A System Dynamics Model of Opioid Abuse in the United States

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Problem Context: Overdoses
Problem Context: Initiation, Nonmedical Use, and Overdoses
Problem Context: Pain is Real
Problem Context: Diversion
Model Overview

1. Initiation and Development of Substance Use Disorders

2. Diversion & Dynamics of “Street” Market
   - Supply
   - Demand

3. Progression of Risky Behaviors
   - Popularity
   - Stigma
Zoom in on Initiation

Diagram showing a process involving the initiation of NMU users, transitioning to paying, and influencing peers. Key points include:

- (acute) prescribing
- leftovers becoming accessible
- global availability
- personal accessibility
- medicine cabinet OPA users
- transitioning to paying
- paying users (not medicine cabinet)
- light users influence peers
- heavy users deter initiation
Zoom in on Initiation: Detail
Zoom in: Access and Initiation

1. Fraction
2. US population 12 plus
3. People receiving POA for acute pain and having leftovers
4. Avg # close friends
5. Likelihood that a non-user knows a POA script holder (who may share)
6. POA naive susceptibles

Population growth → POA naive susceptibles → Initiation
Zoom in: Progression
Zoom in: Global Availability Loop

1. People receiving POA for acute pain and having leftovers
2. U.S. population plus
3. Average number of close friends
4. Likelihood that a POA script holder knows a free user
5. Global availability for NMU
6. Number of people whose medicines are available
7. Leftovers becoming available for NMU
8. Free users no UD
9. Free users with UD
10. Available free POA (medicine cabinet)
11. Typical scripted amount
12. Global availability for NMU
13. Leftovers becoming available for NMU
14. Available free POA (medicine cabinet)
Zoom in: Personal Accessibility Loop
Zoom in: Peer Influence
Zoom in: Stigma and Deterrence
Model Overview

Diversion

Opioid Manufacturing

Acute Patients

Medicine Cabinet

Chronic Patients

Drug Seeking (fraction)

Schedule II

Schedule III

“Street” Scarcity, Price

Polydrug Use or Heroin Use

Initiation (free)

Use Disorder (free)

Use Disorder (paying)

Risk Factor Overview

Initiation

R

B

R

B
Zoom in: Stigma and Deterrence
Interventions: Leverage, Reality

High Leverage!

1980’s: Effective?

2000’s: We keep trying.