

School Mental Health Resources and Adolescent Mental Health Service Use

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Objective: Although schools are identified as critical for detecting youth mental disorders, little is known about whether the number of mental health providers and types of resources that they offer influence student mental health service use. Such information could inform the development and allocation of appropriate school-based resources to increase service use. This article examines associations of school resources with past-year mental health service use among students with 12-month *DSM-IV* mental disorders. **Method:** Data come from the U.S. National Comorbidity Survey Adolescent Supplement (NCS-A), a national survey of adolescent mental health that included 4,445 adolescent–parent pairs in 227 schools in which principals and mental health coordinators completed surveys about school resources and policies for addressing student emotional problems. Adolescents and parents completed the Composite International Diagnostic Interview and reported mental health service use across multiple sectors. Multilevel multivariate regression was used to examine associations of school mental health resources and individual-level service use. **Results:** Nearly half (45.3%) of adolescents with a 12-month *DSM-IV* disorder received past-year mental health services. Substantial variation existed in school resources. Increased school engagement in early identification was significantly associated with mental health service use for adolescents with mild/moderate mental and behavior disorders. The ratio of students to mental health providers was not associated with overall service use, but was associated with sector of service use. **Conclusions:** School mental health resources, particularly those related to early identification, may facilitate mental health service use and may influence sector of service use for youths with *DSM* disorders. *J. Am. Acad. Child Adolesc. Psychiatry*, 2013;52(5):501–510. **Key Words:** mental health, schools, services

Adolescents with psychiatric disorders are consistently underserved by the US child mental health services system.¹⁻³ Among those who do receive services, schools are the most frequent providers²⁻⁶ and are gateways to additional services, as students receiving school-based services are often subsequently seen in the specialty mental health sector.^{7,8} As such, the President's New Freedom Commission on Mental Health, the Department of Health and Human Services, and the Institute of Medicine have specifically called for schools to enhance their early identification methods,⁹⁻¹¹ recognizing that whether, and how quickly, youth with psychiatric disorders connect with services has

considerable implications for the trajectory of mental health care and subsequent psychiatric and educational outcomes.^{8,12,13}

A number of school-level factors may influence service provision for youth with psychiatric disorders. Most notably, the number of mental health service providers on-site has consistently been associated with increased mental health service contact.¹⁴⁻¹⁷ However, other school resources may be equally important as the sheer number of providers. In particular, prevention activities and school-based mental health screening may facilitate early identification and increase openness to mental health service receipt.^{18,19} Outreach to families may reduce barriers to service access.²⁰ Formal connections to community-based providers may facilitate more rapid or targeted referrals.²¹



This article is discussed in an editorial by Dr. Peter S. Jensen on page 458.

Existing studies have not examined the importance of these school-level factors in influencing receipt of mental health services and, in particular, the relative importance of number of providers as compared to the nature of the mental health resources that schools provide. The current report uses data from the National Comorbidity Survey Adolescent Supplement (NCS-A) to examine associations of school mental health resources with student use of mental health services in schools, as well as services in other sectors of the child mental health system.

METHOD

Study Sample

As described in more detail elsewhere,²²⁻²⁴ the NCS-A was carried out between 2001 and 2004 in a dual-frame (household and school) national sample of adolescents (13–17 years of age) and their parents. Only the school sample is included in the current report. School selection initially targeted 289 nationally representative schools serving middle and high school students; however, only 81 schools (28.0%) enrolled. The primary reason for refusal was a reluctance to release student information for research studies. For each school refusing to participate, replacement schools were selected that matched initial refusal schools in size, geographic area, and other demographic characteristics. Because of the low initial recruitment rate, multiple replacement schools were contacted whenever possible. The final sample included 320 schools, reflecting this expansion of recruitment. To identify whether school replacement introduced bias, NCS-A household sample respondents who were students in schools that refused to participate were compared with respondents in matched replacement schools. Analyses indicated no bias in estimates of either prevalence or treatment of disorders.²³ Because of methods used to match replacement schools, demographic characteristics were comparable to those of initially selected schools. The conditional (on school participation) adolescent response rate in the school sample was 82.6% (detailed in Kessler *et al.*²²).

One parent or surrogate (henceforth referred to as “parents”) was asked to complete a self-administered questionnaire about their adolescent’s developmental history and mental health. Parent response rate (conditional on adolescent participation) was 83.7% in the school sample. Recruitment consent procedures were approved by Human Subjects Committees of both Harvard Medical School and the University of Michigan. Cases were weighted for residual discrepancies between sample and population socio-demographic and geographic distributions. Weighted composite socio-demographic distributions closely approximated those of the US Census population (weighting procedures detailed elsewhere²²).

The principal and a mental health coordinator in each NCS-A participating school were asked to complete a survey about school resources and policies regarding student emotional problems. Mental health coordinators were selected by principals as a person most knowledgeable of school mental health policies and were typically guidance counselors (50.2%) or school administrators (20.2%). When self-report surveys could not be obtained, respondents were offered the opportunity to complete a telephone or in-person survey. Surveys were completed by both the principal and mental health coordinator in 227 schools (a response rate of 70.9%). A comparison of the 227 schools with complete survey data to the 93 schools without complete data found no significant differences in public versus private status, student-to-teacher ratio, or proportion of non-Latino white students in the school (based on data from the Quality Education Data database, <http://www.qeddata.com>). Based on NCS-A data, there were also no significant differences in the proportion of students with serious emotional disturbance or the proportion receiving either any mental health services or school-based mental health services. However, schools with complete principal and mental health coordinator data were significantly more likely to be located in rural than in major metropolitan or other urban areas.

Analyses in the current report were limited to 4,445 students with complete adolescent–parent data who attended these 227 schools. Schools were primarily public (79.0%) and were well distributed among major metropolitan (37.0%), other urban (38.0%), and rural (25.0%) areas. They had a median of 70.0% non-Hispanic white students, with an interquartile range (IQR; 25th–75th percentiles) of 9.0% to 94.0%. Median enrollment across these schools was 662.1 students (IQR = 335.5–1025.6) and median student/teacher ratio was 15.7 (IQR = 13.4–19.6).

School-Level Measures

Ratio of Students to Mental Health Providers. Principals indicated the number of Full-Time Equivalent staff (FTEs) allocated for mental health service provision, including both regular school staff and contracted providers, hired at full-time, part-time, and hourly rates. A ratio variable indicated the number of students per FTE mental health provider (student/provider ratio).

Type of School Mental Health Resources. We created six indicators of type and intensity of school mental health resources, based on principal and mental health coordinator reports. First, we coded whether each of 15 topics concerning mental health, violence, and substance use were part of the required curricula presented to students (Cronbach’s $\alpha = 0.92$). The second indicator represented the number of different prevention activities (e.g., violence prevention, substance use prevention, peer mediation) ($\alpha = 0.79$). The third represented the number of different early identification resources (e.g., identification or referral for abuse or emotional problems) ($\alpha =$

0.71). The fourth represented the number of different counseling resources (e.g., individual, group, family counseling) ($\alpha = 0.85$). The fifth represented the extent of collaboration with families, including parent mental health curricula, provision of names/phone numbers of referrals, and joining parents at meetings with mental health professionals or speaking with professionals by phone ($\alpha = 0.66$). Finally, a dichotomous variable indicated whether the school had a memorandum of agreement (MOA) with outside agencies to provide mental health services off school property. With the exception of this dichotomous MOA measure, all scales were standardized to have a mean of 0 and variance of 1.0.

School Covariates. We controlled for several indicators of school demographics and student body characteristics. First, principals estimated the frequency of each of 15 types of behavioral and mental health problems at their school. Based on factor analysis, we divided problems into two scales: (a) violence on campus (e.g., disruptive classroom behavior) ($\alpha = 0.80$); and (b) emotional and behavioral problems at school (e.g., depression, suicidal ideation) ($\alpha = 0.86$). Second, we aggregated student reports of school engagement and, based on factor analysis, created two scales assessing mean within-school responses to questions about academic engagement (e.g., I try hard at school) ($\alpha = .76$), and connectedness to teachers (e.g., I care a lot about what my teachers think of me) ($\alpha = .76$). Scales were standardized to have a mean of 0 and variance of 1.0. We additionally controlled for four school socio-demographic/geographic characteristics: school type (public versus private), percentage of non-Latino white students, school urbanicity (central city of a major metropolitan area, other urban, and rural), and student-to-teacher ratio.

Individual-Level Measures

Mental Health Service Use. Adolescent and parent surveys assessed six types of mental health service in the past 12 months: school services (school psychologist, counselor, nurse, or other mental health visits in school or special classroom or special school placement); specialty mental health (psychiatrist or psychologist visits for outpatient, inpatient, or emergency room services); general medical (general practitioner, pediatrician, other physician, physician assistant, or other general medical provider visits); complementary and alternative medicine (CAM) (support group, self-help group, or visits with a CAM professional); human services (mental health services from a counselor in a social services agency or from a family preservation worker); and juvenile justice services (mental health services from a probation officer or juvenile correction officer). Service use was considered present if reported by either the parent or adolescent.

Diagnostic Assessment. Adolescents were administered a modified version of the Composite International Diagnostic Interview (CIDI), a fully structured

interview assessing *DSM-IV* disorders.²⁵ Previous factor analysis of NCS-A lifetime *DSM-IV* disorders found four disorder classes²⁶: fear (panic disorder and/or agoraphobia, social phobia, specific phobia, and intermittent explosive disorder); distress (major depressive episode or dysthymia [MDE], generalized anxiety disorder, posttraumatic stress disorder, and separation anxiety disorder); behavior (attention-deficit/hyperactivity disorder [ADHD], oppositional defiant disorder [ODD], conduct disorder [CD], and eating disorders), and substance use disorders (alcohol abuse with or without dependence and drug abuse with or without dependence). Parents provided information about behavior disorders (ADHD, ODD, and CD) and MDE. In these cases, parent and adolescent reports were combined at the symptom level using an “or” rule (i.e., symptoms considered present if endorsed by either respondent). All diagnoses used *DSM-IV* organic exclusion rules. All but two diagnoses used *DSM-IV* diagnostic hierarchy rules. Exceptions were ODD, defined with or without CD, and substance abuse, defined with or without dependence. A clinical reappraisal study with a subsample of NCS-A respondents documented good concordance between *DSM-IV* diagnoses based on the CIDI and those based on a clinician-administered interview, with area under the receiver operating characteristic curve (AUC) in the range of 0.78 to 1.00 for each diagnosis.²⁴ We focus here on 12-month disorders.

Consistent with the US Substance Abuse and Mental Health Services Administration (SAMHSA) definition of Serious Emotional Disturbance (SED),²⁷ we identified *DSM-IV* diagnoses significantly interfering with children’s functioning in family, school, or community activities. The SAMHSA definition differs from that provided in the Individuals with Disabilities in Education Act, which specifically requires disorders to adversely affect educational performance.²⁸ The SAMHSA SED definition was operationalized in the NCS-A clinical reappraisal study as a *DSM-IV* disorder with a Children’s Global Assessment Scale (CGAS)²⁹ score of ≤ 50 , representing either moderate impairment in functioning in most areas of living or severe impairment in at least one area of living. Moderate severity was defined as CGAS scores of 51 to 60 (variable functioning, with sporadic difficulties in several but not all areas of living). Other cases were defined as having Mild severity. Although the CIDI adolescent and parent surveys include measures of impairment, they could not be used to construct CGAS scores directly, as CGAS scores are based on clinical ratings. We therefore used a regression-based approach, described elsewhere,³⁰ to predict clinical reappraisal sample CGAS scores from impairment-related CIDI variables. Regression results were used to impute severity scores to the full NCS-A sample using Multiple Imputation. Area under the receiver operating characteristic curve (AUC) for these equations was good in distinguishing serious from mild/moderate mental

disorders (AUC = 0.85) and moderate from mild mental disorders (AUC = 0.82).

Socio-demographics. Socio-demographic variables considered here include respondent age, sex, race/ethnicity, number of biological parents lived with for the majority of respondent's life, and two measures of socio-economic status (SES), namely, parent educational attainment and family income.

Statistical Analysis

We used a series of multilevel logistic regression models³¹ to examine the association of school-level resources with individual-level 12-month service use, controlling for individual-level predictors and school-level covariates. This analysis allowed us to determine the effects of school mental health resources, once we accounted for variability associated with other individual- and school-level factors. Key school-level predictors in our models were student-to-mental health provider ratio and types of mental health resources in the school (number of mental health-related curricula, prevention activities, early identification resources, counseling, collaboration with families, MOAs). School-level controls included school-level emotional/behavioral problems, student engagement, and school socio-demographic variables. Individual-level controls included dummy variables for each of the 12-month NCS-A *DSM-IV* disorders assessed in the NCS-A, dummies for number of disorders, and indicators of impairment in functioning based on the Sheehan Disability Scale.³² Controls were also included for individual-level socio-demographics and placement in a residential treatment setting (foster care, juvenile detention center, hospital) where adolescents would very likely receive services.

We first examined associations of school-level predictors with individual-level use of any mental health services in the total sample and in samples stratified by disorder severity and class of disorder. Next, we examined associations of school-level variables and service sector among individuals receiving services. Logistic regression coefficients and their standard errors were exponentiated to create odds ratios (ORs) with 95% confidence intervals. Standard errors were estimated using the Taylor series linearization method to account for sample weights and clustering. Significance of school-level sets was evaluated using Wald χ^2 tests. These procedures were implemented using SAS software (SAS Institute, Cary, NC). Statistical significance was evaluated using .05-level two-sided tests.

RESULTS

Distribution of School Mental Health Resources

Schools vary considerably in the number and type of mental health resources that they provide. The median number of students per mental health service provider is 311.2, but the range is

quite large (IQR = 130.1–500.6). Almost all schools engage in some prevention (85.0%) or early identification (89.0%) activities. Individual, group, or family counseling is also provided in most schools (88.2%). Almost two-thirds (63.0%) offer parent training on mental health-related topics, and 63.0% accompany parents to outside meetings or speak with outside mental health providers by phone. Of the schools, 75% have MOAs formalizing connections with community-based mental health agencies.

Aggregate Patterns of 12-Month Service Use

NCS-A respondents with disorders often do not receive mental health services. Less than half (45.3%) of NCS-A adolescents with a 12-month *DSM-IV* disorder and 13.0% of those without a disorder report receiving services in the 12 months before interview (Table 1). Adolescents with behavior (64.3%), distress (62.5%), and substance (59.2%) disorders are more likely to receive services than those with fear (41.3%) disorders. More than half of all those with a 12-month disorder who receive mental health services of any kind receive them in schools (56%) and/or in the mental health specialty sector (53%). These percentages differ slightly from those for the complete NCS-A sample, because the current analysis is limited to NCS-A respondents attending schools in which principals and mental health coordinators completed surveys.

Associations of School Mental Health Resources With 12-Month Service Use

We begin by examining the association of the full set of school-level variables with 12-month service use. After controlling for individual-level socio-demographics and 12-month *DSM-IV* disorders, school characteristics are significantly associated with service use among students with serious (SED; $\chi^2_{16} = 126.4, p < .001$) and mild-to-moderate ($\chi^2_{16} = 56.5, p < .001$) 12-month *DSM-IV* disorders, but not among students without a disorder ($\chi^2_{16} = 18.1, p = .32$). When we stratify by class of disorder, school characteristics are significantly associated with service use among youth with behavior ($\chi^2_{16} = 73.0, p < .001$), distress ($\chi^2_{16} = 46.4, p < .001$), and substance ($\chi^2_{16} = 75.5, p < .001$), but not fear disorders ($\chi^2_{16} = 22.2, p = .14$).

To identify school mental health resources associated with service use, we examine multivariate models that account for both number of providers and type of school mental health

TABLE 1 Percentage of the U.S. National Comorbidity Survey Adolescent Supplement (NCS-A) Respondents Receiving 12-Month Services by Class of 12-Month DSM-IV/CIDI Disorders

	Mental Health				Juvenile/Criminal			(n)
	Any Service % (SE)	Specialty % (SE)	General Med % (SE)	Human Service % (SE)	CAM % (SE)	Justice % (SE)	School % (SE)	
Any fear	41.3 (2.9)	22.0 (3.1)	10.4 (1.1)	7.2 (1.5)	3.3 (0.9)	3.8 (1.2)	23.4 (2.3)	(1,132)
Any distress	62.5 (3.2)	36.8 (3.5)	17.3 (2.6)	12.4 (2.2)	8.0 (1.6)	6.1 (1.9)	31.9 (3.2)	(714)
Any behavior	64.3 (3.5)	36.1 (3.0)	15.0 (2.0)	10.7 (1.8)	7.4 (1.5)	11.1 (2.6)	39.6 (3.1)	(720)
Any substance	59.2 (4.5)	37.1 (4.8)	10.1 (2.6)	8.2 (1.7)	10.8 (2.3)	9.5 (2.0)	32.4 (3.4)	(534)
Any disorder	45.3 (2.2)	23.8 (2.1)	11.0 (1.1)	7.2 (1.0)	5.3 (0.9)	5.2 (1.2)	25.4 (2.0)	(1,926)
No disorder	13.0 (1.1)	4.6 (0.8)	1.6 (0.3)	2.0 (0.6)	1.7 (0.4)	1.0 (0.5)	6.2 (0.7)	(2,519)
Total sample	27.6 (1.7)	13.3 (1.4)	5.9 (0.6)	4.4 (0.4)	3.3 (0.5)	2.9 (0.7)	14.9 (1.3)	(4,445)

Note: CAM = complementary and alternative medicine; SE = standard error.

resources in predicting individual mental health service use (controlling individual- and school-level covariates). For students with SED, service use is not significantly associated with the ratio of students to mental health providers or with any of the indicators of type of school mental health resources examined, but is associated with greater principal reports of schoolwide emotional/behavioral problems (odds ratio [OR] = 2.3) and location in a major metropolitan (OR = 17.5) or other urban (OR = 4.9), as compared to rural, area (Table 2). For students with mild-to-moderate mental disorders, service use is also not significantly associated with the ratio of students to mental health providers, but is significantly associated with greater school early identification resources (OR = 1.4) and fewer school-based counseling resources (OR = 0.8).

Stratifying by disorder class, we find that for students with distress disorders, service use is lower in schools reporting greater collaboration with families (OR = 0.7) (Table 3). For students with behavior disorders, service use is lower in schools providing greater counseling resources (OR = 0.7), but is higher in schools with more early identification resources (OR = 1.5), as well as in those located in a major metropolitan area (OR = 3.1) and with a higher (i.e., worse) student-to-teacher ratio (OR = 1.2). Finally, for students with substance use disorders, service use is significantly associated with school provision of prevention activities (OR = 2.0). In addition, service use is lower among students with substance use disorders enrolled in public than in private schools (OR = 0.4) and is higher among students in urban as compared to rural settings (ORs = 4.8–7.1 for location in major metropolitan or other urban areas).

Associations of School Mental Health Resources With Sectors of Use Among Service Users

We next turn to the subset of youth with disorders who are receiving services and examine whether the ratio of students to mental health providers is associated with the sector in which those services are received. (Detailed results are available on request from the corresponding author.) We look specifically at predictors of service use in the school, mental health specialty, and general medical sectors (the three sectors in which adolescents most often receive services). A lower (i.e., better) student-to-mental health provider ratio is associated with increased use of specialty mental health services for students with no disorder, as well as those with mild-to-moderate, distress, and substance use disorders. Lower student-to-mental health provider ratio is also associated with increased general medical service receipt for students with distress disorders and decreased school service receipt for students with SED.

The types of school-based mental health resources, however, are inconsistent in their associations with sector of mental health service use. When we examine results stratified by disorder severity and class, there are only three cases among a total of 18 (six types of school mental health resources predicting service use in each of the three primary sectors) in which a school mental health resource is associated significantly with service use in a specific sector in more than one severity-of-disorder or class-of-disorder subsample. First, school-based counseling is associated with decreased general medical service use by youth with SED, distress, and behavior disorders. Second, prevention activities are associated with increased general medical service use among students with mild-to-moderate mental and distress disorders.

TABLE 2 Associations of School-Level Characteristics and 12-Month Mental Health Service Use by Severity of 12-Month DSM-IV/CIDI Disorder in the Multilevel Logistic Regression Model

	Severity of Disorder			
	Mild/Moderate, n = 1,602		SED, n = 324	
	OR	(95% CI)	OR	(95% CI)
Student/mental health provider ratio	1.0	(0.9–1.1)	0.7	(0.4–1.2)
School mental health resources				
Number of MH curricula	1.0	(0.8–1.2)	1.0	(0.5–1.7)
Memo of agreement	1.1	(0.8–1.6)	1.9	(0.4–8.7)
Counseling	0.8*	(0.6–0.9)	0.8	(0.3–2.1)
Prevention	1.2	(1.0–1.4)	0.9	(0.5–1.8)
Early identification	1.4*	(1.2–1.6)	1.0	(0.5–1.8)
Collaboration with families	1.1	(0.9–1.2)	0.6	(0.4–1.0)
School-Level covariates				
School violence	1.0	(0.8–1.1)	0.7	(0.5–1.1)
Emotional/behavioral problems	0.9	(0.8–1.1)	2.3*	(1.3–4.3)
Academic engagement	0.9	(0.7–1.2)	0.7	(0.3–1.7)
Teacher connection	0.9	(0.7–1.1)	0.8	(0.4–1.7)
Socio-demographics				
Public (vs. private)	0.8	(0.4–1.6)	1.1	(0.2–7.9)
Percentage of students who are non-Latino white	1.0	(0.8–1.1)	0.9	(0.5–1.8)
Major metropolitan area (vs. rural)	1.0	(0.7–1.6)	17.5*	(3.8–81.9)
Other urbanized area (vs. rural)	1.2	(0.8–1.9)	4.9*	(1.7–14.1)
Student/teacher ratio	1.0	(0.8–1.3)	1.2	(0.7–2.0)
χ^2_{16}	56.5*		126.4*	

Note: Results are based on a multilevel random-effects regression model estimated in 227 schools. See text for a description of the individual-level controls included in the model. Adolescents with no disorder are not included in the table because of nonsignificant associations of school-level characteristics and mental health service use. MH = mental health; OR = odds ratio; SED = serious emotional disturbance.

*Significant at the .05 level, two-sided test.

Finally, students with SED and substance use disorders in schools with MOAs are less likely to use school-based services.

DISCUSSION

Consistent with previous studies of youth mental health service use,^{2,4,33} fewer than half (45.3%) of NCS-A adolescents with a 12-month DSM-IV disorder report service use in the year before interview. Adolescents with behavior disorders are more likely to receive services than those with fear, distress, or substance use disorders. Also consistent with previous studies, schools are the primary site of service receipt among NCS-A adolescents who do use mental health services.^{4,5} NCS-A schools vary considerably in their ratio of students to mental health providers and in the types of mental health resources that they offer.^{34,35} It is striking, however, that when we control for type of school mental health resources and other school- and individual-level covariates, the ratio of student to mental health providers is

not significantly associated with adolescent mental health service use. Previous studies report that adolescents with greater access to school-based mental health providers are significantly more likely than others to make service contact,^{14,15} but these studies have not accounted for the types of school mental health resources or the other school-level covariates considered here.

Although the number of providers was not observed to be related to overall service use, we found that other school-level factors are associated with service use among adolescents with mental disorders. The most consistent of these findings indicate, first, that youth with mild-to-moderate mental and behavior disorders are more likely to use services in schools providing greater early identification resources. Early identification resources are defined here as the extent to which schools provide services designed to identify and/or refer students for abuse or emotional problems. These early identification and referral resources likely reflect a school culture that normalizes discussions of emotional/behavioral

TABLE 3 Associations of School-Level Characteristics and 12-Month Mental Health Service Use by Class of 12-Month DSM-IV/CIDI Disorder in the Multilevel Logistic Regression Model

	Class of Disorder					
	Distress, n = 714		Behavior, n = 720		Substance, n = 534	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Student/mental health provider ratio	0.9	(0.7–1.2)	1.0	(0.8–1.2)	0.8	(0.7–1.1)
School mental health resources						
Number of MH curricula	0.9	(0.7–1.2)	0.8	(0.6–1.1)	1.0	(0.7–1.5)
Memo of agreement	1.2	(0.7–2.1)	0.9	(0.5–1.8)	1.7	(0.7–4.2)
Counseling	1.0	(0.7–1.4)	0.7*	(0.6–0.9)	0.7	(0.5–1.0)
Prevention	1.1	(0.9–1.4)	0.9	(0.7–1.2)	2.0*	(1.5–2.8)
Early identification	1.1	(0.9–1.5)	1.5*	(1.0–2.2)	1.2	(0.8–1.7)
Collaboration with families	0.7*	(0.6–0.9)	0.9	(0.7–1.1)	1.0	(0.7–1.2)
School-level covariates						
School violence	0.9	(0.8–1.0)	0.8	(0.6–1.1)	1.0	(0.7–1.3)
Emotional/behavioral problems	1.1	(0.9–1.3)	1.1	(0.9–1.4)	0.9	(0.7–1.2)
Academic engagement	1.1	(0.8–1.4)	0.7	(0.5–1.0)	0.8	(0.5–1.3)
Teacher connection	0.8	(0.7–1.1)	1.2	(1.0–1.5)	1.1	(0.7–1.8)
Socio-demographics						
Public (vs. private)	0.8	(0.4–1.5)	1.1	(0.4–3.1)	0.4*	(0.2–0.8)
Percent students who are non-Latino white	1.0	(0.7–1.3)	1.0	(0.8–1.4)	1.2	(0.8–1.7)
Major metropolitan area (vs. rural)	2.0	(0.9–4.6)	3.1*	(1.4–7.2)	4.8*	(2.0–11.5)
Other urbanized area (vs. rural)	1.8	(1.0–3.3)	2.1	(1.0–4.6)	7.1*	(2.8–17.8)
Student/teacher ratio	1.1	(0.8–1.4)	1.2*	(1.0–1.5)	1.0	(0.8–1.4)
χ^2_{16}	46.4*		73.0*		75.5*	

Note: Results are based on a multilevel random-effects regression model estimated in 227 schools. See text for a description of the individual-level controls included in the model. Adolescents with fear disorders are not included in the table because of nonsignificant associations of school-level characteristics and mental health service use. MH = mental health; OR = odds ratio.

* Significant at the .05 level, two-sided test.

health, thereby reducing stigma in the school community.¹⁸ The greater availability of early identification resources also might suggest that these schools prioritize screening for and addressing the emotional and behavioral needs of students.¹⁹ Unfortunately, recent studies indicate that many school mental health professionals spend large proportions of time on administrative tasks, reducing their ability to directly address student emotional and behavioral needs, particularly through prevention and early intervention.^{36,37} Second, students with SED as well as behavior and substance use disorders are more likely to access services when their schools are located in urban, as compared to rural, settings. This finding is consistent with prior studies,^{35,38} and may reflect limited access to community-based providers or greater stigma associated with mental health service use in rural settings.³⁹ Third, greater provision of school-based counseling resources is associated with decreased overall mental health service use by youth with mild-to-moderate mental and behavior disorders.

This finding suggests that the sheer number of mental health providers and their availability for school-based counseling may be less important for determining initial service contact than their engagement in activities designed to facilitate outreach and identification.

School mental health resources not only influence whether adolescents receive services, but also where they are likely to go, a finding consistent with research identifying schools as a primary source of external referrals.⁸ Importantly, although the ratio of students to mental health providers is unrelated to service use in general, it is a significant predictor of sector of service use. In particular, lower (i.e., better) student-to-mental health provider ratio is significantly associated with increased specialty mental health service use for students with no disorder, as well as mild-to-moderate mental, distress, and substance use disorders, suggesting that greater access to school providers facilitates referral to one of the sectors in which students are most likely to receive ongoing mental health services.²¹

Associations of specific types of school mental health resources with receipt of services in the school, mental health specialty, and general medical sectors are generally inconsistent. However, the findings that are most consistent indicate, first, that increased provision of counseling in schools is associated with decreased general medical service use for youth with SED, distress, and behavior disorders; and second, in contrast, prevention activities are associated with increased general medical service use for students with mild-to-moderate mental and distress disorders. These findings suggest that the types of resources that school mental health professionals offer may influence their choice of service sector referral. Finally, students with SED and substance use disorders in schools that have MOAs with external agencies are significantly less likely to receive school-based services, a finding that is consistent with the MOA purpose of facilitating community-based referrals.

These study findings should be interpreted in light of several limitations. First, the low initial school participation rate and subsequent non-completion of principal and mental health coordinator reports raises concerns about whether our final sample is representative of US schools. We find comparable school demographics as well as rates of *DSM-IV* disorders and service use among students in schools that either initially refused to participate or in which surveys were incomplete. However, in schools without principal and mental health coordinator reports, we have no data on mental health resources or leadership related to the allocation of those resources. It is therefore possible that the schools in which principals and mental health coordinators provided data were also the schools that were most attuned to student mental health needs or that had the most mental health resources. Second, it is possible that errors in measurement reduced the observed associations of school-level variables with service use. In particular, we had no externally validating data to test the accuracy of information provided by principals and mental health coordinators. Third, because school-level data are restricted to the current school of NCS-A respondents, we may have underestimated the association of school mental health resources and service use for youths who first entered services at a younger age. Fourth, our measure of mental health service use assesses any service receipt, but does not specify the quantity or nature of services provided, or their adequacy.

This limits our ability to interpret findings related to service receipt in specific sectors. Fifth, the NCS-A includes limited data on special education identification and service provision. Therefore, we cannot determine whether students identified with *DSM-IV* diagnoses are also identified for receipt of special education services by their schools, whether school mental health resources are allocated through special education, or whether schools prioritize mental health services for students identified through the special education system. Finally, NCS-A data were collected between 2001 and 2004. Recent substantial cuts to education funding have likely reduced mental health staff and services in schools. Replication of these findings in more recently collected samples is an important goal for future research.

Despite these limitations, several key findings emerge from this study. First, school engagement in early identification is meaningfully associated with service use for adolescents with early or mild mental disorders, as well as those with behavior disorders. Programs supporting schools in identification and referral may have particular value in facilitating initial mental health service contact. Second, although the sheer number of mental health providers in the school is not a predictor of service access in general, among adolescents who do use services the number of providers is associated with service use in the specialty mental health sector. This finding indicates the importance of understanding the mechanisms by which an increased number of mental health providers in a school may facilitate referral to community mental health services. Third, provision of counseling in schools is associated with decreased general medical sector use for youth with SED, distress, and behavior disorders, indicating that school-based counseling resources may decrease referrals to pediatricians and for medication evaluation.

These study results provide a foundation for understanding the association of school mental health resources and individual mental health service use and, importantly, control for critical school and individual factors that have not been accounted for in previous research. Future studies would benefit from focusing on the mechanisms by which school staff identify students with emotional problems and the processes that determine whether and, if so, how students are referred for mental health services by their schools. In an era of shrinking health care

resources, schools are likely to play increasingly important roles in addressing early and mild psychiatric disorders, which may in turn influence where and how youth with mental disorders are treated. Understanding patterns of referrals and what drives them is important to ensure that scarce mental health resources are effectively leveraged to address adolescent mental health needs. &

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