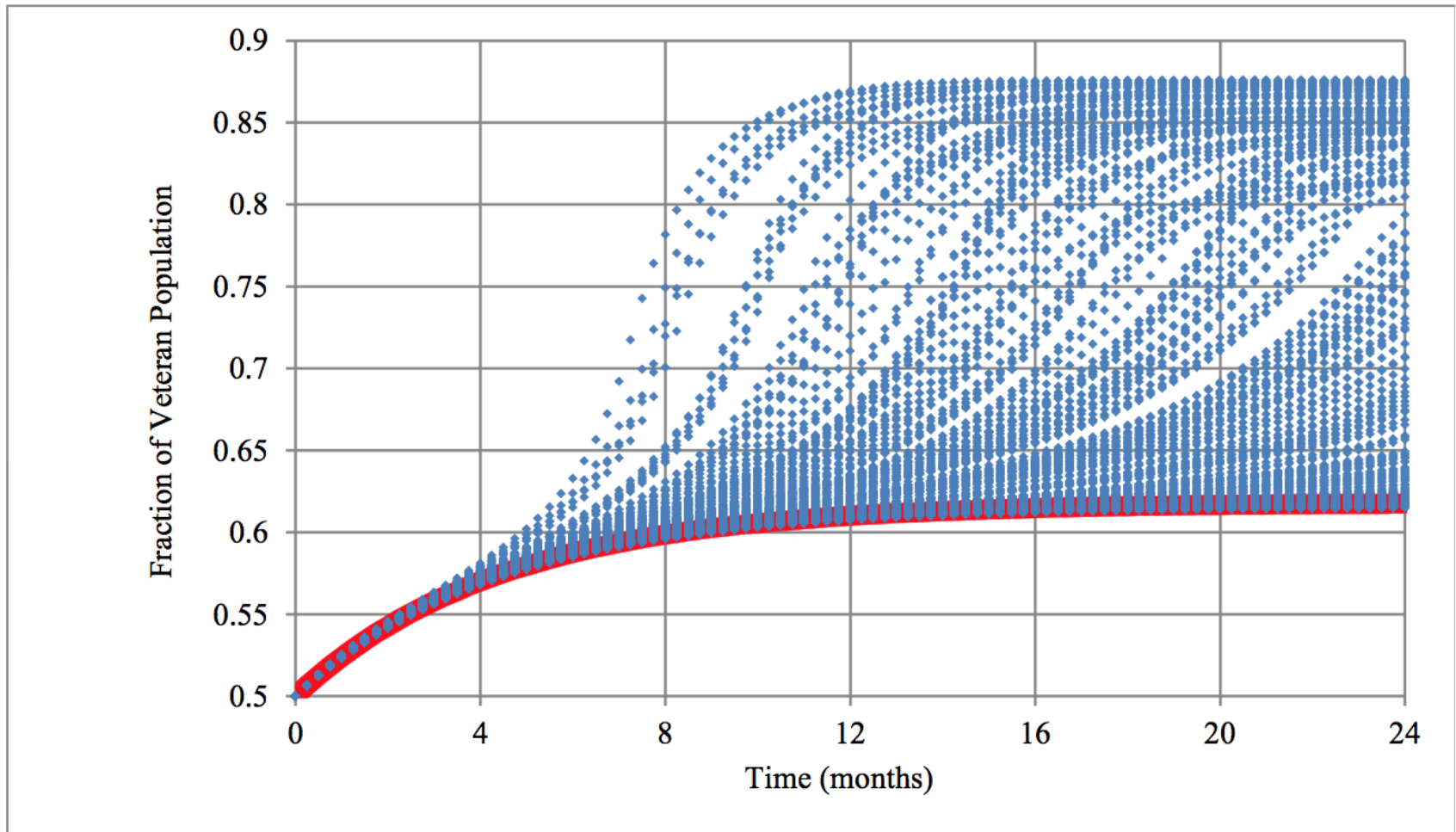| Input Parameter Name	Value or Range	Data Source
Base Time to Obtain Pandemic Influenza Vaccination Services	6 Months	Patient survey
Base Time to Obtain Seasonal Vaccination Services	6 Months	Patient survey
Base Time to Recognize Demand for Pandemic Influenza Vaccination Services	3 Months	Patient survey
Base Time to Recognize Demand for Seasonal Vaccination Services	3 Months	Patient survey
Initial Coordination	0.01	
Initial Veterans	1.5 Million	VHA
Need Recurrence Time for Pandemic Influenza Vaccination Services	24 Months	CDC
Need Recurrence Time for Vaccination Services	12 Months	CDC
Pandemic Influenza Vaccination Services Start Time	12 Months	Scenario assumption
Patient Satisfaction with Service X	1	Patient survey
Patient Satisfaction with Vaccination Services	1	Patient survey
Relative Rate of Pandemic Influenza Vaccination Services when Coordinated	3.5	Estimate from seasonal vaccination field trial data
Relative Rate when Coordinated	1 to 5	Field trial data
Systemic Learning Time	2 to 6 months	Field trial data

Model outputs

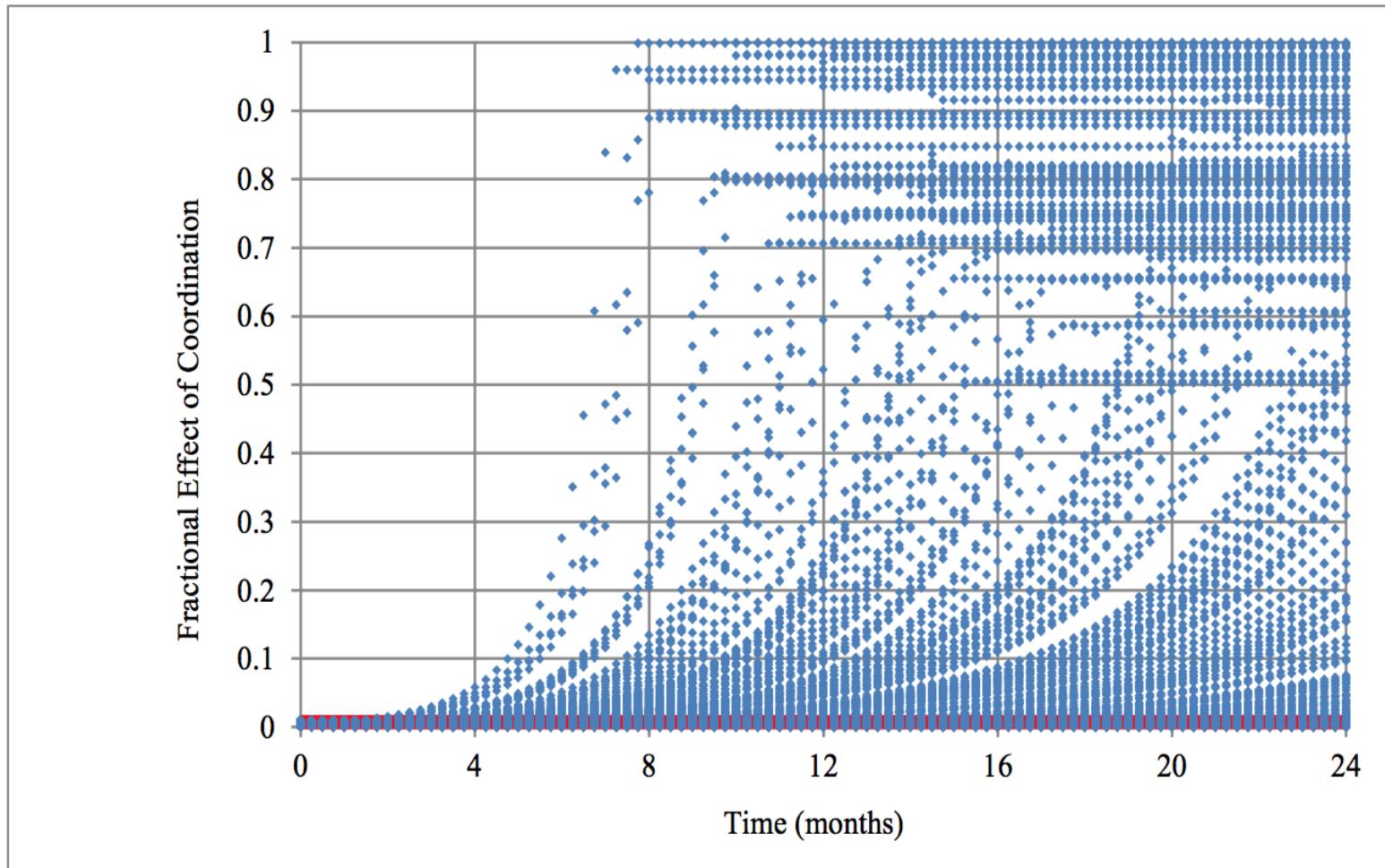| Derived Variable Name	Potential Validation Data
Effect of Patient Satisfaction on Demand	N/A
Effective Coverage	Field trial data
Fraction of Services Provided through Partners	Field trial data
Fraction Receiving Pandemic Influenza Vaccination Services	Field trial data
Patient Satisfaction from Coordination	Patient survey
Receiving Pandemic Influenza Vaccination Services	Field trial data
Receiving Seasonal Vaccination Services	Field trial data
Time to Obtain Pandemic Influenza Vaccination Services	Estimate from patient survey
Time to Obtain Seasonal Vaccination Services	Patient survey
Time to Seek and Obtain Seasonal Vaccination Services	Patient survey
Untreated Veterans	VHA
Unvaccinated Veterans	VHA
Veterans Vaccinated for Seasonal Influenza	VHA
Veterans Vaccinated for Pandemic Influenza	VHA

Model Runs

- Scenario: Compare outcomes with and without coordination

- Duration: 24 months

- Stochastic Duplicates: 200

- Baseline Runs: Use default inputs

- Example Runs: Varying Level of Coordination from 0.0 to 1.0

- Outputs we are interested in:

  - Fraction of Veteran Population Receiving Vaccination for Seasonal Flu

  - Fraction of Veteran Population Receiving Vaccination for Pandemic Flu

  - Patient Satisfaction

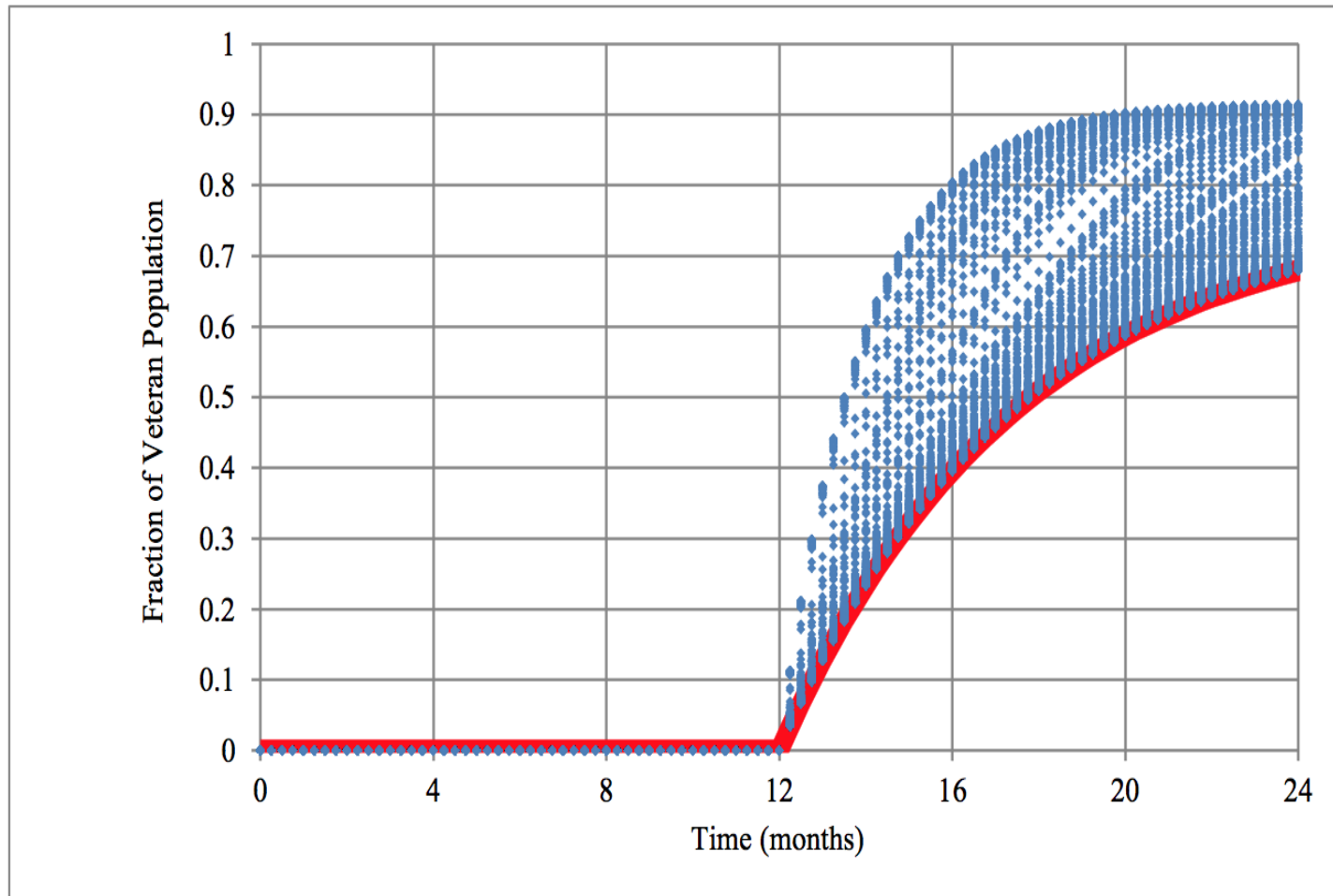# Vaccination for seasonal flu

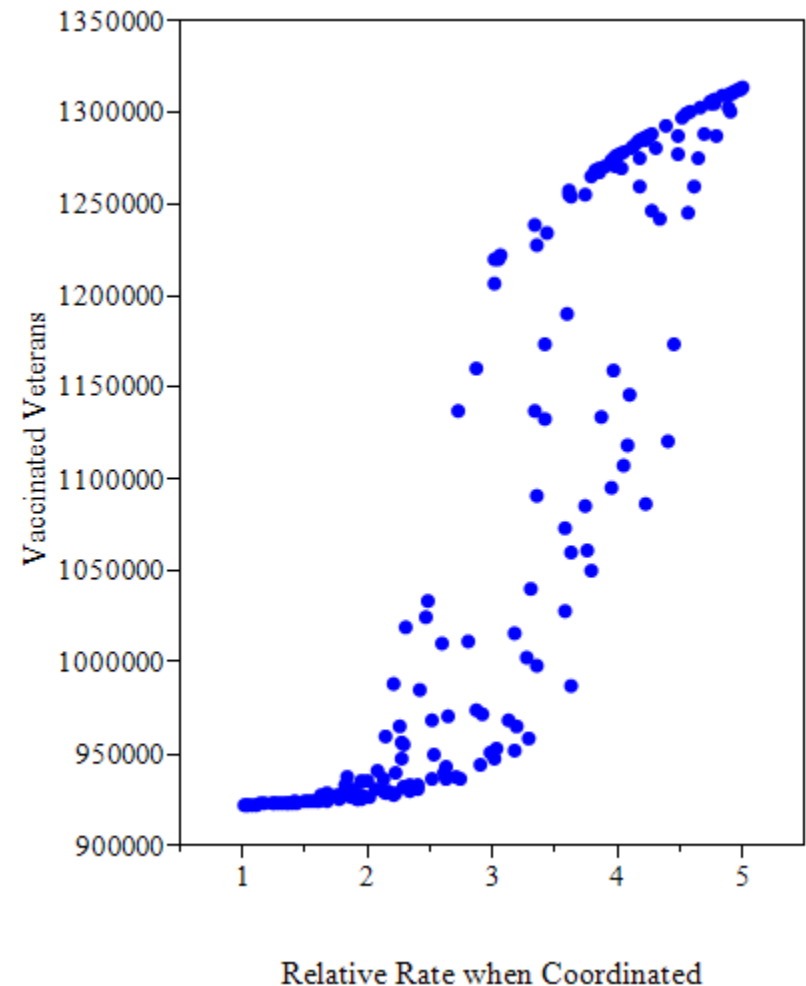# Patient satisfaction

Pandemic Flu

Remember the questions we asked?

- Are public-private partnerships likely to improve vaccine delivery to veterans? *Yes*

- Can a veteran's positive experience from convenient vaccination make him or her more likely to seek other services from the VA? *Yes*

- Can the experience of working together on vaccination prepare VA and private providers for teaming on future pandemic response? *Yes*

Is there a tipping point?

- Results show that system response is non-linear

- Low levels of coordination show no improvement

- Very high levels of coordination show little improvement

- Real world interpretation:
  - Slow roll-out of public/private partnership for veterans care may not show immediate results
  - Possible sweet spot at 60% to 70% partner participation

Conclusions

- Sandia and VHA collaborated on a systems model of coordinated service delivery

- Using initial data, model suggests
    - Coordinated care (i.e. public/private partnership) increases veteran participation in flu vaccination
    - Positive experiences from coordinated care may make veterans more positive about receiving other services through VHA
    - Experience with coordination may help spin up high-volume vaccination or prophylactics delivery during pandemic event

- Possible future directions
    - Obtain better field data to improve predictions
    - Sensitivity analysis to pinpoint most important data to collect
    - Extend to coordinated deliver of other services

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