Substance Use Screening, Brief Intervention, and Referral to Treatment Among Medicaid Patients in Wisconsin: Impacts on Healthcare Utilization and Costs

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Abstract

Unhealthy substance use in the USA results in significant mortality and morbidity. This study measured the effectiveness of paraprofessional-administered substance use screening, brief intervention, and referral to treatment (SBIRT) services on subsequent healthcare utilization and costs. The pre-post with comparison group study design used a population-based sample of Medicaid patients 18–64 years receiving healthcare services from 33 clinics in Wisconsin. Substance use screens were completed by 7367 Medicaid beneficiaries, who were compared to 6751 randomly selected treatment-as-usual Medicaid patients. Compared to unscreened patients, those screened changed their utilization over the 24-month follow-up period by 0.143 outpatient days per member per month (PMPM) ($p < 0.001$), −0.036 inpatient days PMPM ($p < 0.05$), −0.001 inpatient admissions PMPM (non-significant), and −0.004 emergency department days PMPM (non-significant). The best estimate of net annual savings is $391 per Medicaid

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adult beneficiary (2014 dollars). SBIRT was associated with significantly greater outpatient visits and significant reductions in inpatient days among working-age Medicaid beneficiaries in Wisconsin.

Abbreviations: ACA – Affordable Care Act; ASSIST – Alcohol, Smoking, and Substance Involvement Screening Test; ATE – Average Treatment Effect; DiD – Difference-in-differences; MA – Medicaid; PMPM – Per member per month; PSM – Propensity Score Matching; SAMHSA – Substance Abuse and Mental Health Services Administration; SBIRT – Screening, brief intervention, and referral to treatment; USPSTF – United States Prevention Services Task Force; WIPHL – Wisconsin Initiative to Promote Healthy Lifestyles

Introduction

Unhealthy alcohol and other drug use generate substantial health and economic impacts. Risky alcohol consumption in the USA costs society more than $223 billion annually (2006 dollars).[1] In Wisconsin, the study's focus area, excessive alcohol consumption alone costs society between $4.2 and $6 billion annually with approximately 10% coming in the form of healthcare costs.[2,3] To reduce risky and problem drinking, the United States Preventive Services Task Force (USPSTF) recommends that all primary care patients routinely receive alcohol screening, brief intervention, and referral to treatment (SBIRT) services.[4,5] The recommendation is supported by a cost-effectiveness ratio of $1755 (2000 dollars) per quality-adjusted-life-year saved from the perspective of the healthcare system.[5] A USPSTF recommendation is lacking on illicit drug use SBIRT because its effectiveness is less certain.

Two prior studies have found that SBIRT reduces healthcare costs. In a randomized controlled trial in Wisconsin clinics where primary care clinicians delivered alcohol SBIRT and other staff administered follow-up support by phone, declines in hospitalization and emergency department visits resulted in a $523 (1993 dollars) 1-year reduction in healthcare costs per patient who received an intervention.[6] A study of non-dually eligible, disabled Medicaid patients who received alcohol and other drug use intervention services from chemical dependency counselors in Washington State hospital emergency departments found a $4392 reduction in total healthcare costs per patient over the following year relative to similar patients not receiving services.[7] Other studies have shown minimal or no effect of SBIRT on changes in healthcare utilization and expenditures.[8–10] Freeborn et al. found that SBIRT did not change the number of outpatient visits, hospitalizations, or lengths of stay compared to a control group 2 years later.[10] In a policy review, Cowell et al. conclude that the existing evidence is insufficient regarding the cost-effectiveness or cost-benefit of SBIRT on healthcare utilization.[9]

Despite improvements in health outcomes and possible reductions in healthcare costs, few Americans discuss their alcohol use with a primary care provider.[11] Commonly cited barriers are inadequate clinician time and reimbursement.[12] Experts are increasingly calling for primary care clinicians to delegate preventive care to other team members, so a scant primary care workforce can provide the recommended diagnostic and treatment services to increasing numbers of patients with chronic conditions.[13,14]

SBIRT reimbursement is inconsistent, especially when it is delegated to non-physician team members. Although Medicaid programs are authorized to reimburse for SBIRT, many do not. Under Medicare's revised reimbursement policy of 2011, prompted by the Affordable Care Act (ACA), only credentialed clinicians can be reimbursed for SBIRT. Under the ACA, as of January 1, 2014, health insurance companies in exchanges are required to reimburse for alcohol SBIRT but not necessarily when non-credentialed individuals deliver services.

Study Data and Methods

This study assessed the healthcare utilization and cost effects of SBIRT as delivered chiefly by non-credentialed paraprofessionals in 33 Wisconsin healthcare settings, mainly primary care

clinics. Services were delivered between 2007 and 2011 under a state-based SBIRT grant from the US Substance Abuse and Mental Health Services Administration (SAMHSA). A previous analysis of behavioral outcomes for a pseudo-randomly selected group of patients participating in a 6-month follow-up interview found reductions of 20% in risky drinking and 15% in marijuana use.[12]

The authors examined changes in Medicaid healthcare utilization from 1 year prior to 2 years following SBIRT delivery for the 7367 eligible Medicaid patients who completed screening relative to similar individuals receiving care at the same clinic settings who did not receive SBIRT services. This study is one of the first to adopt a population-based perspective in the effect on healthcare utilization of a paraprofessional-administered SBIRT program among working-age Medicaid patients. Using actual healthcare claims with a large sample size will elucidate the question of SBIRT's real-world effectiveness and impact on subsequent healthcare utilization and associated costs.

Patient eligibility

Patient eligibility criteria for this study were (1) age 18–64 years and (2) eligible for Medicaid for at least 1 month in each year of the 3-year observation period. Exclusion criteria were (1) incomplete Medicaid demographic information and (2) incomplete four-question screen. Figure 1 shows the selection of the SBIRT Medicaid beneficiaries resulting in 7367 beneficiaries receiving the intervention included in the study.

The comparison group ($n = 10{,}581$) receiving "treatment-as-usual" was identified using a sex-based frequency match within each clinic by searching for Medicaid beneficiaries who did not receive SBIRT services. SBIRT sites were supported with one health educator, resulting in provision of SBIRT services based on the availability of the health educator and clinic-specific implementation protocols. Not all patients could be served, although the goal was to provide SBIRT services to all patients. No systematic bias in selection of SBIRT services was reported. After applying the eligibility criteria to the restricted 3-year study period, 2308 were not Medicaid eligible in each of the three study periods and 1522 patients were excluded because of age eligibility resulting in 6751 comparison patients. The total study sample was 14,118 working-age adult Medicaid beneficiaries.

Wisconsin initiative to promote healthy lifestyles

A pre-post with a comparison group study design was used to ascertain the change in Medicaid healthcare utilization after receiving substance use screening as part of the *Wisconsin Initiative to Promote Health Lifestyles* (WIPHL) SBIRT program. The WIPHL program's four-question universal screen focused on alcohol and other drug use. Patients with positive screens were referred to a paraprofessional for further assessment with the Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST).[15] The ASSIST has sensitivity ranging between 54% and 97% and specificity ranging between 50% and 96% for most substances. The instrument has suitable inter-item correlation with a Cronbach's alpha of 0.89 for the total substance involvement score.[16] Depending on their ASSIST result, patients received reassurance, brief intervention, or referral to treatment. Intervention and referral included a blend of feedback, education, recommendations, and motivational interviewing.

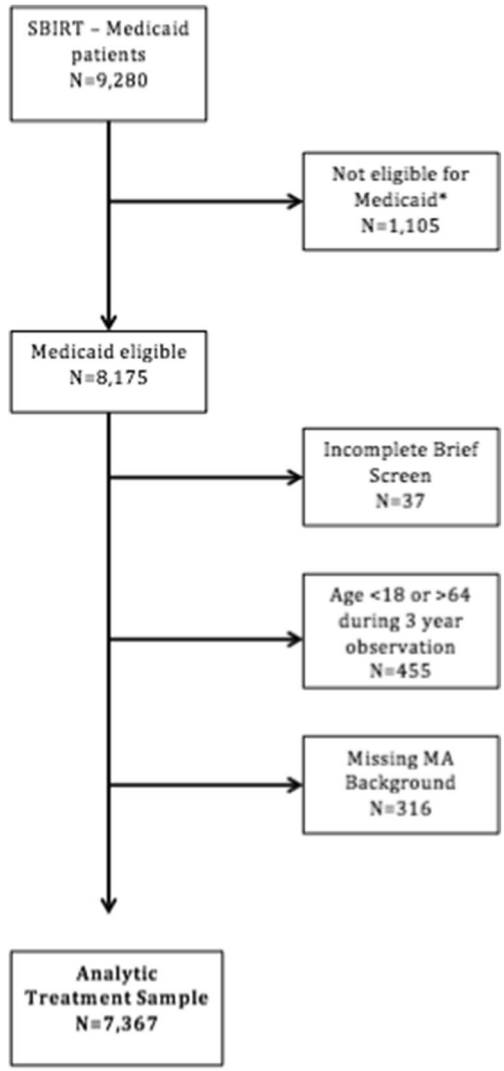
Thirty-three clinics were recruited by the WIPHL staff and self-selected into the SAMHSA-funded program. WIPHL trained and provided ongoing weekly support to the paraprofessionals in each clinic participating in the program. A non-credentialed paraprofessional is a bachelor's or master's level health educator with two weeks of training in the SBIRT process and motivational interviewing. Forty-four health educators were hired by WIPHL; nine were master's level counselors or social workers. Of the 33 bachelor's level paraprofessionals, seven had a degree in

health education. Four were certified health education specialists, and one had a certificate in chemical dependency counseling. Competency was assessed through a series of written examinations and skills/performance tests.[12]

Clinics were expected to implement substance use screening universally rather than targeting only those with suspected risky alcohol and other drug use behaviors. None of the clinics participating in WIPHL had on-site addiction treatment programs. Brown et al. provide further details on the WIPHL participants, paraprofessionals, clinical protocols, and behavioral outcomes.[12]

Figure 1

Treatment sample eligibility: flow diagram of the WIPHL Medicaid beneficiaries receiving SBIRT resulting in 7367 individuals receiving the intervention and included in the study. * Medicaid eligibility defined as at least 1 month in each of the three 12-month time periods of the 3-year observation period



Substance use assessments and health status

Information on patient demographics, Medicaid and Medicare eligibility, and health status was drawn from the Medicaid database. Patients with dual eligibility status were identified through each individual's Medicaid and concurrent Medicare A, B, C, and D eligibility files. Stratifying by dual eligibility was done to analyze Medicaid utilization changes among the high-risk, high-cost patient sample that make up the dually eligible group.

Health status covariates included a chronic disease index (1–4) reflecting the total of four common chronic disease conditions—COPD, heart disease, diabetes, and hypertension. Dichotomous indicators were used for Supplemental Security Income (SSI) recipients, prior mental health conditions and prior alcohol and other drug use diagnoses. SSI status indicates disability as well as very low income status among the non-dually eligible subgroup. Among the WIPHL Medicaid-Medicare dually eligible beneficiaries, SSI is included as a covariate as a measure of very low income and assets given the strict threshold for receiving SSI. According to the Medicare Payment Advisory Commission and Medicaid and CHIP Payment and Access Commission's data book for January 2016, 37% of dually eligible beneficiaries under the age of 65 in the USA were eligible for Medicaid through SSI.[17] Approximately 64% of the dually eligible subgroup in this study received SSI. ICD-9 codes were used to ascertain health status covariates from the baseline Medicaid claims.

Outcomes

The primary healthcare outcomes assessed were (1) outpatient days; (2) inpatient days; (3) inpatient admissions; and (4) emergency department (ED) admissions. Outcomes were ascertained through fee-for-service and managed care Medicaid claims grouped as daily utilization. Services received on the same day were counted as a single day of utilization. Data from the 12 months prior to receiving substance abuse screening were used to calculate baseline utilization. The month in which the individual received the screening was flagged as the index month and excluded from the analysis. Data from the 24 months following the index month were used to calculate post-index utilization. The median index month for SBIRT patients (September 2009) was used to determine pre-post periods for the comparison group. Because many patients' Medicaid eligibility fluctuated over the study period, utilization totals were summed over each time period and divided by the beneficiaries' total months of Medicaid eligibility to calculate a per member per month (PMPM) measure.

Statistical analysis

The patient sample was stratified by dual eligibility status defined as concurrent Medicaid and Medicare eligibility in any given month during the observation period. Changes between pre- and post-screening PMPM utilization were analyzed using propensity score matching (PSM); robust standard errors were computed.

Data for some individuals were censored because they died ($n = 81$) before the end of the 24-month follow-up period or because they received SBIRT in January 2010 or later given the observation period ending December 31, 2011 ($n = 2769$). Utilization was adjusted for total months of eligibility in each time period to help correct for different lengths of follow-up.

A difference-in-differences (DiD) approach was used to assess the average change in healthcare utilization of the SBIRT treatment group before and after receiving SBIRT compared to the average change in the "treatment-as-usual" comparison group. A DiD design helps control for time-invariant differences between the treatment and comparison groups as well as biases resulting from secular trends. The DiD outcome is interpreted as the change in healthcare utilization ($HU_2 - HU_1$)

for each individual where "HU_1" is baseline PMPM utilization and "HU_2" is 24-month follow-up PMPM utilization. PSM was used to improve the comparability between the two groups. The Stata 14 *teffects* command using the nearest neighbor matching was conducted, and the average treatment effect (ATE) among the population was estimated.

Receiving SBIRT was conditioned on the following covariates to calculate the average treatment effect: age, sex, race, chronic condition count (1–4), prior alcohol-related diagnoses, prior mental health diagnoses, and SSI status. Sex was interacted with pregnancy to adjust for pregnancy status. Due to missing data in the "race" variable, 1542 individuals were not matched resulting in a total matched sample of 12,576 individuals. Stata's *teffects* uses the replacement feature in order to match each individual in the SBIRT and comparison groups with the nearest neighbor based on propensity scores to estimate the treatment effect if the individual had been in the other group. Calipers were not used in the matching, and all individuals with complete data in the selected covariates were matched. PSM improved the comparability of the two groups resulting in matched variance ratios of approximately 1 for each covariate (balance tables are available upon request). The ATE among the population was calculated based on the individual treatment effects for both the treated and comparison groups. The ATE of SBIRT is interpreted as the PMPM difference in healthcare utilization between the treatment and the comparison groups' pre-post utilization differences associated with receiving SBIRT. Clinic-level variation was tested among the treatment group and found to have an intraclass correlation of less than 2% when controlling for age and sex on change in outpatient, inpatient, and ED utilization. Given the low level of clinic-level variability relative to the total variability observed, clinic was not included in the analyses. Stata 14 was used to conduct the all analyses.

Fiscal analysis

Monte Carlo simulation (available upon request) was used to predict the estimated cost savings for the state of Wisconsin's Medicaid program. Average treatment effects were used as the base case values and corresponding standard errors used to create symmetric triangular distributions. Uncertainty ranges for expected utilization cost savings associated with SBIRT were based on 10,000 trials. Wisconsin Medicaid-based standardized costs per unit of utilization and corresponding asymmetric triangular distributions were calculated from the Wisconsin Medicaid fee-for-service claims received for the SBIRT treatment group. The calculated mean costs per unit of utilization were estimated to be $45.51 per outpatient day, $1052.66 per inpatient day, and $378.56 per ED admission (2014 dollars).

All data were de-identified prior to the study and met the definition of a limited data set as defined by the Health Insurance Portability and Accountability Acts (HIPAA). The University of Wisconsin Institutional Review Board approved this research and deemed it to be of minimal risk to patients (submission ID number: 2011-0433-CP002).

Results

Table 1 displays attributes of the SBIRT and comparison groups. Statistically significant differences between the groups with regard to age, sex, race, Medicaid and Medicare eligibility, health status, and baseline outpatient and ED utilization were observed. More than 10% of patients had missing data on race, with a greater number of Black patients in the SBIRT group. Both groups were comparable with regard to health status including alcohol-related diagnoses and other drug abuse diagnoses suggesting comparable substance use behaviors. The groups were also comparable with regard to baseline inpatient utilization.

Table 2 shows the ATE among the population on utilization associated with SBIRT for the total study sample and by dual eligibility status. Results show significant increases in outpatient visits of

Table 1

Demographics, Medicaid enrollment, health status, and healthcare utilization at baseline by treatment status

Characteristic	SBIRT ($n=7367$)	Comparison ($n=6751$)	p value
Female sex, no. (%)	5618 (76.3)	4955 (73.4)	<0.001
Age, mean (SD), year	36.0 (12.0)	38.0 (11.5)	<0.001
Race, no. (%)			
White	2944 (40.0)	3658 (54.2)	<0.001
Black	3159 (42.9)	1952 (28.9)	
Other	454 (6.2)	409 (6.1)	
Missing/not indicated	810 (11.0)	732 (10.8)	
Baseline MA eligibility, months	10.7	10.8	<0.01
Time 2 MA eligibility, months	11.7	11.7	NS
Time 3 MA eligibility, months	9.9	11.3	<0.001
Continuous MA enrollment baseline, %	73.4	75.7	<0.01
MA enrollment prior to 2006, %	87.5	85.2	<0.001
Dually eligible—Medicare, %	23.0	23.5	NS
Supplemental Security Income (SSI), no. (%)	2185 (29.7)	1857 (27.5)	<0.01
Alcohol-related, no. (%)	460 (6.2)	462 (6.8)	NS
Other drug abuse, no. (%)	1457 (19.8)	1385 (20.5)	NS
Mental health, no. (%)	3314 (45.0)	3232 (47.9)	<0.01
Diabetes, no. (%)	772 (10.5)	755 (11.2)	NS
Hypertension, no. (%)	1504 (20.4)	1469 (21.8)	NS
Heart disease, no. (%)	388 (5.3)	403 (6.0)	NS
COPD, no. (%)	406 (5.5)	501 (7.4)	<0.01
Outpatient mean PMPM days (SD)	1.48 (0.03)	1.57 (0.03)	<0.05
Inpatient mean PMPM days (SD)	0.132 (0.003)	0.118 (0.007)	NS
Inpatient admission mean PMPM (SD)	0.023 (0.001)	0.022 (0.001)	NS
ED admissions mean PMPM (SD)	0.130 (0.003)	0.115 (0.003)	<0.01

PMPM per member per month

0.143 PMPM (95% CI 0.070, 0.216 $p<0.001$) and a significant decrease in inpatient days of 0.036 PMPM (95% CI −0.064, −0.009 $p<0.05$). A slight decrease of 0.004 PMPM admissions in high-cost ED utilization was also observed for Medicaid recipients receiving SBIRT compared to those not exposed to SBIRT. Per 1000 patients, SBIRT was associated with approximately 1715 more outpatient days, 437 fewer inpatient days and 53 fewer ED admissions per year. (Linear regression adjusting for the same covariates in the PSM analyses yielded similar results for SBIRT: 0.127 (95% CI 0.057, 0.196 $p<0.001$) outpatient days, −0.030 (95% CI −0.056, −0.005 $p<0.05$) inpatient days, −0.0003 (95% CI −0.003, 0.002) inpatient admissions, and −0.004 (95% CI −0.012, 0.005) ED admissions.)

Among dually eligible patients receiving SBIRT, outpatient days increased by 0.255 PMPM (95% CI 0.041, 0.470 $p<0.01$), inpatient days decreased by 0.067 PMPM (95% CI −0.131, −0.002 $p<0.05$), and inpatient admissions decreased by 0.009 PMPM (95% CI −0.015, −0.003 $p<0.01$). For every 1000 dually eligible beneficiaries, this results in an increase of approximately 3065 outpatient visits per year and decreases of 802 inpatient days and 108 inpatient admissions per year.

Table 2

Main results: adjusted average treatment effect (ATE) on changes in types of healthcare utilization per member per month (PMPM) by dual eligibility status

	Number	SBIRT (SE)	95% CI	*p* value	Annual change[c]
Overall analysis [a]					
Outpatient days	12,576	0.143 (0.037)	0.070, 0.216	<0.001	1.72
Inpatient days	12,576	−0.036 (0.014)	−0.064, −0.009	<0.05	−0.43
Inpatient admissions	12,576	−0.001 (0.001)	−0.003, 0.002	NS	0.01
ED admissions	12,576	−0.004 (0.004)	−0.012, 0.004	NS	−0.05
Stratified by dual eligibility[b]					
Dually eligible					
Outpatient days	2719	0.255 (0.109)	0.041, 0.470	<0.05	3.06
Inpatient days	2719	−0.067 (0.033)	−0.131, −0.002	<0.05	−0.80
Inpatient admissions	2719	−0.009 (0.003)	−0.015, −0.003	<0.01	−0.11
ED admissions	2719	0.002 (0.010)	−0.017, 0.022	NS	0.02
Non-dually eligible					
Outpatient days	9857	0.113 (0.036)	0.041, 0.184	<0.01	1.36
Inpatient days	9857	−0.018 (0.017)	−0.051, 0.015	NS	−0.22
Inpatient admissions	9857	0.002 (0.002)	−0.001, 0.005	NS	0.02
ED admissions	9857	−0.004 (0.005)	−0.014, 0.005	NS	−0.05

[a]ATE outcome independent variables: age, sex, prior mental health diagnosis, prior other drug use, prior alcohol-related diagnosis, chronic disease index, dual eligibility, SSI, and pregnancy interacted with sex
[b]ATE outcome independent variables: age, sex, prior mental health diagnosis, prior other drug use, prior alcohol-related diagnosis, chronic disease index, SSI, and pregnancy interacted with sex
[c]Unit is days

Discussion

This study is one of the first to investigate the effects of SBIRT implemented by paraprofessionals among working-age Medicaid patients on healthcare utilization. It used actual Medicaid claims data from diverse clinical settings to determine the change in healthcare utilization associated with substance use screening and brief intervention. Completing the four-question screen, with or without further assessment and brief intervention, was defined as treatment in this study.

Among the total study sample, SBIRT was associated with significantly greater outpatient visits and fewer inpatient days. Among patients with dual Medicaid-Medicare eligibility, significant reductions were also observed for inpatient admissions. SBIRT was not associated with statistically significant reductions in emergency department utilization, though such utilization did decline. The results suggest that SBIRT increases utilization of low-cost outpatient services and decreases utilization of high-cost inpatient and emergency services by Medicaid patients.

Based on these results and Wisconsin Medicaid fee-for-service reimbursement rates, the changes in utilization resulted in annual cost savings of $439 (95% CI −964, 86) (2014 dollars) per beneficiary. Medicaid would have paid an average of $48 per patient per year for SBIRT services based on WIPHL cost estimates. Thus, the total net savings were calculated as $391 (2014 dollars) per year per beneficiary. Based on the Monte Carlo simulation and the overall distributions of potential fiscal savings, the probability of obtaining net savings is 98%. The best estimate of net

annual cost savings per 1000 working-age Medicaid patients after initial screening is $390,815 (2014 dollars).

SBIRT has shown substantial effectiveness in clinical trials, but its impact on subsequent healthcare utilization remains uncertain.[8,9] The previously observed changes in alcohol and other drug use coupled with this study's observed changes in healthcare utilization patterns support the usefulness of paraprofessional-administered SBIRT.[12] The extent to which shifts in healthcare utilization stem from alcohol versus drug services is unclear. Among a subgroup of WIPHL participants, SBIRT did reduce self-reported marijuana use by 15% at a 6-month follow-up.[12] WIPHL's effect on other drug use could not be ascertained due to low prevalence in the primary care follow-up sample. In contrast, recent studies of SBIRT showed no change in drug use, mental healthcare utilization, or other healthcare utilization measures among patients living in disadvantaged, complicated, inner-city environments.[18,19] WIPHL focused on patients coming from a broader, less disadvantaged primary care population, which may be the reason for the differing results in marijuana use.

This study includes a number of strengths. It used paraprofessionals in implementing SBIRT, which would be one way to minimize the costs associated with scaling up services given the time constraints of credentialed providers.[13,14] The study included all individuals screened rather than only those who received interventions, yielding results that potentially apply to broad Medicaid populations. The SBIRT and comparison groups came from the same clinics, minimizing possible bias from variations in other services across clinics. The paraprofessionals were guided in the implementation of services through electronic tablets and were supported by the WIPHL staff to maintain fidelity to the WIPHL model resulting in similar SBIRT services within each setting.[20] The large sample size allowed for the opportunity to analyze utilization changes stratified by dual eligibility status. Lastly, utilization was measured using Medicaid fee-for-service and managed care claims resulting in a comprehensive utilization measure rather than relying on patient self-report.

Our study has several limitations. The WIPHL clinics self-selecting into the project may have unobserved clinical characteristics affecting the impact of SBIRT. This study is also limited to working-age Medicaid patients in Wisconsin resulting in limited generalizability, especially to states with different rates of binge drinking and other drug use. Selectivity of patients for SBIRT is a limitation. Among the total 166,647 Medicaid and non-Medicaid patients defined as eligible by the clinics, 113,642 (68%) patients completed a screen. There is evidence of potential racial bias in the selection for screening by the participating clinics, with a disproportionately high number of minorities screened. Clinic-level eligibility numbers were not stored as part of the program data used in this study; thus, variability in selectivity between clinics cannot be assessed or modeled. Health status was based on proxy measures using Medicaid procedure and diagnostic codes based on the 12 months prior to the index date. Such measures can miss other confounding health factors and behaviors if they were not coded as a diagnosis in the claims analyzed during the baseline time period. Specific implementation procedures are not known for each clinic resulting in limited knowledge as the extent of randomness in implementing SBIRT on the clinic level. This limitation also has the corresponding strength of real-world variation in SBIRT implementation. Data on the intensity of service delivery were not collected, limiting the ability to control for participants completing the recommended service. Due to limitations of the data, this study only considered healthcare utilization that was entirely or partially (crossover claims) covered by Medicaid as a primary or secondary payer.

Screening and brief intervention may not drive a large change in healthcare utilization but the observed patterns could translate to significant fiscal savings if implemented regularly and consistently. Based on a weighted annual per capita expenditure of $6164 among Wisconsin Medicaid disabled and non-disabled adult beneficiaries, $391 represents a 6% reduction in annual per capita payments.[21] Greater effects were observed among the dually eligible group suggesting targeting services to such high-cost patient groups may yield larger high-cost utilization reductions and subsequent cost savings.

Future research should investigate the effect of SBIRT implemented by paraprofessionals among patients with multiple chronic conditions such as diabetes and hypertension. Given the global impact of substance use especially among low- and middle-income countries, the effects of SBIRT should also be studied in such countries with different drinking cultures and patterns.[22,23] Risky substance use among lower socio-economic populations results in significantly greater health consequences.[23,24] A strength of this study is its focus on a low-income Medicaid population and can be used to help connect the potential benefits of SBIRT to other low-income populations.

Implications for Behavioral Health

The results of this study provide evidence that SBIRT implemented by paraprofessionals in primary care settings may elicit a shift toward increased outpatient utilization and decreased inpatient utilization as well as emergency department use. This shift corresponds with a net savings in Medicaid costs. As a step toward promoting SBIRT delivery, Medicaid and Medicare programs might consider reimbursing for paraprofessional-administered services for improving population health.

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Authors' Contributions Dr. Paltzer led the study, constructed the data set, conducted the analyses, and is responsible for the integrity of the data and the analysis. Dr. Brown and Dr. Moberg initiated the study concept and preliminary design, and all authors contributed to the ongoing development of the study. Dr. Paltzer, supported by Dr. Mullahy and Dr. Weimer, contributed in the analysis and interpretation. Dr. Paltzer drafted the manuscript. Dr. Paltzer, Dr. Brown, Dr. Mullahy, Dr. Moberg, Dr. Burns, and Dr. Weimer revised the manuscript.

Compliance with Ethical Standards

Conflict of Interest Dr. Brown is CEO of Wellsys, a company helping healthcare settings deliver behavioral screening and intervention (BSI) services.

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