# Simulating Costs and Benefits of SBI in an EAP

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**www.rti.org**

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- Co-authors
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  - Michael Mills
  - Charles Zhou

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# Background: Why SBI in an EAP?

- 9-11% of an employed sample from the southern U.S. met at-risk drinking criteria (Mazas et al., 2006)

- Association of risky drinking, alcohol abuse, or alcohol dependence with workplace productivity (Osilla et al., 2010; Frone 2008)

- **Employee Assistance Programs** (EAPs) are employee benefit programs offered by many employers

  - Intended to help employees deal with personal problems that might adversely impact their work performance, health, and well-being

- Offering **Screening and Brief Intervention** (SBI) in an EAP reaches the employed population more directly

# Background: Why a simulation model?

- Using a simulation model allows us to get a long-term perspective

- A long-term view helps capture effects that SBI in an EAP may have on rare events, such as employee turnover

  - Often rare events are also expensive events

- Little evidence of long-term costs and benefits of SBI

  - Gentilello (2005)

- No evidence of long-term costs and benefits of SBI in and EAP

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# Model Overview

- Agent Based Model

- Simulation covers 12 years

- Focus on an employed population

  - Characteristics reflect a US representative data set

- Costs and benefits of SBI in an EAP

- Employer's perspective on costs and benefits
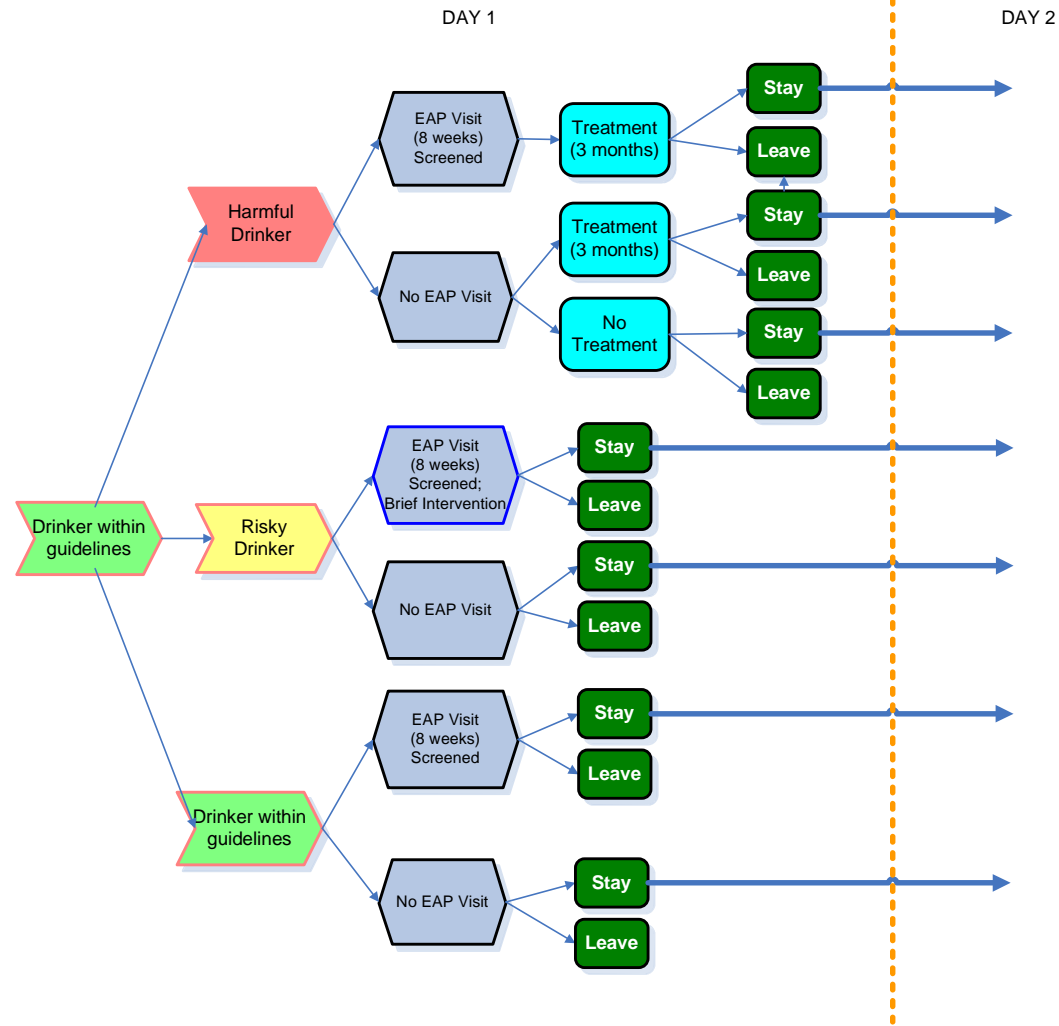
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# Model Mechanics

- Model of the employed population
  - All agents start out employed
  - Follow until leave work (resignation, termination, retirement, death)
  - Replace those who leave with a new employee
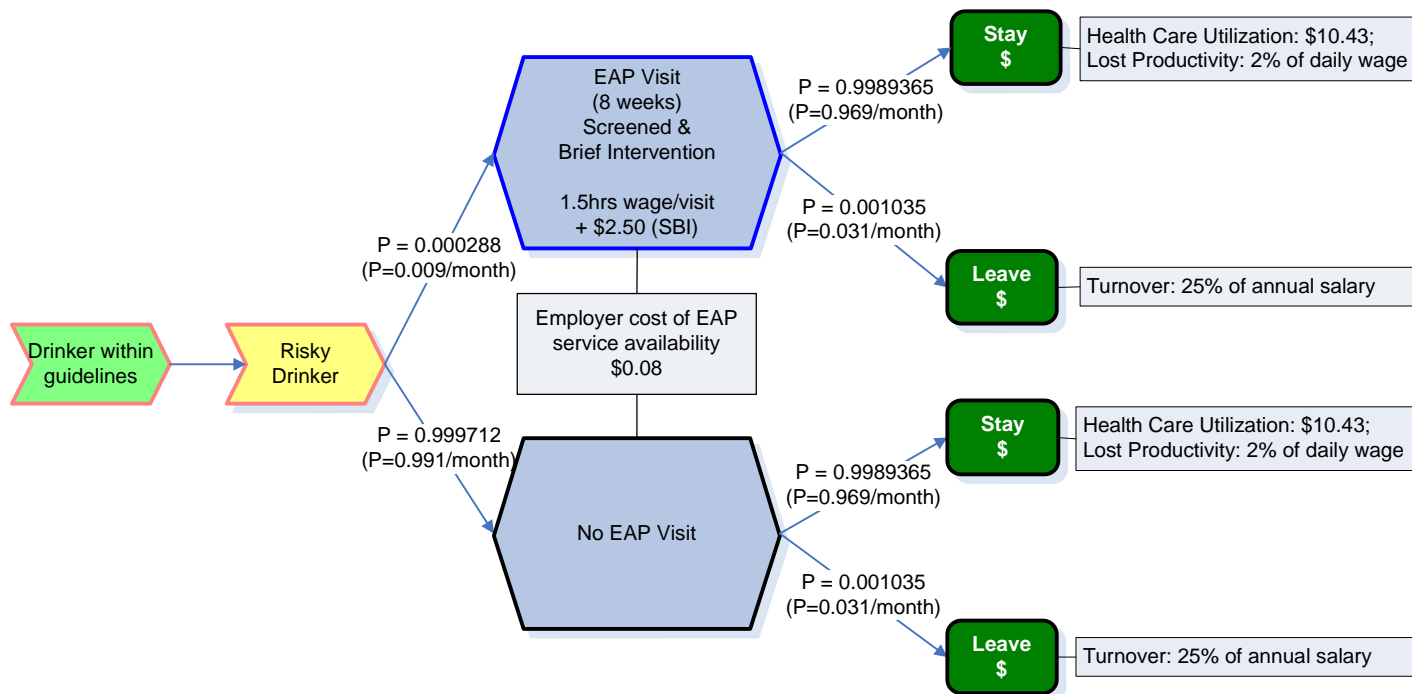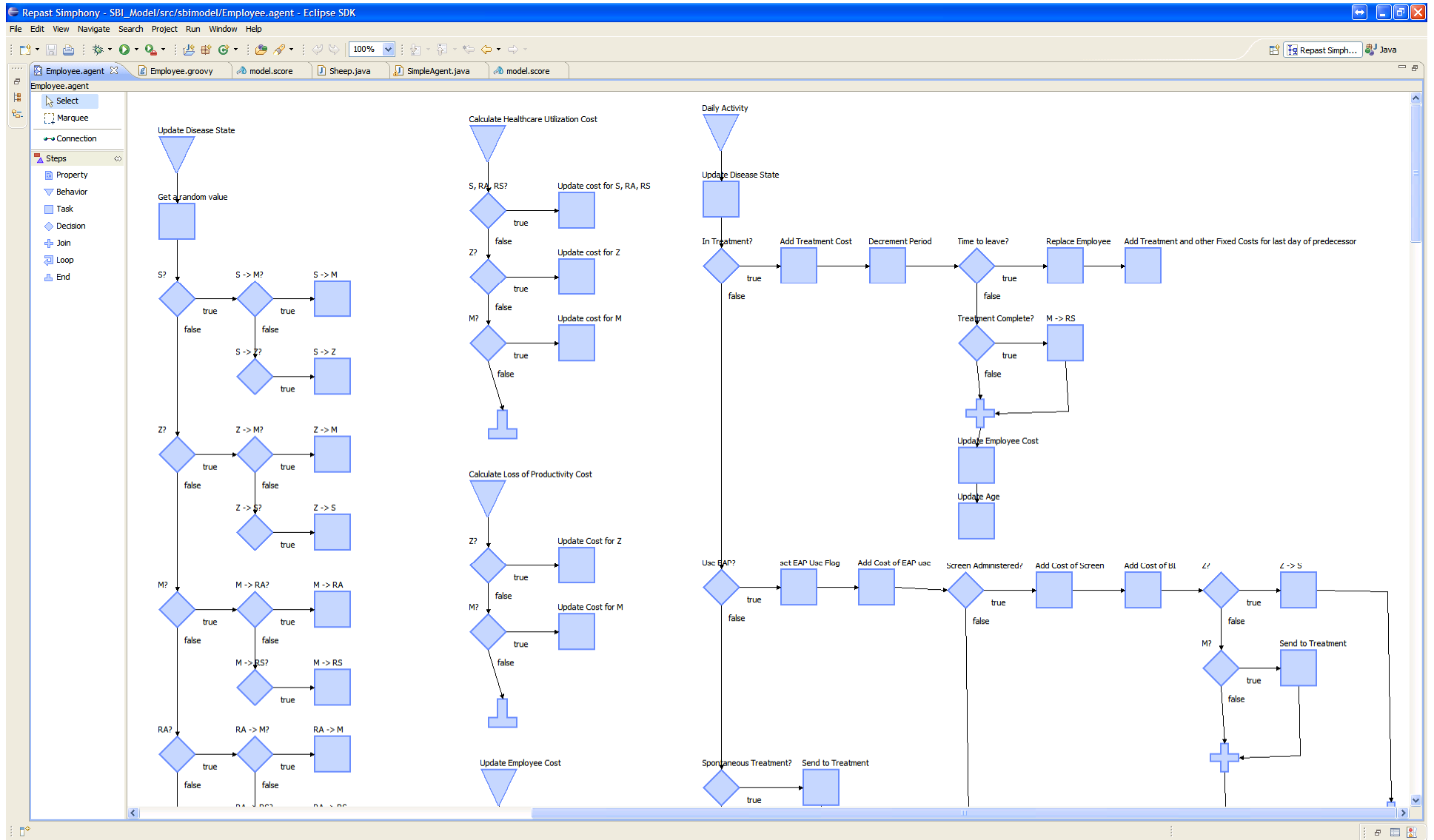  - Daily transitions

# Model Description

- ▪ For each day, simulate

  - ▪ Changing use states

  - ▪ Visiting EAP

  - ▪ Screening all employees using EAP services

  - ▪ Providing BIs for all risky drinkers using EAP services

  - ▪ Providing treatment for drinkers with abuse/dependence

    - ▪ After EAP visit
    - ▪ Spontaneous treatment

  - ▪ Leaving employment for any reason (resignation, termination, retirement, death)

# Model Description



DAY 1

DAY 2

Harmful Drinker

EAP Visit (8 weeks) Screened → Treatment (3 months) → Stay / Leave

No EAP Visit → Treatment (3 months) → Stay / Leave

No Treatment → Stay / Leave

Drinker within guidelines → Risky Drinker

EAP Visit (8 weeks) Screened; Brief Intervention → Stay / Leave

No EAP Visit → Stay / Leave

Drinker within guidelines

EAP Visit (8 weeks) Screened → Stay / Leave

No EAP Visit → Stay / Leave

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# Model Description



EAP Visit
(8 weeks)
Screened &
Brief Intervention

1.5hrs wage/visit
+ $2.50 (SBI)

Employer cost of EAP
service availability
$0.08

No EAP Visit

Drinker within
guidelines

Risky
Drinker

P = 0.000288
(P=0.009/month)

P = 0.999712
(P=0.991/month)

P = 0.9989365
(P=0.969/month)

P = 0.001035
(P=0.031/month)

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(P=0.969/month)

P = 0.001035
(P=0.031/month)

**Stay $**

Health Care Utilization: $10.43;
Lost Productivity: 2% of daily wage

**Leave $**

Turnover: 25% of annual salary

**Stay $**

Health Care Utilization: $10.43;
Lost Productivity: 2% of daily wage

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# Model Description: Use States

- **Abstainer or Drinker within guidelines**
  - No prior symptoms of dependence or abuse
  - and Drank below NIAAA guidelines for at-risk drinking
  - Includes Abstainers

- **Risky drinker**
  - Has never met criteria for abuse or dependence
  - and either Drank above NIAAA guidelines for at-risk drinking in past year
  - or Had at least 1 symptom of abuse or dependence in past year

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# Model Description: Use States

- Harmful Drinker
  - Met DSM-IV* criteria for alcohol abuse or dependence
  - or both Met criteria for a Risky drinker in past year
  - and Met criteria for abuse or dependence sometime in lifetime prior to past year

- Recovering Drinker – Abstinent
  - Did not have a drink in the past year
  - and Met criteria for abuse or dependence sometime in lifetime prior to past year

- Recovering Drinker – Within guidelines
  - Met criteria for 'drinker within guidelines' and >= 1 drink in past year
  - and Met criteria for abuse or dependence sometime in lifetime prior to past year

*The Diagnostic and Statistical Manual of Mental Disorders (DSM) is published by the American Psychiatric Association and provides a common language and standard criteria for the classification of mental disorders.
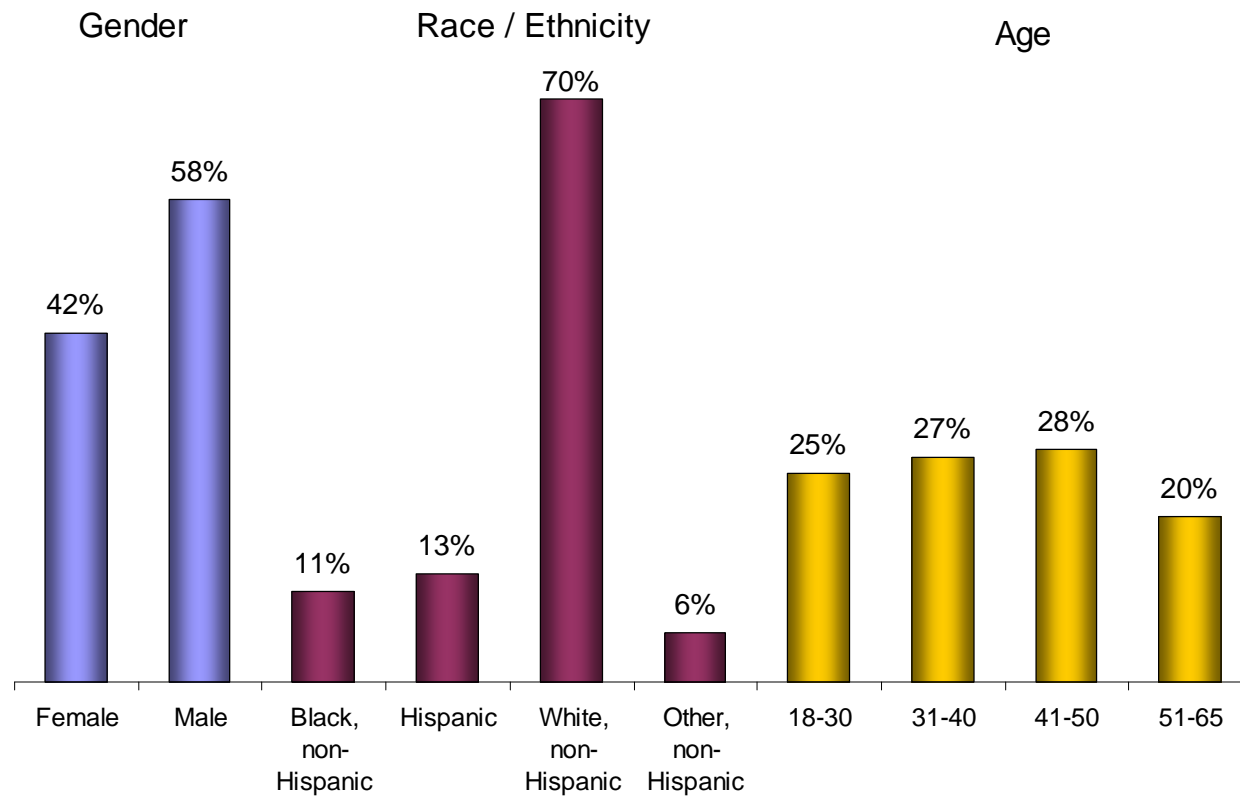
# Analysis

- Ran model with and without SBI provided by EAP

- Main outcomes for analysis

  - Cumulative cost differences between the model with and without SBI in the EAP
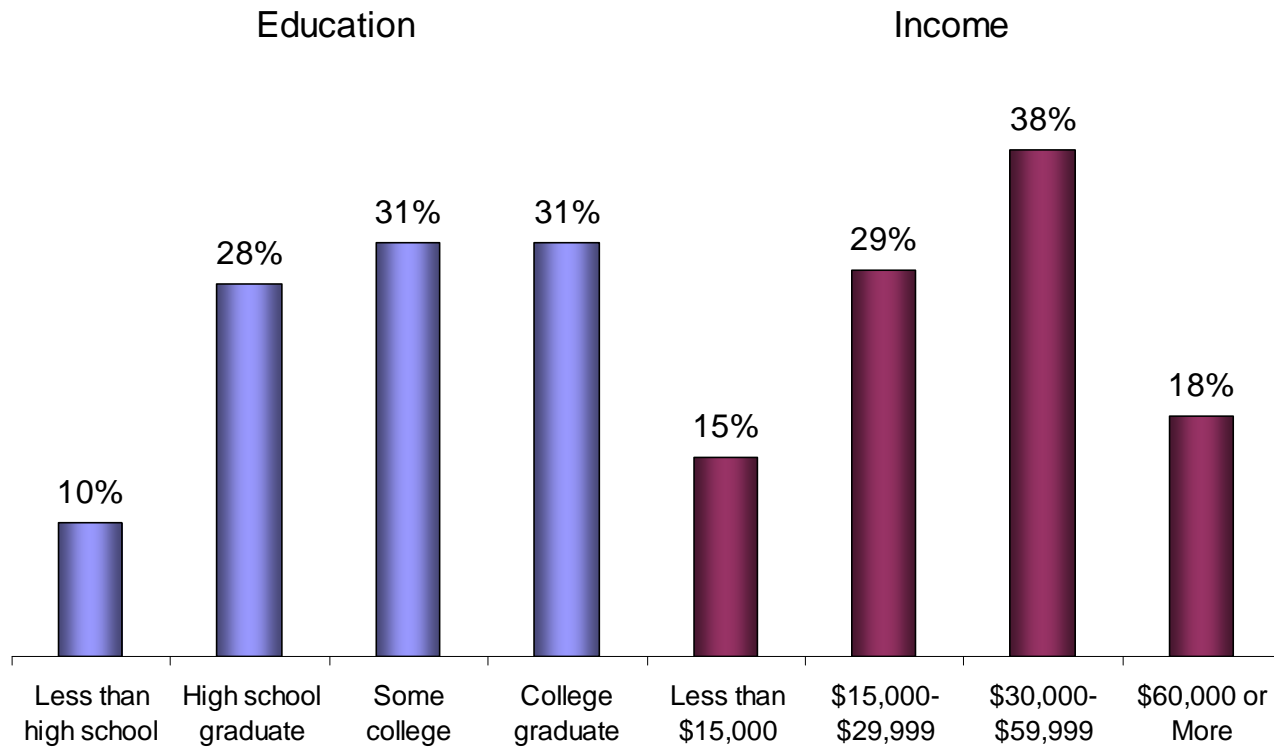
# Data: Overview

- Initial characteristics and use states of employed population at start of model

- Transition probabilities between alcohol use states

- EAP, SBI, and Treatment parameters

- Cost inputs
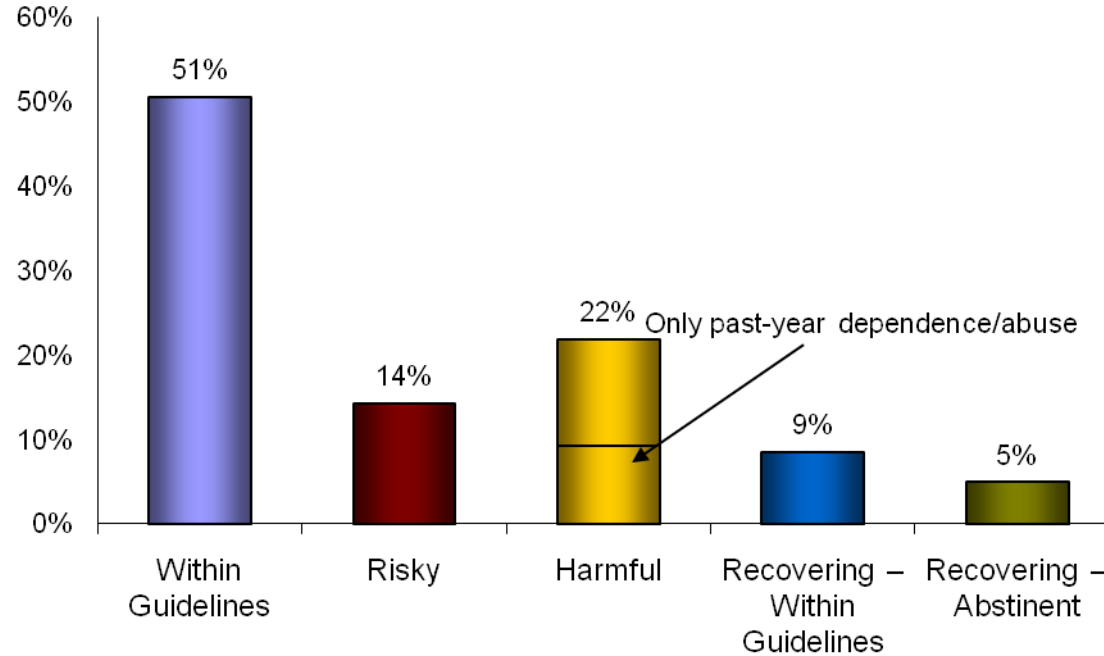
# Data: Initial Characteristics



Gender

Race / Ethnicity

Age

- Female 42%
- Male 58%
- Black, non-Hispanic 11%
- Hispanic 13%
- White, non-Hispanic 70%
- Other, non-Hispanic 6%
- 18-30 25%
- 31-40 27%
- 41-50 28%
- 51-65 20%

Source: NESARC Wave 1

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# Data: Initial Characteristics

Education                                    Income



Education bars:
- Less than high school: 10%
- High school graduate: 28%
- Some college: 31%
- College graduate: 31%

Income bars:
- Less than $15,000: 15%
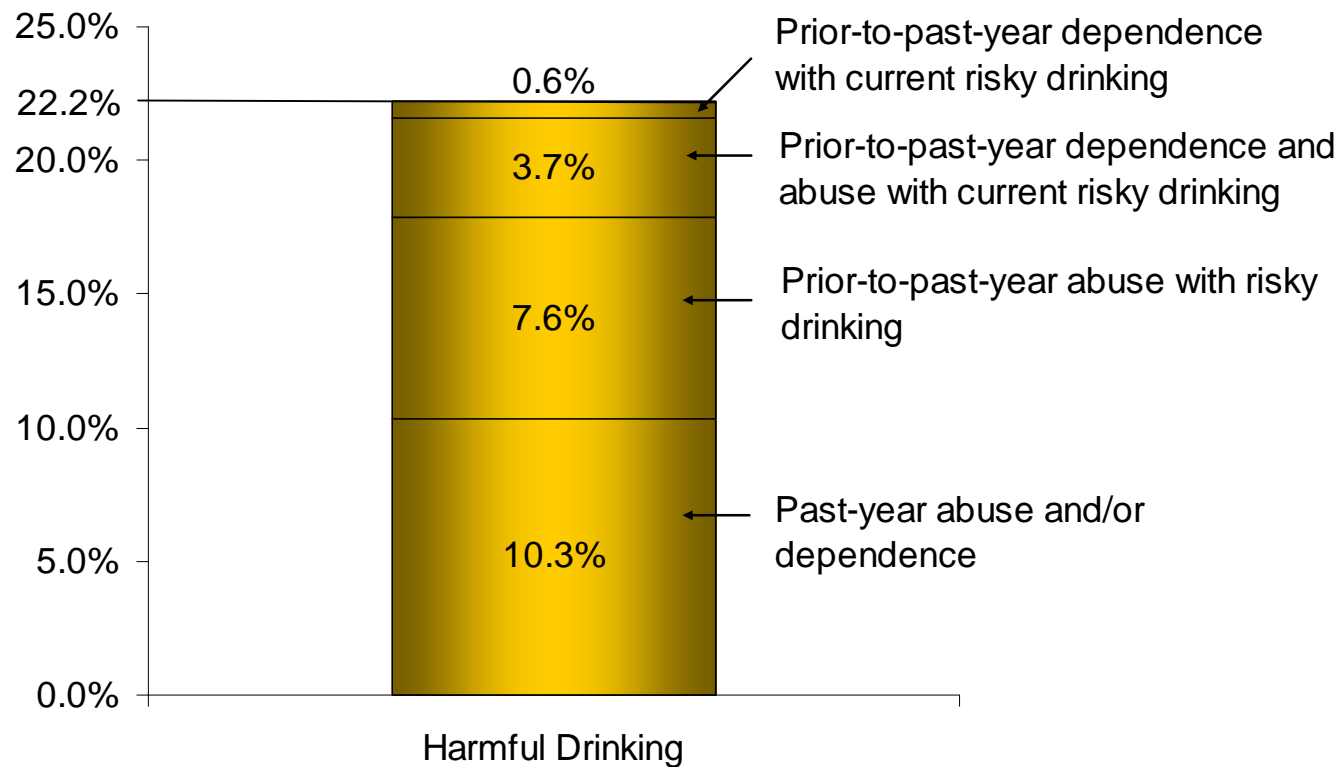- $15,000-$29,999: 29%
- $30,000-$59,999: 38%
- $60,000 or More: 18%

Source: NESARC Wave 1

# Data: Initial Use States



Source: NESARC (National Epidemiologic Survey on Alcohol and Related Conditions) Wave 1 (2001-2002)

# Data: Harmful Drinking State



Chart: Harmful Drinking (total 22.2%)
- 0.6% — Prior-to-past-year dependence with current risky drinking
- 3.7% — Prior-to-past-year dependence and abuse with current risky drinking
- 7.6% — Prior-to-past-year abuse with risky drinking
- 10.3% — Past-year abuse and/or dependence

Source: NESARC (National Epidemiologic Survey on Alcohol and Related Conditions) Wave 1 (2001-2002)

# Data: Transition Probabilities

**Drinking State Transitions between NESARC waves 1 and 2 (approx. 3 yrs)**

| Wave 1 | Wave 2 | | | | |
| --- | --- | --- | --- | --- | --- |
| | Within Guidelines | Risky | Harmful | Recovering – Within Guidelines | Recovering – Abstinent |
| Within Guidelines | 0.8107 | 0.1541 | 0.0353 | --- | --- |
| Risky | 0.3085 | 0.5288 | 0.1627 | --- | --- |
| Harmful | --- | --- | 0.7983 | 0.1537 | 0.0480 |
| Recovering – Within Guidelines | --- | --- | 0.3162 | 0.5744 | 0.1093 |
| Recovering – Abstinent | --- | --- | 0.0941 | 0.1686 | 0.7373 |

Source: NESARC (National Epidemiologic Survey on Alcohol and Related Conditions) Wave 1 (2001-2002) & 2 (2004-2005)

# Data: EAP, SBI and Treatment Parameters

- ## Visit EAP (Corsini Encyclopedia of Psychology)

  - P(visit EAP) = 0.10/year

- ## With SBI in EAPS (Assumptions)

  - P(Screened | visit EAP) = 1
  - P(BI | visit EAP & Risky Drinker) = 1
  - P(BI | visit EAP & not a Risky Drinker) = 0
  - P(Alcohol Treatment | visit EAP & Harmful Drinker) = 1
  - P(Alcohol Treatment | visit EAP & not a Harmful Drinker) = 0

- ## Other Alcohol Treatment (NESARC)

  - P(Treatment | Harmful Drinker) = 0.0282 (over approx. 3 yrs)
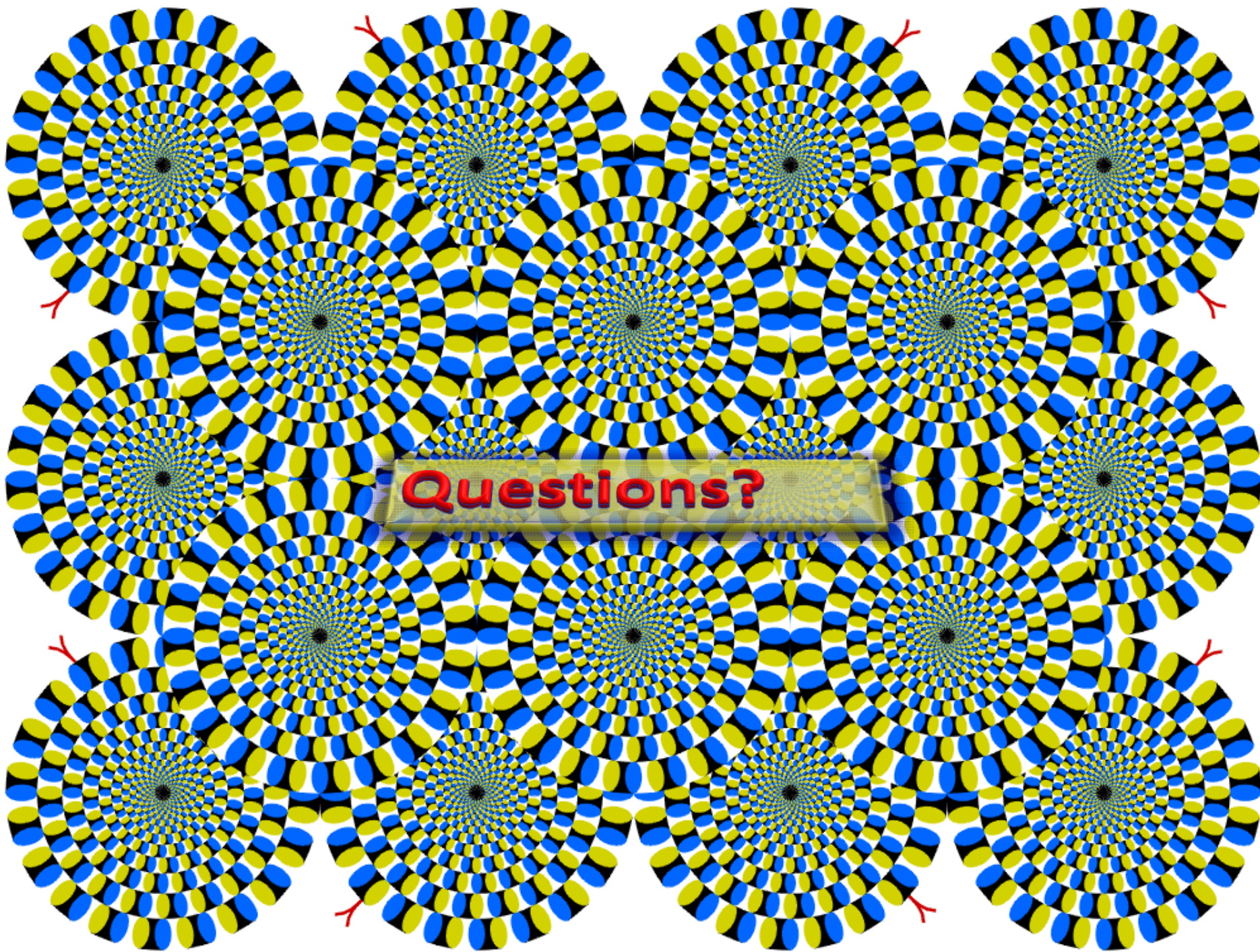  - P(Treatment | not a Harmful Drinker) = 0

# Data: Cost inputs

- EAP services
  - $27.66 per employee per year (Hartwell 1996)
- EAP visit, EAP provides 4 visits, 1 every 2 weeks
  - 1.5 hours valued at employee's wage (estimate based on Cowell et.al.)
- Screen
  - $0.64 per screen (Cowell et.al.)
- Brief Intervention
  - $1.86 per BI (Cowell et.al.)
- Treatment
  - $28 per day, lasts 3 months (ADSS Cost Study, NESARC)
- Cost of lost productivity from drinking
  - $28 per day for hazardous drinking (Osilla 2010)
  - 9.4% of wage for harmful drinking (Harwood 1998)
- Health Care Utilization
  - Approx $3800 per year within guidelines, $3808/yr risky, $4200/yr harmful (Ensuring Solutions and Alcohol Cost Calculator)

# Results: Cumulative Employer Costs (Quarterly)
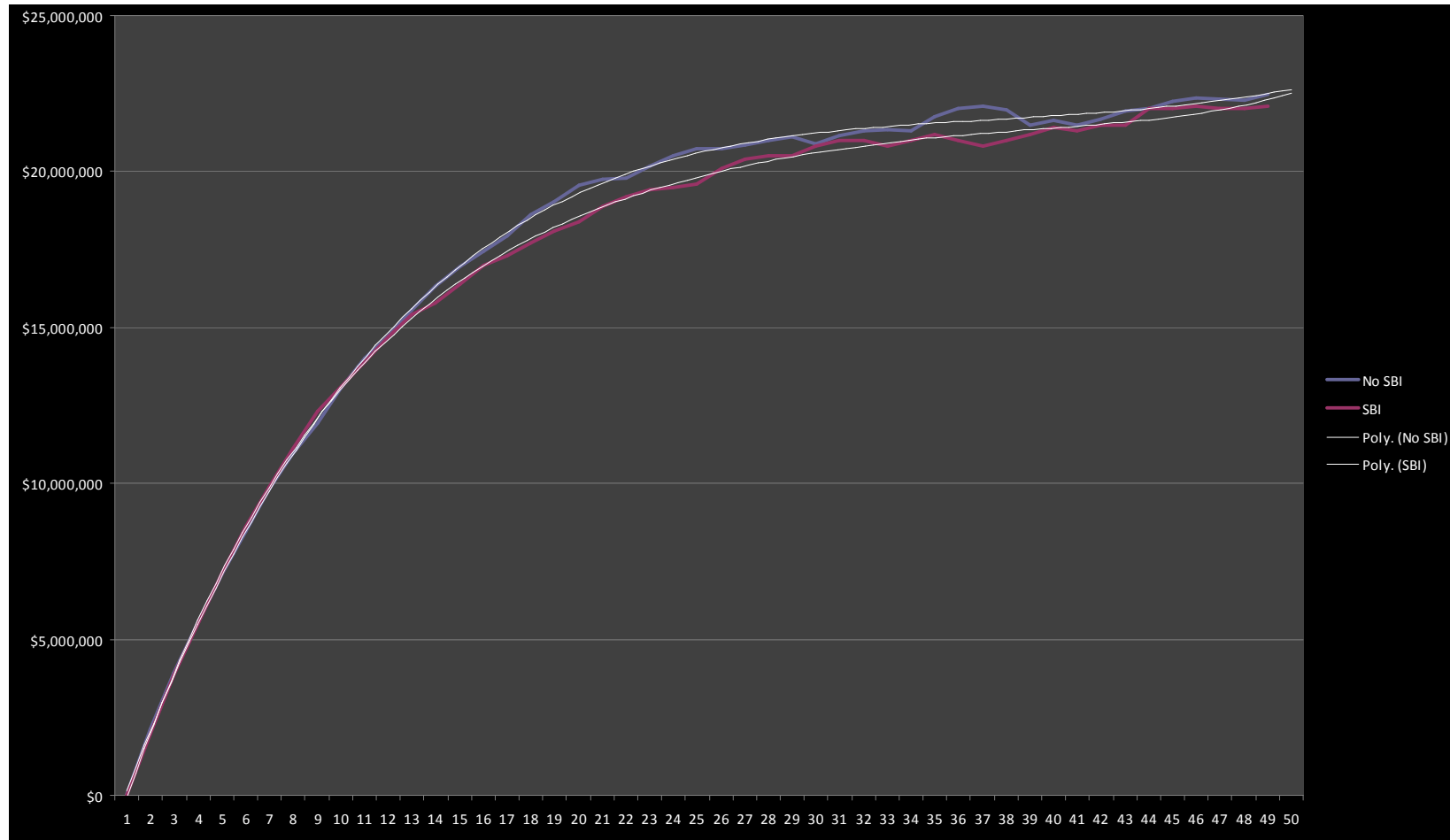
# Next Steps: Fill Data Gaps & Parallelize

- Harmful use covers both abuse and dependence

- How to handle current risky drinking with previous abuse/dependence?

- P(visit EAP | use category)

- Treatment always successful (current assumption)
  - P(Risky $\rightarrow$ within Guidelines | BI) = 1
  - P(Harmful $\rightarrow$ Recovering-within guidelines | Alcohol Treatment) = 1

- Effectiveness of SBI in EAP on moving from risky drinking to drinking within guidelines

- Effectiveness of alcohol treatment on moving from harmful drinking to abstinence/drinking within guidelines

- Distribute Simulation

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Questions?