The cost-effectiveness of alcohol SBI in emergency and outpatient medical settings

Carolina Barbosa, Alexander Cowell, Jeremy Bray, Arnie Aldridge

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Background (1)

- Which medical setting, emergency or outpatient, is associated with better outcomes? Is the more effective setting also more expensive? If so, do the health gains justify the extra costs?

- An extensive literature suggests that alcohol SBI is effective in some medical settings, but it may not always result in health care cost savings(Latimer et al., 2009)

- **Decision makers contemplating whether to implement SBIRT require guidance on what outcomes would be expected and what resources are required to achieve those outcomes**

Background (2)

- Decision makers have increased the use of cost-effectiveness analyses to determine which interventions will be reimbursed from collective funding

- Economic evaluations compare the incremental opportunity costs and incremental consequences of at least two alternatives, and can help on resource allocation and decision making

- QALYs, a generic measure of HRQoL, are recommended by:

  - UK National Institute for Health and Clinical Excellence, in the UK(NICE, 2008)

  - US Public Health Service Panel on Cost-Effectiveness in Health and Medicine, in the US(Gold et al., 1996; Weinstein et al., 1996)

Model Structure

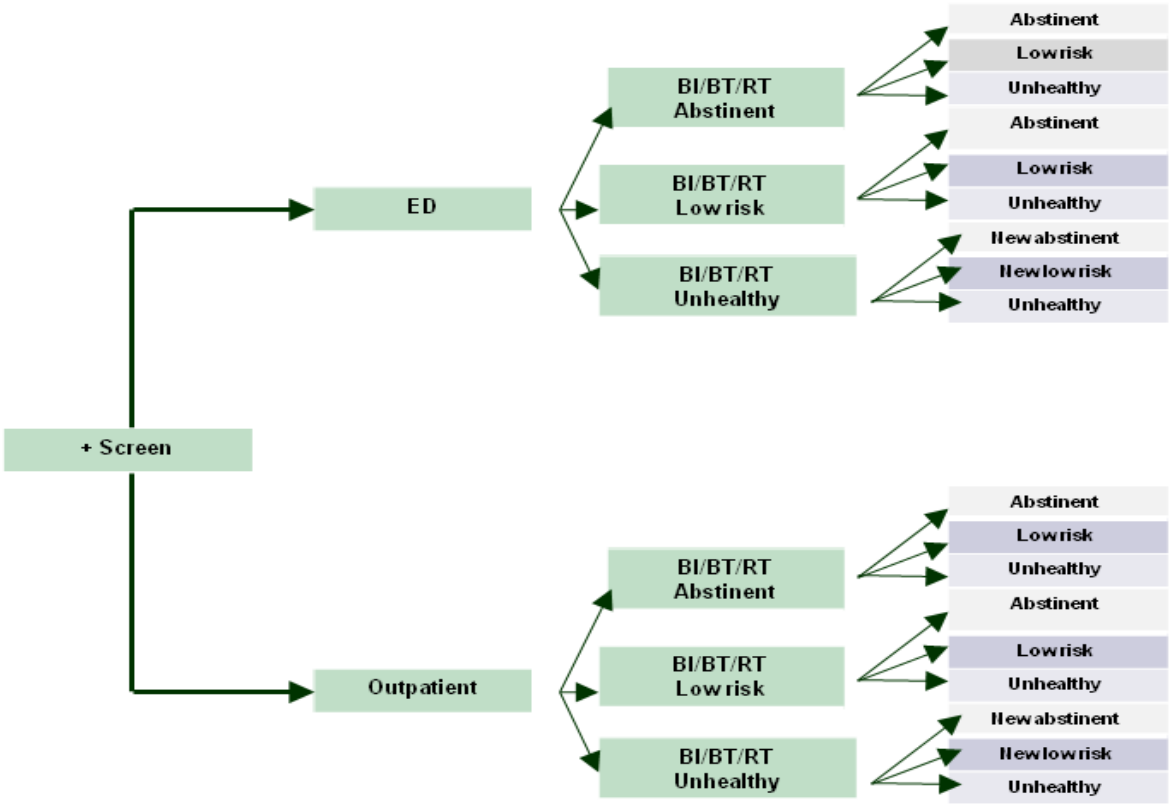
- **Decision analytic model following a cohort simulation approach**: expected outcomes and expected costs for the ED and outpatient settings for a cohort of patients screening positive for alcohol problems
- **Model outcomes**: short-term alcohol consumption behavior, health state utilities, and social costs
- **Probabilistic model**: inputs defined as probability distributions
- **Health states & GPRA questions**: the number of days, during the past 30 days, that used any alcohol, alcohol to intoxication defined as five or more drinks in one sitting, and alcohol to intoxication defined as four or fewer drinks in one sitting and felt high

  Abstinent- no consumption during the past 30 days

  Low risk- consumption below intoxication levels in the past 30 days

  Unhealthy- consumption at intoxication levels in the past 30 days

Model structure (2)



Analysis sample

Table 1. Characteristics of the baseline sample used in the base-case analysis

	ED (n=7658)	Outpatient (n=2169)	*P*
Age, years (SD)	36.9 (13.5)	31.2(16.0)	0.000
Male (SD)	0.611(0.005)	0.543 (0.011)	0.000
Employed (SD)	0.366 (0.482)	0.384 (0.487)	0.415
Alcohol use (SD)	0.753 (0.431)	0.618 (0.486)	0.000
Using drugs (SD)	0.394 (0.489)	0.384 (0.49)	0.405
Using alcohol and drugs (SD)	0.292 (0.455)	0.269 (0.444)	0.04

From grantees administrative data- Government Performance and Results Act (GPRA) data (Service Accountability Improvement System, 2011)

Model inputs

Table 2. Model inputs

Model parameter	Source	Application	PSA
Transition probabilities	Number of patients in each category at baseline and 6-month follow-up	-Used to distribute hypothetical cohort of 1000 patients between states at follow-up	Dirichlet
Health state utilities	Kraemer et al. (2005)	-Used to value quality of life of each health state and calculate QALYs. -Average gain in utility per patient for each setting combined with costs and used in the CEA	Beta
SBIRT costs	-Marginal costs of screening, BI, BT, and RT, by setting from study calculations -Number of sessions from GPRA discharge data	-Average cost of SBIRT per patient for each setting, combined with health outcomes and used in the CEA -Used without social costs if CEA is from the perspective of the treatment provider	Gamma
Social costs	-Unit cost of events (health care utilization, criminal activity, automobile accidents, and operation of automobiles while under the influence of alcohol) from the peer-reviewed literature, and wage loss from patient survey -Frequency of events from patient survey	- Average change in social cost for each health state, combined with SBIRT costs, and net costs and health outcomes used in the CEA from a broader societal perspective	Normal

Results (1)

Table 3. Base-case results per patient (probabilistic results from 1,000 simulations)

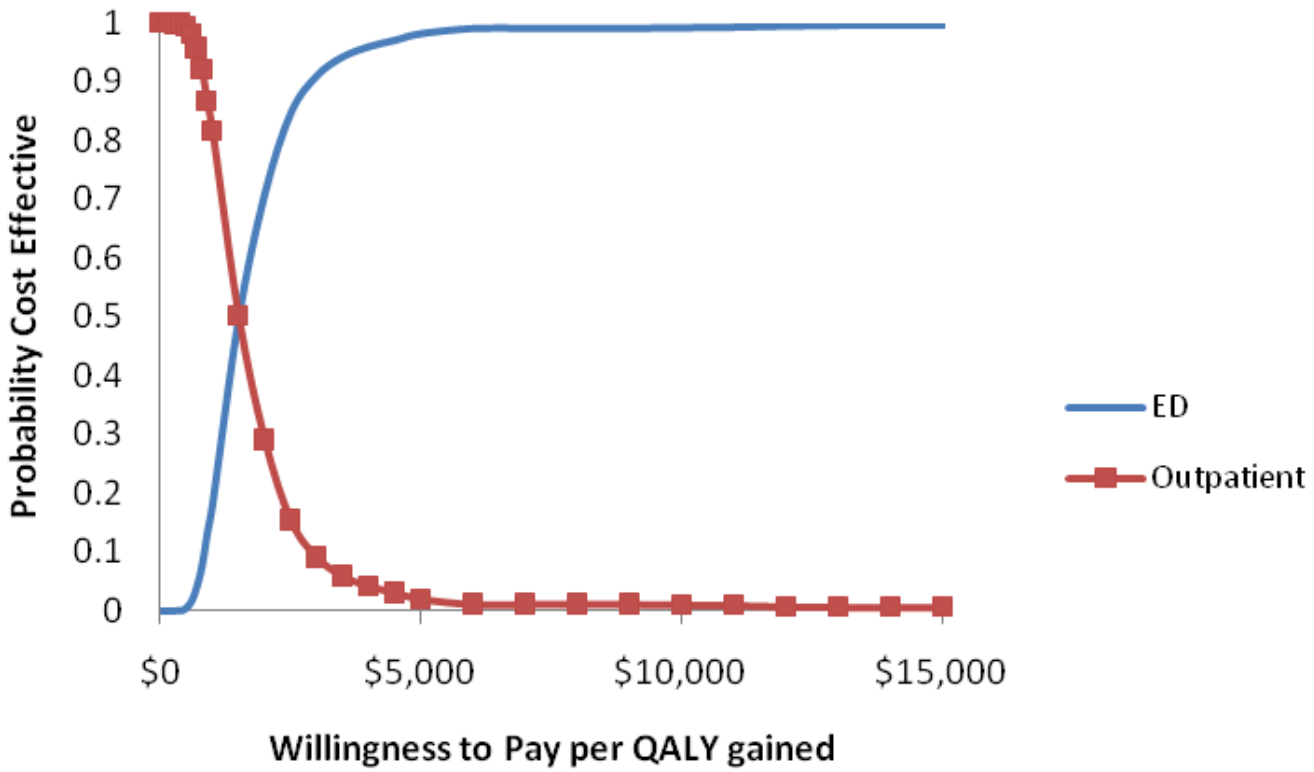
Base-case results	Emergency Department (ED)	Outpatient	ED − Outpatient
SBIRT costs ($, 2011 prices)	12.81	21.44	−8.63
Social cost change ($, 2011 prices)	−544.55	−239.39	−305.16
SBIRT + social costs ($, 2011prices)	−531.74	−217.95	**−313.79**
Baseline QALYs	0.815	0.831	-0.015
Follow-up QALYs	0.828	0.839	-0.011
QALYs gained	0.013	0.008	**0.005**
Good outcome	0.443	0.305	**0.138**
Improve to low risk	0.327	0.292	**0.035**

Results (2)

Table 4. Subgroup and sensitivity analyses, comparison to base-case results

Subgroup analyses	SBIRT costs	Social costs	Health outcomes	ICER
All cohort in unhealthy state at baseline	Same in both settings	Higher reduction both settings, highest for ED	Higher improvement both settings, highest for ED	-ED dominates outpatient for both perspectives -Base-case results robust
All cohort in abstinent and low risk states at baseline	Same in both settings	Lower reduction both settings, lowest for ED	Lower improvement both settings, lowest for ED	-Outpatient vs. ED $900/QALY (provider perspective) -Outpatient dominates ED (societal perspective)
Sensitivity analysis	**SBIRT costs**	**Social costs**	**Health outcomes**	**ICER**
Average costs instead of marginal costs ($76.34 and $86.03 vs. $12.81 and $21.45 for ED and outpatient)	Higher in both settings	No change	No change	-ED dominates outpatient for both perspectives -Base-case results robust
Similar number of sessions between the two settings	Higher in both settings, highest in ED	No change	No change	- ED dominates outpatient for societal perspective - ICER $1,500/QALY

Results (3)



Acceptability curve of the probability that ED and outpatient settings are cost-effective against threshold of willingness to pay per QALY gained, sensitivity analysis on similar number of sessions for ED and outpatient

Discussion

- **SBIRT in ED setting: more cost-effective than outpatient setting**
- **Health gains at low cost: both settings**
- **Societal perspective: both settings cost saving, ED more cost-saving**
- **Outpatient dominates ED: subgroup analysis**
  - Outpatient setting is more effective in maintaining good drinking patterns.
  - ED setting is more effective in improving drinking behavior and increasing quality of life
- **SBIRT should be implemented in both settings depending on:**
  - Decision makers' preferences
  - Budget constraints
  - Setting-specific circumstances: staffing type and patient flow

Limitations and recommendations

- Data limitations: observational design
  - *Pragmatic naturalistic design*

- Data limitations: restricted information
  - *Collect data on drinking history and alcohol-related health problems*

- Data limitations: health state utilities taken from the peer-reviewed literature
  - *Determine U.S. social preferences to value alcohol-related health states*

- Approach limitation: short-term analysis
  - *Model or observe the costs and effects of different drinking patterns and courses of treatment on mortality and morbidity over the longer term*

  - **Main contributions**

    Incorporates HRQoL

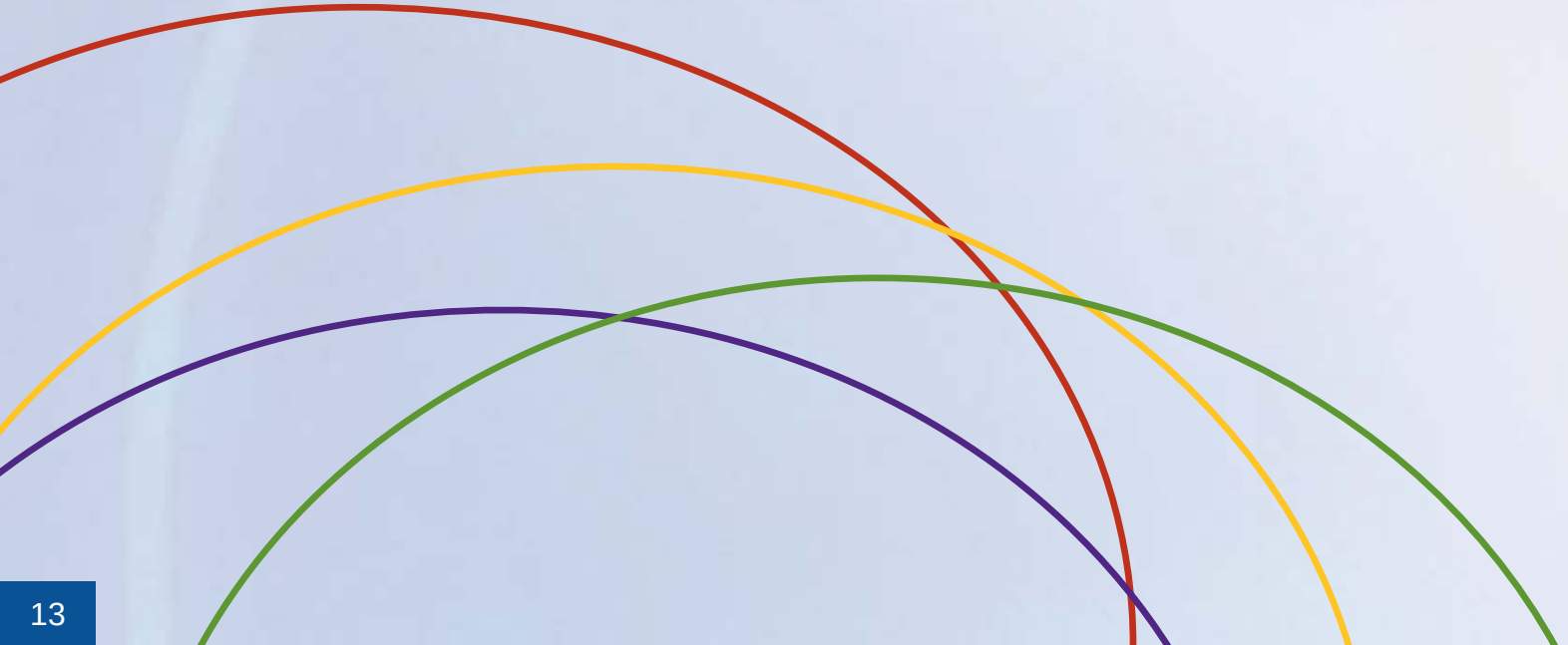
    Incorporates statistical uncertainty

    Provider and societal perspectives

    Allocation of resources across ED and outpatient settings

All models are wrong, but some are useful

George Box, in *Robustness in the strategy of scientific model building*, 1979



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More Information

Carolina Barbosa

Health Economist

cbarbosa@rti.org