Simulating Costs and Benefits of SBI in an EAP

Diglio A. Simoni
RTI International

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Acknowledgments

- Co-authors
  - Jeremy Bray (PI)
  - Alex Cowell
  - 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
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
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

Risky Drinker

P = 0.999712
(P=0.991/month)

No EAP Visit

Employer cost of EAP service availability $0.08

EAP Visit
(8 weeks)
Screened &
Brief Intervention

1.5hrs wage/visit + $2.50 (SBI)

P = 0.9989365
(P=0.969/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;
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Leave $Turnover: 25% of annual salary

Drinker within guidelines

P = 0.999712
(P=0.991/month)

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

Leave $Turnover: 25% of annual salary
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
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

Source: NESARC Wave 1
Data: Initial Characteristics

Source: NESARC Wave 1
Data: Initial Use States

Data: Harmful Drinking State

### Data: Transition Probabilities

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

<table>
<thead>
<tr>
<th>Wave 1</th>
<th>Within Guidelines</th>
<th>Risky</th>
<th>Harmful</th>
<th>Recovering – Within Guidelines</th>
<th>Recovering – Abstinent</th>
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<tr>
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<td>0.8107</td>
<td>0.1541</td>
<td>0.0353</td>
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</table>

Data: EAP, SBI and Treatment Parameters

- Visit EAP (Corsini Encyclopedia of Psychology)
  - $P(\text{visit EAP}) = 0.10/\text{year}$

- With SBI in EAPS (Assumptions)
  - $P(\text{Screened} \mid \text{visit EAP}) = 1$
  - $P(\text{BI} \mid \text{visit EAP} \& \text{Risky Drinker}) = 1$
  - $P(\text{BI} \mid \text{visit EAP} \& \text{not a Risky Drinker}) = 0$
  - $P(\text{Alcohol Treatment} \mid \text{visit EAP} \& \text{Harmful Drinker}) = 1$
  - $P(\text{Alcohol Treatment} \mid \text{visit EAP} \& \text{not a Harmful Drinker}) = 0$

- Other Alcohol Treatment (NESARC)
  - $P(\text{Treatment} \mid \text{Harmful Drinker}) = 0.0282$ (over approx. 3 yrs)
  - $P(\text{Treatment} \mid \text{not a Harmful Drinker}) = 0$
### 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?
- $P(\text{visit EAP} \mid \text{use category})$
- Treatment always successful (current assumption)
  - $P(\text{Risky} \rightarrow \text{within Guidelines} \mid BI) = 1$
  - $P(\text{Harmful} \rightarrow \text{Recovering-within guidelines} \mid \text{Alcohol Treatment}) = 1$
- 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