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INTRODUCTION
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Screening, Brief Intervention and Referral to Treatment (SBIRT): rationale, program overview and cross-site evaluation

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ABSTRACT

Aims Since 2003, the US Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment (SAMHSA, CSAT) has awarded 32 Screening, Brief Intervention and Referral to Treatment (SBIRT) grants to states, territories and tribal organizations to enhance services for persons with, or at risk for, substance use disorders. The grants supported an expansion of the continuum of care to include screening, brief intervention, brief treatment and referral to treatment in general medical and community settings. This paper describes the SAMHSA SBIRT program in the context of the scientific research that motivated its development, as well as the two cross-site evaluations that are the subject of subsequent papers in this Supplement. **Methods** A narrative review of research evidence pertaining to SBIRT and of the cross-site evaluation design that made it possible to determine whether the SAMHSA SBIRT grant program achieved its intended aims. The 11 programs within the two cohorts of grant recipients that were the subject of the cross-site evaluations are described in terms of SBIRT service components, performance sites, providers, management structure/activities and patient/client characteristics. **Conclusion** The US SAMHSA SBIRT program is an effective way to introduce a variety of new services that extend the continuum of care for substance-involved individuals, ranging from early intervention with non-dependent substance users to referral of more serious cases to specialized substance abuse treatment.

Keywords Alcohol, brief intervention, brief treatment, drugs, referral to treatment, SBIRT, screening, substance abuse.

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INTRODUCTION

In 1980, the World Health Organization called for improved treatment for alcohol use disorders and stressed the need for efficient methods to identify people with harmful and hazardous alcohol consumption before health and social consequences develop or become pronounced [1]. Since that time, researchers and policymakers have devoted increasing attention to the potential harm caused by substance use across the full spectrum of use patterns, and numerous studies have shown the efficacy of screening and brief intervention (SBI) for hazardous and harmful alcohol use. More than 50 randomized clinical trials of brief intervention delivered to non-dependent, non-treatment-seeking patients in various health-care settings have been conducted. Most research to date has occurred in English-speaking countries (United Kingdom, United States, Canada, Australia), the Nordic countries (Sweden, Norway, Denmark, Finland) and some Continental European nations (Spain, France and Germany). The efficacy and effectiveness of SBI has been documented in numerous systematic reviews and meta-analyses (e.g. [2–10]).

Other studies have explored SBI for illicit drugs, showing mixed results. Two recently completed, randomized clinical trials tested the efficacy of SBI and found no significant differences in the reduction of illicit drug use or prescription drug misuse between study groups [11,12]. However, a large multi-center cross-national trial, supported by the World Health Organization (WHO), showed overall effects in primary care settings for reduced drug use in patients receiving SBI, although no significant effects were found for the US sites when examined separately [13]. Further, although SBI for at-risk drug

use has not been studied as extensively as at-risk alcohol use [14], earlier clinical studies provide some evidence that SBI may be effective in decreasing at-risk drug use. For example, SBI has been demonstrated to be effective for decreasing subsequent cocaine and heroin use [15], cannabis use [16], amphetamine use [17] and benzodiazepine use [18,19].

In light of the potential clinical efficacy, especially as related to alcohol-focused SBI, policymakers in several countries have initiated demonstration and implementation programs at local and regional levels. This paper describes the most ambitious of these demonstration programs undertaken in the United States: the US Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment (SAMHSA, CSAT) Screening, Brief Intervention and Referral to Treatment (SBIRT) discretionary grant program. Additionally, the cross-site evaluation of the first and third cohorts of SBIRT grant recipients is described, together with a brief overview of the remaining papers that comprise this Supplement.

SAMHSA'S SBIRT PROGRAM

SAMHSA initiated its SBIRT discretionary grant program in 2003 under its Request for Applications (RFA) no. TI03–009. To ensure access to specialty treatment for individuals needing higher levels of care, SAMHSA attached the Referral to Treatment acronym (RT) to the commonly used SBI abbreviation within the RFA title. By including the full range of treatment services represented by 'SBIRT', SAMHSA required grant recipients to explore novel service linkages and investigate a previously underemphasized component of SBI service. From a public health perspective, the SBIRT initiative was designed to accomplish the following objectives: (a) to include services in general medical and other community settings, such as community health centers, school-based health clinics and student assistance programs, occupational health clinics, hospitals and emergency departments; (b) to support clinically appropriate treatment services for non-dependent substance users and for people with substance use disorder diagnoses; (c) to improve linkages among generalist community agencies performing SBIRT and specialist substance abuse treatment agencies; and (d) to identify systems and policy changes needed to increase access to treatment in generalist and specialist settings.

The SAMHSA SBIRT programs were funded via cooperative agreements between the federal government and grant recipients to enhance substance abuse treatment service systems by expanding the continuum of care in both urban and rural population areas. With annual funding support for its first cohort of programs ranging from $2 500 000 to $3 500 000 for 5 years, the SAMHSA SBIRT initiative represented the most ambitious project of its kind, one that could set the stage for a major advance in our understanding of how evidence-based practice can be disseminated within the US health-care system. Each program was permitted to choose the subrecipient communities in which to administer the program, and was also allowed to select preferred implementation models, evidence-based service delivery protocols and staffing configurations.

With subsequent funding cycles in 2005, 2008, 2011, 2012, 2013 and 2014, the SAMHSA SBIRT initiative has funded a total of 29 states (four of which have received two rounds of funding), two tribal councils and one US territory. In addition to these cooperative agreements, the SAMHSA SBIRT initiative has funded 12 campus-based programs at colleges and universities to combat underage drinking and promote innovative SBIRT practices in the context of student health care, 17 medical residency cooperative agreements to promote the adoption of SBIRT among primary care and specialty medical residents and more than 70 training programs for a variety of health professionals.

Cohorts 1 and 3 of SAMHSA's SBIRT program, which are the focus of this Supplement, included nine states (California, Georgia, Illinois, Missouri, New Mexico, Pennsylvania, Texas, Washington and West Virginia) and two tribal organizations (Cook Inlet Tribal Council and Tanana Chiefs Conference in Alaska). Program services targeted a variety of risk factors and were implemented across a range of health-care and other settings in both urban and rural locations.

Tables 1 and 2 provide program descriptions of the two SAMHSA cohorts of grant recipients. These summaries are organized in terms of the components of the SBIRT Program Matrix, a conceptual framework that specifies key program features (see [20]). SBIRT services, performance sites, providers and management structure/activities are outlined in Table 1; characteristics of patients/clients served by each program cohort are presented in Table 2.

As Table 1 indicates, the two cohorts were similar in terms of the types of SBIRT services provided. Differences between cohorts reflect changing SAMHSA mandates, as well as alterations based on the experience of earlier funding recipients (see [21]). Although pre-screening was performed at some cohort 1 sites, this service was conducted universally in cohort 3, and there was a tendency to screen for more risk factors. In particular, SAMHSA required some level of screening for mental health issues for the latter group of programs. Although several different full screening instruments (e.g. the AUDIT [22] and the Drug Abuse Screening Test (DAST) [23]) were used by cohort 1 programs, SAMHSA mandated that all cohort 3 grant recipients use the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST [24]) to screen for alcohol and illicit substance use. Programs in the two cohorts were

Table 1 US Substance Abuse and Mental Health Services Administration (SAMHSA) Screening, Brief Intervention and Referral to Treatment (SBIRT) cross-site evaluation cohorts: program matrix components.

	Cohort 1: funded 2003–2008	*Cohort 3: funded 2008–2013*
Grantees	7 Grant recipients: California; Cook Inlet Tribal Council (Alaska); Illinois; New Mexico; Pennsylvania; Texas; Washington	4 Grant recipients: Tanana Chiefs Conference (Alaska); Georgia; Missouri; West Virginia
Risk factors	Alcohol, illicit drug use, prescription drug abuse (7); other: tobacco, mental health	Alcohol, illicit drug use, prescription drug abuse, tobacco, mental health (4); other: domestic violence
SBIRT services		
Pre-screen (PS)	No alcohol (2); AUDIT-C (3), 1-item alcohol (1); NIAAA (1); no drug (3); 1-item drug (3); 3-item drug (1)	Program-specific questions (1), AUDIT-C (1); PHQ-2 (1); NIAAA, NIDA variants (1)
Screen	AUDIT (6), AUDIT-C (1); ASSIST (1), TCU Screen (1); DAST-10 (4); 3-item drug (2); drug screen II (1); drug PS only (1)	ASSIST (4); Kessler-6 (1); CRAFFT (3); PHQ-9 (1); SF-12 (1); GAIN (1); personal feedback form (1)
Brief intervention		
Approach	MI, FRAMES, NIAAA Guidelines; in-person (7); optional telephone booster sessions (2)	MI, MET, FRAMES, SOC, personal feedback; SAMHSA Committee on Quick Trauma Guide; in-person (4), telephonic (2)
Number of sessions	1–6 across programs	1–6 across programs
Duration of sessions	5–10-minute initial session, follow-ups up to 1 hour, across programs	10–60 minutes across programs
Brief treatment		
Approach	MI (7); CBT (2); CRA (2); individual in-person (4), on-site/telephonic added (6)	MET, MET/CBT5; FRAMES, personal feedback (4); CRA, functional analysis (1); CBT (2); individual in-person, on-site/telephonic (4)
Number of sessions	2–6 (2); 4–12 (1); 5–12 (1); 6–8 (1); 6–12(1); 8–10 (1); unlimited (1)	1–6 (1); 1–8 (1); 1–12 (1); 1–20 (1)
Duration of sessions	15–90 minutes across programs	45 minutes–2 hours across programs
Referral to treatment	At-risk patients/clients referred to a range of substance abuse treatment and community services (7)	At-risk patients/clients referred to a range of substance abuse treatment and community services (4); ASAM criteria used to determine level of care (2); TREM (1)
Performance sites	Emergency departments/trauma centers (ED/TC) (5); ambulatory clinics (7); in-patient hospital services (2); other (treatment facility) (1)	Emergency departments/trauma centers (ED/TC) (3); ambulatory clinics (4), in-patient hospital services (2); other (e.g. schools, health fairs, (1)
	Across programs, approximately 92 venues; 91 medical performance sites: 22 ED/TC; 56 ambulatory clinics; 13 in-patient hospital services	Across programs, approximately 200 venues; 97 medical performance sites: 11 ED/TC; 79 ambulatory clinics; 7 in-patient hospital services
Providers	Pre-screening and screening performed by general medical staff (e.g. nurses); BI conducted by physicians, but more often by dedicated, Master's-level SBIRT staff; BT often limited to more experienced and credentialed providers; RT service augmented by referral liaisons, care coordinators; strategies to improve access (e.g. warm hand-off, transportation)	Pre-screening and screening performed by general medical staff (e.g. nurses); BI conducted by physicians, but more often by dedicated, Master's-level SBIRT staff; BT often limited to more experienced and credentialed providers; RT service augmented by referral liaisons, care coordinators; strategies to improve access (e.g. warm hand-off, transportation)
Management structure/activities		
Hiring and training	Manualized protocols (7); formal training period/ seminar, typically involving didactic instruction, role play and feedback, direct observation of patient/client interactions, and/or 'shadowing' provider service lasting 2 days or less (3), 1 week (1), 2 weeks (1) or 1 month (1)	Manualized protocols (4); PS training for generalist staff (1); formal training period/seminar, typically 1 week, involving didactic instruction, role play and feedback, direct observation of patient/client interactions, and/or 'shadowing' provider service (4); external, contracted training (2)
Coaching and staff evaluation	Regular re-calibration training sessions, review of taped sessions, 'standardized patient' exercises, role play and/ or 'shadowing' (6); regular meetings (2); monthly in-service training (1); surveys to target areas of interest, concern (2); productivity monitoring (1).	Regular meetings and/or conference calls (4); taped sessions, 'standardized patient' exercises, and/or 'shadowing' (3); annual retreat/refresher training (2)

(***Continues***)

Table 1. (Continued)

	Cohort 1: funded 2003–2008	*Cohort 3: funded 2008–2013*
Dissemination	Routine use of screening/outcome data for evaluation, quality improvement, and SBIRT promotion (7); leadership conferences (1); promotional videos, presentations (2); published papers (3); newsletter (1)	Routine use of screening/outcome data for evaluation, quality improvement, and SBIRT promotion (4); website (1)

Parenthetical values indicate the number of programs within the cohort adopting each instrument/approach. Screening instruments: ASSIST = Alcohol, Smoking and Substance Involvement Screening Test [35]; AUDIT = Alcohol Use Disorders Identification Test (Document no. WHO/MSD/MSB/01.6a; [22]); AUDIT-C = Alcohol Use Disorders Identification Test-C [36]; CRAFFT = Car, Relax, Alone, Forget, Friends, Trouble [37]; DAST-10: Drug Abuse Screening Test—10 item [23,38,39]; GAIN = Global Appraisal of Individual Needs [40]; Kessler 6 = Kessler Psychological Distress Scale-6 [41]; NIAAA Guide: *National Institute on Alcoholism and Alcohol Abuse Guide, Helping Patients Who Drink Too Much: A Clinician's Guide* [42]; PHQ-2 = Patient Health Questionnaire-2 [43]; PHQ-9 = Patient Health Questionnaire-9 [44]; SF-12 = 12-Item Short-Form Health Survey [45]; TCU Drug Screen II: Texas Christian University Drug Screen (Institute of Behavioral Research, Texas Christian University). Not all performance sites within each program used the same pre-screen and screening tools; some changes occurred over time in the use of specific instruments. Intervention/treatment approaches: CBT = cognitive–behavioral therapy [46]; CRA = community-reinforcement approach [47,48]; FRAMES = Feedback, Responsibility, Advise, Menu, Empathy, Self-efficacy [49,50]; Matrix Model [51]; MET = motivational enhancement therapy [52,53]; MET/CBT5 = motivational enhancement therapy and cognitive–behavioral therapy 5 [54]; MI = motivational interviewing [55,53]; NIAAA Guide: *National Institute on Alcoholism and Alcohol Abuse Guide, Helping Patients Who Drink Too Much: A Clinician's Guide* [42]; SOC = stages of change [56]; American College of Surgeons Committee on Trauma Quick Guide [57] Referral to treatment: ASAM = American Society of Addiction Medicine Guidelines [58]; TREM = Trauma Recovery and Empowerment Model [59]

required to include a brief treatment (BT) component in addition to BI and RT. Across both, motivational interviewing and related approaches were used for BI and BT. On-site BT provision and telephonic delivery of BI and BT were more prevalent in the third program cohort.

SBIRT services were provided in a diverse set of healthcare venues by programs in both cohorts. However, as shown in Table 1, cohort 3 expanded the reach of SBIRT into a broader array of community settings, such as schools and time-limited health fairs. Although there were only four programs in the third cohort (compared with seven in the first), there were approximately twice as many SBIRT performance sites.

With respect to SBIRT providers, cohort 3 programs continued the trends established by cohort 1; medical generalists were largely responsible for pre-screening (e.g. by nursing staff during intake), with the more clinically oriented services, such as Screening/BI and BT, performed by dedicated SBIRT behavioral health or substance abuse counselors.

SBIRT programs in both cohorts were diverse in terms of managerial practices. All made use of evidence-based protocols, but there were variations in what have been described as key 'implementation drivers', such as staff hiring, training, coaching and evaluation [25].

Finally, there were differences in the populations served by the programs in the cohorts 1 and 3 SAMHSA grantees. Together, cohorts 1 and 3 grantees screened more than a million individuals. With more performance sites, the four cohort 3 programs served as many SBIRT participants as the seven in cohort 1. However, as indicated in Table 2, the screen positive rate for the first cohort was twice that of the third. Cohort 3 had more white and, concomitantly, fewer minority participants, despite similarities in terms of gender and age composition.

Table 2 US Substance Abuse and Mental Health Services Administration (SAMHSA) Screening, Brief Intervention and Referral to Treatment (SBIRT) cross-site evaluation cohorts: patient/client populations.

	Cohort 1 *n = 528 036*	*Cohort 3* *n = 489 396*
Risk status		
Pre-screen positive (%)	NA	18.4
Screen positive (%)	22.4	11.1
Highest recommended service (%)		
BI	15.1	8.8
BT	3.3	1.0
RT	4.0	1.3
Demographic characteristics		
Gender (% male)	43.8	42.1
Age [mean (SD)]	43.6 (17.3)	44.1 (18.7)
Race/ethnicity (%)		
Black/African American	26.2	23.3
Asian	3.0	0.6
Alaskan Native	3.2	2.1
White	47.7	65.6
Other	19.9	8.4
Hispanic (%)	28.2	1.2
Education (%)[a]		
Did not graduate high school	39.1	31.9
High school graduate	54.2	62.9
College degree or higher	5.2	5.2
Employed (%)[a,b]	28.7	29.0
Patterns of alcohol and other substance use[b,c]		
Alcohol use (%)	74.4	80.0
Alcohol intoxication (5+ drinks) (%)	50.4	64.9
Illegal drug use (%)	41.8	45.8
Alcohol and drugs (%)	30.0	32.1
Marijuana (%)	27.3	33.8
Cocaine (%)	14.5	10.3

(***Continues***)

Table 2. (Continued)

	Cohort 1 *n = 528 036*	*Cohort 3* *n = 489 396*
Heroin (%)	5.5	1.2
Methamphetamines (%)	5.2	2.0
Injected drugs (%)	4.7	2.4
Legal, physical and mental health status[a,b]		
Legal issues (%)		
Committed crimes	61.3	77.3
Awaiting trial	10.8	9.6
Parole/probation	15.6	13.8
Physical health [mean (SD)][d]	3.8 (1.0)	3.8 (1.0)
Mental health issues [mean (SD)][e]		
Depression days	9.8 (12.5)	12.4 (13.2)
Anxiety days	9.4 (12.3)	12.4 (13.2)
Cognitive impairment days	5.9 (10.6)	7.5 (11.6)
Violent behavior days	1.1 (4.5)	1.7 (5.8)
Recent treatment experiences[a,b]		
In-patient (%)		
Physical health	22.0	12.5
Mental health	3.7	7.8
Alcohol/substance abuse	8.5	8.1
Emergency department (%)		
Physical health	59.8	51.8
Mental health	9.1	15.3
Alcohol/substance abuse	17.8	23.4

[a]Values are based only on those participants for whom brief treatment (BT) and referral to treatment (RT) were the highest recommended levels of SBIRT service. [b]Responses refer to the 30-day period prior to the interview. [c]Values are based only on those participants who screened positive. [d]Mean [standard deviation (SD)] response scale: 1 = excellent, 2 = very good, 3 = good, 4 = fair, 5 = poor. [e]Mean number of the days in the 30-day period prior to the interview. [f]Includes those enrolled in school/training. BI = brief intervention; NA = not applicable.

Among those who screened positive, cohort 3 participants reported higher levels of alcohol consumption and generally similar rates of illicit drug use. However, rates for specific substances (marijuana, cocaine, heroin and methamphetamine) were higher in the first cohort than the third. Finally, participants in cohort 3 reported more frequent mental health issues, as well as more prior treatment experiences for these problems.

SBIRT CROSS-SITE EVALUATIONS

In addition to SBIRT service grants, SAMHSA funded three cross-site evaluations to provide an independent, systematic examination of its SBIRT programs: the first in 2004 to investigate the first cohort of SBIRT grant recipients, the second in 2009 to evaluate the third cohort of programs, and a third evaluation funded in 2013 that is currently evaluating the SBIRT grant programs funded in 2013 and 2014. The first two of these evaluations provide the basis for this Supplement. An overview of the common approach used by both cross-site evaluations appears below; more detail regarding specific methods is given in the individual papers in this volume.

Using a mixed-method approach, researchers at RTI International, the University of Connecticut School of Medicine, JBS International, Inc. and the AVISA Group conducted evaluations of the SBIRT grant program as implemented in the first and third cohorts of grantees. The evaluation methodology emphasized drawing conclusions across all grantees rather than evaluating SBIRT within any given grantee. As illustrated in Fig. 1, the cross-site infrastructure supported three inter-related evaluation efforts: process, outcome and economic. The process evaluation examined the implementation of SBIRT in diverse settings and documented the content of each program. The outcome evaluation investigated the impact of SBIRT interventions on patients/clients. The economic evaluation examined the costs and cost-effectiveness of the SAMHSA SBIRT programs. In addition, systems-wide analyses drew upon all three components of the cross-site evaluation to explore the sustainability of the SAMHSA SBIRT programs and to examine their effects on key elements of the treatment systems in the grantee states and tribal organizations. The cross-site evaluations also developed methodological innovations to support their evaluation efforts and in response to evaluation design limitations necessitated by the goals of the SAMHSA SBIRT grant program. The collective findings of these evaluation efforts provided SAMHSA with a comprehensive assessment of the SBIRT programs as implemented by the first and third SAMHSA cohorts of grant recipients.

The process evaluation was largely descriptive, and focused upon the content of the SBIRT programs and the details of service delivery. The SBIRT Program Matrix was developed to facilitate this evaluation component by providing a conceptual model that identifies and organizes key SBIRT features [20]. The process evaluation collected information about which SBIRT services were performed, where they were provided, who delivered them, how they were organized and managed and to whom they were administered. Further, it investigated barriers to, and facilitators of, program implementation and examined how the grant recipients' initially proposed models were actually implemented in the field and how they changed or evolved over time [21]. Finally, the cross-site evaluators developed, tested and implemented a new methodology for assessing the degree of adherence to the evidenced-based protocols that were adopted by the SAMHSA programs [26], an issue critical to the interpretation of analyses of patient/client outcomes.

The outcome evaluation was designed to measure changes in substance use and other behaviors associated with the SBIRT interventions. Because numerous clinical trials have established that SBIRT services reduce substance use, and because the goals of the SAMHSA SBIRT

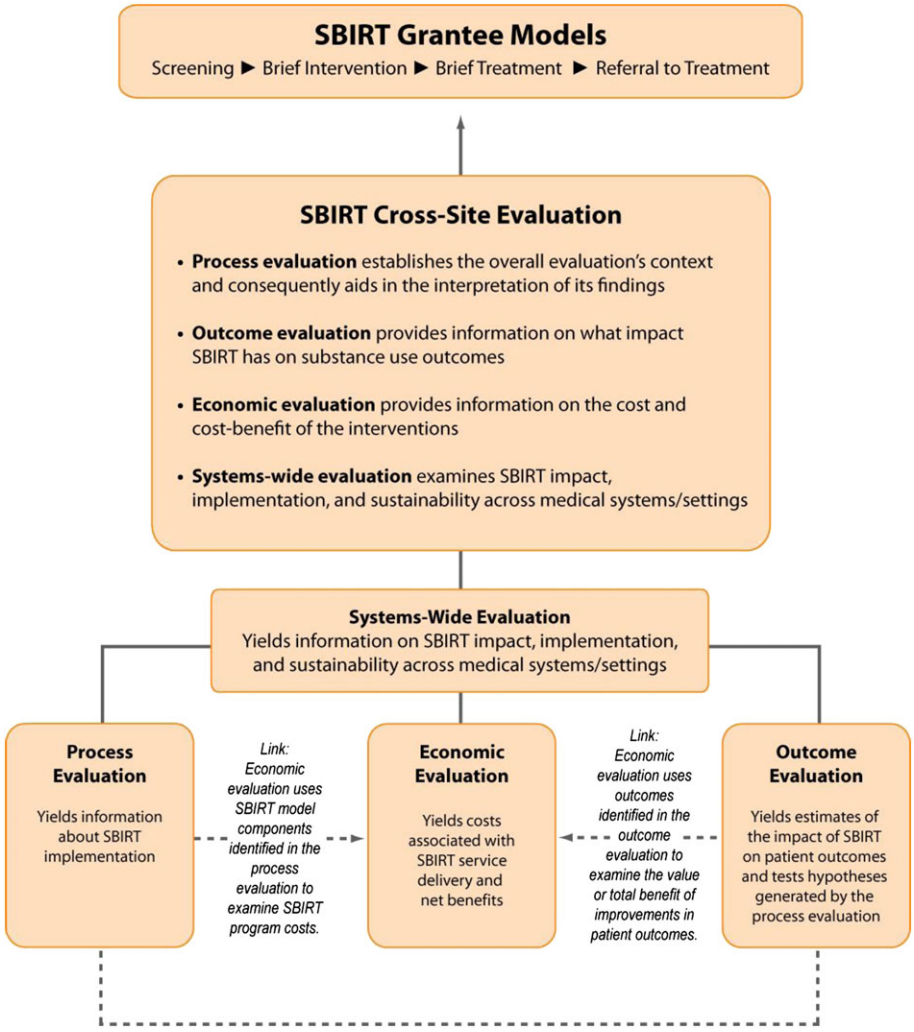

Figure 1 Screening, Brief Intervention and Referral to Treatment (SBIRT) cross-site evaluation framework

program precluded the recruitment of control or comparison groups, the objective of the cross-site outcome evaluation was to confirm that the SBIRT models implemented by the SAMHSA programs yielded the changes in patient/client substance use behaviors that are suggested by the extensive clinical trial literature. Two papers in this Supplement present findings from the cross-site outcome evaluation: one focused upon pre–post changes in substance use associated with SBIRT services [27]; the other employed propensity score-matching to assess the incremental effect of BT relative to BI [28].

The economic component conducted both cost and cost-effectiveness analyses (CEA) of the SBIRT grant programs. To investigate how personnel resources are allocated in their delivery, the economic evaluation team developed a methodology for estimating, in real time, the temporal duration of SBRT service delivery and a variety of related activities [29]. To assess the cost-effectiveness of the SBIRT service delivered, the economic evaluation team used CEA methods to compare the outcomes of the SAMHSA programs to their costs using the incremental cost-effectiveness ratio Barbosa *et al.* [30], which describes the probable additional clinical benefit achieved for each additional dollar spent on a given program.

Collectively, the process, outcome and economic evaluation efforts describe the SBIRT services delivered, their association with changes in client outcomes and their costs. System-focused questions combine data and results from the different cross-site evaluation components to draw broad conclusions about SAMHSA's SBIRT program. Two papers in this supplement address program sustainability issues and two explore issues related to the potential impact of the SAMHSA SBIRT grant program on broader treatment systems in the United States. The first sustainability paper [31] describes the sustainability achieved by the first cohort of SBIRT programs. The second sustainability paper explores financing issues associated with the delivery of SBIRT in the United States [32]. The first systems-level paper [33] explores the effects of US federal SBIRT and other funding and state-level institutional

constraints on the activation of SBIRT Medicaid reimbursement codes: a critical systems-level change that could impact SBIRT sustainability in the United States. Finally, the second systems-level paper [34] summarizes the findings of the SBIRT cross-site evaluation and focuses upon implications for health policy, clinical practice, intervention research and the diffusion of innovations.

CONCLUSION

In 1980, the WHO's call for improved treatment for alcohol use and for efficient methods to identify people with harmful and hazardous alcohol consumption resulted in the development of alcohol SBI. In the decades that followed, numerous studies have shown the efficacy of SBI for hazardous and harmful alcohol use, and a growing literature suggests that SBI may also be effective for illicit drug use, although findings are mixed across trials. In light of this evidence, many countries inaugurated moderate to large-scale demonstration projects to implement SBI as a public health approach to reducing substance misuse and its associated harms [9]. Recognizing the success of programs in other countries, SAMHSA initiated the SBIRT discretionary grant program in 2003. The remaining papers in this Supplement describe results from the cross-site evaluations of the first and third cohorts of SAMHSA grantees. Without a large-scale evaluation, however, little could be said about this ambitious program. With significant funding invested in SBIRT activities throughout the world, there is a growing need for systematic program evaluation research that addresses a range of translational issues such as feasibility, implementation barriers, patient outcomes, cost-effectiveness and program sustainability. As arguably the largest demonstration program of its kind, the SAMHSA SBIRT program, and its concomitant multipurpose evaluation, provide a major opportunity to inform providers, administrators, researchers and policymakers, both in the United States and other countries interested in SBIRT programs.

Declaration of interests

None.

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REFERENCES

1. World Health Organization (WHO). Management of Substance Abuse Website: World Health Organization; 2016; Available at: http://www.who.int/substance_abuse/activities/sbi/en/ (accessed 21 November 2016) (Archived at http://www.webcitation.org/6mBvTes3D on 21 November 2016).
2. Moyer A., Finney J. W., Swearingen C. E., Vergun P. Brief interventions for alcohol problems: a meta-analytic review of controlled investigations in treatment-seeking and non-treatment-seeking populations. *Addiction* 2002; **97**: 279–92.
3. D'Onofrio G., Degutis L. C. Preventive care in the emergency department: screening and brief intervention for alcohol problems in the emergency department: a systematic review. *Acad Emerg Med* 2002; **9**: 627–38.
4. Ballesteros J., Duffy J. C., Querejeta I., Ariño J., González-Pinto A. Efficacy of brief interventions for hazardous drinkers in primary care: systematic review and meta-analyses. *Alcohol Clin Exp Res* 2004; **28**: 608–18.
5. Bertholet N., Daeppen J., Wietlisbach V., Fleming M. F., Burnand B. Reduction of alcohol consumption by brief alcohol intervention in primary care: systematic review and meta-analysis. *Arch Intern Med* 2005; **165**: 986–95.
6. Whitlock E. P., Polen M. R., Green C. A., Orleans T., Klein J. Behavioral counseling interventions in primary care to reduce risky/harmful alcohol use by adults: a summary of the evidence for the US Preventive Services Task Force. *Ann Intern Med* 2004; **140**: 557–68.
7. Kaner E. F., Beyer F., Dickinson H. O., Pienaar E., Campbell F., Schlesinger C. *et al.* Effectiveness of brief alcohol interventions in primary care populations. *Cochrane Database Syst Rev* 2007; **2**: 1–62.
8. Babor T., McRee B., Kassebaum P., Grimaldi P., Ahmed K., Bray J. Screening, Brief Intervention, and Referral to Treatment (SBIRT). *Subst Abuse* 2007; **28**: 7–30.
9. Nilsen P., Kaner E., Babor T. F. Brief intervention, three decades on. *Nord Stud Alcohol Drugs* 2008; **25**: 453–67.
10. Álvarez-Bueno C., Rodríguez-Martín B., García-Ortiz L., Gómez-Marcos M. Á., Martínez-Vizcaíno V. Effectiveness of brief interventions in primary health care settings to decrease alcohol consumption by adult non-dependent drinkers: a systematic review of systematic reviews. *Prev Med* 2015; **76**: S33.
11. Saitz R., Palfai T. P. A., Cheng D. M., Alford D. P., Bernstein J. A., Lloyd-Travaglini C. A. *et al.* Screening and brief intervention for drug use in primary care: the ASPIRE randomized clinical trial. *JAMA* 2014; **312**: 502–13.
12. Roy-Byrne P., Bumgardner K., Krupski A., Dunn C., Ries R., Donovan D. *et al.* Brief intervention for problem drug use in safety-net primary care settings: a randomized clinical trial. *JAMA* 2014; **312**: 492–501.
13. Humeniuk R., Ali R., Babor T., Souza-Formigoni M. L. O., de Lacerda R. B., Ling W. *et al.* A randomized controlled trial of a brief intervention for illicit drugs linked to the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) in clients recruited from primary health-care settings in four countries. *Addiction* 2012; **107**: 957–66.
14. Babor T. F., Kadden R. M. Screening and interventions for alcohol and drug problems in medical settings: what works? *J Trauma Acute Care Surg* 2005; **59**: S80–S87.
15. Bernstein J., Bernstein E., Tassiopoulos K., Heeren T., Levenson S., Hingson R. Brief motivational intervention at a clinic visit reduces cocaine and heroin use. *Drug Alcohol Depend* 2005; **77**: 49–60.
16. Stephens R. S., Roffman R. A., Fearer S. A., Williams C., Burke R. S. The Marijuana Check-up: promoting change in ambivalent marijuana users. *Addiction* 2007; **102**: 947–57.
17. Baker A., Bucci S., Lewin T. J., Kay-Lambkin F., Constable P. M., Carr V. J. Cognitive–behavioural therapy for substance use disorders in people with psychotic disorders. *Br J Psychiatry* 2006; **188**: 439–48.
18. Cormack M. A., Howells E. Factors linked to the prescribing of benzodiazepines by general practice principals and trainees. *Fam Pract* 1992; **9**: 466–71.
19. Heather N., Bowie A., Ashton H., McAvoy B., Spencer I., Brodie J. *et al.* Randomised controlled trial of two brief interventions against long-term benzodiazepine use: outcome of intervention. *Addict Res Theory* 2004; **12**: 141–54.
20. Del Boca F. K., McRee B., Vendetti J., Damon D. The SBIRT program matrix: a conceptual framework for program implementation and evaluation. *Addiction* 2017; **112** (Suppl. 2): 12–22.
21. Vendetti J., Gmyrek A., Damon D., Singh M., McRee B., Del Boca F. K. Screening, brief intervention and referral to treatment (SBIRT): implementation barriers, facilitators and model migration. *Addiction* 2017; **112** (Suppl. 2): 23–33.
22. Babor T. F., Higgins-Biddle J. C., Saunders J. B., Monteiro M. G. Audit. The Alcohol Use Disorders Identification Test (AUDIT): Guidelines for Use in Primary Care. Geneva, Switzerland: World Health Organization; 2001.
23. Skinner H. A. The drug abuse screening test. *Addict Behav* 1982; **7**: 363–71.
24. Humeniuk R., Ali R., Babor T. F., Farrell M., Formigoni M. L., Jittiwutikarn J. *et al.* Validation of the alcohol, smoking and substance involvement screening test (ASSIST). *Addiction* 2008; **103**: 1039–47.
25. Fixsen D. L, Naoom S. F, Blase K. A, Friedman R. M. Implementation Research: a Synthesis of the Literature. Tampa, FL: University of South Florida, Louis de la Parte Florida Mental Health Institute, The National Implementation Research Network; 2005.
26. Vendetti J., McRee B., Singh M., Del Boca F. K. Development of the SBIRT Checklist for Observation in Real Time (SCORe). *Addiction* 2017; **112** (Suppl. 2): 34–42.
27. Aldridge A., Linford R., Bray J. W. Substance use outcomes of patients served by a large US implementation of screening, brief intervention, brief treatment and referral to treatment project (SBIRT). *Addiction* 2017; **112** (Suppl. 2): 43–53.
28. Aldridge A., Dowd W., Bray J. W. The relative impact of brief treatment versus brief intervention in primary health care

screening programs for substance use disorders. *Addiction* 2017; **112** (Suppl. 2): 54–64.
29. Cowell A. J., Dowd W., Landwehr J., Barbosa C., Bray J. W. A time and motion study of screening, brief intervention and referral to treatment implementation in health-care settings. *Addiction* 2017; **112** (Suppl. 2): 65–72.
30. Barbosa C., Cowell A. J., Dowd W., Landwehr J., Aldridge A., Bray J. W. The cost-effectiveness of brief intervention versus brief treatment of screening, brief intervention and referral to treatment (SBIRT) in the United States. *Addiction* 2017; **112** (Suppl. 2): 73–81.
31. Singh M., Gmyrek A., Hernandez A., Damon D., Hayashi S. Sustaining screening, brief intervention and referral to treatment (SBIRT) services in health-care settings. *Addiction* 2017; **112** (Suppl. 2): 92–100.
32. Cowell A. J., Dowd W., Mills M. J., Hinde J., Bray J. W. Sustaining SBIRT in the wild: simulating revenues and costs for substance abuse screening, brief intervention and referral to treatment programs. *Addiction* 2017; **112** (Suppl. 2): 101–9.
33. Hinde J., Bray J. W., Kaiser D., Mallonee E. The influence of state-level policy environments on the activation of the Medicaid SBIRT reimbursement codes. *Addiction* 2017; **112** (Suppl. 2): 82–91.
34. Babor T. F, Del Boca F. K, Bray J. W. Screening, brief intervention and referral to treatment: implications of SAMHSA's SBIRT initiative for substance abuse policy and practice *Addiction* 2017; **112** (Suppl. 2): 110–7.
35. Group W. A. W. The alcohol, smoking and substance involvement screening test (ASSIST): development, reliability and feasibility. *Addiction* 2002; **97**: 1183–94.
36. Bradley K. A., DeBenedetti A. F., Volk R. J., Williams E. C., Frank D., Kivlahan D. R. AUDIT-C as a Brief Screen for Alcohol Misuse in Primary Care. *Alcohol Clin Exp Res* 2007; **31**: 1208–17.
37. Knight J. R., Sherritt L., Shrier L. A., Harris S. K., Chang G. Validity of the CRAFFT substance abuse screening test among adolescent clinic patients. *Arch Pediatr Adolesc Med* 2002; **156**: 607–14.
38. Gavin D. R., Ross H. E., Skinner H. A. Diagnostic validity of the drug abuse screening test in the assessment of DSM-III drug disorders. *Br J Addict* 1989; **84**: 301–7.
39. Yudko E., Lozhkina O., Fouts A. A comprehensive review of the psychometric properties of the Drug Abuse Screening Test. *J Subst Abuse Treat* 2007; **32**: 189–98.
40. Dennis M. L., Titus J. C., White M. K., Unsicker J. I., Hodgkins D. *Global Appraisal of Individual Needs: Administration Guide for the GAIN and Related Measures*. Chestnut Health Systems: Bloomington, IL; 2003.
41. Kessler R. C., Green J. G., Gruber M. J., Sampson N. A., Bromet E., Cuitan M. *et al.* Screening for serious mental illness in the general population with the K6 screening scale: results from the WHO World Mental Health (WMH) survey initiative. *Int J Methods Psychiatr Res* 2010; **19**: 4.
42. US Department of Health and Social Services, National Institute on Alcohol Abuse and Alcoholism (NIAAA). Helping Patients Who Drink Too Much: A Clinician's Guide. Rockville, MD: NIAAA; 2005.
43. Kroenke K., Spitzer R. L., Williams J. B. W. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med Care* 2003; **41**: 1284–92.
44. Kroencke K., Spitzer R., Williams J. The PHQ-9: validity of a brief depression severity measure [electronic version]. *J Gen Intern Med* 2001; **16**: 606–13.
45. Ware J. E. Jr., Kosinski M., Keller S. D. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care* 1996; **34**: 220–33.
46. Kadden R., Carroll K. M, Donovan D, Cooney N, Monti P. M, Abrams D *et al. Cognitive-behavioral Coping Skills Therapy Manual: A Clinical Research Guide for Therapists Treating Individuals with Alcohol Abuse and Alcohol Dependence*. Report No.: Publication no. 94-3723. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 2003.
47. Meyers R. J, Miller W. R. A Community Reinforcement Approach to Addiction Treatment. Cambridge: Cambridge University Press; 2001.
48. Miller W. R., Meyers R. J., Hiller-Sturmhofel S. The community-reinforcement approach. *Alcohol Res Health* 1999; **23**: 116–21.
49. Miller W. R., Sanchez V. C. Motivating young adults for treatment and lifestyle change. In: Howard G., editor. *Issues in Alcohol Use and Misuse in Young Adults*. Notre Dame, IN: University of Notre Dame Press; 1993, pp. 55–82.
50. Bien T. H., Millller W. R., Boroughs J. M. Motivational interview with alcohol outpatients. *Behav Cogn Psychother* 1993; **21**: 347–56.
51. Rawson R. A., Marinelli-Casey P., Anglin M. D., Dickow A., Frazier Y., Gallagher C. *et al.* Methamphetamine Treatment Project Corporate Authors. A multi-site comparison of psychosocial approaches for the treatment of methamphetamine dependence. *Addiction* 2004; **99**: 708–17.
52. Miller W. R, Zweben A, DiClemente C. C, Rychtarik R. G. *Motivational Enhancement Therapy Manual: A Clinical Research Guide for Therapists Treating Individuals with Alcohol Abuse and Alcohol Dependence*. Report no.: Publication no. 94-3723. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 1999.
53. Miller W. R. *Motivational enhancement therapy. In: Hersen M, Rosqvist, editors. Encyclopedia of Behavior Modification and Cognitive Behavior Therapy, vol. 1. Adult Clinical Applications*. Thousand Oaks, CA: Sage Publications; 2005, pp. 383–9.
54. Sampl S., Kadden R. Motivational Enhancement Therapy and Cognitive Behavioral Therapy for Adolescent Cannabis Users: 5 Sessions. Cannabis Youth Treatment (CYT) Series, vol.1. Rockville, MD: Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment; 2001.
55. Miller W. R. Motivational interviewing with problem drinkers. *Behav Psychother* 1983; **11**: 147–72.
56. Prochaska J. O., Redding C. A., Evers K. E. The transtheoretical model and stages of change. In: Glanz K., Rimer B. K., Viswanath K., editors. *Health Behavior and Health Education*, 4th edn. San Francisco, CA: Jossey-Bass; 2008.
57. American College of Surgeons Committee on Trauma (ASCOT). Alcohol screening and brief intervention (SBI) for trauma patients. Committee on Trauma Quick Guide Chicago: ASCOT; 2007.
58. *American Society of Addiction Medicine. The ASAM Criteria: Treatment Criteria for Addictive, Substance-Related and Co-occurring Conditions*. Chevy Chase, MD: American Society of Addiction Medicine; 2013.
59. Toussaint D. W., VanDeMark N. R., Bornemann A., Graeber C. J. Modifications to the Trauma Recovery and Empowerment Model (TREM) for substance-abusing women with histories of violence: outcomes and lessons learned at a Colorado substance abuse treatment center. *J Community Psychol* 2007; **35**: 879–94.