

Adolescent Behaviors and Experiences Survey — United States, January–June 2021



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

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Overview and Methodology of the Adolescent Behaviors and Experiences Survey — United States, January–June 2021

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Abstract

Many U.S. schools closed nationwide in March 2020 to prevent the spread of COVID-19. School closures and online-only instruction have negatively affected certain students, with studies showing adverse effects of the pandemic on mental health. However, little is known about other experiences such as economic and food insecurity and abuse by a parent, as well as risk behaviors such as alcohol and drug use among youths across the United States during the pandemic. To address this gap, CDC developed the one-time, online Adolescent Behaviors and Experiences Survey (ABES), which was conducted during January–June 2021 to assess student behaviors and experiences during the COVID-19 pandemic among high school students, including unintentional injury, violence, tobacco product use, sexual behaviors, and dietary behaviors. This overview report of the ABES *MMWR Supplement* describes the ABES methodology, including the student questionnaire and administration, sampling, data collection, weighting, and analysis.

ABES used a stratified, three-stage cluster probability-based sampling approach to obtain a nationally representative sample of students in grades 9–12 attending public and private schools. Teachers of selected classes provided students with access to the anonymous online survey while following local consent procedures. Data were collected using a 110-item questionnaire during January–June 2021 in 128 schools. A total of 7,998 students submitted surveys, and 7,705 of these surveys had valid data (i.e., ≥20 questions answered). The school response rate was 38%, the student response rate was 48%, and the overall response rate was 18%. Information on mode of instruction and school-provided equipment was also collected from all sampled schools.

This overview report provides student- and school-level characteristics obtained from descriptive analyses, and the other reports in the ABES *MMWR Supplement* include information on substance use, mental health and suicidality, perceived racism, and disruptions to student life among high school students. Findings from ABES during the COVID-19 pandemic can help guide parents, teachers, school administrators, community leaders, clinicians, and public health officials in decision-making for student support and school health programs.

Introduction

Beginning March 2020, many U.S. schools closed nationwide to prevent transmission of SARS-CoV-2, the virus that causes COVID-19 (1). Although studies indicate that COVID-19 illness is generally less severe in children than adults (2), children are still at risk for developing severe illness and complications from COVID-19. In addition, the pandemic has had negative effects on adolescents' mental health (3). Compared with 2019, the proportion of mental health–related emergency department visits in 2020 increased approximately 31% among youths aged 12–17 years (3).

On January 13, 2021, approximately 50% of all students in the United States were receiving online-only instruction (4), and research has shown that online-only instruction has had a negative effect on the mental health of adolescents (5). Although these studies provide data on the effects of the COVID-19 pandemic on mental health among youths, little is known about other experiences such as economic and food insecurity, abuse by a parent, and other risk behaviors youths might have engaged in during this time, such as alcohol and drug use. To assess youth behaviors and experiences during the COVID-19 pandemic, CDC developed and conducted the Adolescent Behaviors and Experiences Survey (ABES) among students in grades 9–12.

In spring 2020, CDC used funds from the Coronavirus Aid, Relief, and Economic Security (CARES) Act to launch ABES (<https://www.govinfo.gov/app/details/PLAW-116publ136>). CDC subject matter experts from the Division

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of Adolescent and School Health program, in collaboration with CDC's COVID-19 Response Team, rapidly developed and implemented ABES by adapting methodology from the national Youth Risk Behavior Survey (YRBS), part of the nation's largest surveillance system dedicated to adolescent health (6). ABES asked students about six categories of behaviors included in a typical YRBS questionnaire: 1) behaviors that contribute to unintentional injury and violence, 2) tobacco product use, 3) alcohol and other drug use, 4) sexual behaviors, 5) dietary behaviors, and 6) physical inactivity. In addition to these questions, ABES included one question about students' perceptions of racism and 12 questions about the following experiences during the COVID-19 pandemic: 1) increased use of alcohol and drugs, 2) economic and food insecurity, 3) abuse by a parent, 4) poor mental health, 5) school and social engagement, and 6) use of telemedicine. This overview report describes the 2021 ABES methodology, including the online questionnaire and administration, sampling, data collection, weighting, and descriptive analyses. In addition, this *MMWR Supplement* also includes reports on substance use, mental health and suicidality, perceived racism, and disruptions to student life among high school students. Findings from ABES during the COVID-19 pandemic can help guide parents, teachers, school administrators, community leaders, clinicians, and public health officials in decision-making for student support and school health programs.

ABES Methodology

Overview

ABES was a one-time, online survey conducted during January–June 2021 to assess student behaviors and experiences during the COVID-19 pandemic. ABES surveyed high school students in grades 9–12 attending U.S. public and private schools. Classes were randomly selected to participate within a nationally representative sample of schools. Because of the different instructional models used across the nation during the pandemic (i.e., in-person only, virtual only, and hybrid), ABES was designed as a self-administered, anonymous survey that was administered online. The online administration allowed each school and teacher the flexibility to decide whether students completed the survey during instructional time or on their own time. In addition to student-level data, school-level data (e.g., instructional mode and school-provided equipment) also were collected.

School Characteristics

The COVID-19 pandemic resulted in modifications of the learning environment, and many students faced several challenges, including lack of adequate resources at home (7). Therefore, collecting information on school characteristics during the fielding of ABES was important. School staff reported the school's instructional model (in-person only, virtual only, or hybrid) at the time of recruitment; hybrid schools had a portion of a school's student body receiving in-person instruction while others received virtual instruction. School staff members also reported whether the school had reduced class sizes and whether they provided laptops or Chromebooks, tablet computers, and Wi-Fi hotspots to students for home use.

Student Online Questionnaire and Administration

Students completed ABES questionnaires in English or Spanish using a secure URL on any Internet-connected device. They were required to watch a 2-minute video (with an option of an English version, with English audio, or a Spanish version, with English audio and Spanish subtitles) and read brief instructions before starting the questionnaire. On average, students completed the 110-item questionnaire in 30 minutes. Although students were encouraged to finish the survey in one sitting, they were able to save their answers, stop the survey, and resume the survey as needed. Cumulative timing data were captured for the entire time a student was logged in, thus a meaningful range of completion time is not available. The survey included 97 questions from the 2021 national YRBS questionnaire. Six of these questions were modified to allow students who were attending school only virtually to indicate that a question asking about a behavior on school property did not apply. The questionnaire also included 12 new questions (not included on the YRBS questionnaire) assessing COVID-19–related behaviors and experiences and one new question on perceived racism (Box). The questionnaire was designed with no skip patterns; however, students could skip questions they did not want to answer. (Questionnaires in English and Spanish are available at <https://www.cdc.gov/healthyyouth/data/abes.htm>.)

In participating schools, after parental permission was granted and a student agreed to participate, teachers of selected classes provided students with instructions for accessing the survey and a randomly generated login code that allowed for completely anonymous participation. Among eligible students, 2.6% had a parent who refused to allow participation, and an additional 4.3% did not return a permission form when

BOX. Student survey questions on COVID-19 and perceived racism — Adolescent Behaviors and Experiences Survey, United States, January–June 2021**COVID-19 questions**

Do you agree or disagree that you drank more alcohol during the COVID-19 pandemic than before it started?

- A. Strongly agree
- B. Agree
- C. Not sure
- D. Disagree
- E. Strongly disagree

Do you agree or disagree that you used drugs more during the COVID-19 pandemic than before it started? (Count using marijuana, synthetic marijuana, cocaine, prescription pain medicine without a doctor's prescription, and other illegal drugs.)

- A. Strongly agree
- B. Agree
- C. Not sure
- D. Disagree
- E. Strongly disagree

During the COVID-19 pandemic, did a parent or other adult in your home lose their job even for a short amount of time?

- A. My parents and other adults in my home did not have jobs before the COVID-19 pandemic started.
- B. Yes
- C. No

During the COVID-19 pandemic, did you lose your paying job even for a short amount of time?

- A. I did not have a paying job before the COVID-19 pandemic started.
- B. Yes
- C. No

During the COVID-19 pandemic, how often did you go hungry because there was not enough food in your home?

- A. Never
- B. Rarely
- C. Sometimes
- D. Most of the time
- E. Always

During the COVID-19 pandemic, how often did a parent or other adult in your home swear at you, insult you, or put you down?

- A. Never
- B. Rarely
- C. Sometimes
- D. Most of the time
- E. Always

During the COVID-19 pandemic, how often did a parent or other adult in your home hit, beat, kick, or physically hurt you in any way?

- A. Never
- B. Rarely
- C. Sometimes
- D. Most of the time
- E. Always

Do you agree or disagree that doing your schoolwork was more difficult during the COVID-19 pandemic than before the pandemic started?

- A. Strongly agree
- B. Agree
- C. Not sure
- D. Disagree
- E. Strongly disagree

During the COVID-19 pandemic, how often was your mental health not good? (Poor mental health includes stress, anxiety, and depression.)

- A. Never
- B. Rarely
- C. Sometimes
- D. Most of the time
- E. Always

During the COVID-19 pandemic, did you get mental health care, including treatment or counseling for your use of alcohol or drugs, using a computer, phone, or other device (also called telemedicine)?

- A. Yes
- B. No

During the COVID-19 pandemic, how often were you able to spend time with family, friends, or other groups, such as clubs or religious groups, by using a computer, phone, or other device? (Do not count attending school online.)

- A. Never
- B. Rarely
- C. Sometimes
- D. Most of the time
- E. Always

During the COVID-19 pandemic, did you get medical care from a doctor or nurse using a computer, phone, or other device (also called telemedicine)?

- A. Yes
- B. No

Perceived racism

During your life, how often have you felt that you were treated badly or unfairly in school because of your race or ethnicity?

- A. Never
- B. Rarely
- C. Sometimes
- D. Most of the time
- E. Always

active consent was required. To help maintain privacy, only one question appeared on the screen at a time. Images were added for questions related to use of tobacco products, substances, and contraceptives to improve respondents' recognition and understanding of the questions.

Sampling

ABES used the same sampling methods as the national YRBS, except that a larger sample was drawn in anticipation of lower response rates (6). The ABES sampling frame included public and private schools with grades 9–12 in all 50 U.S. states and the District of Columbia. Combined data obtained from MDR (formerly Market Data Retrieval) and the National Center for Education Statistics (NCES) were used to create the sampling frame. Public schools were identified from the Common Core of Data (<https://nces.ed.gov/ccd>), and private schools were identified from the Private School Survey (<https://nces.ed.gov/surveys/pss>), both of which are NCES databases. The sampling frame excluded alternative, special education, U.S. Department of Defense, Bureau of Indian Education, and vocational schools that serve students who are also enrolled in another public school. Home-schooled students and students who dropped out of high school were not eligible for ABES if they were not enrolled in a school.

ABES used a stratified, three-stage cluster sampling approach to obtain a nationally representative sample of students. The first sampling stage consisted of primary sampling units (PSUs) encompassing a county, portion of a county, or a group of counties. A total of 81 PSUs were selected across 16 primary strata by urban and nonurban location and percentage of non-Hispanic Black and Hispanic or Latino (Hispanic) students in the PSU. The second sampling stage consisted of 335 secondary sampling units (SSUs), defined as physical schools with grades 9–12 or linked schools combined to provide the four grades. At the first and second stages, the sample was selected with probability proportional to size. Schools with ≥ 28 students per grade were defined as large, and those with < 28 students were defined as small. The third sampling stage selected one or two classes within each grade of an SSU. All students in a selected class were eligible for ABES, unless they were unable to complete the questionnaire independently.

Data Collection Procedures

The ABES study protocol was reviewed and approved by institutional review boards at CDC and ICF International, CDC's survey contractor.* The survey was administered during January–June 2021; student participation was

voluntary and anonymous. ABES was designed to be a self-administered questionnaire completed online during or outside of instructional time on any Internet-connected device. Most participating students (91%) completed ABES using a laptop or desktop computer; 9% of students used a phone or tablet computer.

Data Processing and Response Rates

ABES data were cleaned and edited for inconsistencies. Values that were not plausible or logical were excluded from analysis (e.g., a student who answered that he had never smoked cigarettes but also answered that he had smoked cigarettes during the past 30 days). Before data editing, students in 128 schools submitted 7,998 ABES questionnaires (7,953 in English and 45 in Spanish). Among these 7,998 records, 293 were excluded because < 20 questions had been answered, resulting in 7,705 questionnaires with valid data. The school response rate was 38%, the student response rate was 48%, and the overall response rate ([Student response rate] \times [School response rate]) was 18%.

Race and ethnicity were ascertained using methods from the 2019 national YRBS (6); however, in this *MMWR Supplement*, the “other” race and ethnicity category was disaggregated to report the following racial categories (all non-Hispanic): American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, and multiracial. The response options for sexual identity differed from those in the 2019 national YRBS (Table 1).

Weighting

ABES data were weighted based on student sex and grade to account for school and student nonresponse and the oversampling of non-Hispanic Black students and Hispanic students. Weights were applied to all records and scaled so that weighted counts equaled the total sample size, and weighted student proportions in each grade matched

TABLE 1. Processing of sexual identity question — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Sexual identity question	Student response	Analytic coding
Which of the following best describes you?	Heterosexual (straight)	Heterosexual
	Gay or lesbian	Gay, lesbian, or bisexual
	Bisexual	
	I describe my sexual identity some other way.	Other or questioning
	I am not sure about my sexual identity (questioning).	
I do not know what this question is asking.		Missing
	[Did not respond to the question]	

*45 C.F.R. part 46; 21 C.F.R. part 56.

national proportions. As a result, ABES weighted estimates are nationally representative of all students in grades 9–12 attending public and private schools in the United States.

Analytic Methods

To account for the complex sampling design and weighting, ABES data were analyzed using SAS (version 9.4; SAS Institute) and SUDAAN (version 11.0.1 or 11.0.3; RTI International). The methods section of each report in this *MMWR Supplement* includes details on the analytical methods used in each analysis. For this overview report, a descriptive analysis of ABES student- and school-level data was conducted.

Data Availability and Dissemination

ABES data and documentation describing the data are available to the public (<https://www.cdc.gov/healthyyouth/data/abes.htm>). Student survey and school characteristics data have been merged into one data set and are available in Access and ASCII formats. SAS and SPSS programs are provided for converting the ASCII data into SAS and SPSS data sets. No approval is needed to use the ABES data set. Data requests and other ABES-related questions can be sent to CDC by using the YRBS data request form (<https://www.cdc.gov/healthyyouth/data/yrbs/contact.htm>).

Results

Among the high school students surveyed, 26.7% were in 9th grade, 25.5% in 10th grade, 24.3% in 11th grade, and 23.6% in 12th grade (Table 2). In addition, 50.4% of students were female and 49.8% were non-Hispanic White, 25.4% were Hispanic, and 12.9% were non-Hispanic Black. The remaining students reported other races (all non-Hispanic): American Indian or Alaska Native (0.7%), Asian (4.9%), multiracial (5.8%), and Native Hawaiian or other Pacific Islander (0.5%). A majority of students self-identified as heterosexual (77.5%); 13.2% self-identified as gay, lesbian, or bisexual; and 9.3% self-identified as other or questioning.

Of the 128 participating schools, 75.0% reported using a hybrid instructional mode, 21.9% used online instruction only, and 3.1% used in-person instruction only (Table 3). Approximately half of the schools (50.8%) had reduced class sizes. Most schools (94.5%) provided laptops or Chromebooks to students, and 60.3% provided Wi-Fi hotspots.

Discussion

CDC adapted successful school-based surveillance methods from the national YRBS to develop and launch ABES rapidly during the COVID-19 pandemic. In addition to using existing YRBS questions on the ABES survey, agencywide collaboration was used to develop new ABES questions, provide technical assistance on survey development and data collection, and conduct the analyses presented in this *MMWR Supplement*. ABES was the first national online survey of its kind available in both English and Spanish launched by CDC; online administration allowed students the flexibility to complete the survey during instructional time or on their own time.

TABLE 2. Response rates and student characteristics — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	No. (%)
Sample*	
Schools sampled	339
Students sampled	16,037
Participants*	
Schools	128
Students†	7,705
Response rates*	
Schools	(37.8)
Students	(48.0)
Total	(18.1)
Sex^{§,¶}	
Female	3,999 (50.4)
Male	3,678 (49.6)
Race and ethnicity^{§,**}	
American Indian or Alaska Native, non-Hispanic	83 (0.7)
Asian, non-Hispanic	350 (4.9)
Black, non-Hispanic	1,189 (12.9)
Hispanic or Latino	2,038 (25.4)
Multiracial, non-Hispanic	480 (5.8)
Native Hawaiian or other Pacific Islander, non-Hispanic	31 (0.5)
White, non-Hispanic	3,461 (49.8)
Grade^{§,††,§§}	
9	2,144 (26.7)
10	1,949 (25.5)
11	1,858 (24.3)
12	1,731 (23.6)
Sexual identity^{§,¶¶}	
Heterosexual	5,539 (77.5)
Gay, lesbian, or bisexual	977 (13.2)
Other or questioning	648 (9.3)
Language^{*,***}	
English	7,953 (99.4)
Spanish	45 (0.6)

* Unweighted data.

† Among 7,998 submitted questionnaires, 293 failed data validation and were excluded from analysis, resulting in 7,705 analyzable questionnaires.

§ Weighted data.

¶ 28 questionnaires were missing sex data.

** 73 questionnaires were missing race and ethnicity data.

†† 23 questionnaires had “ungraded” or “other” selected or missing.

§§ Percentages do not total 100% because of rounding.

¶¶ 541 questionnaires were missing sexual identity data.

*** Among 7,998 submitted questionnaires.

However, because schools faced numerous COVID-19–related challenges during the 2020–21 school year, certain districts and schools were reluctant to participate in ABES. For example, certain schools were concerned about loss of instructional time and the additional time required for school staff members. In some instances, contacting appropriate district- and school-level decision-makers to discuss participation was difficult because schools were minimally staffed or closed (ICF International, personal communication, 2021). Despite these challenges, ABES was still successfully administered, resulting in data that can be used to assess the impact of COVID-19 on various experiences and behaviors among high school students.

This is the first national school-based survey among high school students to assess a range of behaviors and experiences during the COVID-19 pandemic. A limited number of studies exist using other surveys among youths, but they have either had a narrower focus (e.g., focusing on one behavior such as substance use) (8) or are not nationally representative (9). With the varying school instructional models across the United States, obtaining national benchmark estimates for adolescent behaviors and experiences was imperative. Revised suppression criteria enabled the reporting of ABES findings for American Indian or Alaska Native, Asian, multiracial, and Native Hawaiian or other Pacific Islander students in this *MMWR Supplement* when data were available. This change allowed for a better understanding of behaviors and experiences among more specific groups of youths. Although the sampling

methodology is the same for ABES and YRBS, findings should not be compared (i.e., prepandemic versus during pandemic) because administration modality and settings differed between surveys. YRBS uses a paper and pencil scannable survey that is administered in person in the schools; ABES used an online survey that students could complete during instructional time or on their own time, with access provided by teachers through schools.

Limitations

The findings in this report are subject to at least five limitations. First, ABES data are representative of students enrolled in schools and are not representative of all U.S. adolescents, including those not enrolled in schools; an estimated 5% of adolescents aged 14–17 years were not enrolled in school in 2018 (10). Second, although ABES protocols were designed to protect students' privacy, responses might have been visible to others during the survey, potentially leading to social desirability or response bias. Third, information on the instructional model being used by schools was collected at the time of school recruitment and might have changed during the study period. Therefore, interpreting findings among students who attended in-person, virtual, and hybrid school conditions is difficult, as is distinguishing in-person versus virtual attendance for the hybrid category. Fourth, because ABES was a one-time cross-sectional survey, causality or directionality of the findings cannot be determined, and changes in behaviors or experiences could not be assessed. Furthermore, the survey was not designed to allow comparisons by survey completion date; therefore, the results cannot be used to assess the impact of changes during the COVID-19 pandemic on responses. Finally, ABES had an 18% overall response rate; low response rates increase the potential for nonresponse bias. However, high response rates alone do not rule out nonresponse bias. Nonresponse bias analyses revealed that weighting adjustments minimized the potential for nonresponse bias because sample weights were adjusted to account for nonresponding schools (AM Roberts, R Iachan, L Harding, X Deng, ICF International, unpublished data, 2021).

Conclusion

Collecting nationally representative data on behaviors and experiences among youths during the COVID-19 pandemic provides information on which behaviors are concerning and most prevalent during this time. ABES findings highlighted in this *MMWR Supplement* can help determine which risk behaviors are more prevalent among youths to assist parents,

TABLE 3. Participating school characteristics — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	No. (%)
Total schools*	128 (100)
Instructional model	
In-person only	4 (3.1)
Virtual only	28 (21.9)
Hybrid†	96 (75.0)
Reduced class size‡	
Yes	63 (50.8)
No	61 (49.2)
School-provided equipment	
Laptops or Chromebooks	
Yes	121 (94.5)
No	7 (5.5)
Tablet computers¶	
Yes	4 (3.3)
No	117 (96.7)
Wi-Fi hotspots**	
Yes	70 (60.3)
No	46 (39.7)

* Unweighted data.

† Any combination of students attending in person and virtually.

‡ Reduced class size information was missing for four schools.

¶ School-provided data on tablet computers were missing for seven schools.

** School-provided Wi-Fi hotspot data were missing for 12 schools.

teachers, school administrators, community leaders, clinicians, and public health officials with addressing these issues. Additional surveillance is needed to monitor behaviors and experiences that are associated with the pandemic among youths across the United States.

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Conflicts of Interest

All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

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Use of Tobacco Products, Alcohol, and Other Substances Among High School Students During the COVID-19 Pandemic — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

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Abstract

The COVID-19 pandemic has been associated with established risk factors for adolescent substance use, including social isolation, boredom, grief, trauma, and stress. However, little is known about adolescent substance use patterns during the pandemic. CDC analyzed data from the Adolescent Behaviors and Experiences Survey, an online survey of a probability-based, nationally representative sample of public- and private-school students in grades 9–12 (N = 7,705), to examine the prevalence of current use of tobacco products, alcohol, and other substances among U.S. high school students. Prevalence was examined by demographic characteristics and instructional models of the students' schools (in-person, virtual, or hybrid). During January–June 2021, 31.6% of high school students reported current use of any tobacco product, alcohol, or marijuana or current misuse of prescription opioids. Current alcohol use (19.5%), electronic vapor product (EVP) use (15.4%), and marijuana use (12.8%) were more prevalent than prescription opioid misuse (4.3%), current cigarette smoking (3.3%), cigar smoking (2.3%), and smokeless tobacco use (1.9%). Approximately one third of students who used EVPs did so daily, and 22.4% of students who drank alcohol did so ≥ 6 times per month. Approximately one in three students who ever used alcohol or other drugs reported using these substances more during the pandemic. The prevalence of substance use was typically higher among non-Hispanic American Indian or Alaska Native students, older students, and gay, lesbian, or bisexual students than among students of other racial or ethnic groups, younger students, and heterosexual students. The prevalence of alcohol use also was higher among non-Hispanic White students than those of other racial or ethnic groups. Students only attending school virtually had a lower prevalence of using most of the substances examined than did students attending schools with in-person or hybrid models. These findings characterizing youth substance use during the pandemic can help inform public health interventions and messaging to address these health risks during and after the COVID-19 pandemic.

Introduction

During the COVID-19 pandemic, many adolescents experienced factors that might increase risk for substance use, including social isolation and boredom; stress from fear about COVID-19; grief; economic, housing, and food insecurity; and disruption to medical, mental health, and social services (1). However, little is known about adolescent substance use patterns during the pandemic. Studies examining changes in substance use among various populations of adolescents during the early stages of the pandemic (2020) have shown mixed results. Although certain studies demonstrated declines

in the use of electronic vapor products (EVPs) and binge drinking (2–4,5), one study found increases in the frequency of alcohol and marijuana use (5), and others indicated no change in alcohol use (3), binge drinking, or marijuana use (4). Inconsistent results across studies might be explained by differences in populations, time frames, and data collection methods. Of note, none of these studies used probability samples of U.S. high school students in all grades.

Additional factors might contribute to changes in adolescent substance use. For example, because youths obtain most EVPs from social sources (6), access to these products during the pandemic likely decreased. However, more permissive alcohol policies during the pandemic (e.g., home delivery) might have increased alcohol availability and weakened established age-gating barriers for youths attempting to purchase alcohol. In addition, parental behaviors related to pandemic stressors might have influenced youth substance use. A longitudinal

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study found that 16% of parents newly allowed their adolescent children to drink alcohol with the family during the pandemic (7).

To better understand adolescent substance use during the COVID-19 pandemic, this report presents data from a national survey conducted during January–June 2021 to examine use of tobacco products, alcohol, and marijuana and the misuse of prescription opioids among U.S. high school students during the 30 days before the survey. Findings in this report can help inform prevention strategies and public health messaging during and after the pandemic.

Methods

Data Source

Data from the Adolescent Behaviors and Experiences Survey (ABES) conducted by CDC during January–June 2021 were used to assess student behaviors and experiences during the COVID-19 pandemic. ABES was a one-time, probability-based online survey of U.S. high school students. ABES used a stratified, three-stage cluster sampling approach to obtain a nationally representative sample of public- and private-school students in grades 9–12 in the 50 U.S. states and the District of Columbia (N = 7,705). Participation in ABES was voluntary; each school and teacher decided whether students completed the survey during instructional time or on their own time. Additional information about ABES sampling, data collection, response rates, and processing is available in the overview report of this supplement (8). The ABES questionnaire, data sets, and documentation are available at <https://www.cdc.gov/healthyyouth/data/abes.htm>.

Measures

The prevalence of current use (≥ 1 day during the 30 days before the survey) of six substances (EVPs, cigarettes, cigars, smokeless tobacco, alcohol, and marijuana), plus current misuse of prescription opioids, was examined (Table 1). Also examined were the prevalence and frequency of current alcohol use and binge drinking, the largest number of alcoholic drinks consumed in a row, frequency of EVP use, source of EVPs, source of alcohol, and changes in alcohol and drug use during the COVID-19 pandemic (Table 1). Two composite measures were created: 1) any current tobacco product use, defined as any use of EVPs, cigarettes, cigars, or smokeless tobacco during the 30 days before the survey, and 2) current use of any tobacco product, alcohol, or marijuana or prescription opioid misuse.

Assessed demographic characteristics included sex, race and ethnicity (non-Hispanic American Indian or

Alaska Native [AI/AN], non-Hispanic Asian [Asian], non-Hispanic Black [Black], Hispanic or Latino of any race [Hispanic], non-Hispanic persons of multiple races [multiracial], non-Hispanic Native Hawaiian or other Pacific Islander [NH/OPI], or non-Hispanic White [White]), grade (9, 10, 11, or 12), and sexual identity (heterosexual; gay, lesbian, or bisexual; or other or questioning). Analyses also examined the instructional model of the school the student was attending (virtual, in-person, or hybrid).

Analysis

Weighted prevalence estimates and corresponding 95% CIs were calculated, and *t*-tests were used to assess differences between groups. Differences between prevalence estimates were considered statistically significant if the *t*-test *p* value was <0.05 . Only statistically significant differences in prevalence estimates are reported. Analyses were completed using SUDAAN (version 11.0.1; RTI International) to account for the complex survey design and weighting.

Results

During January–June 2021, 31.6% of high school students reported current use of any tobacco product, alcohol, or marijuana or current misuse of prescription opioids. Current alcohol use (19.5%), EVP use (15.4%), and marijuana use (12.8%) were more prevalent among high school students than prescription opioid misuse (4.3%), current cigarette smoking (3.3%), cigar smoking (2.3%), and smokeless tobacco use (1.9%). For tobacco product use, differences by demographic characteristics varied by type of tobacco product (Table 2); use of these products was most prevalent among AI/AN, White, and multiracial students and least prevalent among Asian students. Tobacco product use was more prevalent among 12th-grade students than students in lower grades; more prevalent among gay, lesbian, or bisexual students than heterosexual or other or questioning students; and least prevalent among students attending virtual-only schools. Among students who currently used EVPs, 38.0% used them on at least 20 of the 30 days before the survey and 30.9% used them on all 30 days. Students who currently used EVPs most commonly obtained them by getting or buying them from a friend, family member, or someone else (52.4%).

Both current alcohol use and binge drinking varied by demographic characteristics (Table 3). These behaviors were more prevalent among female than male students, most prevalent among White and multiracial students, and more prevalent among students in higher than lower grades; among gay, lesbian, or bisexual students than heterosexual

students; and among students attending hybrid schools than those attending virtual-only schools. Among the 43.1% of students who had ever drunk alcohol, 29.6% strongly agreed or agreed that they drank more alcohol during the COVID-19 pandemic. Drinking more alcohol during the pandemic varied by race and ethnicity but not by grade, sexual identity, or instructional model. Among students who currently drank alcohol, 22.4% drank on ≥ 6 of the 30 days before the survey. Among the 7.7% of students who reported current binge drinking, 21.2% binge drank on ≥ 6 of the 30 days before

the survey and 39.2% consumed eight or more drinks in a row. Students who currently drank alcohol most commonly obtained it by someone giving it to them (38.3%).

Nationally, 12.8% of students currently used marijuana and 4.3% currently misused prescription opioids (Table 4). Differences by demographic group varied by substance. Although marijuana use did not differ by sex, prescription opioid misuse was more prevalent among female than male students. Marijuana use was most prevalent among AI/AN students and multiracial students and least prevalent

TABLE 1. Variables, questions, and analytic coding for tobacco product, alcohol, and other substance use — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Variable	Question	Analytic coding
Current electronic vapor product use	During the past 30 days, on how many days did you use an electronic vapor product?*	≥ 1 day versus 0 days
Frequent current electronic vapor product use	During the past 30 days, on how many days did you use an electronic vapor product?*	≥ 20 days versus 1 or 2 days, 3–5 days, 6–9 days, or 10–19 days
Current cigarette smoking	During the past 30 days, on how many days did you smoke cigarettes?	≥ 1 day versus 0 days
Current cigar smoking	During the past 30 days, on how many days did you smoke cigars, cigarillos, or little cigars?	≥ 1 day versus 0 days
Current smokeless tobacco use	During the past 30 days, on how many days did you use chewing tobacco, snuff, dip, snus, or dissolvable tobacco products, such as Copenhagen, Grizzly, Skoal, or Camel Snus? (Do not count any electronic vapor products.)	≥ 1 day versus 0 days
Current alcohol use	During the past 30 days, on how many days did you have at least one drink of alcohol?†	≥ 1 day versus 0 days
Frequent current alcohol use	During the past 30 days, on how many days did you have at least one drink of alcohol?	≥ 6 days versus 1 day, 2 days, or 3–5 days
Current binge drinking	During the past 30 days, on how many days did you have four or more drinks of alcohol in a row, that is, within a couple of hours (if you are female) or five or more drinks of alcohol in a row, that is, within a couple of hours (if you are male)?	≥ 1 day versus 0 days
Frequent current binge drinking	During the past 30 days, on how many days did you have four or more drinks of alcohol in a row, that is, within a couple of hours (if you are female) or five or more drinks of alcohol in a row, that is, within a couple of hours (if you are male)?	≥ 6 days versus 1 day, 2 days, or 3–5 days
Largest number of drinks in a row	During the past 30 days, what is the largest number of alcoholic drinks you had in a row, that is, within a couple of hours?	Females: ≥ 8 drinks versus 4 drinks, 5 drinks, or 6 or 7 drinks Males: ≥ 8 drinks versus 5 drinks or 6 or 7 drinks
Current marijuana use	During the past 30 days, how many times did you use marijuana?‡	≥ 1 time versus 0 times
Current prescription opioid misuse	During the past 30 days, how many times have you taken prescription pain medicine without a doctor's prescription or differently than how a doctor told you to use it?¶	≥ 1 time versus 0 times
Source of electronic vapor products	During the past 30 days, how did you usually get your electronic vapor products? (Select only one response.)	NA
Source of alcohol	During the past 30 days, how did you usually get the alcohol you drank?	NA
Drank more alcohol during the COVID-19 pandemic	Do you agree or disagree that you drank more alcohol during the COVID-19 pandemic than before it started?	Strongly agree or agree versus not sure, disagree, or strongly disagree
Used more drugs during the COVID-19 pandemic	Do you agree or disagree that you used drugs more during the COVID-19 pandemic than before it started? (Count using marijuana, synthetic marijuana, cocaine, prescription pain medicine without a doctor's prescription, and other illegal drugs.)	Strongly agree or agree versus not sure, disagree, or strongly disagree

Abbreviation: NA = not applicable.

* Electronic vapor products were defined in a preamble that read, "The next three questions ask about electronic vapor products, such as Juul, Smok, Suorin, Vuse, and blu. Electronic vapor products include e-cigarettes, vapes, vape pens, e-cigars, e-hookahs, hookah pens, and mods."

† Alcohol was defined in a preamble that read, "The next five questions ask about drinking alcohol. This includes drinking beer, wine, flavored alcoholic beverages, and liquor such as rum, gin, vodka, or whiskey. For these questions, drinking alcohol does not include drinking a few sips of wine for religious purposes."

‡ Marijuana was defined in a preamble that read, "The next three questions ask about marijuana use. Marijuana also is called pot or weed. For these questions, do not count CBD-only or hemp products, which come from the same plant as marijuana, but do not cause a high when used alone."

¶ Prescription opioid misuse was defined in a preamble that read, "The next two questions ask about the use of prescription pain medicine without a doctor's prescription or differently than how a doctor told you to use it. For these questions, count drugs such as codeine, Vicodin, OxyContin, hydrocodone, and Percocet."

among Asian students, whereas prescription opioid misuse did not vary by race or ethnicity. Both marijuana use and prescription opioid misuse were more prevalent among gay, lesbian, or bisexual students than among heterosexual students; marijuana use also was more prevalent among gay, lesbian, or bisexual students than other or questioning students. Both types of substance use were more prevalent among students

attending hybrid schools than those attending virtual-only schools. In addition, prescription opioid misuse was most prevalent among students attending only in-person schools. Among the 33.7% of students who ever used an illicit drug (marijuana, synthetic marijuana, cocaine, or other illegal drug use or prescription opioid misuse), 31.4% strongly agreed or agreed that they used more drugs during the COVID-19

TABLE 2. Percentage of high school students who currently used tobacco products,* by selected characteristics and type of tobacco product — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	Current electronic vapor product use [†]	Current cigarette use [§]	Current cigar use [¶]	Current smokeless tobacco use ^{**}	Any current tobacco product use ^{††,§§}
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Sex					
Female	16.8 (13.4–20.8)	3.0 (2.1–4.5)	1.3 (1.0–1.9)	0.6 (0.4–1.0)	16.9 (13.7–20.7)
Male	13.9 (11.9–16.3)	3.6 (2.6–4.9)	3.1 (2.4–4.1)	3.2 (2.2–4.8)	14.3 (12.3–16.6)
Race and ethnicity					
American Indian or Alaska Native, non-Hispanic	23.5 (12.3–40.1)	8.9 (5.6–13.8)	4.1 (2.2–7.7)	7.1 (3.3–14.8)	24.0 (11.5–43.5)
Asian, non-Hispanic	4.4 (2.3–8.2)	0.3 (0.1–1.3)	0.5 (0.1–1.8)	1.3 (0.3–5.2)	4.4 (2.3–8.4)
Black, non-Hispanic	10.6 (8.5–13.2)	0.9 (0.3–2.3)	2.6 (1.7–4.1)	0.4 (0.2–0.9)	11.0 (8.7–13.8)
Hispanic or Latino (all races)	9.7 (7.2–12.9)	1.8 (1.2–2.8)	1.3 (0.9–2.1)	0.8 (0.5–1.5)	9.4 (7.1–12.3)
Multiracial, non-Hispanic	17.6 (13.2–23.0)	4.1 (2.0–8.3)	5.4 (3.2–9.0)	1.1 (0.5–2.5)	19.4 (14.5–25.5)
Native Hawaiian or other Pacific Islander, non-Hispanic	— ^{¶¶}	1.2 (0.1–11.0)	3.2 (0.4–21.4)	3.2 (0.4–21.4)	—
White, non-Hispanic	20.3 (17.2–23.9)	4.9 (3.6–6.5)	2.4 (1.7–3.4)	3.0 (2.0–4.3)	20.7 (17.6–24.0)
Grade					
9	13.3 (10.0–17.4)	2.7 (1.6–4.3)	1.9 (1.2–3.0)	1.2 (0.7–2.2)	13.0 (9.9–16.9)
10	12.3 (9.7–15.6)	2.5 (1.6–3.9)	1.9 (1.3–2.8)	1.5 (0.8–3.0)	12.6 (10.0–15.6)
11	16.1 (13.1–19.7)	3.6 (2.5–5.0)	1.6 (1.0–2.4)	1.8 (1.1–2.8)	16.8 (13.8–20.3)
12	20.4 (17.3–23.8)	4.5 (2.6–7.6)	3.6 (2.4–5.4)	3.0 (1.8–5.1)	20.8 (17.4–24.6)
Sexual identity					
Heterosexual	14.7 (12.1–17.6)	2.9 (2.1–3.9)	2.0 (1.6–2.7)	2.0 (1.4–3.0)	14.9 (12.5–17.7)
Gay, lesbian, or bisexual	20.9 (16.8–25.7)	6.2 (3.6–10.3)	3.5 (2.3–5.3)	1.5 (0.8–2.7)	21.6 (17.3–26.5)
Other or questioning	16.1 (12.2–21.1)	3.3 (1.9–5.6)	1.4 (0.7–2.8)	0.7 (0.3–2.2)	15.8 (12.0–20.5)
Instructional model of school					
In-person only	25.2 (13.9–41.2)	5.2 (2.5–10.8)	3.4 (1.8–6.5)	2.9 (1.7–5.1)	25.5 (13.9–42.0)
Virtual only	9.1 (7.3–11.2)	1.4 (0.9–2.0)	1.0 (0.6–1.8)	0.5 (0.2–1.2)	9.0 (7.1–11.4)
Hybrid	17.2 (14.4–20.5)	3.9 (2.8–5.3)	2.6 (2.0–3.4)	2.4 (1.6–3.4)	17.5 (14.8–20.7)
Total	15.4 (13.0–18.1)	3.3 (2.5–4.4)	2.3 (1.8–2.9)	1.9 (1.3–2.8)	15.6 (13.3–18.2)

* Weighted percentages. See Table 1 for variable definitions.

[†] Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: non-Hispanic American Indian or Alaska Native versus non-Hispanic Asian; non-Hispanic Asian versus non-Hispanic Black, Hispanic, non-Hispanic multiracial, and non-Hispanic White; non-Hispanic Black versus non-Hispanic White and non-Hispanic multiracial; Hispanic versus non-Hispanic multiracial and non-Hispanic White; grade 9 versus grade 12; grade 10 versus grade 12; grade 11 versus grade 12; heterosexual versus gay, lesbian, and bisexual; in-person versus virtual; and virtual versus hybrid.

[§] Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: non-Hispanic American Indian or Alaska Native versus non-Hispanic Asian, non-Hispanic Black, Hispanic, non-Hispanic Native Hawaiian or other Pacific Islander, and non-Hispanic White; non-Hispanic Asian versus Hispanic, non-Hispanic multiracial, and non-Hispanic White; non-Hispanic Black versus non-Hispanic multiracial and non-Hispanic White; Hispanic versus non-Hispanic White; non-Hispanic Native Hawaiian or other Pacific Islander versus non-Hispanic White; heterosexual versus gay, lesbian, or bisexual; and virtual versus hybrid.

[¶] Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: female versus male; non-Hispanic American Indian or Alaska Native versus non-Hispanic Asian; non-Hispanic Asian versus non-Hispanic Black, Hispanic, non-Hispanic multiracial, and non-Hispanic White; non-Hispanic Black versus Hispanic; Hispanic versus non-Hispanic multiracial and non-Hispanic White; heterosexual versus gay, lesbian, or bisexual; gay, lesbian, or bisexual versus other or questioning; in-person versus virtual; and virtual versus hybrid.

^{**} Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: female versus male; grade 9 versus grade 12; non-Hispanic American Indian or Alaska Native versus non-Hispanic Black, Hispanic, and non-Hispanic multiracial; non-Hispanic Black versus non-Hispanic White; Hispanic versus non-Hispanic White; non-Hispanic multiracial versus non-Hispanic White; heterosexual versus other or questioning; in-person versus virtual; and virtual versus hybrid.

^{††} Smoked cigarettes or cigars or used smokeless tobacco or an electronic vapor product. To be consistent with other CDC surveillance systems, variable calculated among students who answered all four questions related to tobacco product use.

^{§§} Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: grade 9 versus grade 12; grade 10 versus grades 11 and 12; non-Hispanic American Indian or Alaska Native versus non-Hispanic Asian; non-Hispanic Asian versus non-Hispanic Black, Hispanic, non-Hispanic multiracial, and non-Hispanic White; non-Hispanic Black versus non-Hispanic multiracial and non-Hispanic White; Hispanic versus non-Hispanic multiracial and non-Hispanic White; heterosexual versus gay, lesbian, or bisexual; gay, lesbian, or bisexual versus other or questioning; in-person versus virtual; and virtual versus hybrid.

^{¶¶} Dashes indicate that results are suppressed because $n < 30$.

pandemic. Reporting more drug use during the pandemic was least prevalent among Asian students and Hispanic students, more prevalent among 12th-grade students than 9th-grade students, and more prevalent among students attending hybrid schools than those attending virtual-only schools.

Discussion

This report presents nationally representative data collected beyond the early stages of the COVID-19 pandemic on adolescents' use of various substances. During spring 2021, during the 30 days before the survey, approximately one in three high school students used any tobacco product, alcohol, or marijuana or engaged in prescription opioid misuse; one

in six students used EVPs; one in five drank alcohol; and one in eight used marijuana. In addition, among students who had ever drunk alcohol or used drugs, nearly one in three reported drinking more alcohol or using more drugs during the pandemic. Among students who currently used EVPs or drank alcohol, use on multiple days each month was prevalent, as was binge drinking. These findings are of public health concern because youths' use of tobacco products in any form is unsafe; EVPs contain nicotine, which is highly addictive, can harm adolescent brain development, and can prime the brain for addiction to other drugs (<https://addiction.surgeongeneral.gov/sites/default/files/surgeon-generals-report.pdf>). Underage drinking is associated with multiple health risk behaviors, including poor academic performance, injury, violence, and

TABLE 3. Percentage of high school students who currently drank alcohol or were binge drinking and percentage who strongly agreed or agreed that they drank more alcohol during the COVID-19 pandemic than before it started,* by selected characteristics — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	Current alcohol use [†]	Current binge drinking [§]	Drank more alcohol during the COVID-19 pandemic ^{¶,**}
	% (95% CI)	% (95% CI)	% (95% CI)
Sex			
Female	22.4 (18.5–27.0)	9.5 (6.6–13.5)	27.8 (24.6–31.3)
Male	16.4 (14.3–18.7)	5.9 (4.6–7.6)	31.9 (28.1–36.0)
Race and ethnicity			
American Indian or Alaska Native, non-Hispanic	20.5 (12.7–31.5)	5.8 (3.0–11.0)	14.5 (6.7–28.7)
Asian, non-Hispanic	14.9 (10.0–21.8)	1.8 (0.9–3.6)	30.3 (22.0–40.1)
Black, non-Hispanic	11.0 (8.6–13.9)	2.4 (1.3–4.3)	17.5 (12.5–23.9)
Hispanic or Latino (all races)	16.5 (12.9–20.8)	5.0 (3.4–7.2)	23.6 (19.1–28.7)
Multiracial, non-Hispanic	22.1 (16.7–28.6)	8.5 (6.0–11.7)	34.0 (25.9–43.2)
Native Hawaiian or other Pacific Islander, non-Hispanic	— ^{††}	—	—
White, non-Hispanic	23.5 (19.4–28.3)	11.2 (8.1–15.1)	33.6 (30.1–37.4)
Grade			
9	12.9 (9.9–16.6)	4.6 (2.5–8.2)	28.6 (22.6–35.6)
10	17.1 (14.0–20.8)	5.3 (3.5–7.8)	29.6 (25.0–34.7)
11	21.7 (18.2–25.7)	9.6 (7.5–12.2)	28.4 (23.6–33.8)
12	27.2 (23.8–30.9)	12.1 (9.5–15.2)	31.3 (26.3–36.7)
Sexual identity			
Heterosexual	18.8 (15.6–22.5)	7.8 (5.6–10.8)	29.8 (26.4–33.4)
Gay, lesbian, or bisexual	26.4 (22.1–31.3)	9.0 (6.5–12.5)	31.6 (25.7–38.3)
Other or questioning	20.1 (15.1–26.4)	7.5 (4.8–11.7)	24.5 (18.7–31.6)
Instructional model of school			
In-person only	24.2 (12.9–40.8)	10.1 (5.0–19.1)	28.9 (14.3–49.8)
Virtual only	13.5 (10.7–16.8)	3.8 (2.5–5.9)	26.3 (22.0–31.2)
Hybrid	21.3 (18.3–24.7)	9.0 (6.7–11.8)	30.5 (27.3–33.9)
Total	19.5 (16.8–22.4)	7.7 (5.9–10.1)	29.6 (26.9–32.5)

* Weighted percentages. See Table 1 for variable definitions.

[†] Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: female versus male; non-Hispanic American Indian or Alaska Native versus non-Hispanic Black; non-Hispanic Asian versus non-Hispanic White; non-Hispanic Black versus non-Hispanic White, Hispanic, and non-Hispanic multiracial; non-Hispanic White versus Hispanic; grade 9 versus grades 10, 11, and 12; grade 10 versus grades 11 and 12 grades; grade 11 versus grade 12; heterosexual versus gay, lesbian, or bisexual; and hybrid versus virtual.

[§] Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: female versus male; non-Hispanic American Indian or Alaska Native versus non-Hispanic White; non-Hispanic Asian versus non-Hispanic White, Hispanic, and non-Hispanic multiracial; non-Hispanic Black versus Hispanic, non-Hispanic White, and non-Hispanic multiracial; Hispanic versus non-Hispanic multiracial and non-Hispanic White; grade 9 versus grades 11 and 12; grade 10 versus grades 11 and 12 grades; and hybrid versus virtual.

[¶] Among students who had ever drunk alcohol.

** Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: non-Hispanic American Indian or Alaska Native versus non-Hispanic Asian, non-Hispanic multiracial, and non-Hispanic White; non-Hispanic Asian versus non-Hispanic Black; non-Hispanic Black versus non-Hispanic multiracial and non-Hispanic White; Hispanic versus non-Hispanic multiracial; and non-Hispanic White versus Hispanic.

^{††} Dashes indicate that results are suppressed because $n < 30$.

other substance use. Binge drinking is particularly dangerous for adolescents because it can lead to alcohol poisoning (9).

The behaviors examined in this report varied by subgroups. Differences by sex, race and ethnicity, grade, and sexual identity were typically consistent with those found in other nationally representative surveys of high school students conducted before the pandemic (10,11). In addition, this report is the first to provide national substance use data for racial and ethnic groups other than Black, White, and Hispanic. The percentage of AI/AN students using substances was consistently high, indicating a critical need for prevention and intervention strategies to reach these youths. Similarly, the higher prevalence of substance use among gay, lesbian, or bisexual youths than among heterosexual youths underscores the importance of implementing tailored prevention strategies for this population.

Students attending virtual-only schools had a lower prevalence of using each substance examined, which is consistent with the finding that students most commonly obtained EVPs and alcohol from another person. Attending virtual-only schools could lead to lower prevalence of substance use because of fewer social opportunities, less access to substances, and closer parental supervision than attending schools with hybrid or in-person instructional models. However, this finding also might be related to survey setting. Although all students attending virtual-only schools completed the survey at home, students attending hybrid or in-person schools might have completed the survey at school. Students completing surveys at home have demonstrated lower reporting of risk behaviors than students completing surveys at school, possibly because surveys are completed where parents are present, leading to less disclosure of substance use (12).

TABLE 4. Percentage of high school students who currently used marijuana or misused prescription opioids and percentage who strongly agreed or agreed that they used more drugs during the COVID-19 pandemic than before it started,* by selected characteristics — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	Current marijuana use [†]	Current prescription opioid misuse [§]	Used more drugs during the COVID-19 pandemic ^{¶,**}
	% (95% CI)	% (95% CI)	% (95% CI)
Sex			
Female	12.7 (10.2–15.6)	5.4 (4.4–6.5)	30.1 (25.8–34.7)
Male	12.9 (11.2–14.8)	3.2 (2.3–4.4)	33.1 (29.7–36.7)
Race and ethnicity			
American Indian or Alaska Native, non-Hispanic	25.9 (15.7–39.7)	6.2 (3.3–11.2)	25.2 (11.1–47.6)
Asian, non-Hispanic	4.2 (2.1–8.2)	3.4 (2.2–5.2)	17.9 (11.0–27.8)
Black, non-Hispanic	13.6 (10.5–17.5)	4.1 (2.9–5.8)	31.6 (24.8–39.3)
Hispanic or Latino (all races)	9.9 (7.3–13.4)	4.6 (3.6–6.0)	22.2 (17.9–27.2)
Multiracial, non-Hispanic	19.8 (14.7–26.2)	4.2 (2.6–6.9)	36.5 (29.0–44.8)
Native Hawaiian or other Pacific Islander, non-Hispanic	— ^{††}	—	—
White, non-Hispanic	14.0 (11.8–16.5)	4.3 (3.2–5.7)	36.6 (31.8–41.7)
Grade			
9	9.4 (7.0–12.7)	5.3 (4.2–6.7)	27.7 (22.2–33.9)
10	10.5 (8.3–13.2)	4.3 (3.2–5.7)	29.7 (23.5–36.8)
11	13.4 (11.3–15.9)	4.0 (2.8–5.7)	30.6 (26.1–35.5)
12	18.4 (15.8–21.4)	3.6 (2.6–4.9)	36.5 (31.4–41.9)
Sexual identity			
Heterosexual	12.0 (10.3–13.8)	3.8 (3.0–4.7)	31.1 (27.4–35.0)
Gay, lesbian, or bisexual	18.5 (14.7–22.9)	6.9 (5.2–9.0)	35.7 (28.9–43.0)
Other or questioning	12.1 (9.1–15.8)	5.5 (3.8–7.8)	26.6 (19.0–35.9)
Instructional model of school			
In-person only	16.8 (8.4–30.8)	7.3 (5.4–9.6)	30.5 (21.3–41.4)
Virtual only	9.0 (7.0–11.5)	2.8 (1.9–4.1)	24.5 (18.6–31.6)
Hybrid	13.9 (11.9–16.2)	4.7 (3.8–5.9)	33.4 (30.0–37.0)
Total	12.8 (11.1–14.7)	4.3 (3.6–5.2)	31.4 (28.3–34.7)

* Weighted percentages. See Table 1 for variable definitions.

[†] Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: non-Hispanic American Indian or Alaska Native versus non-Hispanic Asian and Hispanic; non-Hispanic Asian versus non-Hispanic Black, Hispanic, non-Hispanic multiracial, and non-Hispanic White; Hispanic versus non-Hispanic multiracial and non-Hispanic White; grade 9 versus grades 11 and 12; grade 10 versus grade 12; grade 11 versus grade 12; heterosexual versus gay, lesbian, or bisexual; gay, lesbian, or bisexual versus other or questioning; and virtual versus hybrid.

[§] Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: female versus male; grade 9 versus grade 12; heterosexual versus gay, lesbian, or bisexual; in-person versus virtual and hybrid; and virtual versus hybrid.

[¶] Among the 33.7% of students who ever used marijuana, synthetic marijuana, cocaine, or other illegal drugs or misused prescription opioids.

** Pairwise *t*-tests indicate significant differences ($p < 0.05$) between the following subgroups of students: non-Hispanic Asian versus non-Hispanic Black, non-Hispanic multiracial, and non-Hispanic White; non-Hispanic Black versus Hispanic; Hispanic versus non-Hispanic multiracial and non-Hispanic White; grade 9 versus grade 12; and virtual versus hybrid.

^{††} Dashes indicate that results are suppressed because $n < 30$.

Although approximately one third of students who had ever drunk alcohol or used drugs reported using these substances more during the pandemic, prevalence of current use of all substances examined was lower than in national surveys conducted before the pandemic (10,11). Although it is unknown whether these decreases are true decreases or a function of differences in survey methods, substance use among youths continues to be a public health concern. Population-based strategies to prevent and reduce youth substance use remain warranted.

Effective prevention of substance use includes strategies that target risk and protective factors at the individual, family, and community levels (<https://addiction.surgeongeneral.gov/sites/default/files/surgeon-generals-report.pdf>). Population-based strategies have been shown to be effective at reducing youth tobacco product use, including increased pricing of tobacco products, tobacco education campaigns directed at youths, comprehensive smoke-free policies, and restricted youth access to flavored tobacco products (https://www.ncbi.nlm.nih.gov/books/NBK179276/pdf/Bookshelf_NBK179276.pdf). As with tobacco, implementation of alcohol prevention strategies, such as increasing prices, regulating sales, and enforcing laws prohibiting sales to minors, can reduce drinking among both adolescents and adults (<https://www.thecommunityguide.org/topic/excessive-alcohol-consumption>). Similarly, enhanced use of existing substance use policies, such as prescription drug monitoring programs and safer prescribing practices, can help reduce opioid misuse (13). In addition, increasing school connectedness can reduce substance use among students (14), although doing so during the pandemic is challenging, which might explain why substance use has increased among certain students. Further, behavioral counseling from health care providers has been demonstrated to be effective in reducing tobacco product use (<https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/tobacco-and-nicotine-use-prevention-in-children-and-adolescents-primary-care-interventions>); however, youths likely had fewer opportunities for such counseling during the pandemic. Finally, although expanding the delivery of prevention programs that focus on broad-based social-emotional learning and life skills (15) and connecting youths to appropriate services (e.g., behavioral health counseling) continue to be critical to preventing youth substance use, youths likely had fewer opportunities to participate in prevention programs and had fewer interactions with health care providers during the pandemic.

Limitations

General limitations for ABES are available in the overview report of this supplement, including that causality or directionality of observed association cannot be determined (8). The findings in this report are subject to at least three specific limitations. First, information about instructional model was provided at the school level rather than the student level. Although students attending virtual-only schools all attended school virtually, and students attending in-person schools all attended school in person, students attending hybrid schools either attended school both in person and virtually or virtually only, making the distinctions between the three groups less certain. Second, other differences between schools using different instructional models, such as location and poverty status, or differences between students in virtual-only versus in-person versus hybrid schools might explain differences in risk behaviors but were not controlled for in analyses. Finally, because alcohol and other drug use are known to increase among adolescents as they age (10), the aging of adolescents during the pandemic might account for the reported increase in use of substances among surveyed students.

Conclusion

High school students reported substance use during the COVID-19 pandemic, with EVPs, alcohol, and marijuana being the most common; certain respondents who used EVPs and alcohol did so on multiple days during the 30 days before the survey. Further, approximately one in three students who had ever used alcohol and other drugs reported using these substances more during the pandemic. Characterizing youth substance use during the pandemic can inform prevention and intervention strategies and public health messaging during and after the pandemic.

Conflicts of Interest

All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

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Mental Health, Suicidality, and Connectedness Among High School Students During the COVID-19 Pandemic — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

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Abstract

Disruptions and consequences related to the COVID-19 pandemic, including school closures, social isolation, family economic hardship, family loss or illness, and reduced access to health care, raise concerns about their effects on the mental health and well-being of youths. This report uses data from the 2021 Adolescent Behaviors and Experiences Survey, an online survey of a probability-based, nationally representative sample of U.S. public- and private-school students in grades 9–12 (N = 7,705), to assess U.S. high school students' mental health and suicidality during the COVID-19 pandemic. The study also examines whether mental health and suicidality are associated with feeling close to persons at school and being virtually connected to others during the pandemic. Overall, 37.1% of students experienced poor mental health during the pandemic, and 31.1% experienced poor mental health during the preceding 30 days. In addition, during the 12 months before the survey, 44.2% experienced persistent feelings of sadness or hopelessness, 19.9% had seriously considered attempting suicide, and 9.0% had attempted suicide. Compared with those who did not feel close to persons at school, students who felt close to persons at school had a significantly lower prevalence of poor mental health during the pandemic (28.4% versus 45.2%) and during the past 30 days (23.5% versus 37.8%), persistent feelings of sadness or hopelessness (35.4% versus 52.9%), having seriously considered attempting suicide (14.0% versus 25.6%), and having attempted suicide (5.8% versus 11.9%). The same pattern was observed among students who were virtually connected to others during the pandemic (i.e., with family, friends, or other groups by using a computer, telephone, or other device) versus those who were not. Comprehensive strategies that improve feelings of connectedness with others in the family, in the community, and at school might foster improved mental health among youths during and after the COVID-19 pandemic.

Introduction

Emerging data suggest that the COVID-19 pandemic has negatively affected the mental health of many children and adolescents (1). Before the pandemic, youth mental health was already an important public health concern (2,3). For example, among high school students nationwide, significant increases occurred between 2009 and 2019 in having persistent feelings of sadness or hopelessness (26.1% to 36.7%), having seriously considered attempting suicide (13.8% to 18.8%), and having attempted suicide (6.3% to 8.9%) (2). For many youths during the pandemic, mental health was affected by school closures, social isolation, family economic hardship, fear of family loss or illness, and reduced access to health care because of inadequate insurance coverage or medical office closures and reduced hours (1). Two longitudinal studies on adolescent mental

health during the pandemic found increases in depression and anxiety over the course of the pandemic (4,5). In one study, these symptoms were predicted by COVID-19–related worries, online learning difficulties, and increased conflict with parents (4). In another study, emergency department visits for suspected suicide were 50.6% higher among girls and 3.7% higher among boys from February through March 2021 than during the same period in 2019 (6). To understand the impact of COVID-19 on youth mental health and to identify potential protective factors, this study examines U.S. high school students' mental health and suicidality during the COVID-19 pandemic, including the relation between mental health and connectedness to school, family, friends, and community groups. Public health and health care professionals, communities, schools, families, and adolescents can use these findings to better understand students' mental health and suicidal thoughts and attempts during the pandemic and how fostering connectedness at school and with others could be one strategy to promote adolescent health and well-being during the pandemic and beyond.

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Methods

Data Source

This report includes data from the Adolescent Behaviors and Experiences Survey (ABES), which was conducted by CDC during January–June 2021 to assess student behaviors and experiences during the COVID-19 pandemic. ABES was a one-time, probability-based online survey of U.S. high school students. ABES used a stratified, three-stage cluster sampling approach to obtain a nationally representative sample of public- and private-school students in grades 9–12 in the 50 U.S. states and the District of Columbia (N = 7,705). Participation in ABES was voluntary; each school and teacher decided whether students completed the survey during instructional time or on their own time. Additional information about ABES sampling, data collection, response rates, and processing is available in the overview report of this supplement (7). The ABES questionnaire, datasets, and documentation are available at <https://www.cdc.gov/healthyyouth/data/abes.htm>.

Measures

This analysis included seven measures: 1) poor mental health during the pandemic, 2) poor mental health during the past 30 days, 3) persistent feelings of sadness or hopelessness during the past 12 months, 4) serious consideration of attempting suicide during the past year, 5) attempted suicide during the past year, 6) feeling close to persons at school (time frame not specified), and 7) being virtually connected to others during the pandemic (Table 1). For the pandemic-related questions, the time frame was not further specified. In addition, the following

demographic characteristics were analyzed: sex, sexual identity (heterosexual; gay, lesbian, or bisexual; or other or questioning), and race and ethnicity (non-Hispanic American Indian or Alaska Native [AI/AN], non-Hispanic Asian [Asian], non-Hispanic Black [Black], Hispanic or Latino [Hispanic], non-Hispanic persons of multiple races [multiracial], non-Hispanic Native Hawaiian or other Pacific Islander, and non-Hispanic White [White]).

Analysis

Weighted prevalence estimates and 95% CIs were calculated for all study variables among students overall and by demographic characteristics. Statistically significant pairwise differences for the study variables by demographic characteristics, and for associations between mental health, suicidality, and connectedness, were determined by *t*-tests for proportions. Analyses were completed using SUDAAN (version 11.0.3; RTI International) to account for the complex survey design and weighting. Differences were considered statistically significant if the *p* value was <0.05. Only significant results are presented in the text.

Results

Poor Mental Health

Approximately one in three high school students experienced poor mental health (most of the time or always) during the COVID-19 pandemic (37.1%) and during the past 30 days (31.1%) (Table 2). During the 12 months before the

TABLE 1. Question and analytic coding for health behaviors and experiences, by variable assessed — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Variable	Question	Analytic coding
Poor mental health during the pandemic	During the COVID-19 pandemic, how often was your mental health not good? (Poor mental health includes stress, anxiety, and depression.)	Always or most of the time versus never, rarely, or sometimes
Poor mental health during the past 30 days	During the past 30 days, how often was your mental health not good? (Poor mental health includes stress, anxiety, and depression.)	Always or most of the time versus never, rarely, or sometimes
Persistent feelings of sadness or hopelessness	During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?	Yes versus no
Seriously considered attempting suicide	During the past 12 months, did you ever seriously consider attempting suicide?	Yes versus no
Attempted suicide	During the past 12 months, how many times did you actually attempt suicide?	≥1 time versus 0 times
Felt close to persons at school	Do you agree or disagree that you feel close to people at your school?	Strongly agree or agree versus not sure, disagree, or strongly disagree
Virtually connected to others during the pandemic	During the COVID-19 pandemic, how often were you able to spend time with family, friends, or other groups, such as clubs or religious groups, by using a computer, phone, or other device? (Do not count attending school online.)	Always, most of the time, or sometimes versus never or rarely

Suicidal Thoughts and Behaviors

During the 12 months before the survey, 19.9% of students had seriously considered attempting suicide, and 9.0% had attempted suicide. The prevalence of having seriously considered attempting suicide and attempting suicide was higher among female students than male students and varied by race and ethnicity. The prevalence of having seriously considered attempting suicide was higher among White students than Black or Asian students and higher among multiracial students than Black students. The prevalence of having attempted suicide was higher among AI/AN students than White, Black, Hispanic, or Asian students. The prevalence of having seriously considered attempting suicide and attempted suicide was highest among gay, lesbian, or bisexual students, followed by other or questioning students. Heterosexual students had the lowest prevalence.

survey, 44.2% experienced persistent feelings of sadness or hopelessness; that is, had ever felt so sad or hopeless almost every day for two weeks or more in a row that they stopped doing some usual activities.

The prevalence of poor mental health during the pandemic, poor mental health during the past 30 days and persistent feelings of sadness or hopelessness were higher among female than male students (Table 2). Although differences by race and ethnicity were detected for each of these three variables, no consistent patterns were found. The prevalence of poor mental health during the pandemic was higher among gay, lesbian, or bisexual students and other or questioning students than among heterosexual students. The prevalence of poor mental health during the past 30 days and of persistent feelings of sadness or hopelessness was highest among gay, lesbian, or bisexual students, followed by other or questioning students. Heterosexual students had the lowest prevalence.

TABLE 2. Percentage of students with poor mental health, persistent feelings of sadness or hopelessness, suicidal thoughts and attempts, and who experienced connectedness,* by demographic characteristics — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	Poor mental health during the pandemic	Poor mental health during the past 30 days	Persistent feelings of sadness or hopelessness	Seriously considered attempting suicide	Attempted suicide	Felt close to persons at school	Virtually connected to others during the pandemic
	% (95% CI) [†]	% (95% CI) [†]	% (95% CI) [†]	% (95% CI) [†]	% (95% CI) [†]	% (95% CI) [†]	% (95% CI) [†]
Sex							
Female	48.9 [§] (45.6–52.3)	41.6 [§] (38.4–44.9)	56.5 [§] (53.4–59.5)	26.0 [§] (23.4–28.6)	12.4 [§] (10.5–14.5)	40.8 [§] (36.8–44.8)	71.8 (69.7–73.8)
Male	24.4 (22.3–26.7)	19.6 (17.6–21.8)	31.4 (29.1–33.7)	13.6 (12.0–15.4)	5.3 (4.2–6.6)	53.0 (50.7–55.4)	71.7 (69.4–74.0)
Race and ethnicity							
AI/AN, non-Hispanic	23.3 ^{¶,***,††} (15.8–33.0)	20.5 (9.0–40.2)	49.5 ^{¶¶,***} (42.2–56.9)	23.3 (15.6–33.5)	20.1 ^{¶,††,¶¶,***} (12.4–30.9)	50.9 ^{***} (39.4–62.3)	70.6 (46.0–87.1)
Asian, non-Hispanic	33.7 (27.5–40.5)	29.1 (23.7–35.1)	40.2 ^{**} (34.4–46.3)	15.9 ^{††} (12.6–19.9)	7.4 (4.9–11.0)	44.3 ^{††,***} (38.2–50.6)	73.4 (67.1–78.9)
Black, non-Hispanic	28.0 ^{¶,***,††} (23.3–33.2)	25.6 ^{¶,***,††} (22.0–29.5)	39.7 ^{¶,***} (35.9–43.6)	16.2 ^{**††} (13.0–20.0)	10.0 (7.7–12.9)	33.5 ^{¶,***,††} (29.1–38.2)	68.9 ^{††} (65.3–72.3)
Hispanic or Latino	36.8 (33.2–40.6)	31.1 (27.9–34.6)	46.4 (42.1–50.8)	19.7 (16.9–22.7)	8.4 (6.5–10.7)	41.6 ^{**††} (37.1–46.2)	67.2 ^{††} (63.7–70.5)
Multiracial, non-Hispanic	40.0 (32.8–47.7)	32.5 (27.0–38.5)	51.0 ^{††} (44.5–57.4)	25.6 (18.1–34.8)	12.3 (8.0–18.5)	50.8 (43.8–57.8)	68.7 (61.6–75.1)
NH/OPI, non-Hispanic	— ^{§§}	—	45.8 (19.2–75.0)	12.4 (3.3–36.5)	—	—	—
White, non-Hispanic	40.1 (37.4–42.9)	32.8 (29.6–36.2)	43.8 (40.3–47.2)	21.0 (18.6–23.6)	8.9 (7.1–11.0)	52.3 (49.5–55.1)	75.1 (73.2–76.9)
Sexual identity							
Heterosexual	30.3 (27.6–33.2)	25.5 (22.5–28.8)	36.7 (34.1–39.4)	13.6 (11.7–15.8)	5.2 (4.2–6.5)	50.1 (47.1–53.1)	72.7 (70.8–74.5)
Gay, lesbian, or bisexual	63.8 ^{†††} (58.5–68.8)	54.9 ^{†††,§§§} (49.5–60.2)	75.7 ^{†††,§§§} (70.9–79.9)	46.8 ^{†††,§§§} (41.5–52.2)	26.3 ^{†††,§§§} (21.8–31.4)	36.8 ^{†††} (32.2–41.6)	69.9 (65.1–74.2)
Other or questioning	61.5 ^{†††} (54.6–67.9)	45.7 ^{†††} (40.5–50.9)	68.7 ^{†††} (63.6–73.4)	39.5 ^{†††} (34.6–44.7)	16.5 ^{†††} (11.8–22.7)	33.6 ^{†††} (29.1–38.4)	69.6 (65.6–73.3)
Total	37.1 (34.6–39.6)	31.1 (28.5–33.7)	44.2 (41.6–46.8)	19.9 (18.0–22.0)	9.0 (7.7–10.5)	46.6 (44.1–49.2)	71.8 (70.2–73.3)

Abbreviations: AI/AN = American Indian or Alaska Native; NH/OPI = Native Hawaiian or other Pacific Islander.

* Refer to Table 1 for variable definitions.

[†] All percentages are weighted.

[§] Significantly different from male students, based on *t*-test analysis (*p*<0.05).

[¶] Significantly different from Hispanic students, based on *t*-test analysis (*p*<0.05).

^{**} Significantly different from non-Hispanic multiracial students, based on *t*-test analysis (*p*<0.05).

^{††} Significantly different from non-Hispanic White students, based on *t*-test analysis (*p*<0.05).

^{§§} Results suppressed because *n*<30.

^{¶¶} Significantly different from non-Hispanic Asian students, based on *t*-test analysis (*p*<0.05).

^{***} Significantly different from non-Hispanic Black students, based on *t*-test analysis (*p*<0.05).

^{†††} Significantly different from heterosexual students, based on *t*-test analysis (*p*<0.05).

^{§§§} Significantly different from other or questioning students based on *t*-test analysis (*p*<0.05).

Connectedness

At the time of the survey, 46.6% of students strongly agreed or agreed that they felt close to persons at school. In contrast, 71.8% of students sometimes, most of the time, or always spent time virtually (i.e., by using a computer, telephone, or other device) with family, friends, or others during the pandemic. The prevalence of feeling close to persons at school was higher among male students than female students. Being virtually connected to others during the pandemic did not vary by sex. The prevalence of feeling close to persons at school and being virtually connected to others varied by race and ethnicity. The prevalence of feeling close to persons at school was higher among White students than Black, Hispanic, and Asian students; higher among Hispanic, Asian, AI/AN, and multiracial students than Black students; and higher among multiracial students than Hispanic students. The prevalence of being virtually connected to others was higher among White students than Black and Hispanic students. The prevalence of feeling close to persons at school was higher among heterosexual students than gay, lesbian, or bisexual students and other or questioning students; however, being virtually connected to others during the pandemic did not vary by sexual identity.

Connectedness and Mental Health

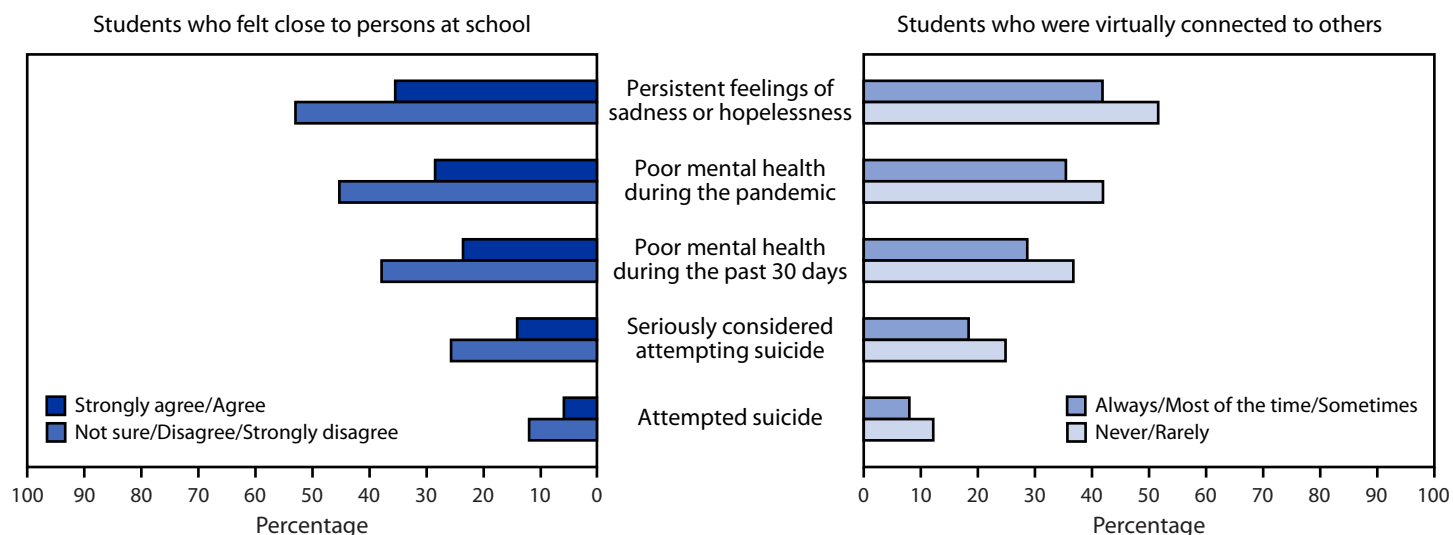
Compared with those who did not feel close to persons at school, students who felt close to persons at school had a lower prevalence of poor mental health during the pandemic (28.4% versus 45.2%) and during the past 30 days

(23.5% versus 37.8%), of persistent feelings of sadness or hopelessness (35.4% versus 52.9%), of having seriously considered attempting suicide (14.0% versus 25.6%), and of having attempted suicide (5.8% versus 11.9%) (Figure). Similarly, students who were virtually connected to others during the pandemic had a lower prevalence of poor mental health during the pandemic (35.5% versus 42.0%) and during the past 30 days (28.7% versus 36.8%), of persistent feelings of sadness or hopelessness (41.9% versus 51.7%), of having seriously considered attempting suicide (18.4 versus 24.9%), and of having attempted suicide (8.0% versus 12.2%) compared with those who were not virtually connected to others during the pandemic.

Discussion

More than one in three high school students (37.1%) experienced poor mental health during the COVID-19 pandemic. In addition, 44.2% of students experienced persistent feelings of sadness or hopelessness, almost 20% seriously considered suicide, and 9.0% attempted suicide during the 12 months before the survey. The prevalence of poor mental health and suicidality was high across students of all sex, sexual identity, and racial and ethnic groups; however, poor mental health, persistent feelings of sadness or hopelessness, and suicidal thoughts and behaviors were less prevalent among those who felt close to persons at school and were virtually connected with others during the pandemic.

FIGURE. Persistent feelings of sadness or hopelessness, perceptions of mental health, and suicidal thoughts and attempts among high school students during the COVID-19 pandemic, by feeling close to persons at school* and being virtually connected† — Adolescent Behaviors and Experiences Survey, United States, January–June 2021



* All comparisons of having felt close versus not sure, disagree, or strongly disagree they felt close were significantly different, based on *t*-test analysis ($p < 0.05$).

† All comparisons of being connected versus never or rarely felt connected were significantly different, based on *t*-test analysis ($p < 0.05$).

During the COVID-19 pandemic, students' feelings of being connected to school were likely reduced by extensive school closures and transitions to virtual learning (8). Efforts to improve connectedness to schools, peers, and family are critical to protecting the mental health and well-being of youths (9), particularly in the context of ongoing pandemic-related stressors. Evidence from previous outbreaks suggests that the pandemic might have long-term consequences for youth mental health and well-being and be associated with potential increases in youth depression, anxiety, and post-traumatic stress disorder, which underscores the urgent need to address mental health needs among youths (10).

In addition to providing youths with access to needed mental health care (11), comprehensive approaches that promote help-seeking behaviors, connections to trusted adults and supportive peers, and engagement in community activities have been shown to have many benefits including improved feelings of connectedness, better mental health, reduced risk for suicide, reduced prevalence of health risk behaviors, and better academic achievement (9,12). Positive experiences during childhood, including school connectedness, can build resilience and protect or buffer adults who have experienced multiple childhood traumas (13).

To foster school connectedness and promote positive school climates, school districts can implement schoolwide programs such as those focused on social and emotional learning, professional development for staff to improve classroom management, and strategies to foster relationships between students, their families, and school staff. Another way to foster school connectedness and promote positive school climates is for school districts to analyze school disciplinary policies to ensure they are being implemented equitably across racial and ethnic groups (9,14,15). In addition to engaging with their child's school, parents and caregivers can build relationships with their child through open discussions and shared activities (15).

Limitations

General limitations to ABES are outlined in the overview report in this supplement (7). The findings in this report are subject to at least four specific limitations. First, the mental health and suicidality variables used in this study are important indicators of students' mental well-being; however, the questions were not designed to diagnose clinical depression. Second, most students were virtually connected to others, such as family, friends, or other groups, during the pandemic. Among students who were never or rarely virtually connected, it is unknown if that was a function of more in-person interactions; individual choice; a lack of family, friends, or

other groups with whom students could be connected; or a lack of access to the technology needed by the student or others with whom the student would connect. Third, the survey did not ask students to indicate whether, at the time of the survey or in weeks or months preceding the survey, they attended school in person, remotely, or both in person and remotely. Students' method of attendance might be a confounder for the findings related to students' feeling of connectedness. Finally, because this was a one-time survey, no longitudinal data from studies using the same data collection methods are available to directly compare pre- and postpandemic mental health status among youths.

Conclusion

Mental health issues among youths are an important public health concern during the ongoing COVID-19 pandemic. However, the findings in this report also indicate that poor mental health, persistent feelings of sadness or hopelessness, and suicidal thoughts and behaviors were less prevalent among those who felt close to persons at school and were virtually connected with others during the pandemic. Comprehensive strategies that improve connections with others at home, in the community, and at school might foster improved mental health among youths during and after the pandemic.

Conflicts of Interest

All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

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Perceived Racism and Demographic, Mental Health, and Behavioral Characteristics Among High School Students During the COVID-19 Pandemic — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

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Abstract

Perceived racism in school (i.e., a student's report of being treated badly or unfairly because of their race or ethnicity) is an important yet understudied determinant of adolescent health and well-being. Knowing how perceived racism influences adolescent health can help reduce health inequities. CDC's 2021 Adolescent Behaviors and Experiences Survey (ABES), an online survey of a probability-based, nationally representative sample of U.S. public- and private-school students in grades 9–12 (N = 7,705), was conducted during January–June 2021 to assess student behaviors during the COVID-19 pandemic. CDC analyzed data from ABES to measure perceived racism and the extent to which perceptions of racism are associated with demographic, mental health, and behavioral characteristics. Mental health and behavioral characteristics analyzed included mental health status; virtual connection with others outside of school; serious difficulty concentrating, remembering, or making decisions; and feeling close to persons at school. Demographic characteristics analyzed included sex, race and ethnicity, and grade. Prevalence of perceived racism and associations between perceived racism and demographic, mental health, and behavioral characteristics are reported overall and stratified by race and ethnicity. Approximately one third (35.6%) of U.S. high school students reported perceived racism. Perceived racism was highest among Asian (63.9%), Black (55.2%), and multiracial students (54.5%). Students who reported perceived racism had higher prevalences of poor mental health (38.1%); difficulty concentrating, remembering, or making decisions (44.1%); and not feeling close to persons at school (40.7%). Perceived racism was higher among those students who reported poor mental health than those who did not report poor mental health during the pandemic among Asian (67.9% versus 40.5%), Black (62.1% versus 38.5%), Hispanic (45.7% and 22.9%), and White students (24.5% versus 12.7%). A better understanding of how negative health outcomes are associated with student experiences of racism can guide training for staff and students to promote cultural awareness and antiracist and inclusivity interventions, which are critical for promoting safe school environments for all students.

Introduction

Racism, defined as “a system of structuring opportunity and assigning value based on the social interpretation of how one looks (i.e., race) that unfairly disadvantages some individuals and communities, unfairly advantages other individuals and communities, and saps the strength of the whole society through the waste of human resources,” (1) is a critical social determinant of health and a key driver of systemic inequities in health outcomes (1,2). Racism influences the health and

well-being of racial and ethnic minority persons and families throughout the lifespan and contributes to racial and ethnic disparities in health outcomes (2,3). Self-reported or perceived racial discrimination among adults is associated with poor mental health, high-risk behaviors (e.g., substance use and misuse), physical health conditions (e.g., hypertension and cardiovascular disorders), and other adverse health outcomes (3). Although less is known about perceptions of racial discrimination among children and adolescents (4,5), a growing body of research describes associations between racial discrimination and health outcomes for youths. Experiences of racial discrimination are associated with poor mental health (e.g., anxiety, depression, and low self-esteem), health risk behaviors, reduced social and adaptive functioning, and delinquent behaviors among

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youths (6,7). Racial discrimination in educational settings contributes to racial disparities in academic achievement and educational attainment, which are important markers for long-term health outcomes (7).

Understanding experiences of racism and racial discrimination among adolescents and how those experiences influence health is important to promote equitable health outcomes for racial and ethnic minority youths. To understand the effects of racism on health, well-defined, consistent definitions and reliable measures of racial discrimination are critical (6). To date, few measures have been designed to assess perceived racial discrimination among child and adolescent populations (5).

Throughout the COVID-19 pandemic, communities of color have been disproportionately affected by severe outcomes of COVID-19 (e.g., hospitalizations, intensive-care admissions, or in-hospital deaths) and limited access to quality health care (8). Structural racism, a central pathway through which racism influences health (3), is associated with inequities in COVID-19 morbidity, hospitalization, and mortality (8). Less is understood about adolescent perceptions of racism and its consequences during the COVID-19 pandemic. Perceived racism in school is an important yet understudied determinant of adolescent health and well-being, and knowing how perceived racism influences adolescent health can help reduce health inequities. In spring 2021, CDC implemented the Adolescent Behaviors and Experiences Survey (ABES) to assess student behaviors during the pandemic. ABES, a nationally representative sample of high school students, included a single-item measure of perceived racism. Using ABES data, this report examines perceived racism and the extent to which perceptions of racism are associated with behavioral health outcomes among adolescents. The findings in this report can help inform the

development of school staff trainings and interventions to support the health and well-being of all students.

Methods

Data Source

Data from the ABES conducted by CDC during January–June 2021 were used to assess student behaviors during the COVID-19 pandemic. ABES was a one-time, probability-based online survey of U.S. high school students. ABES used a stratified, three-stage cluster sampling approach to obtain a nationally representative sample of public- and private-school students in grades 9–12 in the 50 U.S. states and the District of Columbia (N = 7,705). Participation in ABES was voluntary; each school and teacher decided whether students completed the survey during instructional time or on their own time. Additional information about ABES sampling, data collection, response rates, and processing is available in the overview report of this supplement (9). The ABES questionnaire, datasets, and documentation are available at <https://www.cdc.gov/healthyyouth/data/abes.htm>.

Measures

Self-reported measures of lifetime perceived racism at school and four mental health and behavioral characteristics were included in this analysis (Table 1). Mental health and behavioral characteristics included mental health status during the COVID-19 pandemic; virtual connection with family, friends, and other groups outside of school; difficulty concentrating, remembering, or making decisions; and feeling close to persons

TABLE 1. Variables, questions, response options, and analytic coding for perceived racism and behavioral characteristics — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Variable	Question	Response option	Analytic coding
Perceived racism*	During your life, how often have you felt that you were treated badly or unfairly in school because of your race or ethnicity?	Never, rarely, sometimes, most of the time, always	Never versus ever (rarely, sometimes, most of the time, always)
Poor mental health during the COVID-19 pandemic	During the COVID-19 pandemic, how often was your mental health not good? (Poor mental health included stress, anxiety, and depression.)	Never, rarely, sometimes, most of the time, always	Never versus ever (rarely, sometimes, most of the time, always)
Virtual connection with family, friends, or other groups outside of school during the COVID-19 pandemic	During the COVID-19 pandemic, how often were you able to spend time with family, friends, or other groups, such as clubs or religious groups, by using a computer, phone, or other device? (Do not count attending school online.)	Never, rarely, sometimes, most of the time, always	Never versus ever (rarely, sometimes, most of the time, always)
Serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional problem	Because of a physical, mental, or emotional problem, do you have serious difficulty concentrating, remembering, or making decisions?	Yes, no	Yes versus no
Feel close to persons at your school	Do you agree or disagree that you feel close to people at your school?	Strongly agree, agree, not sure, disagree, strongly disagree	Yes (strongly agree, agree) versus no (not sure, disagree, strongly disagree)

* See Supplementary Table at <https://stacks.cdc.gov/view/cdc/115178> for full distribution of the perceived racism variable. The question was derived from the Perceptions of Racism in Children and Youth (PRaCY) scale.

at school. Demographic characteristics included sex, race and ethnicity (non-Hispanic American Indian or Alaska Native [AI/AN], non-Hispanic Asian [Asian], non-Hispanic Black [Black], Hispanic or Latino [Hispanic], non-Hispanic persons of multiple races [multiracial], non-Hispanic Native Hawaiian or other Pacific Islander [NH/OPI], and non-Hispanic White [White]), and grade (9, 10, 11, or 12).

Analysis

Weighted prevalence estimates and 95% CIs for perceived racism (students who reported they were treated badly or unfairly in school because of their race or ethnicity over their lifetime) were calculated overall and by sex, race and ethnicity, grade, mental health, and behavioral characteristics (Table 2). Prevalence estimates and 95% CIs for associations between perceived racism and demographic, mental health, and behavioral characteristics also were calculated stratified by sex and race and ethnicity (Tables 3 and 4). Estimates were suppressed when $n < 30$; consequently, NH/OPI students were only included in Table 2. Statistically significant differences in perceived racism by demographic and behavioral characteristics were determined using a two-sided chi-square test at the p value < 0.05 level. Pairwise differences in perceived racism for grade were calculated by race and ethnicity and considered statistically significant if the t -test p value was < 0.05 . Analyses were completed using SUDAAN (version 11.0.1; RTI International) to account for the complex survey design and weighting.

Results

During January–June 2021, approximately one third (35.6%) of all high school students reported they were “ever” treated badly or unfairly in school because of their race or ethnicity during their lifetime (i.e., perceived racism). Analyses indicated significant differences in student reports of perceived racism across racial and ethnic populations and behavioral characteristics (Table 2). Perceived racism was highest among Asian students (63.9%), followed by Black (55.2%) and multiracial students (54.5%). Prevalence of perceived racism for Asian, Black, NH/OPI, Hispanic, and multiracial students was higher than perceived racism for White (22.5%) and AI/AN students (26.7%). Higher prevalences of perceived racism were reported among students with poor mental health (38.1% versus 23.6%); those with difficulty concentrating, remembering, or making decisions (44.1% versus 28.6%); and those that did not feel close to persons at their school (40.7% versus 29.6%). When stratified by student report of virtual connection with family, friends, and other groups outside of school, no significant difference in perceived racism was found.

When stratified by race and ethnicity, reports of perceived racism varied by sex for Hispanic students (females: 47.3%; males: 35.0%) and White students (males: 25.0%; females: 19.9%), yet patterns were not consistent across groups (Table 3).

Differences in mental health and behavioral characteristics by student report of perceived racism also were observed when stratified by race and ethnicity (Table 4). Perceived racism was higher among students who reported their mental health during the pandemic was not good compared with those with no reported mental health concerns during the pandemic and among Asian (67.9% versus 40.5%), Black (62.1% versus

TABLE 2. Percentage of high school students who reported experiencing perceived racism during their life* — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	% [†] (95% CI)	p value [§]
Sex		0.29
Male	34.6 (31.1–38.3)	
Female	36.5 (32.4–40.8)	
Race and ethnicity		0.00
American Indian or Alaska Native, non-Hispanic	26.7 (18.9–36.3)	
Asian, non-Hispanic ^{¶, **}	63.9 (54.0–72.7)	
Black, non-Hispanic ^{¶, **}	55.2 (50.2–60.1)	
Hispanic or Latino [¶]	41.5 (36.2–47.0)	
Multiracial, non-Hispanic ^{¶, **}	54.5 (44.9–63.8)	
Native Hawaiian or other Pacific Islander, non-Hispanic [¶]	48.5 (32.2–65.2)	
White, non-Hispanic	22.5 (20.0–25.2)	
Grade^{††}		0.55
9	36.8 (32.0–41.9)	
10	34.0 (30.4–37.7)	
11	35.0 (30.7–39.4)	
12	36.6 (31.9–41.5)	
Poor mental health during the COVID-19 pandemic^{§§}		0.00
Ever (always, most of the time, sometimes, rarely)	38.1 (34.6–41.7)	
Never	23.6 (19.9–27.7)	
Virtual connection with family, friends, or other groups outside of school during the COVID-19 pandemic^{§§}		0.94
Never	35.7 (30.4–41.5)	
Ever (always, most of the time, sometimes, rarely)	35.5 (32.1–39.2)	
Serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional problem^{§§}		0.00
Yes	44.1 (39.6–48.7)	
No	28.6 (25.4–32.0)	
Feel close to persons at your school^{§§}		0.00
No (not sure, disagree, strongly disagree)	40.7 (36.9–44.7)	
Yes (strongly agree, agree)	29.6 (25.9–33.6)	
Total	35.6 (32.2–39.2)	NA

Abbreviation: NA = not applicable.

* On the basis of the answer (“never” versus “ever” [rarely, sometimes, most of the time, always]) to the survey question, “During your life, how often have you felt that you were treated badly or unfairly in school because of your race or ethnicity?”

[†] Estimates are weighted.

[§] Statistical significance defined as $p < 0.05$, by chi-square test.

[¶] Pairwise t -test significantly different from non-Hispanic American Indian or Alaska Native and non-Hispanic White students ($p < 0.05$).

^{**} Pairwise t -test significantly different from Hispanic or Latino students ($p < 0.05$).

^{††} No significant pairwise differences ($p < 0.05$).

^{§§} See Table 1 for variable definition.

38.5%), Hispanic (45.7% versus 22.9%), and White students (24.5% versus 12.7%). Perceived racism was lower for Black students who reported not having virtual connection with family, friends, and other groups during the COVID-19 pandemic compared with those who did (32.2% versus 58.4%).

Perceived racism was higher among students who reported difficulty concentrating, remembering, or making decisions compared with those who did not: multiracial (68.7% versus 41.2%), Black (66.9% versus 47.5%), Hispanic (52.9% versus 30.8%), and White students (28.4% versus 18.5%). Finally,

TABLE 3. Percentage of high school students who reported experiencing perceived racism during their life,* by sex, grade, and self-reported race and ethnicity — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	American Indian or Alaska Native, non-Hispanic	Asian, non-Hispanic	Black, non-Hispanic	Hispanic or Latino	Multiracial, non-Hispanic	White, non-Hispanic
	%† (95% CI)	%† (95% CI)	%† (95% CI)	%† (95% CI)	%† (95% CI)	%† (95% CI)
Sex[§]						
Male	29.7 (21.9–39.0)	62.5 (54.1–70.1)	52.2 (44.9–59.3)	35.0 (29.7–40.6)	54.5 (44.1–64.5)	25.0 (21.7–28.8)
Female	23.6 (10.8–44.0)	65.7 (48.8–79.4)	58.1 (49.7–66.0)	47.3 (41.4–53.4)	54.7 (44.0–65.0)	19.9 (16.9–23.2)
Grade[¶]						
9	—**	57.7 (41.6–72.4)	56.1 (48.5–63.4)	43.8 (36.6–51.2)	45.8 (32.1–60.1)	24.7 (20.6–29.4)
10	—	66.8 (56.4–75.7)	47.9 (37.8–58.2)	36.7 (29.8–44.2)	61.8 (51.6–71.0)	22.0 (18.3–26.3)
11	—	54.3 (35.0–72.4)	56.2 (44.3–67.4)	43.9 (35.3–52.9)	48.5 (36.0–61.1)	21.4 (18.0–25.3)
12	—	75.7 (66.3–83.1)	60.5 (49.7–70.3)	40.9 (34.8–47.4)	58.8 (39.9–75.3)	21.7 (18.0–25.9)
Total	26.7 (18.9–36.3)	63.9 (54.0–72.7)	55.2 (50.2–60.1)	41.5 (36.2–47.0)	54.5 (44.9–63.8)	22.5 (20.0–25.2)

* On the basis of the answer (“never” versus “ever” [rarely, sometimes, most of the time, always]) to the survey question, “During your life, how often have you felt that you were treated badly or unfairly in school because of your race or ethnicity?”

† Estimates are weighted.

§ Chi-square test indicate significant difference (p<0.05) among the following subgroups of students: Hispanic or Latino males versus females; non-Hispanic White males versus females.

¶ No significant pairwise differences in grade across racial and ethnic populations (p>0.05).

** Dashes indicate that results are suppressed because n<30.

TABLE 4. Percentage of high school students who reported experiencing perceived racism during their life,* by selected behavioral characteristics and self-reported race and ethnicity — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	American Indian or Alaska Native, non-Hispanic	Asian, non-Hispanic	Black, non-Hispanic	Hispanic or Latino	Multiracial, non-Hispanic	White, non-Hispanic
	%† (95% CI)	%† (95% CI)	%† (95% CI)	%† (95% CI)	%† (95% CI)	%† (95% CI)
Poor mental health during the COVID-19 pandemic^{§,¶}						
Ever (always, most of the time, sometimes, rarely)	27.6 (16.2–43.0)	67.9 (56.1–77.8)	62.1 (55.4–68.3)	45.7 (38.5–53.1)	55.2 (45.2–64.7)	24.5 (22.1–27.1)
Never	—**	40.5 (30.2–51.7)	38.5 (30.3–47.3)	22.9 (17.4–29.5)	41.7 (26.6–58.4)	12.7 (9.3–17.0)
Virtual connection with family, friends, or other groups outside of school during the COVID-19 pandemic^{¶,††}						
Never	—	79.1 (45.4–94.5)	32.2 (23.1–43.0)	41.1 (30.7–52.4)	62.0 (36.2–82.4)	26.1 (19.8–33.6)
Ever (always, most of the time, sometimes, rarely)	31.3 (21.2–43.7)	62.8 (52.7–71.9)	58.4 (52.8–63.7)	41.5 (36.3–46.8)	52.8 (43.6–61.8)	22.6 (19.9–25.5)
Serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional problem^{¶,§§}						
Yes	39.5 (25.6–55.4)	71.6 (61.3–80.0)	66.9 (59.5–73.5)	52.9 (44.2–61.5)	68.7 (54.3–80.3)	28.4 (25.0–32.1)
No	18.1 (11.7–26.8)	55.9 (43.1–68.0)	47.5 (41.9–53.2)	30.8 (26.1–36.0)	41.2 (31.0–52.1)	18.5 (15.5–21.8)
Feel close to persons at your school^{¶,¶¶}						
No (not sure, disagree, strongly disagree)	26.6 (17.9–37.7)	68.8 (59.0–77.2)	57.0 (51.0–62.8)	45.3 (38.9–51.9)	62.8 (51.4–72.8)	26.5 (23.5–29.8)
Yes (strongly agree, agree)	31.5 (18.7–48.0)	56.0 (42.4–68.8)	51.7 (43.9–59.3)	36.4 (29.2–44.2)	45.3 (34.9–56.1)	19.4 (16.2–23.1)

* On the basis of the answer (“never” versus “ever” [rarely, sometimes, most of the time, always]) to the survey question, “During your life, how often have you felt that you were treated badly or unfairly in school because of your race or ethnicity?”

† Estimates are weighted.

§ Chi-square test indicates significant difference (p<0.05) among the following subgroups of students: non-Hispanic Asian, non-Hispanic Black, Hispanic or Latino, and non-Hispanic White.

¶ See Table 1 for variable definition.

** Dashes indicate that results are suppressed because n<30.

†† Chi-square test indicates significant difference (p<0.05) among non-Hispanic Black students.

§§ Chi-square test indicates significant difference (p<0.05) among the following subgroups of students: non-Hispanic Black, Hispanic or Latino, non-Hispanic multiracial, and non-Hispanic White.

¶¶ Chi-square test indicates significant difference (p<0.05) among the following subgroups of students: non-Hispanic multiracial and non-Hispanic White.

perceived racism was higher among students who reported they did not feel close to persons at their school compared with those who did: multiracial (62.8% versus 45.3%) and White (26.5% versus 19.4%).

Discussion

Approximately one in three high school students reported perceived racism during their lifetime, including two thirds of Asian and more than half of Black and multiracial students. Student perceptions of racism were associated with poor mental health; difficulty concentrating, remembering, or making decisions; and a lack of connection with persons at school during the COVID-19 pandemic.

These findings are consistent with other studies on racism and health inequities during the COVID-19 pandemic. The pandemic contributed to increased racism against Asian communities; anti-Asian sentiment (including racist names) stemmed from origination theories of SARS-CoV-2, the virus that causes COVID-19 (10). From March 2020 to February 2021, a period covering ABES data collection, COVID-19 hospitalization rates were consistently higher among Black, Hispanic, and AI/AN populations than among White populations (8). In addition to COVID-19, events in 2020, such as the killings of Ahmaud Arbery and George Floyd and the Black Lives Matter movement, highlighted the increased racial tension, systemic racism, and structural racism experienced by Black Americans (11,12).

In contrast, White and AI/AN students had the lowest levels of perceived racism among all student populations. In addition, an association was observed between students' perceived racism and mental health. All racial and ethnic populations that reported poor mental health also reported a higher prevalence of perceived racism compared with AI/AN students. This finding was unexpected, considering prior research demonstrated widespread personal experiences of discrimination among indigenous populations (13).

Although lower than most other racial and ethnic populations, approximately one fourth of White students reported perceived racism. Associations between perceived racism and behavioral characteristics for White students were similar to other racial and ethnic populations. Perceived racism was higher among White students with poor mental health; difficulty concentrating, remembering, or making decisions; and a lack of connection with persons at their school. These findings might be linked to White students who experience status hierarchy threat, described as when racial progress by minority populations is associated with an increase in perception of discrimination against White persons (14,15).

Finally, the finding that Black students reported less perceived racism when they did not have virtual connection with family, friends, or other groups outside of school is counterintuitive and hard to explain. More research is needed on how the influence of social media and virtual connection with other groups (e.g., friends) outside of school might not be uniformly supportive or health promoting for all students and that the lack thereof might be protective.

Limitations

General limitations for the ABES are available in the overview report of this supplement, including that causality or directionality of observed associations cannot be determined (9). The findings in this report are subject to three specific limitations. First, many of the ABES behavioral questions were asked within the context of the pandemic, and experiences associated with perceived racism might have occurred outside of the period of the pandemic. Because these data are cross-sectional, the extent to which events during the pandemic contributed to lifetime perceived racism at school among students cannot be determined. Second, the single-item, largely interpersonal measure of perceived racism used in this study might not account for the complexity of all racial and ethnic populations' cultural and structural experiences of racism. In addition, structuring of the response options for several questions might have introduced bias into the study results. Finally, school environment was not accounted for in this analysis. School-level demographic characteristics (e.g., geographic region, racial and ethnic composition of school student body, and socioeconomic status) might have influenced study findings.

Future Directions

Clear steps to promote awareness of and mitigate racism in schools are critical because of the associations between negative mental health and behavioral characteristics with perceived racism among adolescents. Although there are benefits to school-based antiracism interventions, these actions are rarely implemented in schools because of multiple factors, including political and social variables (16). This analysis also points to the importance of a more in-depth examination of the AI/AN student population's low levels of perceived racism. Lessons learned from this group might be applied to other racial and ethnic student populations to help reduce racism and perceptions of racism. Future quantitative research should include a more in-depth examination of factors moderating associations between perceived racism and health behaviors

among adolescents, explore the intersection of perceived racism and behavioral health outcomes for youths with multiple marginalized identities (e.g., sexual minority youths and youths with disabilities), review the intersections of race and ethnicity and sex, and explore longitudinal and cohort studies to understand the causality of racism and poor health outcomes.

Conclusion

The ABES nationally representative findings demonstrate that at least half of Asian, Black, and multiracial U.S. high school students reported experiencing racism during their life. Notably, perceived racism was reported by students belonging to all racial and ethnic groups, with higher prevalence among students who reported poor mental health during the COVID-19 pandemic, not feeling close to persons at school, and difficulty concentrating, remembering, or making decisions than those who did not report such mental health and behavioral characteristics. Collectively, these findings are similar to other research that describes an association of discrimination and inequity and poor health outcomes (3). A better understanding of how negative health outcomes are associated with student experiences of racism can guide training for staff and students to promote cultural awareness and antiracist and inclusivity interventions, which are critical for promoting safe school environments for all students.

Conflicts of Interest

All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

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Disruptions to School and Home Life Among High School Students During the COVID-19 Pandemic — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

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Abstract

Youths have experienced disruptions to school and home life since the COVID-19 pandemic began in March 2020. During January–June 2021, CDC conducted the Adolescent Behaviors and Experiences Survey (ABES), an online survey of a probability-based, nationally representative sample of U.S. public- and private-school students in grades 9–12 (N = 7,705). ABES data were used to estimate the prevalence of disruptions and adverse experiences during the pandemic, including parental and personal job loss, homelessness, hunger, emotional or physical abuse by a parent or other adult at home, receipt of telemedicine, and difficulty completing schoolwork. Prevalence estimates are presented for all students and by sex, race and ethnicity, grade, sexual identity, and difficulty completing schoolwork. Since the beginning of the pandemic, more than half of students found it more difficult to complete their schoolwork (66%) and experienced emotional abuse by a parent or other adult in their home (55%). Prevalence of emotional and physical abuse by a parent or other adult in the home was highest among students who identified as gay, lesbian, or bisexual (74% physical abuse and 20% emotional abuse) and those who identified as other or questioning (76% and 13%) compared with students who identified as heterosexual (50% and 10%). Overall, students experienced insecurity via parental job loss (29%), personal job loss (22%), and hunger (24%). Disparities by sex and by race and ethnicity also were noted. Understanding health disparities and student disruptions and adverse experiences as interconnected problems can inform school and community initiatives that promote adolescent health and well-being. With community support to provide coordinated, cross-sector programming, schools can facilitate linkages to services that help students address the adverse experiences that they faced during the ongoing COVID-19 pandemic. Public health and health care professionals, communities, schools, families, and adolescents can use these findings to better understand how students' lives have been affected during the pandemic and what challenges need to be addressed to promote adolescent health and well-being during and after the pandemic.

Introduction

Youths have experienced disruptions to school and home life since the COVID-19 pandemic began in March 2020 (1). The COVID-19 pandemic has disrupted the lives of adolescents by creating or exacerbating economic, food and nutrition, and housing insecurity as well as experiences of abuse, all of which negatively affect health and well-being (2,3). Racial and ethnic discrimination is a social determinant of health (4), and existing health disparities persisted or worsened during the pandemic. For example, American Indian or Alaska Native, Black, and Hispanic or Latino populations typically experienced higher

rates of morbidity and mortality and economic vulnerability compared with the White population before the pandemic and also were more likely than the White population to experience morbidity and mortality from COVID-19 and economic vulnerability during the pandemic (5). Adolescents experienced disruptions to education and accessing health care, although schools and health care providers shifted rapidly to virtual platforms and telemedicine to continue providing services (6).

To date, no study has assessed national prevalence of disruptions and adverse experiences experienced by high school students during the COVID-19 pandemic. This study addresses this knowledge gap by estimating the prevalence of disruptions and adverse experiences during the pandemic, overall and by sex, race and ethnicity, grade, and sexual identity. Public health and health care professionals, communities, schools, families, and adolescents can use these findings to better understand how students' lives have been affected during

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the pandemic and what challenges need to be addressed to promote adolescent health and well-being during and after the pandemic.

Methods

Data Source

This report includes data from the Adolescent Behaviors and Experiences Survey (ABES) conducted by CDC during January–June 2021 to assess student behaviors and experiences during the COVID-19 pandemic. ABES was a one-time, probability-based online survey of U.S. high school students. ABES used a stratified, three-stage cluster sample to obtain a nationally representative sample of public- and private-school students in grades 9–12 in the 50 U.S. states and the District of Columbia (N = 7,705). Participation in ABES was voluntary; each school and teacher decided whether students completed the survey during instructional time or on their own time. Additional information about ABES sampling, data collection, response rates, and processing is available in the overview report of this supplement (7). The ABES questionnaire, datasets, and documentation are available (<https://www.cdc.gov/healthyyouth/data/abes.htm>).

Measures

Students' self-reported disruptions and adverse experiences were assessed (Table 1), including economic, food and nutrition, and housing insecurity; abuse by a parent or other adult in the home (hereafter referred to as abuse by a parent); receipt of telemedicine; and difficulty completing schoolwork. All questions included the timeframe "During the COVID-19 pandemic," except for the question about housing insecurity, which asked about experiencing homelessness during the previous 30 days. Demographic variables included sex, race and ethnicity (non-Hispanic American Indian or Alaska Native, non-Hispanic Asian [Asian], non-Hispanic Black [Black], Hispanic or Latino [Hispanic], non-Hispanic persons of multiple races [multiracial], non-Hispanic Native Hawaiian or other Pacific Islander [NH/OPI], and non-Hispanic White [White]), grade (9–12), and sexual identity (gay, lesbian, or bisexual; other or questioning; or heterosexual).

Analysis

Weighted prevalence estimates and 95% CIs were calculated for disruptions and adverse experiences; estimates were calculated among all students and by demographic characteristics. Bivariate associations between disruptions and

adverse experiences and difficulty completing schoolwork are presented. Pairwise *t*-tests were used to compare prevalence estimates between groups. Estimates were suppressed when $n < 30$; consequently, all results for NH/OPI students were suppressed. Statistical significance was assessed at $p < 0.05$; only significant results are presented. Analyses were completed using SUDAAN (version 11.0.1; RTI International) to account for the complex survey design and weighting.

Results

More than one fourth of adolescents experienced a parent losing a job (28.5%), and nearly one fourth experienced their own job loss (22.3%) or hunger (23.8%) during the COVID-19 pandemic (Table 2). Some experienced homelessness (2.0%). Over half of adolescents experienced emotional abuse by a parent (55.1%), and more than one in 10 experienced physical abuse by a parent (11.3%). Approximately one fourth of students received telemedicine from a doctor or nurse (25.8%), and some received telemedicine for mental health or drug and alcohol counseling (8.5%). Two thirds of students had difficulty completing their schoolwork since the start of the pandemic (66.6%).

Student disruptions and adverse experiences differed by sex and race and ethnicity. Female students experienced a higher prevalence of parental and personal job loss (31.3% and 25.5%), emotional abuse by a parent (62.8%), and difficulty completing schoolwork (69.1%) compared with male students; whereas males experienced homelessness (3.0%) more often. The prevalence of parental job loss was higher among Asian (37.1%) and Hispanic or Latino (38.0%) students compared with all other racial and ethnic groups. Black students experienced the highest prevalence of hunger (32.0%); this estimate is similar to other students of color. White students had the lowest prevalence of experiencing hunger (18.5%), which differed from most other racial and ethnic groups. Multiracial students reported the highest prevalence of emotional abuse by a parent (65.5%), which differed from most other racial and ethnic groups. Black students experienced the highest prevalence of physical abuse by a parent (15.0%); this estimate did not differ from most other students of color, but it was higher than the prevalence of physical abuse experienced by White students (9.8%). Students who reported difficulty completing their schoolwork reported a higher percentage of parental job loss, hunger, or emotional abuse by a parent compared with students who did not have difficulty completing their schoolwork (Table 3).

Students who identified as gay, lesbian, or bisexual and those who identified as other or questioning experienced a

higher prevalence of parental job loss (34.9% and 34.9%, respectively), hunger (34.0% and 32.5%, respectively), and emotional abuse by a parent (74.4% and 75.9%, respectively) compared with heterosexual students (Figure)(Supplementary Table, <https://stacks.cdc.gov/view/cdc/114936>). Gay, lesbian, or bisexual students experienced a higher prevalence of physical abuse by a parent and difficulty completing their schoolwork (19.7% and 74.4%, respectively) than students who identified as other or questioning (13.4% and 63.8%, respectively) or as heterosexual (9.5% and 65.9%, respectively).

Discussion

During January–June 2021, approximately half of high school students in the United States reported emotional abuse by a parent or reported difficulty completing their schoolwork

since the COVID-19 pandemic began in March 2020. In addition, nearly one in four students reported experiencing hunger or economic insecurity and one in 10 students reported physical abuse by a parent. These findings indicate that adolescents have encountered disruptions and adverse experiences during the pandemic that might impact their immediate and long-term health and well-being.

The finding that more than half of adolescents reported emotional abuse and one in 10 reported physical abuse by a parent or other adult in the home during the pandemic is a public health concern; comparatively, a nationally representative sample from the National Survey of Children's Exposure to Violence (NSCEV) reported a lower proportion of children aged 14–17 years (13.9% for past-year emotional abuse and 5.5% for past-year physical abuse by a caregiver) (8). Although these differences might be attributable in part to variations in sampling frame, methodology (e.g., NSCEV

TABLE 1. Measures of disruptions and adverse experiences, receipt of telemedicine, and schoolwork difficulty during the COVID-19 pandemic among high school students — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Student experience	Question	Analytic coding
Economic insecurity		
Parent job loss*	During the COVID-19 pandemic, did a parent or other adult in your home lose their job even for a short amount of time?	Yes versus no
Student job loss*	During the COVID-19 pandemic, did you lose your paying job even for a short amount of time?	Yes versus no
Food and nutrition insecurity		
Hunger	During the COVID-19 pandemic, how often did you go hungry because there was not enough food in your home?	Yes (rarely, sometimes, most of the time, or always) versus no (never)
Housing insecurity		
Homelessness	During the past 30 days, where did you usually sleep?	Yes (in the home of a friend, family member, or other person because I had to leave my home; my parent or guardian cannot afford housing; in a shelter or emergency housing; in a motel or hotel; in a car, park, campground, or other public place; or I do not have a usual place to sleep) versus no (in my parent's or guardian's home)
Abuse by a parent		
Emotional abuse	During the COVID-19 pandemic, how often did a parent or other adult in your home swear at you, insult you, or put you down?	Yes (rarely, sometimes, most of the time, or always) versus no (never)
Physical abuse	During the COVID-19 pandemic, how often did a parent or other adult in your home hit, beat, kick, or physically hurt you in any way?	Yes (rarely, sometimes, most of the time, or always) versus no (never)
Received telemedicine		
Care from a doctor or nurse	During the COVID-19 pandemic, did you get medical care from a doctor or nurse using a computer, phone, or other device (also called telemedicine)?	Yes versus no
Mental health or drug and alcohol counseling	During the COVID-19 pandemic, did you get mental health care, including treatment or counseling for your use of alcohol or drugs using a computer, phone, or other device (also called telemedicine)?	Yes versus no
Schooling		
Schoolwork difficulty	Do you agree or disagree that doing your schoolwork was more difficult during the COVID-19 pandemic than before the pandemic started?	Yes (strongly agree, or agree) versus no (not sure, disagree, or strongly disagree)

* The denominator includes only those who had jobs prior to the beginning of the pandemic.

is not school based and is administered by telephone) and question wording, the high prevalence of self-reported emotional and physical abuse during the pandemic highlights that increased stress contributes to violence. The situation is further complicated by the fact that school closings because of COVID-19 have resulted in students' decreased contact with mandated reporters (9); therefore, the self-reported data in this report are critically important to elucidate the occurrence of child abuse during the pandemic and underscores the need for enhanced violence surveillance and prevention strategies during public health emergencies.

Disparities in experiences of disruption and adversity were observed by sexual identity, race and ethnicity, and sex. Students identifying as gay, lesbian, or bisexual, other

or questioning; students of color; and female students more commonly had disruptions and adverse experiences compared with heterosexual, White, and male students, respectively. Among any demographic grouping, youths who identified as gay, lesbian, or bisexual and other or questioning experienced the highest levels of emotional and physical abuse by a parent. Per analyzed chat transcripts from national online LGBTQ+ support groups for youth, adolescents identifying as lesbian, gay, bisexual, or questioning have been struggling with isolation during the COVID-19 pandemic and coping with family dynamics described as “unsupportive” and “homophobic” (10). Disparities based on race and ethnicity and sex have been documented throughout the pandemic. Previous research shows that during the pandemic, Black and Hispanic or Latino

TABLE 2. Percentage of economic, food and nutrition, and housing insecurity, abuse by a parent, receipt of telemedicine, and schoolwork difficulty among high school students during COVID-19 pandemic, by sex, race and ethnicity, and grade — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Characteristic	Economic insecurity		Food and nutrition insecurity	Housing insecurity	Abuse by a parent		Received telemedicine		Schooling
	Parent job loss	Student job loss	Hunger	Homelessness	Emotional abuse	Physical abuse	Care from a doctor or nurse	Mental health or drug and alcohol counseling	Schoolwork difficulty
	%* (95% CI)	%* (95% CI)	%* (95% CI)	%* (95% CI)	%* (95% CI)	%* (95% CI)	%* (95% CI)	%* (95% CI)	%* (95% CI)
Sex									
Female	31.3 (28.9–33.9)	25.5 (22.3–29.0)	24.9 (22.1–28.0)	1.1 (0.8–1.4)	62.8 (59.5–66.1)	11.6 (10.1–13.2)	29.8 (27.1–32.7)	10.1 (8.5–11.9)	69.1 (66.0–72.0)
Male	25.6 (23.0–28.4) [†]	19.0 (15.7–22.8) [†]	22.7 (20.3–25.2)	3.0 (2.1–4.2) [†]	46.8 (44.2–49.4) [†]	10.9 (9.7–12.2)	21.7 (19.7–23.9) [†]	6.5 (5.5–7.7) [†]	64.1 (62.0–66.1) [†]
Race and ethnicity									
AI/AN, non-Hispanic	15.7 (9.1–25.5)	— [§]	31.2 (19.2–46.4)	1.9 (0.8–4.7)	54.9 (47.7–62.0)	12.5 (8.3–18.5)	24.1 (15.8–34.7)	7.0 (2.5–18.1)	72.4 (64.2–79.3)
Asian, non-Hispanic	37.1 (29.3–45.7) [¶]	18.7 (12.5–27)	28.3 (22.5–34.9)	2.2 (0.7–7.4)	59.2 (54.5–63.7)	12.9 (8.9–18.5)	24.7 (15.2–37.6)	3.9 (2.3–6.7)	61.7 (51.5–70.9)
Black, non-Hispanic	24.9 (21.4–28.7) ^{¶,**}	23.6 (18.6–29.5)	32.0 (28.4–35.7)	2.5 (1.6–3.8)	49.6 (44.0–55.2) ^{**}	15.0 (11.6–19.1)	21.1 (17.8–24.9)	6.3 (4.5–8.7)	67.7 (63.3–71.7)
Hispanic or Latino	38.0 (33.9–42.2) ^{¶,††}	21.8 (17.0–27.5)	28.2 (24.1–32.7)	1.7 (1.1–2.5)	52.5 (48.0–56.9)	11.2 (9.4–13.3)	22.3 (19.1–25.8)	5.4 (4.2–7.0)	69.4 (65.4–73.1)
Multiracial, non-Hispanic	25.4 (18.8–33.4) ^{¶,**,§§}	25.1 (17.4–34.7)	29.5 (23.4–36.5)	1.1 (0.5–2.5) ^{††}	65.5 (59.7–70.8) ^{¶,††,§§}	13.4 (10.6–16.9)	29.7 (24.2–35.8) ^{††,§§}	15.0 (10.8–20.5) ^{¶,††,§§}	67.3 (60.5–73.5)
White, non-Hispanic	24.4 (22.0–27.1) ^{¶,***,§§}	22.2 (19.0–25.8)	18.5 (16.5–20.6) ^{¶,††,§§,¶¶}	2.1 (1.5–2.9)	56.4 (52.3–60.3) ^{††,¶¶}	9.8 (8.6–11.1) ^{††}	28.8 (26.2–31.6) ^{††,§§}	10.2 (8.7–11.9) ^{¶,††,§§}	65.5 (63.1–67.8)
Grade									
9	29.1 (24.7–33.8)	12.6 (9.5–16.6)	24.9 (21.3–28.8)	1.9 (1.3–2.7)	58.0 (54.1–61.8)	14.3 (12.1–16.7)	23.9 (21.4–26.5)	8.0 (6.4–9.9)	66.8 (63.5–69.9)
10	29.0 (26.3–31.8)	17.2 (13.9–21.0)	23.9 (20.4–27.9)	2.3 (1.4–3.6)	54.4 (51.5–57.3)	11.9 (10.0–14.0)	25.7 (22.8–28.8)	8.9 (7.4–10.8)	67.1 (63.9–70.2)
11	27.4 (24.1–31.0)	18.6 (14.8–23.0) ^{***}	23.1 (20.3–26.2)	1.6 (0.9–2.8)	53.9 (49.4–58.4)	10.6 (8.4–13.3) ^{***}	25.8 (23.1–28.7)	8.1 (6.4–10.3)	65.6 (61.9–69.2)
12	28.3 (25.0–31.8)	33.6 (29.6–37.9) ^{***,†††,§§§}	23.3 (20.2–26.7)	2.3 (1.4–3.6)	53.8 (49.9–57.6) ^{***}	7.7 (6.4–9.3) ^{***,†††}	28.3 (24.4–32.5) ^{***}	9.0 (7.0–11.4)	66.9 (62.6–70.9)
Total	28.5 (26.2–30.9)	22.3 (19.8–24.9)	23.8 (21.6–26.3)	2.0 (1.5–2.6)	55.1 (52.3–57.8)	11.3 (10.2–12.4)	25.8 (23.8–28.0)	8.5 (7.4–9.6)	66.6 (64.5–68.6)

Abbreviation: AI/AN = American Indian or Alaska Native.

- * Weighted estimate.
- † Pairwise t-test significantly different from female students (p<0.05).
- § Dash indicates that results are suppressed because n<30.
- ¶ Pairwise t-test significantly different from non-Hispanic AI/AN students (p<0.05).
- ** Pairwise t-test significantly different from non-Hispanic Asian students (p<0.05).
- †† Pairwise t-test significantly different from non-Hispanic Black students (p<0.05).
- §§ Pairwise t-test significantly different from Hispanic or Latino students (p<0.05).
- ¶¶ Pairwise t-test significantly different from non-Hispanic multiracial students (p<0.05).
- *** Pairwise t-test significantly different from 9th-grade students (p<0.05).
- ††† Pairwise t-test significantly different from 10th-grade students (p<0.05).
- §§§ Pairwise t-test significantly different from 11th-grade students (p<0.05).

TABLE 3. Percentage of economic, food and nutrition, and housing insecurity, abuse by a parent, and receipt of telemedicine among high school students during COVID-19 pandemic, by schoolwork difficulty — Adolescent Behaviors and Experiences Survey, United States, January–June 2021

Experience	Experienced schoolwork difficulty	
	Yes	No
	%* (95% CI)	%* (95% CI)
Economic insecurity		
Parent job loss	30.9 (28.4–33.4)	23.9 (20.9–27.2) [†]
Student job loss	23.0 (20.5–25.8)	20.7 (17.2–24.7)
Food and nutrition insecurity		
Hunger	25.5 (22.9–28.2)	20.6 (18.1–23.4) [†]
Housing insecurity		
Homelessness	1.9 (1.4–2.6)	2.2 (1.5–3.1)
Abuse by a parent		
Emotional abuse	58.3 (55.5–61.2)	48.7 (44.9–52.5) [†]
Physical abuse	11.3 (10.1–12.6)	11.1 (9.1–13.5)
Received telemedicine		
Care from a doctor or nurse	26.3 (24.1–28.7)	24.7 (22.0–27.6)
Mental health or drug and alcohol counseling	8.1 (6.9–9.5)	9.2 (7.6–11.2)

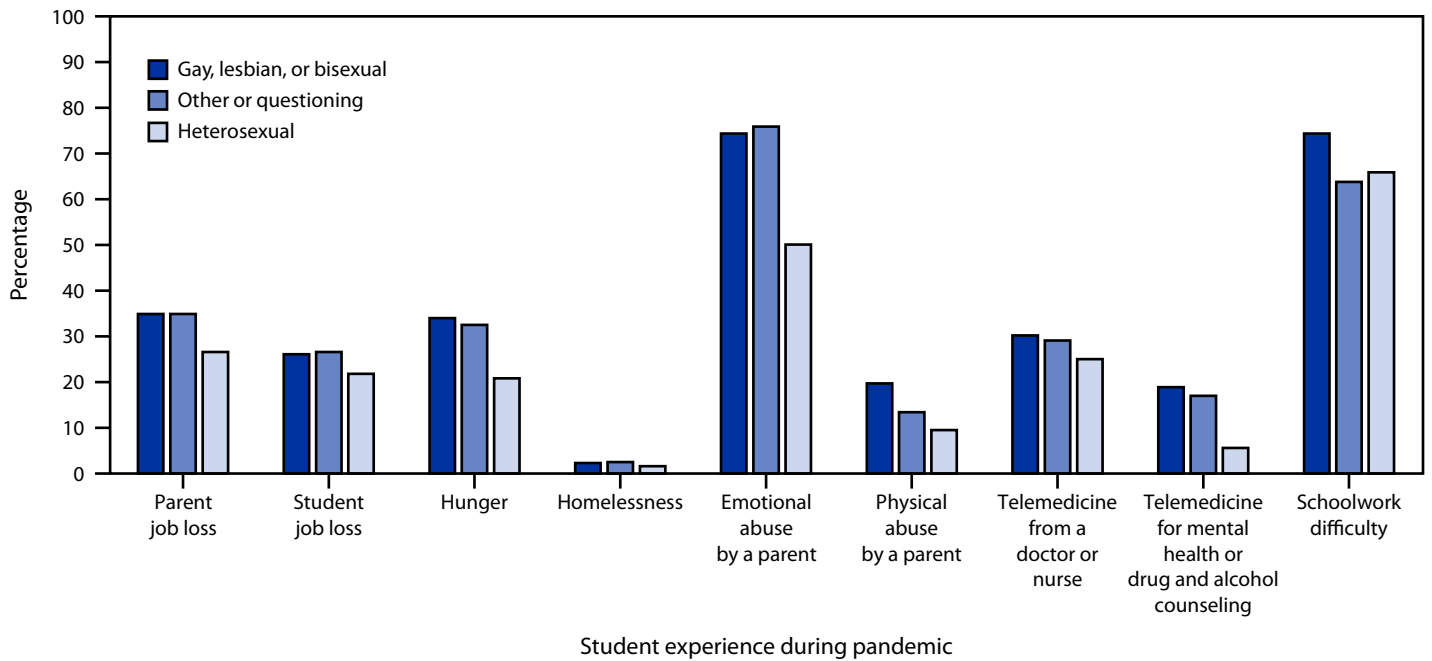
* Weighted estimate.

[†] Pairwise t-test significantly different from students who responded “yes” (p<0.05).

students were more likely to be in households experiencing food and nutrition insecurity, difficulty paying rent, and difficulty affording household expenses compared with White students (11), and that approximately two thirds of female adolescents reported an increase in household chores during the pandemic compared with less than half (43%) of the boys, and more girls (20%) compared with boys (10%) reported having too many chores to do to be able to learn (12).

Many student disruptions and adverse experiences in this report are interconnected with the social determinants of health. Previous research shows that disparities based on race and ethnicity and sex existed among persons who experienced economic, food and nutrition, or housing insecurity before the pandemic, and these persons had a greater likelihood of experiencing these insecurities during the pandemic (13). In addition, financial and social stressors of the COVID-19 pandemic have been documented as risk factors for increased child abuse (9). Finally, the bivariate analysis provides evidence that these experiences are interconnected; students who had difficulty completing their schoolwork experienced higher levels of parental job loss, food and nutrition insecurity, and emotional abuse.

FIGURE. Percentage* of parent job loss,^{†,§} student job loss,^{†,§} hunger,^{†,§} homelessness,^{†,§} emotional abuse by a parent,^{†,§} physical abuse by a parent,^{†,§,¶} receipt of telemedicine by a nurse or doctor,^{†,§} receipt of telemedicine for mental health or drug and alcohol counseling,^{†,§} and schoolwork difficulty^{†,¶} among high school students during the COVID-19 pandemic, by sexual identity — Adolescent Behaviors and Experiences Survey, United States, January–June 2021



* Weighted estimate.

[†] Pairwise t-test heterosexual students significantly different from gay, lesbian, or bisexual students (p<0.05).

[§] Pairwise t-test heterosexual students significantly different from other or questioning students (p<0.05).

[¶] Pairwise t-test other or questioning students significantly different from gay, lesbian, or bisexual students (p<0.05).

One in four students reported using telemedicine to access care from a doctor or nurse and less than one in 10 reported using telemedicine to access mental health or drug and alcohol counseling, with differences by sex and race and ethnicity; White and multiracial students and female students using telemedicine more than other groups. Given the paucity of data on adolescent use of telemedicine, the context for the telemedicine findings of this report remains unclear. Telemedicine might serve as an alternative access point for adolescents seeking essential health services that might address disruptions and adverse experiences, but data describing adolescents' pre-pandemic telemedicine use are lacking. A study using data from four major U.S. telehealth providers found that use of telemedicine decreased slightly among youths aged 5–17 years at the start of the pandemic in early 2020 (8.6%) compared with early 2019 (10.0%) (6), which reflects a lower use than what was found in this report. Future studies could help researchers better understand the range of telemedicine services received and quality of care.

Two thirds of adolescents had difficulty completing their schoolwork since the beginning of the pandemic. These findings are consistent with previous research, which indicates that throughout the COVID-19 pandemic, adolescents have had difficulty transitioning to virtual learning, reporting inconsistencies in school coursework expectations, and confusion about complex and complicated assignments (14). Students who had difficulty completing their schoolwork experienced higher levels of emotional abuse by a parent, parental job loss, and hunger. These disruptions and adverse experiences threaten adolescents' health and safety in addition to acting as barriers to learning. Learning is fostered in environments where students' basic needs are met and where students feel safe, supported, challenged, and engaged (15). Before the pandemic, schools offered essential health services and social supports, such as school meals, chronic disease management, and mental health counseling; however, the pandemic has challenged the ability of schools to meet students' evolving academic and health needs (16).

Schools offer an important pathway to help address the needs of students, but they rely on coordinated efforts across sectors to meet these needs. Prioritization of school health programs and services within schools, in collaboration with families and communities, will be critical to address disruptions to student life and other related effects of the pandemic (17). For example, during the pandemic, the U.S. Department of Agriculture issued multiple waivers that permitted schools flexibility in distributing free meals to school-aged youths, regardless of family income level, through June 2022 (18). In addition to traditional meal service in schools, meals are also being distributed in alternative locations, including along

school bus routes and in school parking lots and churches (18). Coordinated, cross-sector programs and services like these are important for providing continued support for students in their lives both inside and outside of school.

Limitations

General limitations to ABES are outlined in the overview report in this supplement (7). The findings in this report are subject to at least three specific limitations. First, causality or directionality of observed association cannot be determined; although the questions about disruption and adversity ask students about what happened to them during the pandemic (e.g., temporality associated), it cannot be ascertained that the pandemic caused these student experiences. Second, the telemedicine measures should be interpreted with caution given the unknown context for students' pre-pandemic use of telemedicine services. Although most students did not receive telemedicine care from a doctor or nurse since the beginning of the pandemic, students might have accessed in-person health care or might not have needed well-child or other health care visits. In addition, without knowing who provided the care or for which reason, the receipt of telemedicine for mental health or drug and alcohol counseling might not align with students' needed access to care. Finally, the prevalence of food and nutrition insecurity might have been misclassified because self-reported hunger was used as a proxy measure and this measure has not been validated. In addition, other factors are associated with food and nutrition insecurity (e.g., reducing the size of a meal or the variety of foods consumed) (19).

Conclusion

Since the beginning of the COVID-19 pandemic in March 2020, many high school students have experienced hunger and economic insecurity. More than half of students have experienced emotional abuse by a parent and have had difficulty completing their schoolwork. Approximately 10% reported physical abuse by a parent. Disparities by sex, race and ethnicity, and sexual identity highlight the importance of strategies to increase health equity in these domains. Understanding health disparities and student experiences of disruptions and adverse experiences as interconnected problems can inform school and community initiatives that promote adolescent health and well-being. With community support to provide coordinated, cross-sector programming, schools can serve as the setting to facilitate linkages to services that help address the adverse experiences that students have faced during the pandemic. Public health and health care professionals,

communities, schools, families, and adolescents can use these findings to better understand how students' lives have been affected during the pandemic and what challenges need to be addressed to promote adolescent health and well-being during and after the pandemic.

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Conflicts of Interest

All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

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