Title

Reducing Health Risk Behaviors and Improving Depression in Adolescents: A Randomized Controlled Trial in Primary Care Clinics

Journal

Journal of Pediatric Psychology, 43(9)

ISSN

0146-8693

Authors

Bai, Sunhye
Zeledon, Luis R
D'Amico, Elizabeth J
et al.

Publication Date

2018-10-01

DOI

10.1093/jpepsy/jsy048

Peer reviewed

Journal of Pediatric Psychology, 43(9), 2018, 1004–1016
doi: 10.1093/jpepsy/jsy048
Advance Access Publication Date: 16 July 2018
Original Research Article

Reducing Health Risk Behaviors and Improving Depression in Adolescents: A Randomized Controlled Trial in Primary Care Clinics

Sunhye Bai,[1,2] PhD, MPH, Luis R. Zeledon,[3] MD, Elizabeth J. D'Amico,[4] PhD, Steve Shoptaw,[1,5,6] PhD, Claudia Avina,[1] PhD, Anne P. LaBorde,[3] PhD, PsyD, Martin Anderson,[7] MD, MPH, Olivia M. Fitzpatrick,[1] BA, and Joan R. Asarnow,[1] PhD

[1]Department of Psychiatry & Biobehavioral Sciences, University of California Los Angeles, [2]Department of Human Development and Family Studies, The Pennsylvania State University, [3]Kaiser Permanente Los Angeles Medical Center, [4]RAND Corporation, [5]Department of Family Medicine, University of California Los Angeles, [6]Department of Psychiatry, University of Cape Town, and [7]Department of Pediatrics, University of California Los Angeles

All Correspondence concerning this article should be addressed to Sunhye Bai, PhD, MPH, Department of Psychiatry & Biobehavioral Sciences, University of California Los Angeles, 300 Medical Plaza, Room 3314, Los Angeles, CA 90095, USA. E-mail: sbai@ucla.edu

Received January 5, 2018; revisions received June 6, 2018; accepted June 8, 2018

Abstract

Objective Primary care (PC) is a major service delivery setting that can provide preventive behavioral health care to youths. To explore the hypothesis that reducing health risk behaviors (HRBs) would lower depressive symptoms, and that health risk and depression can be efficiently targeted together in PC, this study (1) evaluates an intervention designed to reduce HRBs among adolescent PC patients with depressive symptoms and (2) examines prospective links between HRBs and depressive symptoms. **Method** A Randomized controlled trial was conducted comparing a behavioral health intervention with enhanced Usual PC (UC+). Participants were 187 adolescents (ages 13–18 years) with past-year depression, assessed at baseline, 6 months, and 12 months. Primary outcome was the Health Risk Behavior Index (HRBI), a composite score indexing smoking, substance use, unsafe sex, and obesity risk. Secondary/exploratory outcomes were an index of the first three most correlated behaviors (HRBI-S), each HRB, depressive symptoms, and satisfaction with mental health care. **Results** Outcomes were similar at 6 and 12 months, with no significant between-group differences. HRBI, HRBI-S, and depressive symptoms decreased, and satisfaction with mental health care increased across time in both groups. HRBI, HRBI-S, and smoking predicted later severe depression. Conversely, severe depression predicted later HRBI-S and substance use. **Conclusions** UC+ and the behavioral health intervention yielded similar benefits in reducing HRBs and depressive symptoms. Findings underscore the bidirectional links between depression and HRBs, supporting the importance of monitoring for HRBs and depression in PC to allow for effective intervention in both areas.

Key words: adolescence; depression; health risk behaviors; integrated care; intervention; primary care.

Less than 50% of adolescents with mental health or substance use problems (hereafter referred to as behavioral health problems) receive adequate treatment, in part because of poor detection of problems, and barriers to accessing empirically supported services (Merikangas et al., 2011). The pediatric primary care (PC) setting is a major point of health service contact for these youths, as most adolescents visit their

physician annually or more (Nordin, Solberg, & Parker, 2010). Developing and evaluating care models that aim to integrate behavioral health services into PC may help address this service gap and improve adolescent health (Fallucco, Seago, Cuffe, Kraemer, & Wysocki, 2015; Kolko & Perrin, 2014; Rapp, Chavira, Sugar, & Asarnow, 2017; Stancin & Perrin, 2014; Tynan, 2016).

Integrated care offers the possibility of improving adolescent health while reducing health care costs associated with patient care (McGrady & Hommel, 2016). A recent meta-analysis of interventions that aimed to improve access to behavioral health services through PC (hereafter referred to as "integrated care") detected a small but statistically significant intervention effect, relative to Usual PC (Asarnow, Rozenman, Wiblin, & Zeltzer, 2015). Specifically, integrated care interventions improved mental health outcomes such as depression, anxiety/somatic complaints, and behavioral problems. However, effects were weaker and not statistically significant for interventions targeting substance use/abuse (Asarnow et al., 2015). Indeed, among the nine studies aimed at reducing substance use in the meta-analysis, only one study yielded statistically significant intervention benefits (Pbert et al., 2008). These results underscore the importance of further work to evaluate and develop PC strategies that optimally target behavioral health concerns.

Reducing the emergence and exacerbation of substance use and related health risk behaviors (HRBs) in adolescence is a top health priority (D'Souza-Li & Harris, 2016). HRBs, such as smoking, drug and alcohol use, unsafe sex, and unhealthy diet and exercise habits frequently occur with adolescent depression, adding to the personal and societal burden of this common and impairing disorder (Asarnow et al., 2014; Luppino et al., 2010; Wickrama & Wickrama, 2010). Given the cluster of HRBs that co-occur with and possibly exacerbate depression during adolescence (Fluharty, Taylor, Grabski, & Munafò, 2017; Luppino et al., 2010; O'Neil, Conner, & Kendall, 2011; Wickrama & Wickrama, 2010), targeting *multiple* HRBs with one intervention program may be an efficient strategy for reducing health risk and depression in youths. This approach fits well within PC, as the PC clinician is well positioned to screen, monitor, and intervene on HRBs and depression, and promote physical and behavioral health (Stancin & Perrin, 2014). Given the time constraints of PC visits, multiple HRB interventions that target several co-occurring problems may be a useful alternative to a complex suite of many evidence-based behavioral health treatments, each targeting a different but related problem.

Multiple HRB interventions have proven successful in diverse contexts and samples including school-based universal prevention trials (Hale, Fitzgerald-Yau, & Viner, 2014), HIV prevention trials targeting high-risk youths (Rotheram-Borus et al., 2003; Rotheram-Borus et al., 2001), and PC trials targeting adult patients at risk for cardiovascular disease or cancer (Goldstein, Whitlock, & DePue, 2004; Prochaska & Prochaska, 2011). The present study applied this approach to target HRBs and depression in the PC setting, selecting adolescents with past-year depression histories. Given the frequent co-occurrence of HRBs and depression, we focused on a depressed sample to allow the evaluation of a critical hypothesis underlying the intervention; that reductions in HRBs would lead to fewer depressive symptoms.

The study advances the field by evaluating whether a PC intervention strategy that simultaneously addresses multiple HRBs can lead to reduced HRBs and depressive symptoms. The intervention was designed to target risk and protective factors for the emergence and exacerbation of HRBs. We aimed to decrease and prevent HRBs in adolescents selected for depression, and to determine whether this approach would have benefits on HRBs and depression levels. Our ultimate goal was to identify PC strategies for decreasing HRBs and depression, improving health and behavioral health, and minimizing the personal and economic costs of behavioral health problems. We hypothesized that the intervention—in comparison with enhanced usual care—would decrease participation in HRBs and improve depression at 6 months. Intervention effects were explored over the 6- to 12-month follow-up. This intervention was guided by our hypothesis that less engagement in HRBs would be associated with fewer depressive symptoms. We tested this underlying hypothesis by examining the prospective links between HRBs and depression. We predicted that youths who engaged in more HRBs would report more depressive symptoms, and consistent with our targeted patient-selection strategy, that youths with more depressive symptoms would engage in more HRBs.

Methods

The 24-7 HEALTH study is a randomized controlled trial (ClinicalTrials.gov Identifier: NCT00461539) comparing an integrated behavioral health intervention targeting multiple HRBs in adolescents with depressive symptoms, with enhanced usual PC (UC+). All participants and parents for youths <18 years provided written informed consent or assent, as appropriate. Participants received $40 at the baseline, $45 at the 6-month, and $50 at the 12-month assessments to minimize attrition, as youth motivation was expected to decrease the farther away youths were from enrollment. Study procedures were approved by IRB at each

study site and monitored by a Data Safety Monitoring Board.

Sample and Design

Participants were recruited from PC clinics in a large managed care organization (Site A) and an academic medical center accepting public and private insurance policies (Site B) located in an urban west coast city. Participants were 13–18 years old and ethnically diverse: 8.6% White, 11.3% African-American, 73.1% Latino/Hispanic, and 7.0% Asian/Other.

Screenings occurred from December 2007 to November 2010 and from October 2008 to August 2010 at Sites A and B, respectively. Trained research staff approached patients in PC waiting rooms to complete a brief self-administered screening questionnaire. To complete the screener, approached patients had to be waiting to see a PCP who had agreed to participate in this study, have sufficient time to complete the screener, be between ages 13–18 years, and be without apparent illness or intellectual disability that would interfere with participation. Additional exclusionary criteria included living over 1 hr away, youth not English-speaking, or parents not English- or Spanish-speaking. Only one child per family was screened. Study enrollment eligibility was based on youth endorsing possible/probable past-year depressive disorder, indicated by 2 weeks or more of dysphoric mood and/or anhedonia in the past year on the Composite International Diagnostic Interview (Wells et al., 2000; World Health Organization, 1997). Subsequent inclusion criteria were youth endorsement of at least one of the four targeted HRBs and/or current depression on the Center for Epidemiologic Studies Depression Scale (CES-D) or the Diagnostic Interview Schedule for Children (DISC; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) used for depression diagnoses following the initial screening.

Of the 1,493 adolescents eligible for screening, 1,324 completed the screener (Figure 1). Of the 491 potentially eligible participants, 279 completed informed consent/assent procedures, and 217 completed the baseline assessment during an additional in-person visit. Finally, 187 were randomized to receive the HEALTHY TEENS intervention ($n = 95$) or UC+ ($n = 92$) in a parallel group design with 1:1 allocation ratio, using a computerized random number generator that reduces bias during allocation sequence generation. We stratified on gender, age (13–15, 16–18), and composite Health Risk Behavior Index (HRBI) ($<2 = low\ risk$, $\geq 2 = high\ risk$) for a total of eight stratifications. The project director input participant information into the randomization program, obtained the allocation, and notified the Care Manager (CM) to which the case was assigned. Assessment and enrollment staff were naive to randomization status and sequence and were not informed about the randomization protocol. Among the 187 youths randomized, 166 (88.8%) completed the 6-month follow-up assessments and 118 (63.1%) completed the 12-month follow-up assessments.

Sample size calculation was conducted using RMASS2, which is well suited for power analyses for longitudinal data. The study was originally designed to detect a main treatment effect, averaged across the 6- and 12-month follow-up assessments, of $d = .30$ with 80% power, assuming a two-sided significance level of $alpha = .05$, within subject correlations of $r = .5$, and up to 20% attrition by 1 year. Under these same assumptions, the achieved PC sample size of 187 allows detection of an effect size of $d = .37$, still well under a standard medium effect.

Intervention Conditions

Enhanced Usual PC

Usual PC was enhanced by providing copies of depression treatment guidelines based on guidelines and recommendations from the Agency for Healthcare Research and Quality and the American Academy of Child and Adolescent Psychiatry to participating PC clinicians.

Intervention

The intervention aimed to target risk and protective factors for the development of HRBs as well as HRBs that the youth was endorsing. For youths who were engaging in fewer HRBs, intervention sessions emphasized prevention, potential triggers, and pressures that the youth might confront, and reinforced youths' healthy choices. For youths presenting with multiple HRBs, the intervention targeted these HRBs and promoted competing healthier behaviors.

The intervention was designed to take place over ten 60-min weekly sessions and was delivered to youths by CMs. See Table I. After developing an initial intervention plan with the youth in the first session, CMs contacted PCPs to review and finalize the plan. Two-session long modules covered each of the four HRB domains: smoking, alcohol and drug use, unsafe sexual practices, and obesity/diet/exercise. The order of modules was based on patient priorities and goals identified during the initial session. The final session focused on reviewing and reinforcing change, and developing a plan for continued progress. With a combination of motivational enhancement strategies and cognitive–behavioral approaches, the intervention focused on: (1) strengthening motivation to engage in healthy behavior by increasing awareness of the negative consequences of HRBs, encouraging youth to consider their goals and values, and disrupting the

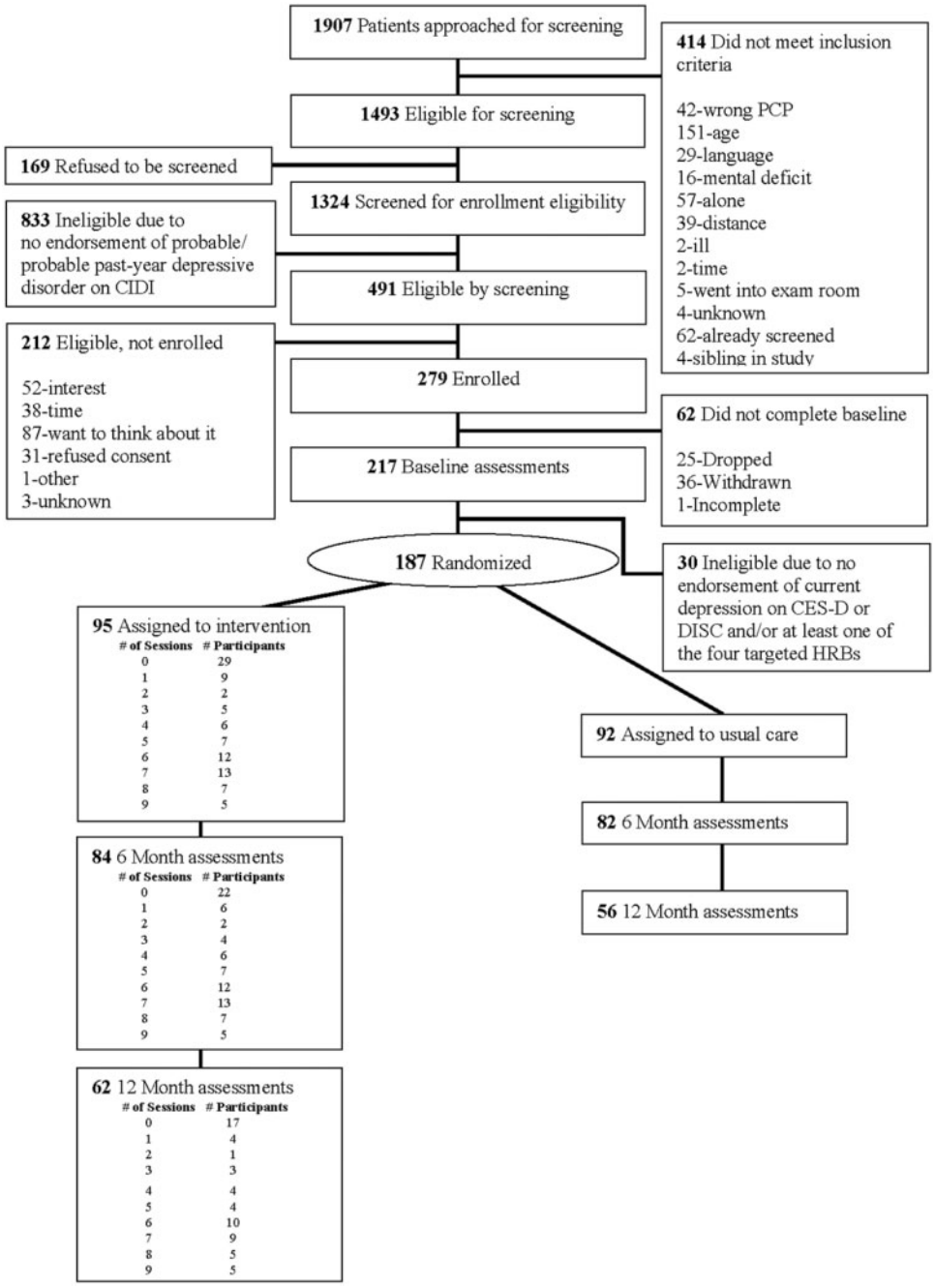

Figure 1. Consort flow diagram.

automaticity of HRB sequences; (2) increasing awareness of affective, thought, and situational/environmental triggers for HRBs; (3) introducing and practicing competing cognitive and behavioral responses to these triggers; and (4) modeling and coaching behaviors that support a healthy life style. Owing to the space and service structures of the two sites, in Site A, the intervention was consistently delivered in the PC clinic, whereas in Site B, CMs held sessions in offices that were proximal to but outside of the PC clinic. Intervention condition youths continued to receive UC+ during the study period.

CMs were psychotherapists with Master's or PhD degrees in the mental health field, who participated in an intensive 40- to 60-hr training, mock interview sessions, and weekly supervision and feedback, led by licensed clinical psychologists/project directors. Intervention sessions were audio-recorded, and 17.4% ($n = 61$) were randomly selected and coded for quality control and adherence by the third author, who is a member of the Motivational Interviewing Network of Trainers (MINT). Therapist adherence to intervention protocol was rated using 20 questions that assessed coverage of session content, use of techniques, clarity,

Table I. *Overview of HEALTHY TEENS Intervention Sessions With Youths*

Session	Content
1	Initial evaluation, explore pros and cons of risk behaviors, examine knowledge and attitudes, review values, create motivation, set goals, and develop intervention plan
2	Health Behavior Domain 1: Identify triggers and high-risk situations, feeling thermometer, recognize helpful and unhelpful thoughts and behaviors, adaptive coping styles, strategies for switching negative into positive thoughts, and combating maladaptive thought patterns that make it difficult to change/engage in positive health behavior
3	Health Behavior Domain 1: Consider triggers and high-risk situations, behavioral strategies for reducing risk, problem-solving, relaxing under pressure, pleasant activities and self-rewards, assertiveness, and handling put-downs
4–5	Health Behavior Domain 2: Complete module as in Health Domain 1, Sessions 2–3
6–7	Health Behavior Domain 3: Complete module as in Health Domain 1, Sessions 2–3
8–9	Health Behavior Domain 4: Complete module as in Health Domain 1, Sessions 2–3
10	Review progress, strategies that worked, develop plan for continued progress, build a social support network to support health behavior, and access health care/community resources

responsiveness to patient needs, interpersonal effectiveness, collaboration, session length, and efficient use of time. Questions were rated on a three-point scale (0 = *not at all*, 1 = *satisfactory*, 2 = *excellent*) and scores were averaged (*range* = 0–2). Scores ≥1 indicated satisfactory/excellent adherence. The mean was 1.80 (*SD* = 0.68), with 96.7% of rated sessions scoring ≥1.

Data Collection

Assessments were completed with youths and parents at baseline, 6 months and 12 months from February 2008 to September 2011 at Site A and March 2008 to December 2011 at Site B. Assessors were masked to randomization status, received 40–60 hrs of training, and were supervised by licensed clinical psychologists. All baseline assessments were conducted in-person, in the clinic or the participants' homes, depending on participant preference. In total, 6-month and 12-month assessments were conducted in-person as well. In rare instances when a follow-up in-person assessment was not feasible, interviews were orally administered by assessors via telephone. All youth assessments and most parent assessments were conducted in English; 11 parents completed baseline assessments in Spanish. All survey administrators were trained, certified, and supervised by a senior staff member with DISC training. Quality assurance ratings completed on randomly selected 20% of interviews indicated good interview quality (*M* = 1.20, *SD* = 0.54) on a three-point scale, 1 (*good*) to *3* (*poor*) (Asarnow et al., 2014).

At each assessment, adolescents used a private computer to complete self-report questionnaires assessing youth behavioral health. In the occasional telephone assessment, participants had the option of completing questionnaires via mailed packets, or over the telephone. Adolescents and parents independently participated in the DISC IV-depression module, and a diagnosis was made if adolescent met criteria based on teen or parent report. We obtained objective measurements of height and weight to calculate body mass index (BMI) for age and gender (Centers for Disease Control and Prevention & National Center for Health Statistics, 2000). If an assessment was completed by phone, self-reports were used.

Primary Outcome: HRBI

The primary outcome variable was the HRBI (*range* = 0–4), derived by summing binary indicators of four health risks that are common in adolescence and frequently correlated with depression: (1) past-month smoking, (2) past-month alcohol use with impairment or any illegal drug use (including marijuana use), (3) past 6-month sex without condom, and (4) current obesity risk.

Smoking was assessed with one item (i.e., "On how many days did you smoke a cigarette in the last month?") from the Youth Risk Behavior Surveillance System (YRBSS) rated from 0 = *none* and 4= ≥20 days (Brener et al., 2004). Scores were dichotomized (0 = *none*, 1 = *any*).

Substance use was assessed using a dichotomous score indicating whether youth reported the presence or absence of any drug use or alcohol use with impairment (0 = *none*, 1 = *any*) based on responses to the YRBSS items described below and impairment measured using the Problem Oriented Screening Instrument for Teenagers (POSIT; Rahdert, 1991):

Alcohol use was assessed with one item: "On how many days did you have any alcohol in the last month?" This item was supplemented with the 17-item POSIT (Rahdert, 1991) which assessed substance use-related impairment (e.g., "getting into trouble at school," "hurting self or others under the influence," "feeling addicted"). POSIT shows good internal consistency, test–retest reliability, and convergent validity (Knight, Goodman, Pulerwitz, & DuRant, 2001; McLaney, Boca, & Babor, 1994). Internal consistency ranged from $\alpha = .83$–.86 across the three assessments in the current study. Youths reporting both the presence of any alcohol use and

endorsed impairment on the POSIT (*score* ≥1) received a score of 1 on alcohol use.

Marijuana use was assessed with one item, "On how many days in the last month did you use marijuana?" scored 0 = *none*, 1 = *any*.

Other drug use was derived from seven similar yes/no items that assessed any past-month use of stimulants ("uppers"), depressants ("downers"), Ritalin, MDMA, hallucinogens, inhalants, and other drugs. Any past-month other drug use was coded as *substance use* = 1.

Substance use was coded as 1 if there was any past-month alcohol use (*alcohol use* = 1) with any impairment (*POSIT* ≥ 1), or any past-month drug use (including marijuana) regardless of impairment. All else were coded as 0.

Unprotected sex defined as past 6-month sex without a condom was assessed with one item (i.e., "During the past 6 months, how many times did you have sexual intercourse without a condom?") from the YRBSS, scored as 0 = *no sex or no sex without a condom* and 1 = *any report of sex without condoms*.

Obesity risk was coded as 0 = *BMI <85th percentile* or 1 = *BMI ≥85th percentile*.

Secondary Outcomes

Depressive symptoms (CES-D) within the past week were also assessed as an outcome, in accordance with our hypothesis that reducing HRBs would reduce depressive symptoms. We used the CES-D as our depression indicator, because the CES-D is a dimensional measure of depressive symptoms and only half the sample met diagnostic criteria for depression. The CES-D is a widely used self-report scale with high internal reliability, adequate test–retest reliability, and high construct validity (Radloff, 1991). Scores from the 20 items rated on a 0–3 scale were summed (*range* = 0–60). Current internal consistency ranged from α = .73–.78. To further assess the clinical relevance of the study, we tested depression severity dichotomously, with 1 representing severe depression (0 = *CES-D* < 24, 1 = *CES-D* ≥ 24; Roberts, Lewinsohn, & Seeley, 1991).

Satisfaction with mental health care was assessed using an item on a five-point scale ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*) found to be sensitive to intervention effects in the Youth Partners in Care trial, which evaluated a depression intervention within PC (Asarnow et al., 2005).

Exploratory Outcomes

HRBs were each explored as a separate binary outcome: (1) past-month smoking, (2) past-month substance use, (3) past 6-month sex without condom, and (4) current obesity risk.

Smoking, substance use, and unsafe sex (HRBI-S), defined as the composite sum of smoking, substance use, and unsafe sex (*range* = 0–3), was also tested as an exploratory secondary outcome. HRBI-S excluded obesity risk, as obesity risk was not associated with other HRBs in this sample (Asarnow et al., 2014).

Data Analysis

We examined demographic and clinical characteristics and assessed balance across intervention groups using *t*-tests for continuous and χ^2 tests for categorical variables at baseline (Table II). Aim 1 tested intervention effectiveness with intent-to-treat analyses. We fitted two-level mixed-effects regression models with maximum likelihood estimates for each outcome, to account for nested structure of the data (i.e., assessments within individuals), calculate unbiased estimates of parameters by using all available combination of data points, and eliminate the need for missing values imputations. Wave and intervention condition (0 = *UC+*, 1 = *Intervention*) and the *wave* × *intervention* term were tested as fixed effects in two-level regression models with random intercepts; wave was examined both as a continuous variable and a categorical variable (reference = *baseline*) to assess sensitivity. HRBI and HRBI-S were estimated using ordinal logistic regressions, and each binary HRB indicator and severe depression on the CES-D were estimated using logistic regressions. CES-D depressive symptoms and satisfaction with mental health care were estimated using linear regressions. Covariates were grand-mean-centered age in years at each assessment, gender (*0 = male, 1 = female*), site (*0 = Site B, 1 = Site A*), and Latino/Hispanic origin (*0 = non-Hispanic, 1 = Hispanic*) because of their potential effects on primary or secondary outcomes (Evans-Polce, Vasilenko, & Lanza, 2015), as well as family income (*0 = income <$30K, 1 = income ≥ $30K*) given its links to retention across the three assessments. These were included in the models as fixed effects. Using a similar analytic strategy, we additionally explored dose response among youths in the intervention condition, given the heterogeneity of treatment duration. For each outcome, we examined site as a possible moderator of intervention effects. Because no statistically significant site effects were detected, we report data combined across sites.

To address our second aim, we used two-level regression models with random intercepts to examine the prospective within-person association between HRBs and depression from one assessment to the next (i.e., lagged effect), and vice versa. For example, we tested the association between HRBs at current assessment (e.g., at baseline) and depressive symptoms 6 months later (e.g., at 6 months), over and above current depressive symptoms (e.g., at baseline).

Table II. *Baseline Patient Characteristics (N = 187)*

Variable	Parameters	Total *n* (%)/*M* (*SD*)	Intv. (*n* = 95) *n* (%)/*M* (*SD*)	UC+ (*n* = 92) *n* (%)/*M* (*SD*)	*p*
Age	*M* (*SD*)	16.06 (1.45)	16.08 (1.42)	16.04 (1.49)	.87
Gender	Female	107 (57)	52 (55)	55 (60)	.49
	Male	80 (43)	43 (45)	37 (40)	
Child ethnicity	Latino/Hispanic	136 (73)	63 (66)	73 (79)	.05
	Not Latino/Hispanic	51 (27)	32 (34)	19 (21)	
Family income	<$30,000	117 (63)	59 (62)	58 (63)	.90
	≥$30,000	70 (37)	36 (38)	34 (37)	
Site	Academic	58 (31)	30 (32)	28 (30)	.87
	Managed health care	129 (69)	65 (68)	64 (70)	
DISC MDD diagnosis	None	90 (48)	46 (49)	44 (48)	.88
	Definite or intermediate	96 (52)	48 (51)	48 (52)	
HRBI	*M* (*SD*)	1.41 (1.00)	1.42 (0.94)	1.39 (1.07)	.84
HRBI	0	31 (17)	14 (15)	17 (18)	.38
	1	83 (44)	42 (44)	41 (45)	
	2	45 (24)	25 (26)	20 (22)	
	3	22 (12)	13 (14)	9 (10)	
	4	6 (3)	1 (1)	5 (5)	
Smoking	No	152 (81)	75 (79)	77 (84)	.41
	Yes	35 (19)	20 (21)	15 (16)	
Substance use	No	120 (64)	59 (62)	61 (66)	.55
	Yes	67 (36)	36 (38)	31 (34)	
Unsafe sex	No	126 (67)	67 (71)	59 (64)	.35
	Yes	61 (33)	28 (29)	33 (36)	
Obesity risk	Healthy/underweight	80 (43)	41 (43)	39 (42)	.92
	Overweight/obese	107 (57)	54 (57)	53 (58)	
HRBI-S	0	93 (50)	46 (48)	47 (51)	.46
	1	47 (25)	23 (24)	24 (26)	
	2	32 (17)	20 (21)	12 (13)	
	3	15 (8)	6 (6)	9 (10)	
CES-D depressive symptoms	*M* (*SD*)	20.05 (10.59)	20.56 (11.24)	19.53 (9.91)	.51
CES-D severe depression	<24 not severe	128 (69)	63 (66)	65 (71)	.52
	≥24 severe	59 (31)	32 (34)	27 (29)	
Satisfaction with mental health care	*M* (*SD*)	3.32 (0.99)	3.43 (1.02)	3.20 (0.95)	.10

CES-D = Center for Epidemiologic Studies Depression Scale; DISC = Diagnostic Interview Schedule for Children; HRBI = Health Risk Behavior Index; HRBI-S = composite of smoking, substance use, unsafe sex; MDD = major depressive disorder.

Consistent with analyses conducted for Aim 1, HRBI and HRBI-S were estimated using ordinal logistic regressions, each HRB indicator and severe depression were estimated using logistic regression, and depressive symptoms was estimated using linear regression. Additional covariates included intervention group, age, gender, ethnicity, family income, and site. We used Stata version 14 for all multilevel mixed-effects models in our analyses (i.e., ME commands).

Results

Attrition and Treatment Adherence

Assessment response rates did not differ significantly across intervention conditions at 6 months (88% in intervention vs. 89% in UC+; $p = .878$) or 12 months (65% in intervention vs. 61% in UC+, $p = .534$). Older teens $t = -1.89$, $p = .061$, and those who reported more smoking, $\chi^2(1) = 3.32$, $p = .068$, or more substance use, $\chi^2(1) = 2.82$, $p = .093$, were marginally less likely to complete the 6-month assessment. Six-month assessment response rates did not differ by gender, ethnicity, income, site, HRBI, unsafe sex, obesity risk, depressive symptoms, or satisfaction with mental health care. From baseline to 12 months, teens reporting family incomes < $30, 000 were more likely to be lost to follow-up, $\chi^2(1) = 6.01$, $p = .014$.

Teens assigned to the intervention attended a mean of 3.69 sessions, $SD = 3.19$, *range* = 0–9; 29 (30.5%) attended no sessions. Site was associated with intervention dose, such that Site A youths (the site where CMs were integrated within the PC clinic) attended on average 4.18 sessions, $SD = 3.14$, whereas Site B youths attended a mean of 2.63 sessions, $SD = 3.10$; $t(57.08) = -2.26$, $p = .028$. Dose did not vary by demographic, clinical, or implementation variables including, age, gender, ethnicity, family income, major depressive disorder (MDD) diagnosis, CES-D, HRBI, HRBI-S, and the four HRBs. Sensitivity analyses conducted without the 29 youths who attended no sessions yielded similar results with no change in conclusions. Consequently, we present results based on the full sample.

Descriptive Statistics

The mean age of the sample was 16 years, $SD = 1.45$, *range* = 13–19. They were 57% female, 73% Latino/Hispanic, and 63% with annual family incomes <$30,000. The UC+ group had a higher proportion of Latino/Hispanics. While all youths endorsed past-year probable depressive disorder based on reports of anhedonia and/or depressed/dysphoric mood on the screener, 52% met DISC-criteria for definite or probable past-year MDD per parent or youth reports at baseline. On the CES-D, 32% scored in the severe range. At baseline, median HRBI score was 1 (*range* = 0–3). Specifically, 19% reported past 30-day smoking, 36% reported any substance use, 23% reported alcohol use with impairment, 26% any marijuana use, and 11% other illicit drug. Past 6-month unsafe sex was reported by 33% of youths, and 57% were overweight or obese. Intervention and UC+ groups did not differ in baseline HRBs (Table II). Clinical/adverse event monitoring revealed a past 6-month suicide attempt reported by one UC+ participant at a 6-month assessment, judged to be unrelated to study participation.

Intervention and Time Effects

We tested intervention effects on HRBI (primary outcome), HRBI-S, and each HRB separately and found no statistically significant differences (Table III). Statistically significant time effects were observed, with youths in both conditions reporting fewer HRBs over time (odds ratio [OR] = 0.57, 95% confidence interval, CI [0.39, 0.85], $p = .006$). Specifically, HRBI was significantly lower at 12 months in comparison with baseline (OR = 0.32, 95% CI [0.15, 0.72], $p = .006$). Similarly, HRBI-S declined across time (OR = 0.62, 95% CI [0.39, 0.99], $p = .044$]) and showed a significant reduction at 12 months in comparison with baseline (OR = 0.38, 95% CI [0.15, 0.99], $p = .047$). When we examined each HRB separately, we found that the odds of a youth engaging in unsafe sex decreased across time (OR = 0.53, 95% CI [0.30, 0.92], $p = .023$). A statistically significant decline was observed at 12 months in comparison with baseline (OR = 0.27, 95% CI [0.09, 0.82], $p = .021$). Rates of obesity risk, smoking, and substance use were stable across the 12-month follow-up. There was no specific dose at which a significant reduction in HRBs was observed.

Intervention effects were not statistically significant for depressive symptoms (Table III). Depression improved over time, with a significant decline in symptoms observed at 6 months relative to baseline ($B = -2.97$, 95% CI [−5.20, −0.74], $p = .009$, $d = -0.28$). However, the decline in depressive symptoms escaped statistical significance in the overall time analysis ($B = -1.26$, 95% CI [−2.59, 0.06], $p = .062$). Youths attending more intervention sessions had lower CES-D scores at 6 and 12 months. The test of the region of significance for the *session* × *wave* interaction indicated a minimum dose of five sessions for statistically significant reductions. Intervention group, time, or dose did not predict a youth's odds of scoring in the severe range (*CES-D* ≥ 24).

Intervention assignment did not affect satisfaction with mental health care as shown in Table III. Youths reported greater satisfaction with their mental health care at 6 months, in comparison with baseline ($B = 0.44$, 95% CI [0.17, 0.70], $p = .001$, $d = 0.42$), but the increase in satisfaction with mental health care was not statistically significant in the overall time analysis ($B = 0.14$, 95% CI [−0.02, 0.29], $p = .086$). Dose did not significantly moderate the effect of time on satisfaction with mental health care.

HRBs and Depressive Symptoms

Next, we examined the prospective links between depressive symptoms and HRBs, over and above the intervention condition to test our hypothesis guiding the intervention strategy; specifically, that less participation in HRBs would contribute to lower depression levels. Results were similar regardless of whether we examined CES-D as a dimensional or categorical variable. To avoid redundancy and increase clinical relevance, we present results from analyses examining severe depression (*CES-D* ≥ 24). As shown in Figure 2A, the HRBI and HRBI-S predicted an increase in a youth's odds of endorsing clinically severe depression 6 months later, over and above current severe depression (OR = 1.39, 95% CI [1.02, 1.89], $p = .038$; OR = 1.49, 95% CI [1.07, 2.07], $p = .018$, respectively). When examining HRBs individually, only smoking predicted an increase in the odds of severe depression: OR = 2.46, 95% CI [1.13, 5.37], $p = .024$.

When we examined whether depression predicts HRBs, we found that severe depression predicted an increase in HRBI-S across 6 months (OR = 2.20, 95% CI [1.09, 4.42], $p = .027$), over and above current HRBs, as shown in Figure 2B. Analyses of individual HRBs indicated that severe depression predicted an increase in the odds of substance use: OR = 2.26, 95% CI [1.03, 4.97], $p = .043$.

Discussion

This study found similar effects for a behavioral health intervention aimed at addressing multiple HRBs and depression in adolescent PC patients, compared with UC+ at 6 months and 1 year later. These results are consistent with those from a recent meta-analysis showing weak and nonsignificant effects for substance use interventions in integrated care (Asarnow et al., 2015). Nonsignificant findings may have occurred

Table III. *Adjusted Analysis of 6-Month and 12-Month Intervention Effects on HRBs, Depression, and Satisfaction With Mental Health Care*

	HRBI				HRBI-S				Severe depression[a]				Depression symptoms			Satisfaction with mental health care		
Predictors	*b*	SE	*p*	OR	*b*	SE	*p*	OR	*b*	SE	*p*	OR	*B*	SE	*p*	*B*	SE	*p*
Wave (baseline = 0)																		
6 months	−0.50	0.33	.133	0.61	−0.42	0.37	.255	0.66	−0.67	0.45	.139	0.51	−2.97	1.14	.009	0.44	0.14	.001
12 months	−1.13	0.41	.006	0.32	−0.97	0.49	.047	0.38	−0.39	0.52	.447	0.67	−2.09	1.36	.125	0.20	0.16	.208
Intv. (UC+ = 0)																		
Intv.	0.29	0.49	.555	1.33	0.27	0.54	.618	1.31	0.29	0.50	.563	1.34	1.12	1.53	.466	0.23	0.15	.136
Wave × intv.																		
6 months × intv.	−0.08	0.45	.857	–	0.05	0.51	.927	–	0.32	0.61	.603	–	1.09	1.57	.488	−0.30	0.19	.117
12 months × intv.	0.58	0.52	.267	–	0.51	0.64	.418	–	−0.14	0.70	.842	–	−0.25	1.78	.887	−0.08	0.21	.720

	Smoking				Substance use				Unsafe sex				Obesity risk			
	b	SE	*p*	OR	*b*	SE	*p*	OR	*b*	SE	*p*	OR	*b*	SE	*p*	OR
Wave (baseline = 0)																
6 months	−0.53	0.68	.433	0.59	−0.43	0.51	.391	0.65	−0.44	0.48	.363	0.65	−0.82	0.68	.231	0.44
12 months	−1.22	0.84	.148	0.29	−0.84	0.61	.173	0.43	−1.32	0.57	.021	0.27	−0.50	0.84	.554	0.61
Intv. (UC+ = 0)																
Intv.	0.82	0.84	.328	2.27	0.45	0.66	.501	1.56	−0.29	0.57	.617	0.75	0.23	1.08	.831	1.26
Wave × intv.																
6 months × intv.	0.24	0.86	.779	–	0.53	0.69	.443	–	−0.12	0.66	.852	–	−0.26	0.93	.783	–
12 months × intv.	1.24	1.00	.212	–	0.85	0.79	.281	–	0.04	0.75	.955	–	0.41	1.14	.717	–

[a]Severe depression CES-D ≥24; *b* = log-odds from logistic regressions; OR = odds ratio; *B* = unstandardized coefficient from linear regressions; intv. = intervention. *N* = 187 at baseline. Attrition resulted in a 6-month sample size of 166 and 12-month sample size of 118. All models control for youth age, gender, ethnicity, income, and site and include random intercepts.

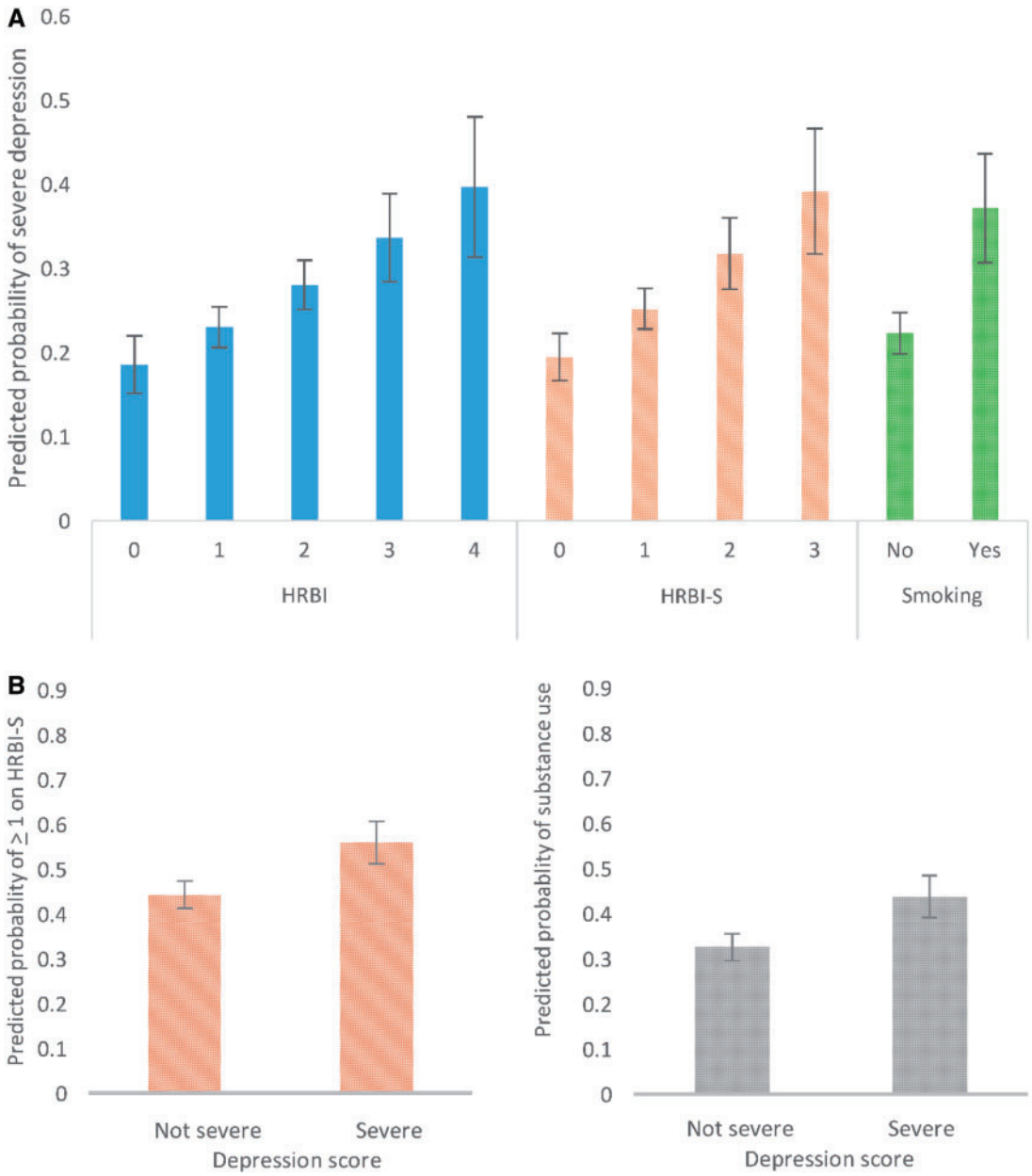

Figure 2. (A) Prospective associations between current HRBs and severe depression 6 months later, over and above current severe depression status; (B) prospective associations between current severe depression and HRBs 6 months later, over and above current HRBs.

Note. Error bar: Standard error of predicted probabilities; severe depression: CES-D ≥24; models control for current HRB or current severe depression status, intervention condition, age, gender, site, income, ethnicity, and random intercepts.

because adolescents in the current study were more similar to those in the studies included in the meta-analysis, and had HRB rates comparable with those reported in epidemiological studies of high school youths (Eaton et al., 2010). The present sample, therefore, was generally lower risk than the more vulnerable adolescents in past HIV prevention trials on which the study intervention model was based (Rotheram-Borus et al., 2001). Findings contrast with studies showing intervention benefits in PC for higher-risk youths, such as those who endorse more serious alcohol and/or drug use (D'Amico, Miles, Stern, & Meredith, 2008; Tanner-Smith & Lipsey, 2015). PC interventions that focus on higher-risk youths may yield stronger benefits. The relatively low dose of intervention received may also have contributed to similar between-group outcomes, raising questions about the feasibility of the study's multiple HRB intervention model for general PC youths.

Youths at Site A, where CMs were more integrated within PC services and sessions were routinely held in PC, attended more sessions and received a higher

intervention dose than Site B youths, where sessions were often held in offices proximal to but not within PC. This finding is consistent with the broader literature suggesting that integrating services within PC clinics may improve behavioral health service gaps (Asarnow, Kolko, Miranda & Kazak, 2017; Stancin & Perrin, 2014). Our results support the value of service delivery approaches that integrate behavioral health within PC clinics for improving access to and rates of care.

It is important to note that study results contrast with those from PC trials that have found significant benefits of interventions aimed at improving access to evidence-based depression care through PC relative to UC+, despite relatively low treatment rates (Asarnow et al., 2005, 2009). Study results also indicate that our efforts to decrease treatment barriers through motivational interviewing and offering care through PC were not sufficient. Youths likely still experienced barriers such as time, transportation, embarrassment, and stigma (Gulliver, Griffiths, & Christensen, 2010), and perhaps had low motivation because of their lack of involvement in HRBs, which may have prevented them from attending all 10 offered sessions.

On a positive note, cumulative health risk, unsafe sex, and depressive symptoms decreased in both groups across the 1-year follow-up. Likewise, satisfaction with mental health care increased over time. PC visits offer opportunities to screen for and monitor HRBs and depression (Hagan, Shaw & Duncan, 2017). This may, in turn, contribute to reductions in HRBs and depression over time. Our finding that HRBs predicted severe depression and that severe depression predicted more HRBs 6-months later further highlights the potential value of monitoring for both HRBs and depression in PC. Ongoing monitoring may allow efficient and effective deployment of intervention strategies and facilitate the delivery of personalized care that matches intervention strategies to the needs of each youth, as suggested by the screening, brief interventions, and referral to treatment (SBIRT) model (Mitchell, Gryczynski, O'Grady & Schwartz, 2013). Future research is needed to build a stronger evidence base for effective PC strategies that target HRBs and depression.

The study is not without limitations. Our sites were in an urban city in southern California, and the majority of our sample identified as Latino/Hispanics. Thus, findings may not generalize to other populations and areas. Although we provided culturally sensitive care by using Spanish-speaking therapists and tailoring examples to the youth's culture, additional approaches to address the cultural contexts of individual youths and families might have strengthened intervention benefits. The study intervention did not emphasize family involvement, partly because of the sensitivity of some of the targeted HRBs (e.g., unsafe sex). Greater outreach to families might have strengthened intervention effects, given the challenges that minority parents may face in engaging in treatment (Lau, 2006). Our sampling strategy targeted youths with elevated depression, but the average youth endorsed only one HRB, which likely contributed to a floor effect for the HRBI. Furthermore, the overall participation rate was low relative to the number of eligible participants, and a portion of our randomized youths was lost to follow-up. There were likely multiple reasons why patients elected not to attend sessions, including lack of motivation, lack of HRBs, and other personal and practical barriers to attendance. Assessing barriers can help to identify strategies for increasing rates of care. Usual PC in this study may have been stronger than in many other community clinics, as clinics were situated in medical centers with relatively easy access to behavioral health resources. The UC+ condition may have been getting more or higher-quality treatment than is usual in many PC settings. Unfortunately, we lack the administrative data to assess number of PC visits attended or behavioral health referrals received during the intervention period. Finally, intervention youths received a lower than expected dose of the intervention, indicating low feasibility of this longer intervention within PC clinics that serve a general (vs. high-risk) population. This limits our ability to test effects of the intervention as designed.

In conclusion, this study adds to existing research on integrated medical–behavioral health care, and consistent with prior research, underscores the challenges in decreasing HRBs in general PC populations (Asarnow et al., 2015). We found similar outcomes for youths receiving UC+ or a behavioral health intervention targeting multiple HRBs. These results, in conjunction with our finding that youths tended to receive far lower intervention doses than anticipated, indicate that our 10-session intervention for targeting multiple HRBs in youths with generally low risk may have low feasibility and acceptability within PC. However, our findings that greater participation in HRBs predicted severe depression and that youths with severe depression subsequently engaged in more HRBs, underscore the value of monitoring for HRBs and depression among PC patients to allow for effective intervention in both areas. Our finding that youths from the clinic where the intervention was more integrated within PC and conducted in the PC clinic attended more sessions supports the value of integrating behavioral health care within PC to increase access to care. Additional research is needed to identify optimal PC strategies, examine the value of the multiple HRB intervention approach for PC clinics serving primarily high-risk youths, and evaluate the benefits of a briefer multiple HRB approach.

Acknowledgments

The authors wish to thank the youth, families, staff, and colleagues who made this project possible, including Drs Mary Jane Rotheram-Borus, Catherine Sugar, Lonnie Zeltzer, and our DSMB, and Drs Donald Guthrie, Gabrielle Carlson, and Mark Rapaport.

Funding

This work was supported by the National Institute of Mental Health (grant numbers R01MH078596 and 2T32MH073517).

Clinical trial registration: http://www.clinicaltrials.gov NCT00461539

Conflicts of interest: Dr. Asarnow reported receiving grant, research, or other support from the National Institute of Mental Health, the American Foundation for Suicide Prevention, the Substance Abuse and Mental Health Services Administration, the American Psychological Association (APA), the Society of Clinical Child and Adolescent Psychology (Division 53 of the APA), and the Association for Child and Adolescent Mental Health. She has served as a consultant on quality improvement for depression and suicide/self-harm prevention, serves on the Scientific Council of the American Foundation for Suicide Prevention, and the Scientific Advisory Board of the Klingenstein Third Generation Foundation. No other disclosures were reported.

References

Asarnow, J. R., Jaycox, L. H., Duan, N., LaBorde, A. P., Rea, M. M., Murray, P., … Wells, K. B. (2005). Effectiveness of a quality improvement intervention for adolescent depression in primary care clinics: A randomized controlled trial. *JAMA*, *293*, 311–319.

Asarnow, J. R., Jaycox, L. H., Tang, L., Duan, N., LaBorde, A. P., Zeledon, L. R., … Wells, K. B. (2009). Long-term benefits of short-term quality improvement interventions for depressed youths in primary care. *The American Journal of Psychiatry*, *166*, 1002–1010.

Asarnow, J. R., Kolko, D. J., Miranda, J., & Kazak, A. E. (2017). The pediatric patient-centered medical home: Innovative models for improving behavioral health. *American Psychologist*, *72*, 13–27.

Asarnow, J. R., Rozenman, M., Wiblin, J., & Zeltzer, L. (2015). Integrated medical-behavioral care compared with usual primary care for child and adolescent behavioral health: A meta-analysis. *JAMA Pediatrics*, *169*, 929–937.

Asarnow, J. R., Zeledon, L. R., D'Amico, E., LaBorde, A., Anderson, M., Avina, C., … Shoptaw, S. (2014). Depression and health risk behaviors: Towards optimizing primary care service strategies for addressing risk. *Primary Health Care*, *4*, 152. doi: 10.4172/2167-1079.1000152

Brener, N. D., Kann, L., Kinchen, S. A., Grunbaum, J. A., Whalen, L., Eaton, D., … Ross, J. G. (2004). Methodology of the youth risk behavior surveillance system. *MMWR. Recommendations and Reports: Morbidity and Mortality Weekly Report. Recommendations and Reports*, *53*, 1–13.

Centers for Disease Control and Prevention & National Center for Health Statistics (2000). CDC growth charts: United States. Retrieved from http://www.cdc.gov/growthcharts.

D'Amico, E. J., Miles, J. N., Stern, S. A., & Meredith, L. S. (2008). Brief motivational interviewing for teens at risk of substance use consequences: A randomized pilot study in a primary care clinic. *Journal of Substance Abuse Treatment*, *35*, 53–61.

D'Souza-Li, L., & Harris, S. K. (2016). The future of screening, brief intervention and referral to treatment in adolescent primary care: Research directions and dissemination challenges. *Current Opinion in Pediatrics*, *28*, 434–440.

Eaton, D. K., Kann, L., Kinchen, S., Shanklin, S., Ross, J., Hawkins, J., … Wechsler, H.; Centers for Disease Control and Prevention (CDC). (2010). Youth risk behavior surveillance–United States, 2009. *Morbidity and Mortality Weekly Report. Surveillance Summaries*, *59*, 1–142.

Evans-Polce, R. J., Vasilenko, S. A., & Lanza, S. T. (2015). Changes in gender and racial/ethnic disparities in rates of cigarette use, regular heavy episodic drinking, and marijuana use: Ages 14 to 32. *Addictive Behaviors*, *41*, 218–222.

Fallucco, E. M., Seago, R. D., Cuffe, S. P., Kraemer, D. F., & Wysocki, T. (2015). Primary care provider training in screening, assessment, and treatment of adolescent depression. *Academic Pediatrics*, *15*, 326–332.

Fluharty, M., Taylor, A. E., Grabski, M., & Munafò, M. R. (2017). The association of cigarette smoking with depression and anxiety: A systematic review. *Nicotine and Tobacco Research*, *19*, 3–13.

Goldstein, M. G., Whitlock, E. P., & DePue, J. (2004). Multiple behavioral risk factor interventions in primary care: Summary of research evidence. *American Journal of Preventive Medicine*, *27*, 61–79.

Gulliver, A., Griffiths, K. M., & Christensen, H. (2010). Perceived barriers and facilitators to mental health help-seeking in young people: A systematic review. *BMC Psychiatry*, *10*, 113.

Hagan, J. F., Shaw, J. S., & Duncan, P. M. (2017). *Bright futures guidelines* (4th ed.). Elk Grove Village, IL: American Academy of Pediatrics.

Hale, D. R., Fitzgerald-Yau, N., & Viner, R. M. (2014). A systematic review of effective interventions for reducing multiple health risk behaviors in adolescence. *American Journal of Public Health*, *104*, e19–e41.

Knight, J. R., Goodman, E., Pulerwitz, T., & DuRant, R. H. (2001). Reliability of the Problem Oriented Screening Instrument for Teenagers (POSIT) in adolescent medical practice. *The Journal of Adolescent Health*, *29*, 125–130.

Kolko, D. J., & Perrin, E. (2014). The integration of behavioral health interventions in children's health care: Services, science, and suggestions. *Journal of Clinical Child and Adolescent Psychology*, *43*, 216–228.

Lau, A. S. (2006). Making the case for selective and directed cultural adaptations of evidence-based treatments: Examples from parent training. *Clinical Psychology: Science and Practice*, *13*, 295–310.

Luppino, F. S., de Wit, L. M., Bouvy, P. F., Stijnen, T., Cuijpers, P., Penninx, B. W., & Zitman, F. G. (2010). Overweight, obesity, and depression: A systematic review

and meta-analysis of longitudinal studies. *Archives of General Psychiatry*, *67*, 220–229.

McGrady, M. E., & Hommel, K. A. (2016). Targeting health behaviors to reduce health care costs in pediatric psychology: Descriptive review and recommendations. *Journal of Pediatric Psychology*, *41*, 835–848.

McLaney, M. A., Boca, F. D., & Babor, T. (1994). A validation study of the problem-oriented screening instrument for teenagers (POSIT). *Journal of Mental Health*, *3*, 363–376.

Merikangas, K. R., He, J. P., Burstein, M., Swendsen, J., Avenevoli, S., Case, B., … Olfson, M. (2011). Service utilization for lifetime mental disorders in U.S. adolescents: Results of the National Comorbidity Survey–Adolescent supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry*, *50*, 32–45.

Mitchell, S. G., Gryczynski, J., O'Grady, K. E., & Schwartz, R. P. (2013). SBIRT for adolescent drug and alcohol use: Current status and future directions. *Journal of Substance Abuse Treatment*, *44*, 463–472.

Nordin, J. D., Solberg, L. I., & Parker, E. D. (2010). Adolescent primary care visit patterns. *The Annals of Family Medicine*, *8*, 511–516.

O'Neil, K. A., Conner, B. T., & Kendall, P. C. (2011). Internalizing disorders and substance use disorders in youth: Comorbidity, risk, temporal order, and implications for intervention. *Clinical Psychology Review*, *31*, 104–112.

Pbert, L., Flint, A. J., Fletcher, K. E., Young, M. H., Druker, S., & DiFranza, J. R. (2008). Effect of a pediatric practice-based smoking prevention and cessation intervention for adolescents: A randomized, controlled trial. *Pediatrics*, *121*, e738–e747.

Prochaska, J. J., & Prochaska, J. O. (2011). A review of multiple health behavior change interventions for primary prevention. *American Journal of Lifestyle Medicine*, *5*, 208–221.

Radloff, L. S. (1991). The use of the center for epidemiologic studies depression scale in adolescents and young adults. *Journal of Youth and Adolescence*, *20*, 149–166.

Rahdert, E. R. (1991). *The adolescent assessment/referral system manual*. Retrieved from https://eric.ed.gov/?id=ED340960.

Rapp, A. M., Chavira, D. A., Sugar, C. A., & Asarnow, J. R. (2017). Integrated primary medical-behavioral health care for adolescent and young adult depression: Predictors of service use in the youth partners in care trial. *Journal of Pediatric Psychology*, *42*, 1051–1064.

Roberts, R. E., Lewinsohn, P. M., & Seeley, J. R. (1991). Screening for adolescent depression: A comparison of depression scales. *Journal of the American Academy of Child and Adolescent Psychiatry*, *30*, 58–66.

Rotheram-Borus, M. J., Lee, M. B., Murphy, D. A., Futterman, D., Duan, N., Birnbaum, J. M., & Lightfoot, M. (2001). Efficacy of a preventive intervention for youths living with HIV. *American Journal of Public Health*, *91*, 400–405.

Rotheram-Borus, M. J., Song, J., Gwadz, M., Lee, M., Rossem, R. V., & Koopman, C. (2003). Reductions in HIV risk among runaway youth. *Prevention Science*, *4*, 173–187.

Shaffer, D., Fisher, P., Lucas, C. P., Dulcan, M. K., & Schwab-Stone, M. E. (2000). NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*, 28–38.

Stancin, T., & Perrin, E. C. (2014). Psychologists and pediatricians: Opportunities for collaboration in primary care. *The American Psychologist*, *69*, 332–343.

Tanner-Smith, E. E., & Lipsey, M. W. (2015). Brief alcohol interventions for adolescents and young adults: A systematic review and meta-analysis. *Journal of Substance Abuse Treatment*, *51*, 1–18.

Tynan, W. D. (2016). Commentary: Integrated primary care psychology evolving with the affordable care act. *Journal of Pediatric Psychology*, *41*, 1165–1167.

Wells, K. B., Sherbourne, C., Schoenbaum, M., Duan, N., Meredith, L., Unützer, J., … Rubenstein, L. V. (2000). Impact of disseminating quality improvement programs for depression in managed primary care: A randomized controlled trial. *JAMA*, *283*, 212–220.

Wickrama, T., & Wickrama, K. A. (2010). Heterogeneity in adolescent depressive symptom trajectories: Implications for young adults' risky lifestyle. *Journal of Adolescent Health*, *47*, 407–413.

World Health Organization. (1997). *Composite International Diagnostic Interview (CIDI): core version 2.1: interviewer's manual*. Geneva, Switzerland: World Health Organization.