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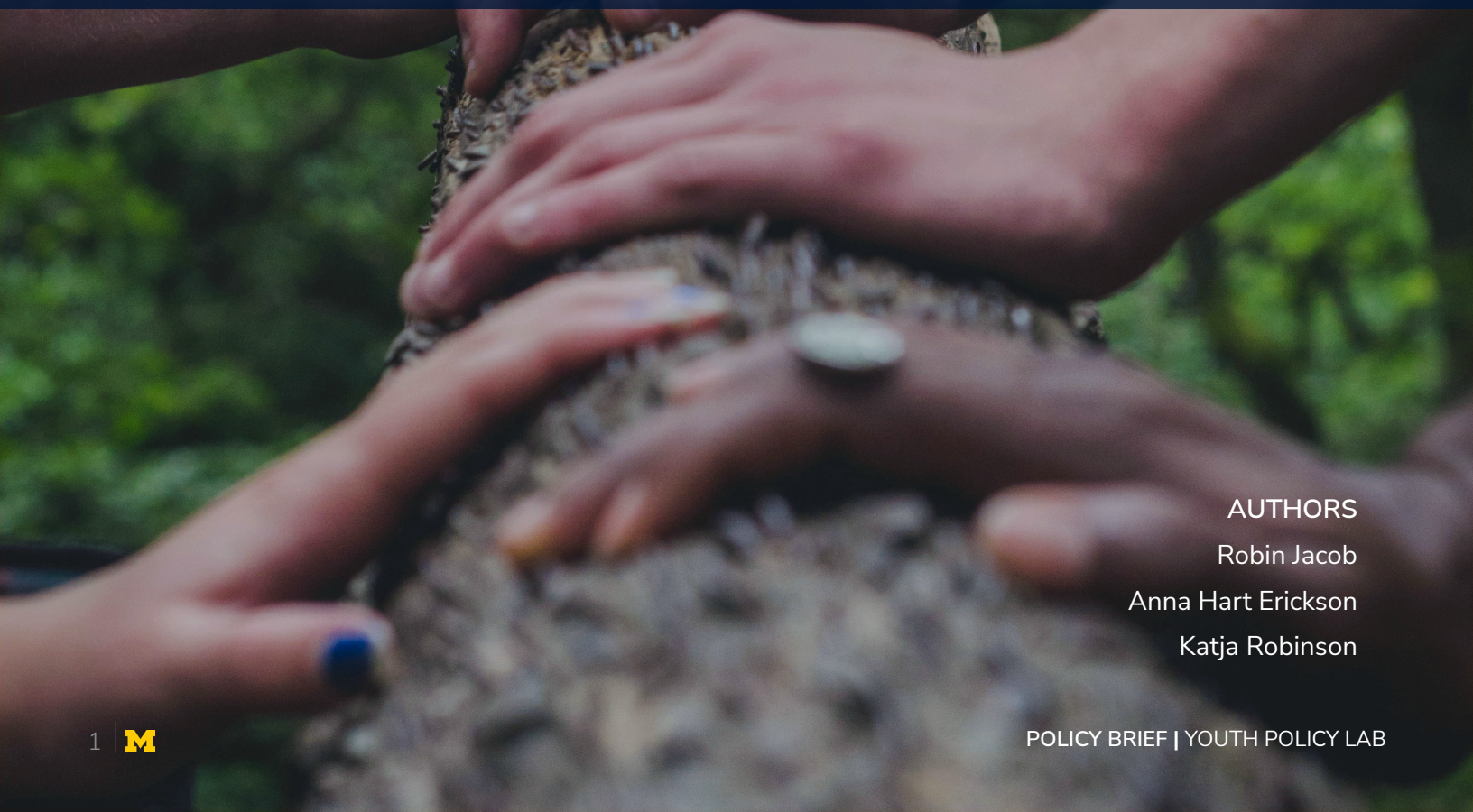
Variation in Adolescent Depression Rates: A Review of Findings Using the Patient Health Questionnaire (PHQ) Across School Contexts and Years



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EXECUTIVE SUMMARY

Rates of adolescent depression and anxiety have increased over the past two decades, but the onset of the COVID-19 pandemic and related disruptions and school closures led to even higher levels of reports of mental health concerns[1]. However, understanding the extent of the problem is difficult because reported rates of depression vary significantly depending on the measure used, from a low of 5.7% to a high of 42%. Data is also limited for some groups of students (e.g., American Indian/Alaska Native). Using data from student responses to the Patient Health Questionnaire (PHQ) depression measure over multiple years in three districts, we explored how rates of reported symptoms of depression varied by: (a) context (i.e., rural vs. urban), (b) year, (c) student characteristics, and (d) the shorter 2-item or longer 9-item PHQ measure. Our findings have potential implications for policymakers and school mental health professionals as they identify and support students experiencing depression.

KEY FINDINGS

Overall, our findings were consistent with national reports that indicate high levels of adolescent depression. Across data sets and over time, at least 34% of students reported symptoms. Students in the rural district reported lower rates of symptoms of depression than in the urban district, but both reported higher rates after the start of the COVID-19 pandemic compared to just before. Rates of depression vary considerably by student characteristics. Students who identify as girls or LGBTQ+ reported higher rates of depression than those who do not. Students who identify as multiracial had higher rates of depression than those who identify as Black/African American, Hispanic/Latinx, or White. Finally, we observed discrepancies between the PHQ-2 and the PHQ-9's ability to identify a consistent set of students with symptoms of depression. Both the short and longer versions may miss some students, which may be driven by differences in the depression symptoms included in each measure. If resources allow, the PHQ-9 may be a better measure of depression for adolescents, but the PHQ-2 produces mostly comparable results.

INTRODUCTION

In fall 2021, the American Academy of Pediatrics (AAP), the American Academy of Child and Adolescent Psychiatry (AACAP), and the Children's Hospital Association (CHA) declared a National State of Emergency in Children's Mental Health. While experts agree that the COVID-19 pandemic exacerbated the problem, rates of youth depression, anxiety, and suicidal ideation were already on the rise prior to its start[2]. Adolescent depression is associated with decreased school performance[3], increased risks of anxiety[4], substance abuse[5], and suicidal ideation[6]. Depression in adolescence is also associated with an increased likelihood of depression, anxiety, and suicidality in adulthood[7]. Understanding the nature and extent of the problem is critical to addressing the mental health needs of adolescents

MEASURING DEPRESSION

Despite agreement that mental health is an increasing public health concern, it is difficult to identify consistent rates for some indicators (e.g., depression and anxiety). Mental health concerns are measured in a variety of ways, and rates can vary greatly depending on the instrument, making comparisons difficult[8]. National surveys use a variety of terms and related approaches to estimate the prevalence of depression. For instance, definitions of depression, or symptoms of depression, can include: diagnosed major depressive episodes, self-reports of persistent feelings of sadness or hopelessness, self-reports of symptoms of depression in the last two weeks, or parent reports that a health care provider told them their child has depression.

Nationally, reported rates of depressive concerns in children range from a low of 5.7% to a high of 42% depending on definition and related instrument, as well as age (see Table 1). The National Survey on Drug Use and Health (NSDUH), for example, reports on major depressive episodes (lifetime and in the last year), which is defined as having at least five of the nine symptoms of depression listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) occurring nearly every day within a two-week period[9]. The most recent published estimates for a major depressive episode in the past year for adolescents (12-17yrs) was 19% in 2022. The Youth Risk Behavioral Survey (YRBS) is administered to a nationally representative sample of 9th-12th grade students in public and private schools and uses persistent feelings of sadness or hopelessness as an indicator of symptoms of depression. In 2021, 42% of students reported experiencing persistent feelings of sadness or hopelessness on the YRBS, up from 37% in 2019[10]. The National Survey of Children's Health (NSCH) is a caregiver-administered survey that includes questions about the well-being of children between 3 and 17 years old. In this survey, caregivers report any current or past depression diagnosis of their children by a health care provider—5.7% of parents in 2022 reported that their children have been diagnosed with depression[11]. The National Health and Nutrition Examination Survey (NHANES), a cross-sectional survey administered to a national representative sample of all ages, uses the PHQ-9—a self-report of current symptoms of depression. Between 2013 and 2018, 5.8% of students between 12 and 17 years old reported moderate to severe symptoms of depression (a score of 10 or higher)[12].

Globally, a meta-analysis conducted in 2020 of 26 studies, using a variety of measures, found a pooled rate of elevated depression symptoms of 25% for children between 4 and 18[13].

TABLE 1: Overview of Rates of Depressive Concerns by Survey and Definition

National Surveys	National Survey on Drug Use and Health (NSDUH)	Youth Risk Behavioral Survey (YRBS)	National Survey of Children's Health (NSCH)	National Health and Nutrition Examination Survey (NHANES)
Definition of Depression	Major Depressive Episode	Persistent feelings of sadness or hopelessness	Caregivers report any current or past diagnosis	PHQ-9, self-report of current symptoms of depression, score of 10 or higher
Population	12-17yrs	14-18yrs (students in grades 9-12)	3-17yrs	12-17yrs
Year	2022	2021	2022	2013-2018
Overall rates of depressive concerns	19.5%	42%	5.7%	5.8%
Gender				
Female	28.0%	57%	7.5%	8.4%
Male	11.5%	29%	3.9%	3.3%
LGBTQ+	-	69%	-	-
Race/Ethnicity				
American Indian/ Alaska Native	14.1%	40%	-	-
Asian	14.9%	35%	-	3.6%
Black/ African American	16.7%	39%	5.5%	6.0%
Hispanic/Latinx	19.5%	46%	5.1%	5.3%
Native Hawaiian/ Pacitic Islander	-	39%	-	-
White	21.0%	41%	6.0%	6.0%
Multiracial	19.1%	49%	-	-

As reported rates of depression can vary by measure, they also can differ by respondent characteristics including age, gender, and race/ethnicity (see Table 1).

- Girls reported much higher rates of symptoms of depression than boys in all surveys.
- Only one study (YRBS) included sexual orientation. Almost 70% of students who identify as LGBTQ+ report "persistent feelings of sadness or hopelessness.
- Younger adolescents tend to have lower rates of depression, which likely explains the lower rates of depression in studies that included younger respondents[14]. The NSDUH reports rates of major depressive episodes increasing from 13.0% for 12–13 year-olds to 23.8% for 16–17 year-olds. However, there is still variability between studies that include the same age groups (i.e., NSDUH and NHANES).

- Rates of depression by racial or ethnic identity varied. Students identifying as multiracial or Hispanic had the highest rates in the YRBS. Data from the NSDUH shows some variation from year to year (not shown in the table), but students identifying as White, Hispanic/Latinx, or multiracial had the highest rates of Major Depressive Disorder (around 20%). In contrast, students identifying as Black/African American had higher rates than those identifying as Hispanic/Latinx in the NHANES.
- One limitation of the NHANES survey is that data is only available before the COVID-19 pandemic so may not represent current rates.

THE PATIENT HEALTH QUESTIONNAIRE

Even using the same measure, there can be considerable variability in rates of depression symptoms. As part of the Youth Policy Lab's work evaluating student mental health programs, we used the Patient Health Questionnaire (PHQ-9), a self-reported measure of symptoms of depression. The PHQ-9 was designed to screen for symptoms of depression in a clinical setting but has also been used as a measure of depression in the context of research and evaluation. It is clinically validated and widely used to detect symptoms of depression in a general population and for adolescents[15]. A shorter, 2-item version is also validated and widely used[16], but it is considered less sensitive, particularly for adolescents – that is, it may not accurately identify individuals with symptoms of depression as well as the 9-item version.

The PHQ-9 includes a set of 9 items that receive a score of zero to three, based on the frequency with which the individual experiences symptoms: not at all = 0, several days = 1, more than half the days = 2, nearly every day or every day = 3 (see Figure 1). These 9 items reflect the 9 symptoms of major depression that are listed in the DSM-V: 1) depressed mood, 2) loss of interest, 3) significant weight loss or gain, 4) sleeping too much or too little (insomnia or hypersomnia), 5) moving very slowly or being restless (psychomotor agitation or retardation), 6) fatigue or loss of energy, 7) feelings of worthlessness, 8) diminished ability to concentrate, and 9) recurrent thoughts of death[17]. A composite score is calculated from the individual items. A score of 10 or above (out of a possible 27) indicates the respondent is exhibiting depression symptoms that warrant a follow-up screening. The shorter screener (PHQ-2) includes the first two items from the PHQ-9, and a composite score of 3 or higher (out of a possible 6) is used as the cut-point that warrants a follow-up screening. The first two items of the PHQ-9 reflect the two symptoms "depressed mood" and "loss of interest or pleasure in daily activities" from the DSM-V.

FIGURE 1: Patient Health Questionnaire (PHQ-9)

Over the past 2 weeks, how often have you been bothered by any of the following?

	Not at all	Several days	More than half the days	Nearly every day or every day
Little interest or pleasure in doing things	○	○	○	○
Feeling down, depressed, or hopeless	○	○	○	○
Trouble falling / staying asleep or sleeping too much	○	○	○	○
Feeling tired or having little energy	○	○	○	○
Poor appetite or overeating	○	○	○	○

	Not at all	Several days	More than half the days	Nearly every day or every day
Feeling bad about yourself or that you have let yourself or your family down	○	○	○	○
Trouble concentrating on things, such as school work, reading, or watching TV	○	○	○	○
Moving or speaking so slowly that other people could have noticed. Or the opposite, being restless more than usual	○	○	○	○
Thoughts that you would be better off dead or of hurting yourself in some way	○	○	○	○

Use of the Patient Health Questionnaire (PHQ) for Measuring Depression in Peer-Reviewed Studies

As shown in Table 1, the one nationally representative survey that uses the PHQ-9, the National Health and Nutrition Examination Survey (NHANES), found that only 5.8% of 12-17 year-olds exhibited symptoms of depression. The other nationally representative surveys with similar age groups found much higher rates using different measures. To provide context for the findings from our work evaluating student mental health programs, we conducted a review of the literature using the PHQ as a measure of adolescent depression. We sought to understand overall rates of depression for adolescents and how they varied by year (e.g., pre or post-pandemic), student characteristics, setting (i.e., urban/suburban/rural), and by PHQ-2 or 9. We identified 8 studies from peer-reviewed journals using a PHQ measure that were conducted in school or clinical settings in the past decade. Their findings are summarized below in Table 2.

TABLE 2: Studies Using the PHQ as a Measure of Adolescent Depression

Study	Time Period	Population	Sample Size	Measure	Rate of Moderate to Severe Depression	Subgroup or Other Notable Findings
Acker et al. (2023)	2017 through November 2021	Patients aged 12-19 in a large health system in northern CA	34,066	PHQ-2	11.7%	Highest rates for Black and Hispanic adolescents (both 12.5%) and lowest for Asian/Pacific Islander (8.6%)
Anand et al. (2021)	June 2018 to February 2019	Patients aged 12-21 in a primary care practice in Brooklyn, NY	2,364	PHQ-2 and PHQ-9	PHQ-2: 7.4% PHQ-9: 10.6%	Differences in reported rates between the PHQ-2 and -9 emerged after the start of the school year.
Crandal et al. (2022)	April 2016 to August 2020	Patients aged 12-17 in a San Diego, CA health system	95,613	PHQ-9	6.5%	Students who screened positive for depression were more likely to be older and female.
Adams et al. (2022)	Spring 2020 to Spring 2022	Student athletes in grades 9-12 in a CA high school	125-363	PHQ-2 (administered as part of a sports physical)	Spring 2020: 5.7% Fall 2020: 13.8% Fall 2021: 8.6% Spring 2022: 9.4%	Students who scored 3+ on the PHQ-2 were given the PHQ-9. Of those, 36% screened positive in Spring 2020 and by Spring 2022, 60% did.
McGuine et al. (2021)	May 2020	Student athletes in grades 9-12 in the US	13,002	PHQ-9 (survey, students were recruited via social media)	39.5%	Female and older students reported higher rates.
Sekhar et al. (2021)	November 2018 to November 2020	Students in grades 9-12 in 14 PA schools	12,909	PHQ-9 (administered by school mental health professionals)	15.9%	Students were more likely to be identified as having symptoms of depression and initiate treatment with a universal screening approach.
Murata et al. (2020)	April to July 2020	Adolescents aged 13 to 17	583	PHQ-9 (online survey, recruited via social media and through a PA health system)	55%	Sample was predominately female (80%) so this rate is likely higher than the general population
Burdzovic, Andreas, & Brunborg (2017)	Fall 2014	Students in grades 8-12 in Norway	846	PHQ-9	17.1%	A much higher percentage of girls reported symptoms (23.8%) versus boys (9.3%)

As with the nationally representative surveys of adolescent depression, there is significant variety in the rates reported in the literature using the PHQ as a measure; ranging from a low of 5.7% to a high of 55% (see Table 2). Given the varying rates, timelines, and samples of the studies, it is difficult to determine if rates of depression increased after the start of the COVID-19 pandemic. One study that looked at rates across four time points found that rates increased just after the start of the pandemic and then decreased in two following waves, but still remained above the pre-pandemic rates[18].

Similar to national statistics, students who indicated symptoms of depression were more likely to be female and older[19]. One exception to this was Anand et al. (2021), who found that age had no effect on likelihood of reporting symptoms of depression.

Sekhar et al. (2021) studied the impacts of universal screening for depression. They found that the practice increased the likelihood of identifying students with symptoms of depression in both rural and urban settings, but the effect was larger for rural students. They also found that targeted screening for depression may include bias, with some groups referred at higher rates than others. They found a reduction in racial/ethnic differences in identification when a universal approach was used, particularly for Black/African American students.

The two studies that reported rates by race and ethnicity had some conflicting findings. Sekhar et al. (2021) found that students in the "other" category had the highest rate of symptoms (21.6%). This group included multiracial, American Indian/Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and other. Non-Hispanic White students had a slightly higher rate than non-Hispanic Black or Hispanic students, but all were between 14 and 16%. In contrast, Acker et al. (2023) found higher rates for students identifying as Black and Hispanic (both 12.5%) than for White students; and Asian/Pacific Islander students had the lowest rate at 8.6%. Their study also examined the impact of economic disadvantage on depression and found that increased neighborhood disadvantage was associated with higher levels of depression.

THE CURRENT STUDY

As part of the Youth Policy Lab's work evaluating student mental health programs, the TRAILS Tier 1 Social and Emotional Learning and Tier 2 Early Intervention programs specifically, we have collected data from students using both the PHQ-2 and PHQ-9 measures. We were interested in using our own data to explore how rates of symptoms of depression compare with existing research and nationally representative data, and how rates vary across contextual and demographic characteristics. Our data was collected through surveys of students in multiple districts, across three years. We explored the following research questions:

1. How do rates of symptoms of depression as measured by the PHQ-2 vary by
    a. school context (i.e., rural vs. urban school district)?
    b. student background characteristics (i.e., gender, race and ethnicity, sexual orientation, and transgender identity)?
    c. year of screening?
2. How do rates of depression vary when using the PHQ-2 vs. PHQ-9?

Methods

Sample

The data for this brief came from three districts in two states. The first is a large, urban district in the Midwest (District A). The total number of students in the district was 50,895 in 2019 and 49,001 in 2020. The other two are adjacent, rural districts in the Mountain West (Districts B & C) serving a total of 2,274 students in 2021. District demographics are provided in Table 3. Students in District A are predominantly Black/African American (82%). The rate of Free and Reduced-Price Lunch (FRPL) eligibility is over 80%. Just over 11% of students are classified as English Language Learners (ELL). Student characteristics differ significantly from District A but are similar between Districts B and C. District B has a higher percentage of students who are Hispanic/Latinx, and subsequently, also a higher percentage of English Language Learners.

TABLE 3: District Demographics

	AY 2020-2021 District A (Y2)	AY 2021-2022 District B	AY 2021-2022 District C	AY 2020-2021 National
Total Enrollment (count)	49,001	1,198	1,091	49,374,751
Race & Ethnicity	**%**	**%**	**%**	**%**
American Indian/Alaska Native	0.2	1.2	0.6	0.9
Asian	1.5	0.4	0.7	5.4
Black/African American	81.7	2.0	1.6	15.0
Hispanic/Latinx	13.9	40.7	31.9	28.1
Middle Eastern/North African	[a]	[a]	[a]	[a]
Hawaiian/Pacific Islander	0.1	0.3	0.3	0.4
White	2.5	49.4	61.4	45.7
Other	[a]	[a]	[a]	[a]
Multiracial	0.3	5.9	3.5	4.5
Female	49.4	48.6[b]	46.9[b]	48.6
Free and Reduced-Price Lunch Eligibility	82.9	23.2	23.1	51.5
English Language Learners	11.4	18.3[b]	13.1[b]	10.3

Notes: Demographic data is from publicly available state data. References available upon request. These data sources only include male & female for gender. District A demographics are similar across both years so statistics for Y2 are reported here. National data are reported for 2020-2021[20].

[a] The publicly available district data does not include Middle Eastern/North African or Other as race/ethnicity categories.

[b] The publicly available district data for these categories is for PreK-12 students. The total enrollment including PreK for District B is 1,249 and 1,171 for District C.

These districts differ in a few notable ways from national statistics. During the 2020-2021 school year, 51.5% of US students were eligible for Free and Reduced Price Lunch (a measure of current poverty) and 10.3% were English Language Learners[21]. District A has a much higher rate of FRPL eligibility, and Districts B & C have much lower rates than the national average. All three districts have a higher rate of students who are ELLs than the national average, but District B differs the most from the national average—8 percentage points higher.

Nationally, in 2020, 45.7% of US students identified as White, 15.0% Black, 28.1% Hispanic, 5.4% Asian, 4.5% two or more races, 0.9% American Indian/Alaska Native, and 0.4% Pacific Islander[22]. District A has a much higher percentage of students who identified as Black/African American, and lower percentages of those who are White and Hispanic/Latinx than the national averages. District B has a higher percentage of students who are Hispanic/Latinx and both B and C have a smaller percentage of students who are Black/African American than the average.

Timeline

All data was collected in the fall of the academic year, between October and December. Parents and guardians were provided the opportunity to opt their students out of the surveys prior to their dissemination. The first set of data was collected in District A the fall of 2019 (AY 2019-20), just before the start of the COVID-19 pandemic. Follow up data was collected in that same district in the fall of 2020 (AY 2020-21). The final set of data was collected from districts B & C in the fall of 2021 (AY 2021-22). During the 2020-21 school year students in District A experienced more virtual learning than students in Districts B and C, who returned to primarily in-person learning in the fall of 2020.

Student Sample

Response rates for each district were calculated using the number of students who were eligible to take the survey, the number of opt-outs reported, and the number of surveys received from that district based on student reports within the survey.

In District A, in AY 2019-20, the survey response rate was 75% among eligible students in grades 8-12 (n=12,794). In District A, in AY 2020-21, the response rate was 49% for students in grades 6-12 (n=13,264). Of these, we were only able to merge 11,528 (87%) to district demographic data for inclusion in our analysis.[1] This represents 43% of all students in District A in grades 6-12 (n=27,028).

In Districts B and C, response rates were 82% in District B (n=581) and 74% in District C (n=455) for students in grades 6-12.

To create comparable data sets, our analysis included a smaller sample of respondents. We limited our sample for most analyses to grades 8-12 and all students who responded to the PHQ-2 or PHQ-9. We include data for grades 6-7 for the grade subgroup analyses only. Respondent demographics for race and ethnicity are similar to districtwide averages across most categories (see Table 4). A higher percentage of girls responded to the survey in District A in both Y1 and Y2 than are represented in the district overall.

1 Demographic data was not collected as part of the survey in AY2020-21 so survey data was merged with district administrative data which included student demographics.

TABLE 4: Respondent Demographics (Grades 8-12)

	AY 2019-2020 District A (Y1)	AY 2020-2021 District A (Y2)	AY 2021-2022 Districts B&C
	%	%	%
Race & Ethnicity	n=9,112	n=8,503	n=557
American Indian/Alaska Native	1.8	0.3	***
Asian	2.9	2.6	***
Black/African American	63.1	79.3	2.0
Hispanic/Latinx	11.7	15.3	21.9
Middle Eastern/North African	0.6	a	***
Hawaiian/Pacific Islander	0.1	0.1	***
White	0.8	2.3	50.3
Other	3.5	a	7.0
Multiracial	15.6	***	16.5
Gender	n=9,112	n=8,503	n=550
Girl/woman	53.8	57.7	46.7
Boy/man	43.7	42.3	46.9
Non-binary	0.9	a	2.2
Other	1.6	a	4.2
Sexual Orientation	n=8,786		n=517
LGBTQ+	17.7	a	17.0
Heterosexual	67.9	a	65.2
Other	2.6	a	7.9
Prefer not to answer	11.8	a	9.9
Transgender	n=8,834		n=538
Yes	3.9	a	4.3
No	79.8	a	87.2
I don't know	7.3	a	4.8
Prefer not to answer	9.0	a	3.7

Notes: *** Data suppressed for confidentiality purposes (cell size is fewer than 10 students).

[a]District A did not include all gender options, LGBTQ+, transgender, or the "Other" option for race in AY2020-21

Measures

Student surveys were administered by the schools to understand the mental health needs of students in each district. The surveys included a number of items related to mental health in addition to depression, such as questions about anxiety, trauma, and school climate. The focus of this report is the PHQ depression screener items. TRAILS and the Youth Policy Lab developed the surveys used in District A (Y1) and Districts B and C; referred to as the TRAILS Needs Assessment. The TRAILS Needs Assessment used the PHQ-9 as the measure of symptoms of depression. In Year 2, District A used a Universal Wellness Assessment—a survey they developed in collaboration with TRAILS—with the purpose to provide guidance around mental health services. It included the shorter PHQ-2.

In order to compare across all waves of data collection, we calculated the PHQ-2 composite scores for District A (Y1) and Districts B & C and used this for our primary analysis. Data from the PHQ-9 is also reported for these two time points for secondary comparison analysis. Further information about the analysis can be found in Appendix B.

FINDINGS

Overall Rates of Students Reporting Symptoms of Depression on PHQ-2

Across all districts and time periods, 34-40% of students reported symptoms of depression using the PHQ-2 items (Table 5). This is consistent with some nationally reported statistics of adolescent depression (e.g., YRBS), but higher than many comparable studies using the PHQ as a measure of depression, as discussed previously.

We observed an increase in the percentage of students reporting symptoms of depression from 2019-20 (Y1) to 2020-21 (Y2) in District A, consistent with reports of increased adolescent depression coinciding with the COVID-19 pandemic. Comparing between districts, student reports of symptoms of depression in Districts B and C were lower than the District A 2020-21 reports, but higher than those from 2019-20. This is consistent with the findings of Adams et al. (2022) that show rates of depression increasing to the highest levels in fall 2020 and then decreasing in the following year, but not to pre-pandemic levels. While none of the comparison literature reported findings by setting (i.e., urban vs. rural), Acker et al. (2023) found an effect of neighborhood economic disadvantage on depression, which may account for some of the difference between rates of depression between District A and Districts B & C.

TABLE 5: Percentage of Students Reporting Symptoms of Depression on the PHQ-2 (Grades 8-12)

	AY 2019-2020 District A n=9,152	AY 2020-2021 District A n=9,794	AY 2021-2022 Districts B&C n=556
PHQ-2 Composite Score	%	%	%
Depression symptoms present (3+)	34.1	39.8	36.7

Subgroup Analyses

We conducted subgroup analyses for race and ethnicity, gender, sexual orientation, and transgender identity. The sample size for each table differs slightly from the full sample. Responses were only included in these analyses if students completed both the demographic item and the PHQ.

Race/Ethnicity

In District A we observed an increase in percentage of students reporting symptoms of depression between Y1 and Y2 for all available racial and ethnic identities except Asian (Table 6). The rates for Districts B & C are comparable to District A for all groups except Black/African American. The percentage of Black/African American students reporting symptoms of depression in Districts B & C was over 20 percentage points lower than in District A and more in line with the research showing lower rates of depression for Black/African American adolescents. This finding should be interpreted with caution due to the small sample size in Districts B & C. Rates for some other racial/ethnic groups are suppressed due to small sample sizes.

Our findings differed in some ways from the literature on rates of depression for racial and ethnic groups. Data from the National Survey on Drug Use and Health indicates that Hispanic/Latinx students and students who identify as more than one race/multiracial have higher rates of depression than other racial or ethnic groups[23]. While we observed high rates for multiracial students, our findings did not indicate higher rates of depression for Hispanic/Latinx students. We also found higher rates for Black/African American students than for other groups. This is consistent with the findings of Acker et al. (2023), who also used the PHQ-9, but inconsistent with the National Survey on Drug Use and Health findings[24].

TABLE 6: Percentage of Students Reporting Depression Symptoms by Racial/Ethnic Identity (PHQ-2)

	AY 2019-2020 District A n=9,112	AY 2020-2021 District A n=8,503	AY 2021-2022 Districts B&C n=557
Race & Ethnicity	% depression symptoms present (3+)		
American Indian/Alaska Native	27.4	58.3	***
Asian	43.3	36.2	***
Black/African American	33.5	41.8	18.2
Hispanic/Latinx	26.9	33.7	34.4
Middle Eastern/North African	32.1	a	***
Hawaiian/Pacific Islander	27.3	50.0	***
White	28.6	34.5	35.0
Other	32.8	a	35.9
Multiracial	41.1	***	45.7

Notes: ***Data suppressed for confidentiality purposes (cell size is fewer than 10 students).
a District A did not include "Middle Eastern/North African" and "Other" options for race, in AY2020-21.

Gender

Consistent with national statistics and other studies using the PHQ as a measure, the percentage of girls reporting symptoms of depression is much higher than that for boys (Table 7)[25]. These gender differences in rates of depression emerge and are highest in adolescence[26]. Between districts, a smaller percentage of students who identify as boys report symptoms of depression in Districts B & C than in District A in either year. Most of the available research is limited to analysis using a gender binary. We found that students who identify as non-binary and "other" have high rates of symptoms of depression across all districts. In particular, over 90% of students who identify as non-binary in Districts B & C reported symptoms of depression. While this finding should be interpreted with some caution due to the small sample size, it is consistent with other high reports of depression for this group.

TABLE 7: Percentage of Students Reporting Depression Symptoms by Gender (PHQ-2)

	AY 2019-2020 District A n=9,112	AY 2020-2021 District A n=8,503	AY 2021-2022 Districts B&C n=557
Gender	% depression symptoms present (3+)		
Girl/woman	38.9	47.2	45.9
Boy/man	26.8	31.1	23.3
Non-binary	65.9	[a]	91.7
Other	40.8	[a]	52.2

Notes: ***Data suppressed for confidentiality purposes (cell size is fewer than 10 students).
[a] District A did not include all gender options in AY2020-21.

Sexual Orientation

Students who identify as heterosexual report similar rates of depression symptoms in both districts (Table 8). However, a much higher percentage of students who identify as LGBQ+ in Districts B & C report depression symptoms. These districts are in rural communities, which tend to be more conservative. Students with LGBQ+ identities in these communities might experience more discrimination and, as a result, increased symptoms of depression. National rates of reported depression for this group of students can range from 49% to as high as 66%[27].

TABLE 8: Percentage of Students Reporting Depression Symptoms by Sexual Orientation (PHQ-2)

	AY 2019-2020 District A n=9,112	AY 2020-2021 District A n=8,503	AY 2021-2022 Districts B&C n=557
Sexual Orientation	% depression symptoms present (3+)		
LGBQ+	54.1	[a]	71.6
Heterosexual	30.3	[a]	29.7
Other	27.2	[a]	34.1
Prefer not to answer	31.4	[a]	27.5

Notes: [a] District A did not include sexual orientation in AY2020-21.

Transgender Identity

Students who do not identify as transgender report similar rates of depression symptoms in both districts (Table 9). Similar to students who identify as LGBQ+, a much higher percentage of students who identify as transgender or "don't know" in Districts B & C report depression symptoms. Again, students who identify as transgender, or are questioning their identity, in these communities might experience more discrimination and, as a result, increased symptoms of depression. Nationally, 60% or more of students who are transgender, non-binary, or questioning report symptoms of depression[28]. We found lower reports than that for students identifying as transgender in District A but consistent or higher rates for all other LGBTQ+ groups.

TABLE 9: Percentage of Students Reporting Depression Symptoms by Transgender Identity (PHQ-2)

	AY 2019-2020 District A n=9,112	AY 2020-2021 District A n=8,503	AY 2021-2022 Districts B&C n=557
Transgender	% depression symptoms present (3+)		
Yes	40.7	[a]	73.9
No	34.4	[a]	35.6
I don't know	32.2	[a]	50.0
Prefer not to answer	32.7	[a]	25.0

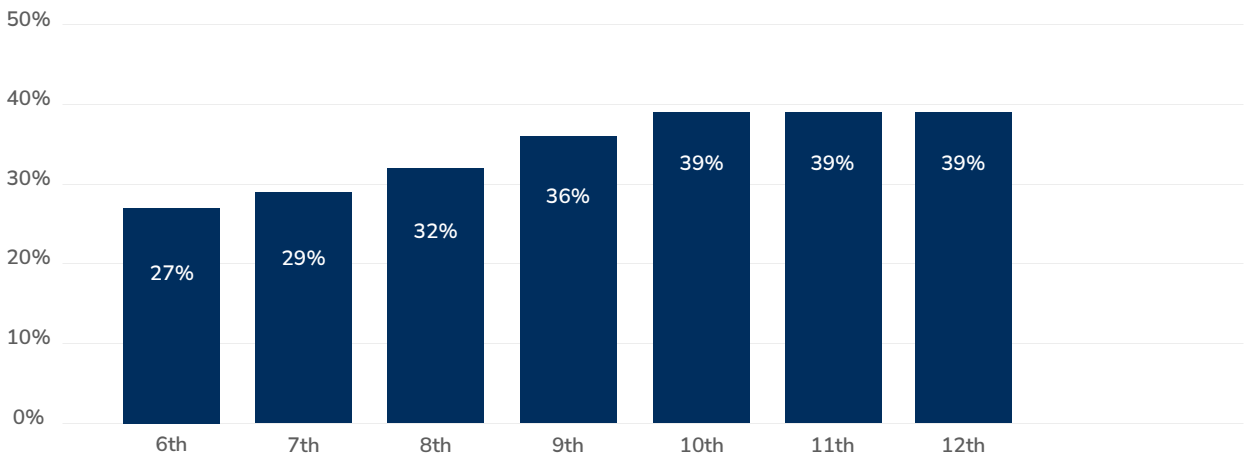
Notes: [a] District A did not include transgender in AY2020-21.

Grade

We conducted analyses using the PHQ-2 for all years and districts by grade. Consistent with most of the literature about depression and age, we found increasing rates of depression from 6th grade on, with rates plateauing at 39% for grades 10 through 12 (see Figure 2).

We observed more variation for Districts B & C by grade than for District A when comparing rates by grade across districts and time points. Students in 6th grade reported higher rates of depression and students in 10th grade reported lower rates than the trend but the smaller sample sizes may explain this variation.

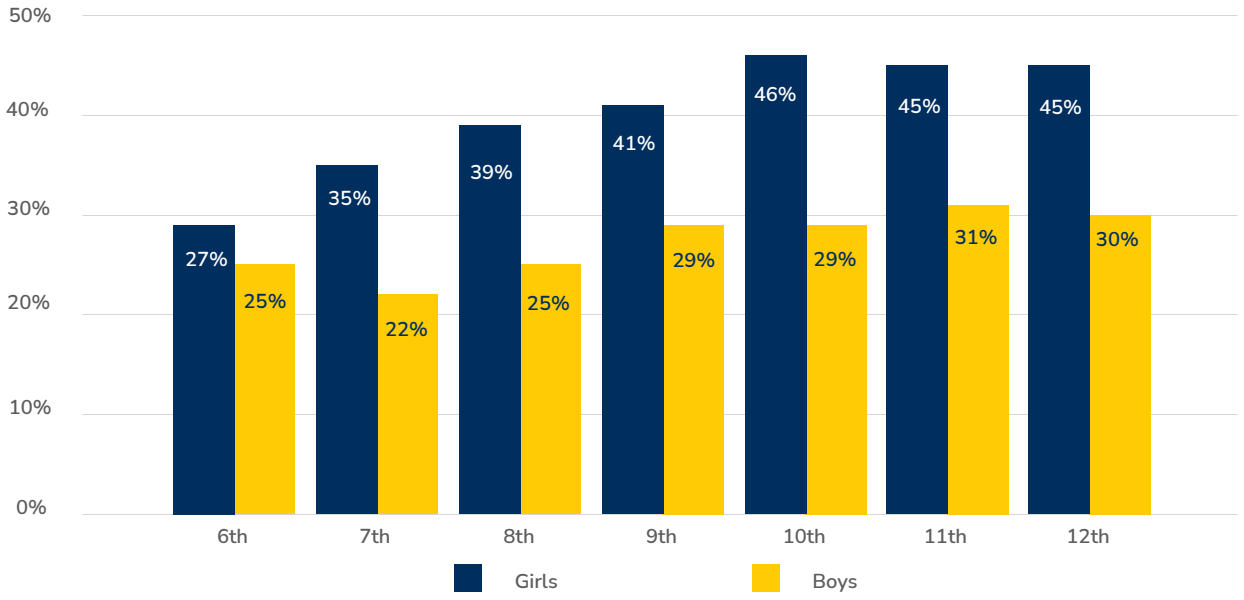
FIGURE 2: Percentage of Students Reporting Symptoms of Depression on the PHQ-2 by Grade (All Districts/Years)



Grade and Gender Identity

In addition to looking at grade and gender separately, we also explored how grade and gender interacted, conducting analyses using the PHQ-2 for all years and districts by grade and gender (see Figure 3). We limited our analysis to a gender binary in order to include all waves of data. Girls reported higher symptoms of depression than boys across all grades but the gender gap increased after grade 6. Rates of symptoms of depression for boys decreased between grades 6 and 7 but increased after that. Rates for boys in Districts B & C also varied from the trend; lower than the previous grade for both grades 8 and 10 (see Appendix B for figures by district).

FIGURE 3: Percentage of Students Reporting Symptoms of Depression by Grade (All Districts)



PHQ-2/PHQ-9 Comparison

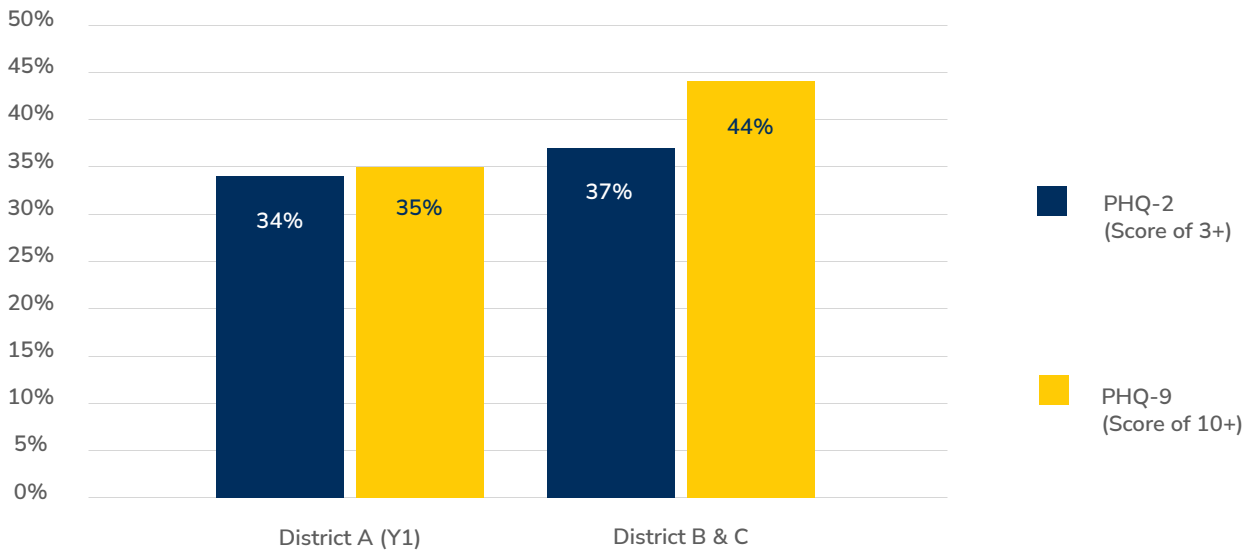
We were also interested in how the findings compared between the PHQ-2 and the longer PHQ-9. If results from both screening tools yield comparable results, then the shorter version of the measure would be preferable to reduce the time burden for future data collection.

We calculated the PHQ-2 and PHQ-9 composite scores for the districts and time points for which data was available. It is important to note that all students included in this comparison answered the full set of PHQ-9 items. The percentages reported here are based on our calculations using either the first two items to calculate the PHQ-2 scores or the entire nine items to calculate the PHQ-9 scores for the same set of respondents. We did not administer the PHQ-2 and the PHQ-9 separately. This approach has certain limitations since it is possible that students' responses to the PHQ-2 alone might differ from what they provided on the full PHQ-9 measure.

Overall Rates of Students Reporting Symptoms of Depression on PHQ-2 vs PHQ-9

Our comparison of the PHQ-9 and PHQ-2 in District A (Y1) showed similar rates of symptoms of depression regardless of measure (see Figure 4). Nevertheless, we observe a difference in the percentages of students exhibiting symptoms of depression in Districts B & C when the using the shorter measure versus the longer one. A higher percentage of students (more than 7 percentage points) are at or above the threshold for symptoms of depression using the responses to all of the items on the PHQ-9 versus using just those that are included in the PHQ-2. This outcome was unexpected; our assumption was that the longer PHQ-9 would identify a smaller proportion of students showing symptoms of depression compared to the shorter PHQ-2 version.

FIGURE 4: Percentage of Students Reporting Symptoms of Depression in both Districts - PHQ-2 vs PHQ-9



A more detailed analysis was conducted to explore these discrepancies. We found that over 80% of the time, both measures consistently identified students who did (25.7%) or did not (56.9%) report depression symptoms. For the remaining almost 18% of students, about half (8.6%) screened positive for depression on the PHQ-2 but not on the PHQ-9 (see Table 10). The remaining group (8.8%) screened positive on the PHQ-9 but not on the PHQ-2. While the percentage of students with symptoms of depression for the PHQ-2 and PHQ-9 were almost identical in this district—the group of students that were identified by each differed. As a result, a significant number of students with symptoms of depression would be overlooked depending on the screening tool used.

TABLE 10: Cross-Tabulation of Students' Depression Score on PHQ-2 and PHQ-9 in District A

	AY 2019-2020 District A n=9,112	
	PHQ-9 (score of <10)	PHQ-9 (score of ≥10)
	%	%
PHQ-2 (score of <3)	56.9	8.8
PHQ-2 (score of ≥3)	8.6	25.7

For Districts B & C, we found that almost 90% of the time, both measures consistently identified students who did (34.0%) or did not (53.5%) report depression symptoms. For the remaining almost 12.5% of students, only 2.7% screened positive for depression on the PHQ-2 but not on the PHQ-9, a lower percentage than in District A (see Table 11). A larger percentage (9.8%) screened positive for depression on the PHQ-9 but did not on the PHQ-2. The percentage of students that are overlooked by using the PHQ-2 alone is very similar in all districts—8.8% in District A and 9.8% in District B & C.

TABLE 11: Cross-Tabulation of Students' Depression Score on PHQ-2 and PHQ-9 in District B & C

	AY 2021-2022 Districts B & C n=553	
	PHQ-9 (score of <10)	PHQ-9 (score of ≥10)
	%	%
PHQ-2 (score of <3)	53.5	9.8
PHQ-2 (score of ≥3)	2.7	34.0

These findings indicate differences in the ability of depression measures to identify students with symptoms of depression. This difference may be due, in part, to the different types of symptoms that are reflected by the items included in the screening tools. The first two items of the PHQ measure cognitive-affective symptoms (e.g., depressed mood and reduced ability or inability to experience pleasure) and may be more indicative of moderate depression. The full PHQ-9 may be better able to identify symptoms of mild to severe depression, at least in adults, because the full battery of items also address somatic symptoms (e.g., fatigue or inability to sleep)[29]. In our sample, students that were overlooked by using the PHQ-2 alone, showed more frequent and higher ratings of items relating to fatigue or loss of energy, diminished ability to concentrate, and feelings of worthlessness, when we analyzed their responses to the full PHQ-9 (see Appendix B for results). Anand et al. (2021) found that the PHQ-9 was more accurate at identifying symptoms of depression in adolescents compared to the PHQ-2. The authors pointed out that symptoms of depression in adolescents often manifest in somatic complaints—symptoms that are not represented in the PHQ-2 but are included in the PHQ-9. Furthermore, the authors found that while both screening tools produced similar results during the summer break, rates of depression differed significantly during the school year. While the results from the PHQ-2 remained stable throughout the year, the PHQ-9 scores increased during the school period. This finding indicates its potential sensitivity to school-related stresses.

Comparison PHQ-2 vs PHQ-9: Students with Suicidal Ideation

According to Richardson et al.[30], students dealing with depression are at greater risk for suicide. There is the potential to utilize a depression screener as a substitute for suicidal risk assessment. One potential issue with using the PHQ-2 alone is that it may fail to identify students at risk of suicide if it is used as a proxy for assessing suicidal risk in students. Richardson et al. (2010) found that 19% of students who indicated thoughts of suicide did not score above the cut-point on the PHQ-2 screener. The PHQ-9 includes an item asking about frequency of "thoughts that you would be better off dead or of hurting yourself in some way," making it more likely to capture students who are at risk of suicide. Even still, this item may underrepresent risk for suicide for some groups of students[31]. Our analysis corroborates some of these findings. For both District A and Districts B & C, we see that a higher percentage of students who indicated suicidal ideation, on a separate screening item, did not have a score of 3 or above on the PHQ-2 screener compared to those who were assessed using the PHQ-9. In District A, of the 2,053 students indicating suicidal ideation, 35.4% were not identified using the PHQ-2, while 28.7% were overlooked using the PHQ-9. We found a similar pattern in Districts B & C. Of the 87 students indicating suicidal ideation, 21.8% were not detected using the PHQ-2 alone, while 18.4% were not detected when using the PHQ-9. This indicates that the PHQ-9 may be somewhat better than the PHQ-2 at detecting students with suicidal ideation. However, we also see that a high proportion of students who indicated suicidal thoughts did not score above the cut-point on the PHQ-9 screener either. Similar findings can be seen in a study by Horowitz et al.[32], whose results indicate the limitation of depression screeners as a proxy for suicidal risk assessment. Their findings revealed that using the PHQ-9 alone might overlook a significant proportion of students who screened positive for suicide risk.

TABLE 12: Percentage of Students Not Identified by the PHQ-2 and PHQ-9 Reporting "Yes" on the following question: "In the past year, did you ever seriously think about attempting suicide?"

Students Who Seriously Thought About Attempting Suicide in The Last Year	AY 2019-2020 District A n=2053	AY 2021-2022 Districts B & C n=87
	%	%
PHQ-2 (score of <3)	35.4	21.8
PHQ-9 (score of <10)	28.7*	18.4

*The total number of students indicating suicidal ideation for the PHQ-9 in District A was n=2,015

LIMITATIONS AND DISCUSSION

This report adds to the literature regarding the use of the PHQ-2 and PHQ-9 as measures of symptoms of depression for adolescent populations. While the two versions of the PHQ are most often used as screening measures in clinical settings, they also provide a standardized measure of depression for academic research and policymakers.

Our review of studies using either of the PHQ measures found reported rates of symptoms of depression ranging from a low of 5.7% to a high of 55%, but were generally between 10 and 20%. Across all years and districts, students in our sample reported symptoms of depression on the higher end of this range, over 30%, using either the PHQ-2 or PHQ-9. Consistent with other studies and nationally available data we found higher rates of reports of depression for students identifying as girls/women and non-binary, transgender, and LGBQ+. Rates were particularly high for non-binary students.

While a strength of our studies is that they include multiple districts across multiple years, our districts vary in significant ways from a nationally representative sample. District A has a much higher rate of FRPL eligibility, and Districts B & C have much lower rates than the national average. While we were not able to link individual family income data to student responses, other research has shown that poverty can have a negative impact on mental health[33]. However, even in the districts with lower rates of poverty, we observe a large percentage of students reporting symptoms of depression.

District C has a higher percentage of students who are Hispanic/Latinx and English Language Learners than the national average. District A has a much higher percentage of students who are identified as Black/African American than the average. We found much higher rates of reports of depression for Black/African American students in District A than B & C. Small sample sizes limit the conclusions we can make about other racial and ethnic groups but our findings indicate higher rates of depression than for students identifying as Black/African American, Hispanic/Latinx, or White.

There is very little longitudinal data regarding depression for adolescents who identify as multiracial but recent reports indicate higher rates for these youth[34]. We found higher rates of depression among students identifying as multiracial than Black/African American, Hispanic/Latinx, or White in both sets of districts. Given that the U.S. population is increasingly multiracial, this is a significant finding worth exploring further.

We used composite score cut points of 3+ and 10+ for the PHQ-2 and PHQ-9, respectively, to conduct our analyses as these are most commonly used in the field. However, there is some evidence that a score of 11+ may be less likely to produce false positives for adolescents[35]. This may be worth further study given the high rates of screening positive that we observed with a cut-point of 10.

A comparison of the PHQ-2 and PHQ-9 for our samples shows that a different group of students would be overlooked depending on which screening tool is utilized. Because of this, there may be some benefits to using the full PHQ-9. It is possible to calculate a composite score for just the first two items if desired but it provides more information about other symptoms and also provides information on suicidal ideation. Our analysis indicates that the PHQ-9 is better than the PHQ-2 at detecting students with suicidal ideation. However, a substantial percentage of students with suicidal ideation were not captured when using a threshold score of 10 on the PHQ-9 either. This indicates that the last item on the PHQ-9 may not be sufficient in detecting suicidal ideation when combined with the other items to calculate a composite depression score. Practitioners and researchers may benefit from examining this item independently.

RECOMMENDATIONS

While the primary purpose of the data we collected was for program development and evaluation, our findings also have broader implications for schools and districts as they create policies for serving students with symptoms of depression. Our findings provide the basis for a set of considerations and related recommendations for developing school mental health policy around screening and identifying students who may be experiencing depression.

District policymakers and school mental health professionals (SMHPs) must weigh competing interests when setting school policy for supporting students with mental health concerns. While awareness of, and programs to support, mental health have increased dramatically in the past two decades, they continue to be underfunded and understaffed[36].

Universal screening using either of the two PHQ measures is likely to identify a larger group of students that may be experiencing depression than targeted screening. While this is the desired outcome, identifying more students also requires more follow up from mental health professionals to further evaluate students for depression and then, if necessary, provide supportive services. Should the PHQ-9, or any measure that includes an item about thoughts or actions of self-harm, be used, then schools must be able to provide a timely response to students who indicate a risk of self-harm. If schools have limited capacity to follow up with these students, then they may consider using the brief PHQ-2 screening tool as an alternative. However, if this is not feasible either, schools can follow a more targeted outreach approach by focusing on student groups that are statistically at greater risk for depressive symptoms.

Consistent with national data, and a significant body of research, our study found that students who identify as girls reported higher symptoms of depression than boys. Other groups of students for whom there is less national and historical data, including students who identify as LGBTQ+ or multiracial, also reported higher rates of symptoms of depression in our study. However, if schools take a more targeted approach, it is crucial that all school personnel receive adequate training to recognize and understand depression symptoms in adolescents.

One limitation of many studies of adolescent mental health is the lack of data for many subgroups of students. Often small sample sizes prevent reporting disaggregated data for many subgroups of students in order to protect student confidentiality. Many studies do not report results by race and ethnicity, or only do for the groups that represent a larger percentage of the population (i.e., white, Black/African-American, Hispanic/Latinx). Most only include reports for a gender binary and also do not include any identification of sexual orientation. We recommend that studies disaggregate data by demographics if possible. One of the significant contributions of our study is a more comprehensive picture of adolescent depression for many subgroups of students.

Our study was not designed to evaluate the reliability or validity of the PHQ-2 or PHQ-9 as a screening tool. However, our analyses provide evidence that supports the findings of validation studies that indicate that the PHQ-9 is a better screening measure for adolescents. However, administering the PHQ-2 still appears to be a better method for identifying symptoms of depression (using either a 2- or 3-point cut-off) than identification without a screening measure by a physician[37] or school mental health professional[38].

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APPENDIX A - Survey Measures

TABLE A.1: Student Characteristic Survey Items (TRAILS Needs Assessment)

	Demographics	
1	Which of these groups describe you? [Check all that apply]* a. American Indian or Alaska Native b. Asian c. Black or African American d. Hispanic or Latinx e. Middle Eastern or North African f. Native Hawaiian or Pacific Islander g. White h. Other i. Prefer not to answer	Select all that apply. Make "Prefer not to answer" exclusive
2	What is your gender? a. Girl/woman b. Boy/man c. Gender non-binary d. Prefer not to answer e. Other, please describe	
3	When a person's sex and gender do not match they might think of themselves as transgender. Which one response best describes you?* a. I am not transgender b. I am transgender and identify as a boy or man c. I am transgender and identify as a girl or woman d. I am transgender and identify in some other way e. I don't know f. I prefer not to answer	
4	Do you consider yourself to be:* a. Gay or Lesbian b. Bisexual c. Pansexual d. Asexual e. Queer f. Heterosexual or Straight g. Questioning or Unsure h. Other, please describe i. I prefer not to answer	

APPENDIX B - Additional Analysis

Analysis

Survey items were cleaned and analyzed by Youth Policy Lab staff in Stata versions 15 through 17. For this analysis, we created comparable data sets from the three data sources using student-reported grade and responses to the PHQ items. If we were able to calculate a composite score for the PHQ (i.e., a student responded to all of the PHQ items), the student was included in the analysis, regardless of progress on the remainder of the survey. We calculated summary statistics for the total population and by student characteristics.

The TRAILS Needs Assessment used different classifications for gender, race, and ethnicity from the District A administrative data so we are only able to make direct comparisons for specific demographic groups across some of the time points in this report. For gender identity, we are only able to report rates of depression for students who are classified as Male or Female based in administrative data in District A in Year 2. The TRAILS Needs Assessments also included categories for "gender non-binary" and "other." We report these when available.

For race and ethnicity, this study included the following categories: American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latinx, Middle Eastern or North African, Hawaiian or Pacific Islander, White, Multiracial, and Other. Multiracial is only present in the TRAILS needs assessment data. In the TRAILS Needs Assessment, students could check any race or ethnicity category that applied. We categorized any student selecting two or more race and ethnicity categories as Multiracial. District A administrative data did include a few students who are identified as being two or more races but it is not comparable to the percentage who select more than one if given the option. For confidentiality, we suppressed the data for any group that had fewer than 10 respondents.

District PHQ-2 Results by Grade and Gender

FIGURE B.1: Percentage of Students Reporting Symptoms of Depression by Grade and Gender, District A, AY 2019-2020

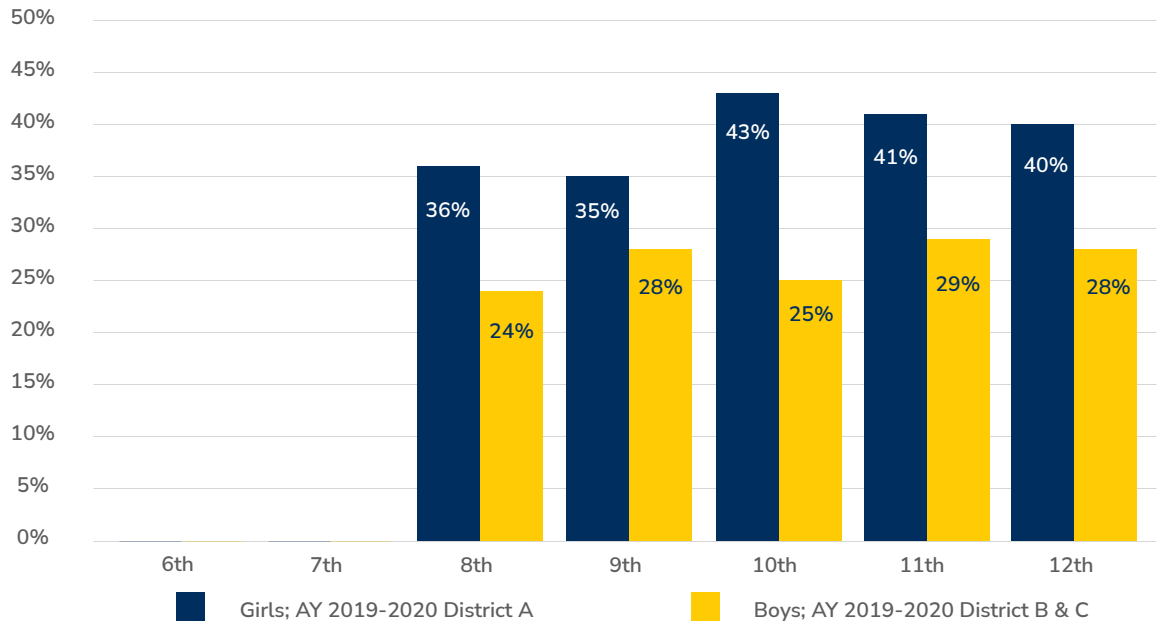


FIGURE B.2: Percentage of Students Reporting Symptoms of Depression by Grade and Gender, District A, AY 2020-2021

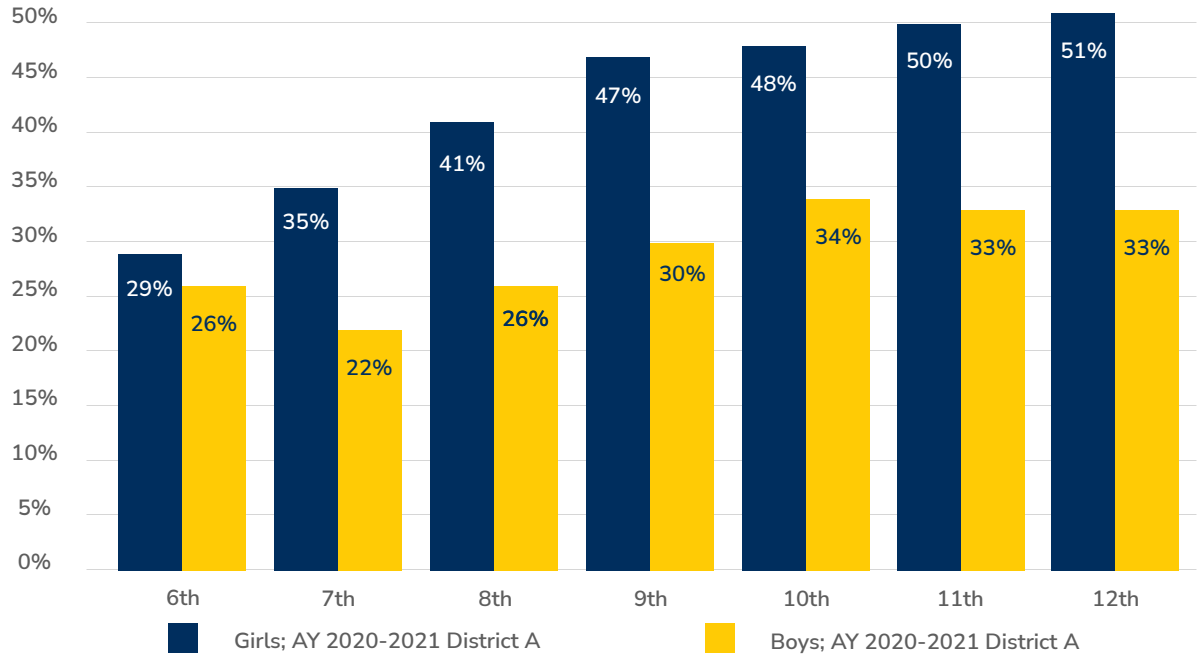
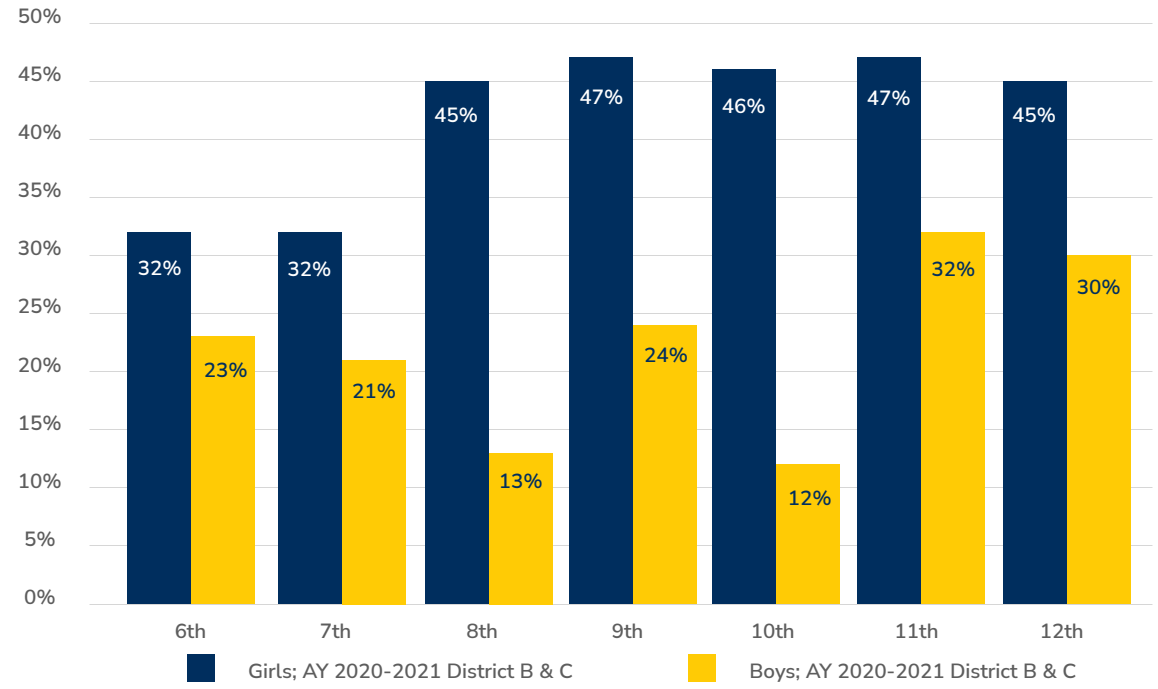


FIGURE B.3: Percentage of Students Reporting Symptoms of Depression by Grade and Gender, Districts B & C, AY 2021-2022



PHQ-9 Results

Data for the PHQ-9 is only available for District A in AY 2019-2020 and Districts B & C. Tables for all subgroup analyses are included here.

TABLE B.1: Percentage of Student Reporting Symptoms of Depression on the PHQ-9 (Grades 8-12)

PHQ-9 Composite Score	AY 2019-2020 District A n=9,004	AY 2021-2022 Districts B & C n=553
	%	%
Depression symptoms present (10+)	34.5	43.8

Subgroup Analyses

Race/Ethnicity

TABLE B.2: Percentage of Students Reporting Symptoms of Depression on the PHQ-9 by Race/Ethnicity (Grades 8-12)

Race & Ethnicity	AY 2019-2020 District A n=9,112	AY 2021-2022 Districts B&C n=557
	% depression symptoms present	
American Indian/Alaska Native	23.8	***
Asian	43.3	***
Black/African American	32.7	18.2
Hispanic/Latinx	31.3	39.3
Middle Eastern/North African	39.3	***
Hawaiian/Pacific Islander	18.2	***
White	31.4	42.9
Other	32.2	35.9
Multiracial	40.9	53.3

Notes: ***Data suppressed for confidentiality purposes (cell size is fewer than 10 students).

Gender Identity

TABLE B.3: Percentage of Students Reporting Symptoms of Depression on the PHQ-9 by Race/Ethnicity (Grades 8-12)

Gender	AY 2019-2020 District A n=9,112	AY 2021-2022 Districts B&C n=550
	% depression symptoms present	
Girl/woman	39.9	53.3
Boy/man	24.9	29.1
Non-binary	75.6	91.7
Other	42.9	60.9

Sexual Orientation

TABLE B.4: Percentage of Students Reporting Depression Symptoms by Sexual Orientation (PHQ-9)

	AY 2019-2020 District A n=8,786	AY 2021-2022 Districts B&C n=517
Sexual Orientation	% depression symptoms present	
LGBQ+	57.6	70.5
Heterosexual	29.2	37.4
Other	27.7	43.9
Prefer not to answer	31.3	35.3

Transgender Identity

TABLE B.5: Percentage of Students Reporting Depression Symptoms by Transgender Identity (PHQ-9)

	AY 2019-2020 District A n=8,834	AY 2021-2022 Districts B&C n=538
Transgender	% depression symptoms present	
Yes	41.9	82.6
No	34.0	42.6
I don't know	34.6	50.0
Prefer not to answer	31.7	30.0

PHQ-2 vs PHQ-9 Comparison Subgroup Analyses

Gender

We were interested in whether the PHQ-2/PHQ-9 disparity was limited to certain student groups. Boys might be more likely to rate these items higher than those related to feelings, as research has shown that adult males often report irritability or externalizing symptoms more than sadness[39]. However, when we conducted a subgroup analysis by gender, we only observed a large increase for students who identify as non-binary in District A, but did find increases for all groups, except non-binary, in Districts B & C (Table B.6).

TABLE B.6: Percentage of Students Reporting Depression Symptoms by Gender Identity (PHQ-2 & PHQ-9)

	AY 2019-2020 District A n=9,112		AY 2021-2022 Districts B & C n=557	
Gender	% depression symptoms present (≥3) PHQ-2	% depression symptoms present (≥10) PHQ-9	% depression symptoms present (≥3) PHQ-2	% depression symptoms present (≥10) PHQ-9
Girl/woman	38.9	39.9	45.9	53.3
Boy/man	26.8	24.9	23.3	29.1
Non-binary	65.9	75.6	91.7	91.7
Other	40.8	42.9	52.2	60.9

Additional analysis showed that girls were slightly more likely to be missed when using the PHQ-2 screener alone. In District A, 10.0% of girls (n=482) showed symptoms of depression on the PHQ-9 but would not be identified when using the PHQ-2 (see Table B.7). This compares to 7.0% of boys (n=273). We saw a similar pattern for Districts B & C (see Table 21). In these districts, 11.5% of girls (n=29) would be missed when using the PHQ-2 alone compared to 7.8% of boys (n=20).

TABLE B.7: Cross-Tabulation of Students' Depression Score on PHQ-2 and PHQ-9 in District A by Gender

	AY 2019-2020 Districts A Boys/Men n=3,904		AY 2019-2020 Districts A Girls/Women n=4,813	
	PHQ-9 (score of <10)	PHQ-9 (score of ≥10)	PHQ-9 (score of <10)	PHQ-9 (score of ≥10)
	%	%	%	%
PHQ-2 (score of <3)	66.0	7.0	50.8	10.0
PHQ-2 (score of ≥3)	8.7	18.4	8.6	30.6

TABLE B.8: Cross-Tabulation of Students' Depression Score on PHQ-2 and PHQ-9 in District B &C by Gender

	AY 2021-2022 Districts B & C Boys/Men n=258		AY 2021-2022 Districts B & C Girls/Women n=252	
	PHQ-9 (score of <10)	PHQ-9 (score of ≥10)	PHQ-9 (score of <10)	PHQ-9 (score of ≥10)
	%	%	%	%
PHQ-2 (score of <3)	69.0	7.8	42.1	11.5
PHQ-2 (score of ≥3)	1.9	21.3	3.6	42.9

Race/Ethnicity

We observed a higher percentage of students reporting symptoms of depressions using the PHQ-9 instead of the PHQ-2 for Hispanic/Latinx students in all districts, and White and Multiracial students in Districts B & C (see Table B.9).

TABLE B.9: Percentage of Students Reporting Depression Symptoms by Student Characteristics (PHQ-2 & PHQ-9)

	AY 2019-2020 District A n=9,112		AY 2021-2022 Districts B & C n=557	
Race & Ethnicity	% depression symptoms present (≥3) PHQ-2	% depression symptoms present (≥10) PHQ-9	% depression symptoms present (≥3) PHQ-2	% depression symptoms present (≥10) PHQ-9
American Indian/Alaska Native	27.4	23.8	***	***
Asian	43.3	43.3	***	***
Black/African American	33.5	32.7	18.2	18.2
Hispanic/Latinx	26.9	31.3	34.4	39.3

TABLE B.9 (cont'd)

Race & Ethnicity	AY 2019-2020 District A n=9,112		AY 2021-2022 Districts B & C n=557	
	% depression symptoms present (≥3) PHQ-2	% depression symptoms present (≥10) PHQ-9	% depression symptoms present (≥3) PHQ-2	% depression symptoms present (≥10) PHQ-9
Middle Eastern/North African	32.1	39.3	***	***
Hawaiian/Pacific Islander	27.3	18.2	***	***
White	28.6	31.4	35.0	42.9
Other	32.8	32.2	35.9	35.9
Multiracial	41.1	40.9	45.7	53.3

Notes: ***Data suppressed for confidentiality purposes (cell size is fewer than 10 students).

[a] District A did not include all gender options, LGBQ+, transgender, or the "Middle Eastern/North African" and "Other" options for race, in AY2020-21.

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Conflict of Interest Statement

The University of Michigan has a financial interest in the TIDES Center, with which the TRAILS program is affiliated.

Support the Youth Policy Lab's effort to use data for good.

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Photo by Shane Rounce on Unsplash

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Youth Policy Lab

The University of Michigan Youth Policy Lab was launched in 2016 with a vision for reducing socio-economic disparities through improvements in education and other social policies affecting youth. By developing evidence-based, policy-relevant research in partnership with local and state agencies, practitioners, and policymakers, Dr. Robin Jacob and Dr. Brian Jacob sought to build upon their exemplary careers in social science research by taking research findings out of academic journals and putting them in the hands of decision-makers. With this aim in mind, they have spent the past seven years bringing the resources and expertise of one of the nation's leading public research universities to bear on some of Michigan's most pressing social challenges.

The Youth Policy Lab envisions a world where partner-driven research drives positive social change. Our mission is to inform public policy decisions by analyzing data and evaluating programs to help our partners answer their most pressing questions.