



RESEARCH REPORT

Potential Cost Savings Associated with Providing Screening, Brief Intervention, and Referral to Treatment for Substance Use Disorder in Emergency Departments

A Rapid Review

Lisa Clemans-Cope
June 2018

Sarah Benatar

Marni Epstein

Nikhil Holla



ABOUT THE URBAN INSTITUTE

The nonprofit Urban Institute is a leading research organization dedicated to developing evidence-based insights that improve people's lives and strengthen communities. For 50 years, Urban has been the trusted source for rigorous analysis of complex social and economic issues; strategic advice to policymakers, philanthropists, and practitioners; and new, promising ideas that expand opportunities for all. Our work inspires effective decisions that advance fairness and enhance the well-being of people and places.

Contents

Acknowledgments	iv
Executive Summary	v
Introduction	1
Purpose of This Review	2
Methods	4
Eligibility Criteria	4
Search Strategy	5
Study Selection	5
Study Data Extraction and Quality Assessment	6
Data Extraction	6
Data Synthesis	7
Results	8
Comparison of the Estimates of the Intervention Costs	8
Comparison of the Estimates of Savings	10
Discussion	14
Generalizability and Limitations of This Review	15
Conclusions	16
References	17
About the Authors	20
Statement of Independence	21

Acknowledgments

This report was funded by the California Health Care Foundation. We are grateful to them and to all our funders, who make it possible for Urban to advance its mission.

The views expressed are those of the authors and should not be attributed to the Urban Institute, its trustees, or its funders. Funders do not determine research findings or the insights and recommendations of Urban experts. Further information on the Urban Institute's funding principles is available at urban.org/fundingprinciples.

The authors are grateful to Genevieve Kenney and Stephen Zuckerman for their helpful comments and suggestions and to Fiona Blackshaw and Vicky Gan for their copyediting.

Executive Summary

This report provides a rapid review of recently published evidence on the potential cost savings associated with providing screening, brief intervention, and referral to treatment (SBIRT) for people with substance use disorders (SUDs) in emergency departments (EDs). The review focuses on studies related to alcohol and drug use disorders with the aim of characterizing economic evaluations of interventions from existing literature that can inform cost savings for similar initiatives. A growing number of localities and states are considering implementing SUD screening, brief intervention, and referral in the ED setting. These programs could be the foundation for future service expansions including the initiation of SUD treatment in the ED, which could substantially increase access to evidence-based SUD treatment.

Over approximately two weeks, the research team synthesized available peer-reviewed evidence using a comprehensive search strategy of literature published after 2010. Consistent with established practices of rapid review, the search strategy was not designed to be an exhaustive search of the published and gray literature. Studies were excluded based on an initial title/abstract eligibility assessment and then a full text eligibility assessment. Study quality was evaluated using established quality assessment criteria, and less rigorous or low-quality studies were excluded. Eight peer-reviewed studies were deemed eligible for inclusion. A consistent set of key elements was extracted from all eligible studies.

Taken as a whole, the eight studies suggested that screening, brief intervention, and referral to treatment for SUD in the ED is cost-effective. Four of the eight studies examined the per patient cost of intervention in the ED setting, including the costs of direct service delivery, service support, and space. Intervention costs were estimated to be between approximately \$4 and \$54 for screening (including any prescreening), though some estimates exceeded \$76; between \$4 and \$94 for brief intervention and \$22 for brief treatment; and between \$8 and \$27 for referral to treatment (Barbosa et al. 2016; Bray et al. 2012, 2014; Horn et al. 2017). Altogether, the aggregated per patient cost of each component of the intervention was between \$24 and \$173, with the middle range of total per patient interventions costs estimated at \$39, \$52, and \$138; costlier interventions were sometimes more extensive (e.g., including booster sessions).

Five of the eight studies that met eligibility criteria examined potential per patient savings related to SUD screening, brief intervention, and referral in the ED setting. Three of those studies found substantial savings (Pringle et al. 2018; Estee et al. 2010; Barbosa et al. 2015), and two studies did not

have statistically significant findings (Horn et al. 2017; Busch et al. 2017). One of the two studies that used administrative claims data—a robust measure of health care costs—to estimate per patient savings estimated health care savings as high as \$2,074 per patient per year for an intervention group of Medicaid enrollees (Pringle et al. 2018). The other study that used administrative claims data to estimate per patient savings estimated \$4,392 to \$6,504 per patient per year in health care savings for the study population (working-age Medicaid enrollees with disabilities in Washington State; Estee et al. 2010). A third study that found statistically significant savings used self-reported data and estimates from earlier literature to estimate savings related to an SBIRT intervention across a general population screening positive for alcohol use disorder in an ED setting. This paper found savings in health care, criminal justice, and other domains, including forgone wages totaling \$532 per patient for six months, or \$1,064 per patient per year, if savings are sustained at a constant rate (Barbosa et al. 2015).

The cost-related findings appear to be sensitive to many factors, including the type of clinical worker performing each task, the patient and payer characteristics, and the volume of patients at the ED. In addition, cost-related findings appear to be sensitive to measurement issues. The studies that did not report statistically significant savings used self-reported measures of health care use (Horn et al. 2017; Busch et al. 2017), while other studies used administrative or claims databases (Pringle et al. 2018; Estee et al. 2010). Health care use is a critical factor in assessing cost effects, and the studies that used administrative data may measure health care costs more precisely, particularly because those who screen positive for an SUD in an ED setting are likely to have costly health care use that is difficult to estimate. A handful of identified studies were strong, using rigorous methods and reliable data, but further cost-related evaluations are needed to strengthen and update the evidence base.

ED staff are uniquely positioned to provide screening for alcohol and substance use disorders and, when necessary, brief intervention and referral to treatment. Our review of eight recent peer-reviewed studies on the costs and effectiveness of screening and brief intervention concludes that these interventions are likely to produce cost savings overall. The costs associated with offering this service are generally low compared with the potential benefits of lower future health care costs. More rigorous evaluation is needed, particularly of new programs that include initiation of evidence-based SUD treatment in the ED.

Introduction

This report provides a rapid review of recently published evidence on the potential cost savings associated with providing screening, brief intervention, and linkage or referral to treatment for people with substance use disorders (SUDs) in emergency departments (EDs). This review focuses on studies related to alcohol and drug use disorders. SUDs are a critical public health problem. Nationwide, the estimated costs of substance use disorders related to alcohol and illicit drugs are over \$440 billion, including at least \$38 billion in health care costs (NIDA 2017). About 8 percent of people ages 12 and older (21 million people nationwide) reported having an SUD, according to the 2015 National Survey on Drug Use and Health by the Substance Abuse and Mental Health Services Administration (SAMHSA; Peterson-Kaiser 2017). Among those, about three-quarters had an alcohol use disorder, and almost two-fifths had an illicit drug use disorder. Among adults with an SUD, 41 percent had a co-occurring mental disorder (Bose et al. 2016), and together, mental health and substance use disorders are the leading causes of disease burden in the United States (Peterson-Kaiser 2017).

A growing body of literature has assessed the effectiveness of approaches to identifying people with substance use disorders who could benefit from intervention and evidence-based treatment. Much of the research has focused on a process tool called screening, brief intervention, and referral to treatment (SBIRT), an evidence-based practice used to identify, reduce, and prevent problematic use and disorders related to alcohol and illicit drugs (SAMHSA-HRSA 2011). SBIRT can be implemented with a variety of different screening tools or brief intervention types. Other processes similar to SBIRT were used in other studies. While many studies have focused on alcohol use disorder in primary care settings, recent innovations have applied the approach to illicit drugs and to other settings, particularly to people with opioid use disorders presenting to an ED. Evidence supporting the efficacy of interventions like SBIRT for alcohol use in an ED setting is of moderate quality and has shown mixed results (Barata et al. 2017). However, a recent systematic review identified a number of studies that demonstrated positive effects of brief intervention delivered in the ED, such as small reductions in alcohol consumption, reductions in risky alcohol consumption, reductions in negative consequences of alcohol use, and reductions in ED visits (Barata et al. 2017). Evidence supporting the efficacy of interventions like SBIRT for drug use in an ED setting is limited but growing, with new promising studies and recognition of the potential effects of screening for opioid use disorder (OUD) and initiation or facilitated referral to effective treatment medications such as buprenorphine (D'Onofrio et al. 2015; Rubin 2018; Martin et al. 2018; Lynch and Yealy 2018; Bernstein and D'Onofrio 2017).

EDs could play a critical role in interventions targeting people with SUDs because ED users have higher rates of SUDs than others (Wu et al. 2012), and the rate of ED visits among people with SUDs has recently been increasing (Weiss et al. 2016). In addition, patients in the ED setting may be more receptive to intervention and treatment, recognizing the gravity of their situation, although the evidence related to the “teachable moment” concept is mainly focused on people with alcohol use disorder (AUD; Walton et al. 2008; Longabaugh et al. 1995; Gentilello et al. 1988). More recently, EDs have been focused on screening for and treating opioid use disorder (Rubin 2018).

Efforts to implement policies around screening, brief intervention, and referral to treatment for SUD in EDs are increasing, with various initiatives in EDs in California (CHCF 2017), Rhode Island (RI DOH, RI BDHDDH 2017), Baltimore (Baltimore City Health Department 2018), New Jersey (Rutgers School of Social Work 2018), New Hampshire (Dartmouth-Hitchcock 2018), Washington (Speaker, Mayfield, and Felver 2017), Connecticut, Massachusetts, and New York (SAMHSA NREPP 2011). Related initiatives focused on counseling and support services provided by “recovery coaches” in EDs have also been reported to be under way in Maine, North Carolina, Ohio, Oklahoma, Texas, and Vermont (Vestal 2017).

The clinical benefits of evidenced-based care for substance use disorders are well-documented, and recent literature has begun to study the efficacy of SBIRT interventions for substance use disorders in the ED setting on reducing drug use (Bogenschutz et al. 2014; Guan et al. 2015; Merchant, Baird, and Liu 2015; Woodruff et al. 2014; Woolard et al. 2013). To date, little attention has been paid to the costs and cost-effectiveness of screening, brief intervention, and referral to treatment interventions for substance use disorder in the ED, yet policymakers tasked with allocating scarce resources need to know whether investments in these interventions for substance use disorder are likely to be economically sound. Localities and states need this information to implement SUD screening, brief intervention, and referral in the ED setting. And these programs can be the foundation for future service expansions including the initiation of SUD treatment in the ED, which could substantially increase access to evidence-based SUD treatment.

Purpose of This Review

This review is part of a project supported by the California Health Care Foundation (CHCF). We identify economic evaluations of interventions from existing literature that can inform the cost savings of providing the proposed program in the ED. We focus on the savings of ED-based programs that provide screening, brief intervention, and, in some cases, a link to treatment. Since 2010, only one systematic

review (Bray, Cowell, and Hinde 2011) appears to have assessed cost or economic analyses in the area of screenings and brief intervention for SUD in the ED, focusing on alcohol use disorder.

This rapid review investigates the following research questions around interventions to provide screening, brief intervention, and a link to treatment for people with SUD who present in the ED:

- What are the costs related to each of the following components: screening, brief intervention, and a link to treatment for people with SUD who present in the ED?
- What are the estimated savings of the intervention?
- Are the intervention costs or estimated savings sensitive to factors, circumstances, or provider or patient characteristics?
- What is the overall strength of the evidence?

In this study, we did not examine non-ED settings or the patient mix and its effect on cost estimates, nor did we break down the estimated costs into components for a detailed comparison of study estimates. Our review of the efficacy of these interventions was not exhaustive because it was not a primary research question. Despite these limitations, understanding the main cost-related implications of recent, relevant, and rigorous studies is critical for designing effective policies that capitalize on new knowledge.

Next, we present our methods related to study eligibility criteria, search strategy for identifying relevant eligible studies, record selection, study data extraction and study quality assessment criteria, data synthesis, results, discussion, and concluding thoughts.

Methods

Eligibility Criteria

To identify relevant evidence for the rapid review, we specified a population of interest, interventions, comparators, study types of interest, and limits that could be applied to the review questions. The eligibility criteria for study inclusion are shown in table 1.

TABLE 1
Eligibility Criteria for the Review

	Eligible studies
Population	Adults with a need to be screened for SUD
Interventions	SUD screening interventions in the ED Screening types included prescreen, screen, brief intervention, brief treatment, counseling sessions, referral to treatment, ED-initiated treatment, brief negotiated interview, motivational interviewing
Comparators	SUD screening intervention treatment groups No intervention/usual care Setting comparison groups
Key outcomes	Levels and changes in unit cost, total cost, and per patient cost of overall and specific health care costs (e.g., costs related to ED visits, outpatient visits, inpatient stays), total costs (e.g., costs related to criminal justice, patient time costs), intervention cost total and by intervention component, health system costs Cost-effectiveness outcomes including incremental cost-effectiveness ratios, cost per quality-adjusted life year, return on investment of the initiative.
Study designs	Randomized, quasi-experimental (e.g., difference-in-differences), economic evaluations (cost-effectiveness studies, cost-utility studies, cost-benefit analyses) Program cost reports Systematic reviews and meta-analyses of economic evaluations
Limits	Publications in English Publications published 2010 onward

Search Strategy

Over approximately two weeks, we synthesized available peer-reviewed evidence using a search strategy broadly consistent with established practices of rapid review (Ganann, Ciliska, and Thomas 2010). In keeping with these practices, this study was not designed to be an exhaustive search of the published and gray literature. We limited the search by years, restricting to studies published 2010 and later; we restricted search databases to PubMed; and we restricted study language to English. Two researchers conducted independent searches of the PubMed database to identify relevant studies on the costs of screening, brief intervention, and referral to treatment for SUD in the ED. Relevant studies were found using different combinations of keyword search terms. Additional literature was identified by conducting manual searches of references found in these studies. Because of the time constraints of this rapid review, the search strategy was designed to collect the most relevant studies, which may have omitted some relevant studies.

Study Selection

Search results were deduplicated, and the titles and abstracts of the records were reviewed for eligibility with respect to the rapid review eligibility criteria (table 1). From this, 18 relevant studies were identified. The full text of potentially relevant papers was obtained to inform the eligibility review. After an in-depth full text assessment, 10 of the 18 studies were excluded from data extraction. One study was excluded because it lacked information about its research study design and only reported descriptive results, seven were excluded because their cost outcome measure was not relevant, and two were excluded because they did not focus on the ED setting. Our final review consisted of eight studies, as shown in table 2 (Barbosa et al. 2015, 2016; Bray et al. 2012, 2014; Busch et al. 2017; Estee et al. 2010; Horn et al. 2017; Pringle et al. 2018). Studies were either cost-effectiveness analyses or cost reports, which estimate unit and annual cost estimates from the perspective of the service provider.

TABLE 2

Program Overview

Study	Study design	Dates	Target conditions	Setting
Barbosa et al. 2015	Cost-effectiveness analysis	2005–10	Alcohol misuse	ED and outpatient
Barbosa et al. 2016	Cost report	Data collected for 2012 costs	Alcohol and illicit drug misuse	ED, outpatient and inpatient
Bray et al. 2012	Systematic review of cost reports	Papers published between 1991 and 2011	Alcohol misuse	Four of 17 studies were in the ED setting
Bray et al. 2014	Cost report	2005–10	Alcohol and illicit drug misuse	ED, outpatient and inpatient
Busch et al. 2017	Cost-benefit analysis	April 2009–June 2013	Opioid dependency	ED
Estee et al. 2010	Difference-in-differences analysis	April 2004–September 2006	Alcohol and illicit drug misuse	ED
Horn et al. 2017	Cost-benefit analysis	October 2010–March 2013	Alcohol and illicit drug misuse	ED
Pringle et al. 2018	Difference-in-differences analysis	January–December 2012	Alcohol and illicit drug misuse	ED

Study Data Extraction and Quality Assessment

Two researchers carried out a quality assessment based on the quality assessment criteria established by the National Heart, Lung, and Blood Institute. These define separate criteria for cohort studies, randomized control trials, systematic reviews, and case control studies. The criteria assessed for bias, appropriate study design, internal validity, and causality. Each of the two researchers independently carried out the data extraction on four of the eight identified studies. Each researcher then reviewed the other’s extraction for content and inconsistencies. Disagreements and clarifications were resolved through discussion with a third researcher.

Data Extraction

The following data were extracted from all eligible studies: authors, program dates, comparison groups, intervention program elements, target patient population, target condition, number of patients, study design, geography, setting, staff positions and responsibility, cost-analysis methodology, costs included, outcome measures, imputed or actual costs, follow-up period, inclusion of sensitivity analyses, intervention delivery minutes, substance use outcomes, and cost-effectiveness or other cost outcomes.

Data Synthesis

Each study was summarized and critically appraised for its quality and potential to inform the research questions. The evidence to answer each of the rapid review research questions was summarized.

Results

Below, we summarize the findings from the reviewed studies to shed light on savings and cost-effectiveness of the intervention in the ED and in other settings. Then, we summarize findings from cost studies, findings related to types of clinical staff, and reimbursement considerations.

Comparison of the Estimates of the Intervention Costs

Four studies examined the per patient cost of the intervention in the ED setting (Barbosa et al. 2016; Bray et al. 2012, 2014; Horn et al. 2017). The estimated intervention costs for screening (and prescreening, if any), brief intervention (and brief treatment or booster sessions, if any), referral, and total cost are shown in table 3. Costs include direct service delivery, service support, and space.

Estimated costs were

- between about \$4 and \$54 for screening (including any prescreening), with some estimates at \$76 and higher;
- between \$4 and \$94 for brief intervention, and around \$22 for brief treatment; and
- between \$8 and \$27 for referral to treatment.

Altogether, the per patient cost of intervention was estimated to range from \$24 and \$173. The middle range of total per patient interventions costs were estimated to be \$39, \$52, and \$138; the costlier interventions were sometimes more extensive (e.g., including booster sessions).

TABLE 3

Estimated per Patient Intervention Costs of SUD Screening, Brief Intervention, and Referral in the ED Setting

Study	Estimated cost of screening (and prescreening, if any)	Estimated cost of brief intervention (and brief treatment or booster sessions, if any)	Estimated cost of referral	Estimated total cost of screening, brief intervention, and referral
Barbosa et al. 2016	\$1 for a prescreen, \$7 for a full screen in the ED. Screens included ASSIST and CRAFT. Prescreens administered by mid-level clinicians, master's-level practitioners, or self; screens administered by master's-level practitioners. Includes costs of direct service delivery, service support, and space.	\$10 for a brief intervention and \$23 for a brief treatment in the ED. Brief interventions were 15 minutes or less and mainly used motivational interviewing. Brief treatments were up to one hour and involved cognitive-behavioral or motivational enhancement therapy. Both were administered by master's-level practitioners. Includes costs of direct service delivery, service support, and space.	\$12 for referral to treatment.	\$52 for screening, brief intervention, brief treatment, and referral to treatment in the ED.
Bray et al. 2012	In the 4 studies that took place in the ED, costs per screen were \$20 (psychologist), \$76 (nurse), and \$79 (social worker), with an outlier of \$602 (health promotion advocate). Costs included labor, materials, and space.	In the 4 studies that took place in the ED, the costs per brief intervention were \$4 (nurse), \$47 (psychologist, including documentation time), \$82 (health promotion advocate), and \$94 (social worker, including supervisory, documentation, and waiting time).	Data not available	\$24–173 for screening and brief intervention in the ED.
Bray et al. 2014	\$4 for a screen in the ED, conducted by contracted specialists. Costs included direct service delivery, service support, space, and contracted services.	\$6 for the brief intervention and \$22 for the brief treatment in the ED, conducted by contracted specialists. Costs included direct service delivery, service support, space, and contracted services.	\$8 for referral to treatment in the ED, conducted by contracted specialists.	\$39 for screening, brief intervention, brief treatment, and referral to treatment in the ED.
Horn et al. 2017	\$54 for a screen conducted by a medical assistant. The screen used was the 10-item Drug Abuse Screening test. Costs included labor, materials, equipment, and overhead.	\$57 for a brief intervention and two booster sessions, based on the motivational interviewing approach and conducted by a substance abuse and behavioral disorder counselor. Costs included labor, overhead, and participant's time.	\$27 for assessment and referral to treatment by a counselor. Costs included labor and overhead.	\$138 for screening, brief intervention, and two booster sessions, and assessment and referral to treatment in the ED.

Note: Cost estimates rounded to nearest dollar.

Comparison of the Estimates of Savings

Five studies examined the potential per patient savings related to SUD screening, brief intervention, and referral in the ED setting (Horn et al. 2017; Pringle et al. 2018; Estee et al. 2010; Barbosa et al. 2015; Busch et al. 2017). Estimated health care savings, criminal justice savings (if any), other savings (if any), total savings, and key measurement and study design information are shown in table 4. Three studies found substantial savings (Pringle et al. 2018; Estee et al. 2010; Barbosa et al. 2015), and two studies did not have statistically significant findings (Horn et al. 2017; Busch et al. 2017).

Two studies used administrative claims databases to measure health care costs (Pringle et al. 2018; Estee et al. 2010). Health care use is a critical factor in assessing cost effects, and the studies that used administrative data may measure health care costs with more precision, particularly because of highly skewed medical costs.

In their study of a 2012 intervention, Pringle and colleagues (2018) used a quasi-experimental difference-in-differences design with a screening intervention group (the evidence-based alcohol, smoking, and substance involvement screening test [ASSIST]) and three separate control groups. Health care data were drawn from Medicaid administrative claims for both cost and use. The screening intervention in an ED setting was found to be a cost-effective and cost-beneficial approach to substance use disorders management, with health care savings of \$2,074 per patient per year for the intervention group of Medicaid enrollees.

Estee and colleagues (2010) conducted a study focused on Medicaid beneficiaries with disabilities in Washington State who presented with alcohol or drug-related inquiries from 2004 to 2006. This work was based on a quasi-experimental difference-in-differences design evaluation with approximately 1,500 individuals in the treatment group and a matched comparison group of equal size. The study found health care savings of \$4,392 to \$6,504 per patient per year for the study population of working-age Medicaid enrollees with disabilities in Washington State.

Barbosa and colleagues (2015) found net savings in an SBIRT intervention for alcohol use disorder in an ED setting from 2005 to 2010 for seven grantees across six states and one tribal organization. This study used self-reported data, qualitative observational data, and estimates from earlier literature and included nearly 10,000 SBIRT positive-screen patients from a SAMHSA grant-funded cohort across seven US states, 75 percent of whom screened positive for alcohol use and nearly 40 percent of whom screened positive for illicit drug use. Study sites employed different staff to conduct the intervention, limiting the comparability of cost estimates across study sites, but providing information on a potential

range in intervention costs and savings. Social savings were estimated to include health care, criminal justice, social costs of health conditions, forgone wages, and automobile accidents. These savings were estimated to be \$532 per patient for six months, which translates to \$1,064 per patient per year if savings are sustained at a constant rate.

The other two studies used self-reported data, survey data, qualitative observational data, and estimates from earlier literature. Busch and colleagues (2017) found savings related to the intervention, and Horn and colleagues (2017) did not, but neither study had statistically significant findings. Busch and colleagues (2017) examined a novel extension to an SBIRT intervention in the ED that focused on opioid use disorder, and included a treatment group that initiated buprenorphine treatment in the ED. This study compared the cost-effectiveness of brief intervention plus ED-initiated buprenorphine with that of referral to community-based treatment or brief intervention, and that of referral in the 30 days after randomization into one of these groups. The study relied on self-reported data for several outcomes critical to measuring costs, including health care use, which may introduce error in savings. Horn and colleagues (2017) examined SBIRT in an ED setting, assessing self-reported information on health status, health care use, workplace productivity, and involvement with the criminal justice system. This work compared intervention costs and associated changes in health care for three randomized groups from 2010 to 2013: (1) one group who received screening, assessment, and referral to treatment; (2) another group that received screening, assessment, and referral to treatment and on-site brief intervention and booster; and (3) a control group that received only minimal screening and a brochure. The confidence intervals for total net benefits were generally wide and included both negative and positive values (e.g., -\$14,403 to \$4,209 for the SAR group compared with the screening-only group), making it difficult to characterize findings. The study may be limited by its reliance on self-reported outcomes that are critical to costs, such as health care use. In addition, it excluded patients seeking addiction treatment or in addiction treatment—the population for which the greatest efficacy and savings potential could be achieved.

TABLE 4

Estimated per Patient Savings Related to SUD Screening, Brief Intervention, and Referral in the ED Setting

Study	Source of cost estimates	Analysis used	Period	Estimated health care savings	Estimated criminal justice savings	Estimated other savings	Estimated total savings	Other information
Pringle 2018	Medicaid claims data	Difference-in-differences analysis	1 year after intervention	\$2,074 (21%) per patient per year	Data not available	Data not available	N/A	Only Medicaid payments were assessed.
Estee 2010	Medicaid claims data	Difference-in-differences analysis	1 year after intervention	\$4,392 to \$6,504 per patient per year after the intervention	Data not available	Data not available	N/A	Only Medicaid payments were assessed.
Barbosa 2015	Self-reported data, qualitative observational data, estimates from earlier literature	Cost-effectiveness analysis and incremental cost-effectiveness ratio analysis	6 months after the intervention	Included in social savings	Included in social savings	Social savings also included social costs of health conditions, forgone wages, automobile accidents	Net savings of \$532 per patient for 6 months translate to \$1,064 per patient per year	
Busch 2017	Self-reported data, survey data, estimates from earlier literature	Cost-effectiveness analysis and incremental cost-effectiveness ratio analysis	30 days after the intervention	Health care savings associated with ED-initiated buprenorphine were \$209 more than those for referral group. Savings for the brief intervention group were \$158 more than for referral group.	Criminal justice savings associated with ED-initiated buprenorphine were \$2,791 more than those for referral group. Savings for the brief intervention group were \$1,574 more than for referral group.	Patient time savings associated with the ED-initiated buprenorphine group were \$186 more than those for referral group. However, the brief intervention group was found to save less patient time and costed \$40 more than the referral group.	Total cost savings not provided	Savings were generally not found to be significant. The incremental cost-effectiveness ratio analysis showed that the ED-initiated buprenorphine had higher benefits per incremental cost than referral or brief treatment.

Study	Source of cost estimates	Analysis used	Period	Estimated health care savings	Estimated criminal justice savings	Estimated other savings	Estimated total savings	Other information
Horn 2017	Self-reported data, survey data, estimates from earlier literature	Cost-benefit analysis	1 year after the intervention	No savings. Net savings from health care (i.e., costs minus monetized benefits) in the referral-to-treatment group were negative (-\$996) compared with the screening-only group. The brief intervention group also had negative net savings (-\$1,957) compared with the screening-only group.	Net savings related to illegal activities in the referral-to-treatment group were negative (-\$3,432) compared with the screening-only group. The brief intervention group also had negative net savings (-\$549) compared with the screening-only group.	Net savings from paid employment in the referral-to-treatment group were negative (-\$664) compared with the screening-only group, but the brief intervention group had positive net savings (\$448) compared with the screening-only group.	Total net savings in the referral-to-treatment group were negative (-\$5,006) compared with the screening-only group. The brief intervention group also had negative net savings (-\$2,032) compared with the screening-only group.	Net savings estimates were not found to be significant in any of the analyses. The confidence intervals for total net benefits were generally wide and included both negative and positive values (e.g., -\$14,403 to \$4,209 for the referral-to-treatment group compared to the screening only group), making it difficult to characterize findings.

Note: Cost estimates rounded to nearest dollar.

Discussion

Our review of the eight studies finds that screening, brief intervention, and referral to treatment for SUD in the ED is cost-effective. In the four studies that examined the per patient cost of the intervention in the ED setting—including direct service delivery, service support, and space—the intervention cost was estimated to be between \$4 and \$54 for screening (including any prescreening), with some estimates at \$76 and higher; between \$4 and \$94 for brief intervention and around \$22 for brief treatment; and between \$8 and \$27 for referral to treatment (Barbosa et al. 2016; Bray et al. 2012, 2014; Horn et al. 2017). Altogether, the per patient cost of the intervention was between \$24 and \$173, with the middle range of total per patient intervention costs at \$39, \$52, and \$138; the costlier interventions were sometimes more extensive (e.g., including booster sessions).

Of the five studies that examined the potential per patient savings related to SUD screening, brief intervention, and referral in the ED setting, three found substantial savings (Pringle et al. 2018; Estee et al. 2010; Barbosa et al. 2015), and two did not have statistically significant findings (Horn et al. 2017; Busch et al. 2017). Two studies that used administrative claims data to measure health care costs (Pringle et al. 2018; Estee et al. 2010) found substantial savings. Health care savings were \$2,074 per patient per year for an intervention group of Medicaid enrollees in one study (Pringle et al. 2018) and \$4,392 to \$6,504 per patient per year in another study of working-age Medicaid enrollees with disabilities (Estee et al. 2010). A third study that found statistically significant savings used self-reported data and estimates from earlier literature to estimate savings related to an SBIRT intervention across a general population screening positive for alcohol use disorder in an ED setting. This paper found savings in health care, criminal justice, and other domains, including forgone wages totaling \$532 per patient for six months, or \$1,064 per patient per year, if savings are sustained at a constant rate (Barbosa et al. 2015).

The cost-related findings appear to be sensitive to many factors, including the type of clinical worker performing each task, the patient and payer characteristics, and the volume of patients at the ED. In addition, cost-related findings appear to be sensitive to measurement issues. Some studies used self-reported measures of health care use (Horn et al. 2017; Busch et al. 2017), while other studies used administrative or claims databases or medical records (Pringle et al. 2018; Estee et al. 2010). Health care use is a critical factor in assessing cost effects, and the studies that used administrative data may measure health care costs more precisely, but many studies did not rely on high-quality health cost data. Thus, though some individual studies were strong, further cost-related evaluations are needed to strengthen and update the evidence base.

The type of staff (e.g., master's-level practitioner, substance use counselor) conducting the screening, brief intervention, and referral to treatment contributes considerably to the potential cost of offering these services and to the outcomes, benefits, and savings that could be derived from the intervention. Barbosa and colleagues (2016) determined that the bulk of the costs in the SBIRT intervention (70 percent) were attributed to labor costs. In addition, savings may depend on patient volume. A simulation by Cowell and colleagues (2017) suggests that EDs with fewer than 27,000 visits can sustain SBIRT through third-party payer reimbursements (private health insurance and/or Medicaid).

This body of work identifies some costs that will be important for localities to consider. Specifically, several studies identified the high costs associated with the infrastructure needed to support service delivery activities, such as medical record keeping or reading the patient's chart. Clinical supervision, staff supports, and their associated costs should also be considered because of their importance in supporting high-quality services and their potential to mitigate counselor burnout and compassion fatigue.

Generalizability and Limitations of This Review

Many studies limited their assessment to patient subgroups, such as Medicaid enrollees or dual Medicaid-Medicare enrollees, limiting generalizability to other patient populations. Many of the study settings were EDs that likely had experience in implementing screenings and interventions related to SUDs, limiting generalizability to EDs without such experience. In addition, many studies focused on screening and brief intervention for alcohol use disorder and may not be easily generalizable to other substance use disorders. Because this was a rapid review, relevant studies may have been missed, and because the review is limited to studies published since 2010, studies published before 2010 may be relevant but were not included.

Conclusions

Interventions with ED staff are opportunities to identify people with SUD and facilitate referral to effective treatment if needed. Our review of eight recent peer-reviewed studies on the costs and savings associated with screening, brief intervention, and referral concludes that these ED interventions are likely to produce cost savings overall. The costs associated with offering SBIRT in EDs are low compared with the potential savings from lower future health care costs, but the results appear to be sensitive to different factors such as the patient population and the type of staff carrying out the program. More research is needed. In the future, further savings may be achieved by expanding the initiative to include initiation of treatment in the ED, such as medication treatment, when indicated.

References

- Baltimore City Health Department. 2018. "Levels of Care." Baltimore City Health Department. April 30, 2018. <https://health.baltimorecity.gov/levels-care>.
- Barata, Isabel A., Jamie R. Shandro, Margaret Montgomery, Robin Polansky, Carolyn J. Sachs, Herbert C. Duber, Lindsay M. Weaver, et al. 2017. "Effectiveness of SBIRT for Alcohol Use Disorders in the Emergency Department: A Systematic Review." *Western Journal of Emergency Medicine* 18 (6): 1143–52. <https://doi.org/10.5811/westjem.2017.7.34373>.
- Barbosa, Carolina, Alexander Cowell, Jeremy Bray, and Arnie Aldridge. 2015. "The Cost-Effectiveness of Alcohol Screening, Brief Intervention, and Referral to Treatment (SBIRT) in Emergency and Outpatient Medical Settings." *Journal of Substance Abuse Treatment* 53 (June): 1–8. <https://doi.org/10.1016/j.jsat.2015.01.003>.
- Barbosa, Carolina, Alexander J. Cowell, Justin Landwehr, William Dowd, and Jeremy W. Bray. 2016. "Cost of Screening, Brief Intervention, and Referral to Treatment in Health Care Settings." *Journal of Substance Abuse Treatment* 60 (January): 54–61. <https://doi.org/10.1016/j.jsat.2015.06.005>.
- Bernstein, Steven L., and Gail D'Onofrio. 2017. "Screening, Treatment Initiation, and Referral for Substance Use Disorders." *Addiction Science & Clinical Practice* 12 (1): 18. <https://doi.org/10.1186/s13722-017-0083-z>.
- Bogenschutz, Michael P., Dennis M. Donovan, Raul N. Mandler, Harold I. Perl, Alyssa A. Forcehimes, Cameron Crandall, Robert Lindblad, et al. 2014. "Brief Intervention for Patients with Problematic Drug Use Presenting in Emergency Departments: A Randomized Clinical Trial." *JAMA Internal Medicine* 174 (11): 1736–45. <https://doi.org/10.1001/jamainternmed.2014.4052>.
- Bose, Jonaki, Sarra L. Hedden, Rachel Lipari, Park-Lee Eunice, Jeremy D. Porter, and Michael R. Pemberton. 2016. "Key Substance Use and Mental Health Indicators in the United States: Results from the 2015 National Survey on Drug Use and Health." <https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2015/NSDUH-FFR1-2015/NSDUH-FFR1-2015.htm#cmhi02>.
- Bray, Jeremy W., Alexander J. Cowell, and Jesse M. Hinde. 2011. "A Systematic Review and Meta-Analysis of Health Care Utilization Outcomes in Alcohol Screening and Brief Intervention Trials." *Medical Care* 49 (3): 287–94. <https://doi.org/10.1097/MLR.0b013e318203624f>.
- Bray, Jeremy W., Erin Mallonee, William Dowd, Arnie Aldridge, Alexander J. Cowell, and Janice Vendetti. 2014. "Program- and Service-Level Costs of Seven Screening, Brief Intervention, and Referral to Treatment Programs." *Substance Abuse and Rehabilitation* 5:63–73. <https://doi.org/10.2147/SAR.S62127>.
- Bray, Jeremy W., Gary A. Zarkin, Jesse M. Hinde, and Michael J. Mills. 2012. "Costs of Alcohol Screening and Brief Intervention in Medical Settings: A Review of the Literature." *Journal of Studies on Alcohol and Drugs* 73 (6): 911–19.
- Busch, Susan H., David A. Fiellin, Marek C. Chawarski, Patricia H. Owens, Michael V. Pantalon, Kathryn Hawk, Steven L. Bernstein, Patrick G. O'Connor, and Gail D'Onofrio. 2017. "Cost-Effectiveness of Emergency Department-Initiated Treatment for Opioid Dependence." *Addiction (Abingdon, England)* 112 (11): 2002–10. <https://doi.org/10.1111/add.13900>.
- CHCF. 2017. "Emergency Care for the Opioid Epidemic: Hospitals Step Up to Offer Buprenorphine in the ED." *California Health Care Foundation* (blog). September 29, 2017. <https://www.chcf.org/publication/emergency-care-for-the-opioid-epidemic-hospitals-step-up-to-offer-buprenorphine-in-the-ed/>.
- Cowell, Alexander J., William N. Dowd, Michael J. Mills, Jesse M. Hinde, and Jeremy W. Bray. 2017. "Sustaining SBIRT in the Wild: Simulating Revenues and Costs for Screening, Brief Intervention and Referral to Treatment Programs." *Addiction (Abingdon, England)* 112 Suppl 2 (February): 101–9. <https://doi.org/10.1111/add.13650>.

- Dartmouth-Hitchcock. 2018. "Emergency Department Recovery Coach: Substance Use and Mental Health Initiative (SUMHI)." 2018. <http://med.dartmouth-hitchcock.org/sumhi/ed-recovery-coach.html>.
- D'Onofrio, Gail, Patrick G. O'Connor, Michael V. Pantalon, Marek C. Chawarski, Susan H. Busch, Patricia H. Owens, Steven L. Bernstein, and David A. Fiellin. 2015. "Emergency Department-Initiated Buprenorphine/Naloxone Treatment for Opioid Dependence: A Randomized Clinical Trial." *JAMA* 313 (16): 1636–44. <https://doi.org/10.1001/jama.2015.3474>.
- Estee, Sharon, Thomas Wickizer, Lijian He, Melissa Ford Shah, and David Mancuso. 2010. "Evaluation of the Washington State Screening, Brief Intervention, and Referral to Treatment Project: Cost Outcomes for Medicaid Patients Screened in Hospital Emergency Departments." *Medical Care* 48 (1): 18–24. <https://doi.org/10.1097/MLR.0b013e3181bd498f>.
- Ganann, Rebecca, Donna Ciliska, and Helen Thomas. 2010. "Expediting Systematic Reviews: Methods and Implications of Rapid Reviews." *Implementation Science*, 10.
- Gentilello, Larry M., Pat Duggan, Dean Drummond, Alan Tonnesen, Eugene E. Degner, Ronald P. Fischer, and R. Lawrence Reed. 1988. "Major Injury as a Unique Opportunity to Initiate Treatment in the Alcoholic." *American Journal of Surgery* 156 (6): 558–61. [https://doi.org/10.1016/S0002-9610\(88\)80553-1](https://doi.org/10.1016/S0002-9610(88)80553-1).
- Guan, Wentao, Tao Liu, Janette R. Baird, and Roland C. Merchant. 2015. "Evaluation of a Brief Intervention to Reduce the Negative Consequences of Drug Misuse among Adult Emergency Department Patients." *Drug and Alcohol Dependence* 157 (December): 44–53. <https://doi.org/10.1016/j.drugalcdep.2015.10.007>.
- Horn, Brady P., Cameron Crandall, Alyssa Forcehimes, Michael T. French, and Michael Bogenschutz. 2017. "Benefit-Cost Analysis of SBIRT Interventions for Substance Using Patients in Emergency Departments." *Journal of Substance Abuse Treatment* 79 (August): 6–11. <https://doi.org/10.1016/j.jsat.2017.05.003>.
- Jonas, Daniel E., Halle R. Amick, Cynthia Feltner, Georgiy Bobashev, Kathleen Thomas, Roberta Wines, Mimi M. Kim, et al. 2014. "Pharmacotherapy for Adults with Alcohol Use Disorders in Outpatient Settings: A Systematic Review and Meta-Analysis." *JAMA* 311 (18): 1889–1900. <https://doi.org/10.1001/jama.2014.3628>.
- Lee, Jinhee, Thomas F. Kresina, Melinda Campopiano, Robert Lubran, and H. Westley Clark. 2015. "Use of Pharmacotherapies in the Treatment of Alcohol Use Disorders and Opioid Dependence in Primary Care." Research article. *BioMed Research International*. 2015. <https://doi.org/10.1155/2015/137020>.
- Longabaugh, Richard, P. Allison Minugh, Ted D. Nirenberg, Patrick R. Clifford, Bruce Becker, and Robert Woolard. 1995. "Injury as a Motivator to Reduce Drinking." *Academic Emergency Medicine* 2 (9): 817–25. <https://doi.org/10.1111/j.1553-2712.1995.tb03278.x>.
- Lynch, Michael J., and Donald M. Yealy. 2018. "Looking Ahead: The Role of Emergency Physicians in the Opioid Epidemic." *Annals of Emergency Medicine*, February. <https://doi.org/10.1016/j.annemergmed.2018.01.051>.
- Martin, Alister, Andreas Mitchell, Sarah Wakeman, Ben White, and Ali Raja. 2018. "Emergency Department Treatment of Opioid Addiction: An Opportunity to Lead." *Academic Emergency Medicine*, February. <https://doi.org/10.1111/acem.13367>.
- Merchant, Roland C., Janette R. Baird, and Tao Liu. 2015. "Short-Term Efficacy of a Brief Intervention to Reduce Drug Misuse and Increase Drug Treatment Utilization Among Adult Emergency Department Patients." *Academic Emergency Medicine: Official Journal of the Society for Academic Emergency Medicine* 22 (10): 1172–80. <https://doi.org/10.1111/acem.12767>.
- NHLBI (National Heart, Lung, and Blood Institute). n.d. "Study Quality Assessment Tools." Accessed May 21, 2018. <https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools>.
- Paltzer, Jason, Richard L. Brown, Marguerite Burns, D. Paul Moberg, John Mullahy, Ajay K. Sethi, and David Weimer. 2017. "Substance Use Screening, Brief Intervention, and Referral to Treatment Among Medicaid Patients in Wisconsin: Impacts on Health Care Utilization and Costs." *Journal of Behavioral Health Services & Research* 44 (1): 102–12. <https://doi.org/10.1007/s11414-016-9510-2>.

- Peterson-Kaiser. 2017. "What Are the Current Costs and Outcomes Related to Mental Health and Substance Abuse Disorders?" *Peterson-Kaiser Health System Tracker* (blog). 2017. <https://www.healthsystemtracker.org/chart-collection/current-costs-outcomes-related-mental-health-substance-abuse-disorders/>.
- Pringle, Janice L., David K. Kelley, Shannon M. Kearney, Arnie Aldridge, William Dowd, William Johnjulio, Arvind Venkat, Michael Madden, and John Lovelace. 2018. "Screening, Brief Intervention, and Referral to Treatment in the Emergency Department: An Examination of Health Care Utilization and Costs." *Medical Care* 56 (2): 146–52. <https://doi.org/10.1097/MLR.0000000000000859>.
- RI DOH, RI BDHDDH. 2017. "Levels of Care for Rhode Island Emergency Departments and Hospitals for Treating Overdose and Opioid Use Disorder." March 2017. <http://health.ri.gov/publications/guides/LevelsOfCareForTreatingOverdoseAndOpioidUseDisorder.pdf>.
- Rubin, Rita. 2018. "As Overdoses Climb, Emergency Departments Begin Treating Opioid Use Disorder." *JAMA*, May. <https://doi.org/10.1001/jama.2018.4648>.
- Rutgers School of Social Work. 2018. "New Jersey Opioid Overdose Recovery Program." <https://socialwork.rutgers.edu/centers/center-prevention-science/center-initiatives-and-programs/new-jersey-opioid-overdose-recovery-program>.
- SAMHSA NREPP. 2011. "Project ASSERT (Alcohol and Substance Abuse Services, Education, and Referral to Treatment)." May. <https://nrepp.samhsa.gov/Legacy/ViewIntervention.aspx?id=222>.
- SAMHSA-HRSA. 2011. "SBIRT: Screening, Brief Intervention, and Referral to Treatment." <https://www.integration.samhsa.gov/clinical-practice/sbirt>.
- Speaker, Elizabeth, Jim Mayfield, and Barbara Felver. 2017. "Sustainability of Screening, Brief Intervention and Referral to Treatment in Health Care Settings (WASBIRT-PCI)." *WA DSHS Research and Data Analysis Division*, 12.
- Vestal, Christine. 2017. "Coaching Overdose Survivors to Avoid the Next One." June 2, 2017. <http://pew.org/2sj8IN8>.
- Walton, Maureen A., Abby L. Goldstein, Stephen T. Chermack, Ryan J. Mccammon, Rebecca M. Cunningham, Kristen L. Barry, and Frederic C. Blow. 2008. "Brief Alcohol Intervention in the Emergency Department: Moderators of Effectiveness." *Journal of Studies on Alcohol and Drugs* 69 (4): 550–60. <https://doi.org/10.15288/jsad.2008.69.550>.
- Weiss, Audrey M., Marguerite L. Barrett, Kevin C. Heslin, and Carol Stocks. 2016. "Trends in Emergency Department Visits Involving Mental and Substance Use Disorders, 2006-2013 #216." December 2016. https://www.hcup-us.ahrq.gov/reports/statbriefs/sb216-Mental-Substance-Use-Disorder-ED-Visit-Trends.jsp?utm_source=AHRO&utm_medium=EN-1&utm_term=&utm_content=1&utm_campaign=AHRO_EN1_10_2017.
- Woodruff, Susan I., John D. Clapp, Kimberly Eisenberg, Cameron McCabe, Melinda Hohman, Audrey M. Shillington, C. Beth Sise, et al. 2014. "Randomized Clinical Trial of the Effects of Screening and Brief Intervention for Illicit Drug Use: The Life Shift/Shift Gears Study." *Addiction Science & Clinical Practice* 9 (May): 8. <https://doi.org/10.1186/1940-0640-9-8>.
- Woolard, Robert, Janette Baird, Richard Longabaugh, Ted Nirenberg, Christina S. Lee, Michael J Mello, and Bruce Becker. 2013. "Project REDUCE: Reducing Alcohol and Marijuana Misuse: Effects of a Brief Intervention in the Emergency Department." *Addictive Behaviors* 38 (3): 1732–39. <https://doi.org/10.1016/j.addbeh.2012.09.006>.
- Wu, Li-Tzy, Marvin S. Swartz, Zunyou Wu, Paolo Mannelli, Chongming Yang, and Dan G. Blazer. 2012. "Alcohol and Drug Use Disorders among Adults in Emergency Department Settings in the United States." *Annals of Emergency Medicine* 60 (2): 172-180.e5. <https://doi.org/10.1016/j.annemergmed.2012.02.003>.
- Zarkin, Gary, Jeremy Bray, Jesse Hinde, and Richard Saitz. 2015. "Costs of Screening and Brief Intervention for Illicit Drug Use in Primary Care Settings." *Journal of Studies on Alcohol and Drugs* 76 (2): 222–28.

About the Authors

Lisa Clemans-Cope is a principal research associate and health economist in the Health Policy Center at the Urban Institute. Her areas of expertise include substance use disorder treatment, health spending, access to and use of health care, Medicaid and CHIP programs, health reform legislation and regulation, and health-related survey and administrative data. She has led qualitative and quantitative research projects examining the impacts of policies aimed at improving diagnosis and treatment of individuals with substance use disorders. Clemans-Cope holds a BA in economics from Princeton University and a doctorate in health economics from the Johns Hopkins Bloomberg School of Public Health.

Sarah Benatar is a senior research associate in the Health Policy Center. With substantive expertise in maternal and child health, much of her work is focused on CHIP and Medicaid beneficiaries. Recent work includes an evaluation of CMMI's Strong Start for Mothers and Newborns initiative—examining the impacts of alternative prenatal care and delivery models on preterm birth reduction for a Medicaid population, including pregnant substance users. Benatar has conducted key informant interviews in New Hampshire to understand the state's substance use disorder benefit array and access challenged following expansion of SUD coverage to the traditional Medicaid population. She holds a BA in sociology from Wesleyan University and a PhD in public policy from the George Washington University.

Nikhil Holla is a research analyst in the Health Policy Center. His work focuses on substance abuse and the social determinants of health surrounding low income mothers and children. He received a BA from Washington University in St. Louis.

Marni Epstein is a research assistant in the Health Policy Center. Her current works focuses on treatment of substance use disorder under Medicaid and quantitative analysis of Medicaid administrative claims data. She received a BA from Johns Hopkins University.

STATEMENT OF INDEPENDENCE

The Urban Institute strives to meet the highest standards of integrity and quality in its research and analyses and in the evidence-based policy recommendations offered by its researchers and experts. We believe that operating consistent with the values of independence, rigor, and transparency is essential to maintaining those standards. As an organization, the Urban Institute does not take positions on issues, but it does empower and support its experts in sharing their own evidence-based views and policy recommendations that have been shaped by scholarship. Funders do not determine our research findings or the insights and recommendations of our experts. Urban scholars and experts are expected to be objective and follow the evidence wherever it may lead.



2100 M Street NW
Washington, DC 20037

www.urban.org