

HEALTHY BROOKLINE
VOLUME XVIII



YOUTH RISK BEHAVIOR SURVEY

Brookline Department of Public Health
2015-18

Acknowledgements

This report is a collaborative project of the Brookline Public Health and Human Services Department and the Public Schools of Brookline.

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The survey was implemented under the direction of Tina Bozeman, Curriculum Coordinator for Health and Physical Education at the Public Schools of Brookline, and Jen Martin, Brookline High School History Teacher and Advisory Teacher Leader.

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A Message from the Health Commissioner

I am proud to present you with the 2015-18 Healthy Brookline Vol XVIII for the Brookline Public Health and Human Services. This report provides a glimpse into health risk behaviors of our youth and opportunities to collaborate together. The report focuses on several indicators such as alcohol, tobacco, and marijuana use, mental health, sexual behaviors among Brookline student's grades 7-12. Also, included are areas for improvement that we can develop strategies for better outcomes. I look forward to future dialogue and policy development.



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Executive Summary for Healthy Brookline Volume XVIII

INTRODUCTION

Healthy Brookline Volume XVIII is part of the Brookline Public Health and Human Services' annual assessment of the health risk behaviors of Brookline youth. The report presents data from Brookline students in grades 7-12 and includes indicators in the following areas:

- Alcohol use
- Marijuana use
- Other illegal drug use
- Tobacco use
- Violence-related behaviors
- Sexual behavior
- Mental health
- Use of technology for recreational purposes
- Perceptions of parental disapproval of drug and alcohol use

ALCOHOL USE

For most comparable alcohol indicators, Brookline 7th-12th graders reported lower rates than state and national levels. Rates were the same (18%) for recent binge drinking at Brookline High School as rates both state and nationwide.

- The reported rate of lifetime alcohol use among Brookline 7th and 8th graders was similar to the statewide rate (13% vs 12%, respectively).
- Reported use of alcohol during the month prior to the survey among high school students was 30% in 2017, up from 27% in 2015.
- In the month prior to both the 2015 and 2017 surveys, 18% of high school students reported binge drinking.
- Finally, 15% of senior females and 10% of senior males reported they had engaged in sexual activity after using alcohol.

MARIJUANA USE

Rates of marijuana use on all indicators among Brookline 7th-12th graders were lower than state and national levels. Lifetime marijuana use was 26% for Brookline High School students, compared to 41% for state and 39% for US levels. Among 7th and 8th graders, lifetime marijuana use was 2%, lower than the 6% for the state.

- Marijuana use in the month before the survey was 17% among high school students. Among seniors, 13% reported having used marijuana during the school day in the last year.

- The lifetime use of marijuana varied by grade as well as by gender — 44% of senior males and 43% of senior females, 30% of junior males and 36% of junior females, 30% of sophomore males and 25% of sophomore females, and 12% of freshman males and 7% of freshman females reported lifetime use of marijuana.

TOBACCO USE

In 2017, the survey question “ever used” was changed to include both tobacco cigarettes and electronic cigarettes, without differentiation. Rates of use among Brookline 9th-12th graders remain relatively low, with a decrease in most indicators from 2015 to 2017.

At the high school level, the rate at which Brookline teens had ever used tobacco (17%) was lower than the state (29%) and national (31%) rates.

VIOLENCE-RELATED BEHAVIOR

Brookline High School students reported fewer violence-related risk behaviors than their MA and US counterparts in several categories.

- Among high school students, the number of students who reported being bullied at school in the past 12 months was 13% in 2017, 9% in 2015, and 16% in 2013. Among middle school students, the rate was 8%, down from 13% in 2015 and lower than the state rate of 15%.
- A total of 19% of gay or lesbian students and 20% of bisexual students reported being bullied on school property compared to 12% of heterosexual students.
- Among high school students, the prevalence of students that reported hearing derogatory remarks regarding sexual orientation at school decreased from 68% in 2015 to 56% in 2017.

SEXUAL BEHAVIOR

Brookline High School students reported lower rates of sexual intercourse compared to the state and national averages (36% and 41%, respectively). Rates of sexual intercourse have continued to decline compared to previous years.

- In 2017, 18% of BHS students reported ever having sexual intercourse compared to 23% in 2013 and 21% in 2015.
- Among sexually active BHS students, reported condom use during sexual intercourse increased from 62% in 2015 to 66% in 2017.
- In 2017, among Brookline 7th and 8th graders, 2% reported having ever had sexual intercourse, compared to 2% in 2015 and 6% in 2013.

MENTAL HEALTH

Brookline High School students reported worse mental health compared to previous years.

- The rate of BHS 9th-12th graders who reported feeling overwhelming stress or anxiety during the past 12 months rose from 82% in 2015 to 84% in 2017.
- In 2017, 29% of BHS students reported symptoms of depression and 24% reported feeling suicidal in the past 12 months compared to 25% and 18%, respectively, in 2015.
- Females were more likely to report depression compared to males: 48% of female vs. 12% of male seniors, 41% of female vs. 24% of male juniors, 35% of female vs. 16% of male sophomores, and 35% of female vs. 20% of male freshmen.
- Similarly, 79% of Brookline 7th and 8th graders reported experiencing overwhelming stress or anxiety in the past year compared to 70% in 2015.

USE OF TECHNOLOGY FOR RECREATIONAL PURPOSES

The survey questions pertaining to use of technology were updated to reflect the increase in platforms and viewing options. For the first time in 2017, the survey combined TV use with all other technology platforms.

- Similarly, 79% of Brookline 7th and 8th graders reported experiencing overwhelming stress or anxiety in the past year compared to 70% in 2015.
- In 2017, 51% of BHS students reported using handheld devices for non-school related work for three or more hours a day. In 2015, 16% watched TV for three or more hours on an average school day, and 39% used a computer for recreational purposes on an average school day.
- 35% of 7th and 8th graders reported conversing with people they didn't know personally online. Out of 7th and 8th graders who reported conversing with people they didn't know online, 6% reported arranging an "in person" meeting with someone online and 12% reported feeling threatened or scared when online.

PERCEPTION OF PARENTAL DISAPPROVAL

Students' perceptions of the level of parental disapproval appeared to affect their reported rates of use of alcohol and other drugs.

- BHS students who believed their parents disapproved of alcohol use used significantly less alcohol on all indicators.
- Students who perceived no parental disapproval or slight parental disapproval were more likely to have ever tried alcohol than those who perceived strong dis-

approval (66% and 59%, respectively, as compared to 24% who perceived strong parental disapproval).

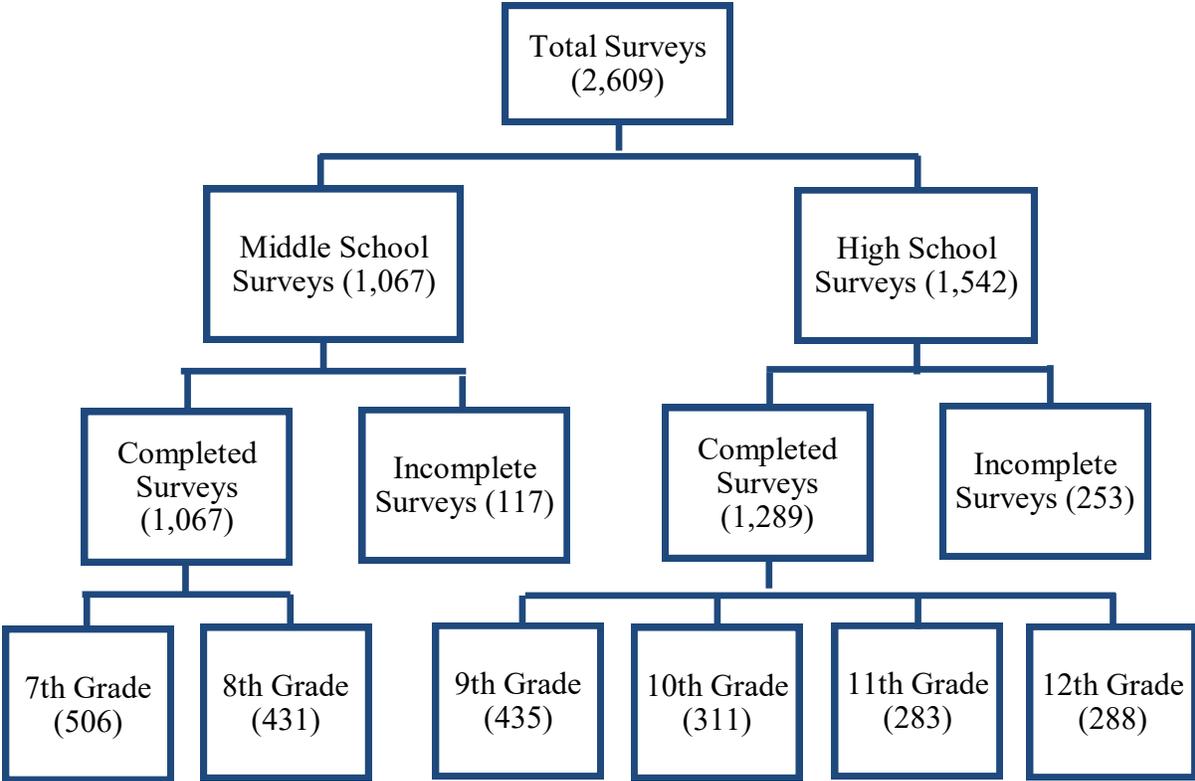
- Of those who perceived no parental disapproval, 52% reported recent binge drinking, compared to 41% who perceived slight parental disapproval and 13% who perceived strong parental disapproval.

METHODOLOGY

This survey targets all students enrolled in grades 7-12 in Brookline. Students were surveyed from a sampling frame composed of Brookline High School and Brookline's eight K-8 schools. The surveys were distributed to all students who were present in schools on the days of the survey administration in March and April of 2017. The high school surveys were administered during students' advisory period, and the middle school surveys were administered during health classes. A total of 1,542 students in grades 9–12 and 1,067 students in grades 7-8 participated.

The Brookline samples were compiled in the summer and fall of 2017. The national and statewide surveys of the *YRBS*, to which the Brookline sample is compared, were administered during the spring of 2015. Both national and state surveys used a multi-stage cluster sampling design to gather randomly selected representative samples of students. Brookline's sample, however, was non-randomized. The Brookline sample did not include students in grade 6. School participation and student participation were both voluntary and anonymous.

Summary of Survey Completion



Demographics of Participants

Gender:

There was relatively equal representation of males and females, with 49% of the survey population identifying as female in both the high school and middle school cohorts. Two percent of the middle school population identified as intersex or non-binary.

Residency:

Students have lived in the U.S. for:	Middle School (% of all MS students)	High School (% of all HS students)
Always lived in the U.S.	75	76
7-14 yrs	14	11
4-6 yrs	4	6
1-3 yrs	6	4
<1 yr	2	4

Race/Ethnicity:

Race/Ethnicity	Middle School (% of all MS students)	High School (% of all HS students)
White/Caucasian	60	66
Asian*	24	25
Black/African American	11	10
Hispanic/Latino	12	10
Middle Eastern*	6	5
Armenian	6	2
Other	10	3
American Indian/Alaskan Native	3	<1%

*Asian includes Native Hawaiian or Other Islander, Chinese, Japanese, Indian, Filipino, Taiwanese, Cambodian, Vietnamese, and Korean

*Middle Eastern includes Pakistan, Afghanistan, Lebanon, Syria, Turkey

<1% Native American and Alaskan Native

Primary Caretakers:

Students' primary care-taker	Middle School (% of all MS students)	High School (% of all HS students)
Both Parents	71	76
Both Parents (separately)	10	11
Single and Step-parent	4	3
Single Parent	14	8
Other Guardian	2	n/a
Other (ex. Foster, older sibling, etc.)	<1	<1

Results from the Student Demographics

Table 1 and Table 2 below report the results from the Brookline Middle School and the Brookline High School Health Surveys, respectively. Table 1 reports the results from the 2013-2017 Brookline High school health surveys as well as the latest state and national high school surveys. Table 2 reports the 2011-2017 Brookline Middle School Health Surveys. There was insufficient data on middle school health behaviors at the state and national levels to make further comparisons.

Summary Comparison Table of Risk Behaviors of Brookline 9th-12th Graders (2011-2017) and State/US 9th-12th Graders (2015)

Brookline High School Survey, 2013-2017					
	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
ALCOHOL USE (%)					
Lifetime alcohol use	56	47	36	61	63
Alcohol use, past 30 days	35	27	30	34	33
Alcohol use before age 13	12	6	5	13	17
Binge drinking, past 30 days	19	18	13	18	18
Drinking during school day, past 30 days	5	2	15	3	-
Did you drive after drinking alcohol in past 30 days	3	-	6	9	8
Riding in vehicle with driver who has been drinking and was over 21	11	12	16	18* (Driver age not specified)	20*(Driver age not specified)
Riding in vehicle with driver who has been drinking and was under 21	6	4	5		
MARIJUANA USE (%)					
Lifetime marijuana use	34	27	26	41	39
Lifetime marijuana use, over 100 times	7	4	4	-	-
Marijuana use, before age 13	2	1	1	6	8
Marijuana use, past 30 days	21	16	17	25	22

	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
Marijuana use during school days, past 30 days	9	5	6	5	N/A
OTHER ILLEGAL DRUG USE (%)					
Lifetime cocaine use	4	1	1	5	5
Lifetime heroine use	3	1	>1	2	2
Lifetime use of Ritalin, Adderall, Concerta, amphetamines without a prescription	7	4	2	3	3
Lifetime use of steroid use without a prescription	3	1	<1	-	4
Lifetime use of hallucinogens, LSD, mushrooms, ketamine, ecstasy	8	3	1	4	5* (Ecstasy only)
Lifetime use of prescription painkillers to get high (Percocet, Oxycodone, Vicodin)	6	2	2	-	-
Lifetime use of depressants to get high (Klonopin, Valium, Xanax, Ativan)	4	2	1	-	-
Lifetime OTC cough/cold medicine use (to get high)	4	5	2	-	-
TOBACCO USE (%)					
Lifetime use of a tobacco product	26	15	17	29	31

	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
Started smoking tobacco cigarettes before age 13	5	2	2	4	7
Smoking tobacco cigarettes, past 30 days	10	5	5	8	11
Use of chewing tobacco, snuff, dip, past 30 days	4	2	3	6	-
VIOLENCE RELATED BEHAVIORS (%)					
Carried a gun, past 30 days	4	1	<1	3	5
Carried a weapon (such as knife or club) at school, past 30 days	4	2	2	3	4
Skipped school because felt unsafe, past 30 days	5	4	3	5	6
Heard prejudiced language/remarks made towards gays, lesbians, bisexual students, past 30 days	68	68	56	-	-
Heard negative or derogatory remarks about racial, ethnic, immigrant and/or religious people	-	-	61	-	-
Bullied at school, past 12 months	16	9	13	16	20
Electronically bullied, past 12 months	11	6	7	13	16
Sexual contact against one's will	7	8	6	6	7

	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
Sexual contact against one's will, by partner	-	-	4	8	11
Partner hit, slapped, or physically hurt you on purpose, past 12 months	5	5	1	7	10
MENTAL HEALTH (%)					
Felt sad, hopeless for 2 or more weeks, past 12 months	-	25	29	27	30
Felt suicidal, past 12 months	20	18	24	15	18
Seriously considered suicide and made a plan, past 12 months	2	2	4	12	15
Attempted suicide that resulted in medical treatment, past 12 months	<1	1	<1	3	3
SEXUAL BEHAVIOR (%)					
Ever had sexual intercourse	23	21	18	36	41
Sexual intercourse before age 13	3	1	1	3	4
Three or more sexual partners	7	6	5	8* (4 or more)	12* (4 or more)
Usually use a condom during sexual intercourse (among sexually active students)	75	62	66	63	57

	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
Engaged in sexual activity after using alcohol that you wouldn't have if you weren't drinking (among students who have ever used alcohol)	14	8	21	22	21
BODY WEIGHT AND DIETARY BEHAVIORS (%)					
Describe self as slightly or very overweight	22	23	24	32	32
Fasted for 24 hours or more to lose or maintain weight, past month	11	6	7	10	-
Took diet pills, powders or liquids without physician advice to lose or maintain weight, past month	3	2	2	3	-
Vomited or took laxatives to lose or maintain weight, past 12 months	3	3	4	4* (Past month)	-
PHYSICAL ACTIVITY (%)					
Participated in 60 minutes of activity for at least 5 of the last 7 days	36	40	45	45	49
Participated on at least 1 BHS sports team, past 12 months	53	58	59	61	65
Watched 3 or more hours of TV on an average school day	13	16	-	18	25
Used a computer, phone or other handheld device for non-school related activities for 3 or more hours on an average school day	33	39	51	43	41

	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
PROTECTIVE FACTORS (%)					
Received mostly A's, B's or C's	86	95	96	76* (A's or B's)	-
Participated in volunteer work (at least 11 hours/month)	47	49	47	-	-
Participated in organized extracurricular activities (at least 1 day in past week)	64	77	66	-	-
Has teacher or other adult in school with whom one can talk about problems	62	67	62	73	-

Summary Comparison Table of Risk Behaviors of Brookline 7th-8th Graders (2011-2017) and State/US 6th-8th Graders (2015)

Brookline Middle School Survey, 2013-2017					
	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
ALCOHOL USE (%)					
Lifetime alcohol use	22	15	11	12	13
Alcohol use, past 30 days	8	6	4	-	4
Alcohol use before age 13	15	11	6	9	-
Riding in vehicle with driver who has been drinking	8	8	11	4	9
Felt pressured to drink alcohol (*among alcohol drinkers)	9	8	3	6	-
MARIJUANA USE (%)					
Lifetime marijuana use	6	5	2	2	6
Marijuana use, before age 13	2	2	1	1	-
Marijuana use, past 30 days	4	4	1	<1	2
Felt pressured to use marijuana (*among alcohol drinkers)	10	6	3	32*	-
OTHER ILLEGAL DRUG USE (%)					
Lifetime cocaine use	1	2	<1	<1	-
Lifetime use of Ritalin, Adderall, Concerta, amphetamines without a prescription	2	1	1	1	-
Lifetime use of steroid use without a prescription	1	1	2	<1	-

	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
Lifetime use of sniffing glue, paints or sprays to get high	6	4	1	<1	-
Lifetime use of prescription painkiller to get high (Percocet, OxyContin, Vicodin)	1	2	1	<1	1* (past 30 days)
Lifetime use of prescription drug that is not student's	-	2	2	<1	3
TOBACCO (%)					
Ever used a tobacco product	9	5	3	3	6
Use of chewing tobacco, snuff, dip, past 30 days	2	2	-	<1	-
Use of other forms of tobacco (smoke-free, dissolvable, cigarillos, flavored), past 30 days	2	4	4	1	-
Felt pressured to use tobacco products	9	7	4	-	-
VIOLENCE-RELATED BEHAVIOR (%)					
Ever carried a weapon (gun, club or knife)	16	15	15	3	-
Access to a gun	5	5	3	3	-
Ever in a physical fight requiring treatment by doctor or nurse	5	5	4	7	-
Sexual contact against one's will	4	6	2	1	-
Deliberately hit, slapped, or physically hurt by partner, past year	6	3	1	1	-
Heard prejudiced language/remarks made towards gay, lesbian or bisexual students outside of school, past 30 days	80	59	54	47	-

	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
Heard prejudiced language/remarks made towards gay, lesbian or bisexual students outside of school, past 30 days	80* (unspecified location)	59	54	47	-
Electronically bullied, past 12 months	16	-	13	8	-
MENTAL HEALTH (%)					
Felt overwhelming stress or anxiety, occasionally or frequently, past 12 months	71	69	79	76	-
Ever seriously thought about killing self	11	12	14	15	8 (in past year)
Ever made a plan about how to kill self	7	10	10	3	-
Ever attempted suicide	3	4	4	1	4
Ever attempted self-harm (i.e. cutting, burning)	10	12	14	11	16
SEXUAL BEHAVIOR (%)					
Ever had sexual intercourse	6	6	2	2	-
Sexual intercourse before age 13	4	3	1	1	-
Three or more sexual partners	3	2	1	1	-
Usually use a condom during sexual intercourse (among sexually active)	65	70	68	43	-
Participated in oral sex	8	5	4	3	-
Felt pressured to have sexual intercourse (*Only among those who have had sexual intercourse)	7	9	4	25*	-

	Brookline	Brookline	Brookline	MA	US
Survey Questions	2013	2015	2017	2015	2015
BODY WEIGHT DIETARY BEHAVIORS (%)					
Described self as slightly or very overweight	22	23	23	20	-
Fasted for 24 hours or more to lose or maintain weight, past 30 days	6	5	5	4	8
Took diet pills, powders or liquids without doctor's advice to lose or maintain weight, past month	1	2	1	1	1
Ever vomited or taken laxatives to lose or maintain weight	2	4	3	<1	3 (in past 30 days)
PHYSICAL ACTIVITY (%)					
Participated in at least 60 minutes of activity for at least 5 of the past 7 days (increased HR and breathed hard)	51	50	52	52	49
Watched 3 or more hours of TV on an average school day	16	14	19	-	21
Used a computer, phone or other handheld device for non-school related work for 3 or more hours on an average school day	28	34	33	46	42

Alcohol Use

In 2015, approximately 10,265 deaths resulted from excessive use of alcohol in the United States.¹ Among youth, the use of alcohol and other drugs has been linked to unintentional injuries, physical fights, and academic/occupational problems.³ In 2010 alone, 189,000 emergency room visits by persons under age 21 were linked to alcohol.⁶

Research indicates that early drinkers are more likely than nondrinkers to have impaired decision-making capabilities and to engage in potentially risky behavior. The outcomes associated with such actions are wide-ranging, including various types of injury, car crashes, homicide and suicide, and death from alcohol poisoning.^{6,7} Specifically regarding risk-taking behavior, in 2015, 20% of students reported riding with a driver who had been drinking alcohol, and 9% reported driving after drinking in the past 30 days.⁴

Research further indicates the developing adolescent brain may be particularly susceptible to long-term consequences from alcohol use, including cognitive impairment. Long-term alcohol misuse is also associated with liver disease, cancer, cardiovascular disease, neurological damage, depression, anxiety, and antisocial personality disorder.^{5,10}

Adolescents' attitudes about the risks associated with a particular substance are often closely related to their use of that substance, with an inverse association between drug use and risk perceptions (i.e., as the prevalence of risk perception decreases, the prevalence of drug use increases).¹¹ Nationally, only 39% of adolescents perceived great risk from having five or more drinks of alcohol once or twice a week, remaining constant from 2008 to 2013.^{12,13}

The results in Table 1 and Table 2 use the following definitions for alcohol use:

Lifetime alcohol use: Any consumption of alcohol during one's life, other than a few sips with family or for religious purposes.

Recent alcohol use: One or more alcoholic drinks on at least one of the 30 days prior to the survey.

Binge drinking: Five or more alcoholic drinks in a row, within a couple of hours

¹ Centers for Disease Control and Prevention. (2019). *Motor Vehicle Safety*. Retrieved from :https://www.cdc.gov/motorvehiclesafety/impaired_driving/impaired-driv_factsheet.html on July 29, 2019.

² U.S. Department of Transportation. *Fatality Analysis Reporting System (FARS) Web-based Encyclopedia*.

³ Substance Abuse and Mental Health Services Administration (1991). *The Relationship between Mental Health and Substance Abuse among Adolescents*. Rockville, MD: Substance Abuse and Mental Health Services Administration.

⁴ Massachusetts Department of Elementary and Secondary Education. *2015 Health and Risk Behaviors of Massachusetts Youth*.

⁵ Naimi TS, Brewer RD, Mokdad A, Denny C, Serdula MK, Marks JS. (2003). *Binge drinking among US adults*. JAMA. (289).pg.70-75.

⁶ Retrieved from <https://www.cdc.gov/alcohol/fact-sheets/underage-drinking.htm> on August 29, 2018.

⁷ Office of Applied Studies. (2004). *Results from the 2003 National Survey on Drug Use and Health: National findings*. Rockville, MD: Substance Abuse and Mental Health Services Administration. Retrieved from <http://oas.samhsa.gov/2k5/alcDelinquent/alcDelinquent.html> on August 29, 2018.

⁸ Retrieved from NIH fact sheet [*Underage Drinking*]. <http://www.nih.gov/about/researchresultsforthepublic/UnderageDrinking.pdf> on August 29, 2018.

⁹ National Institute on Alcohol Abuse and Alcoholism. (2014). *Alcohol Use Disorder*. Retrieved from <http://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/alcohol-use-disorders> on August 29, 2018.

¹⁰ U.S. Department of Health and Human Services. (2017). *The Surgeon General's Call to Action To Prevent and Reduce Underage Drinking*. U.S. Department of Health and Human Services, Office of the Surgeon General. Retrieved from <http://www.surgeongeneral.gov/topics/underagedrinking/calltoaction.pdf>

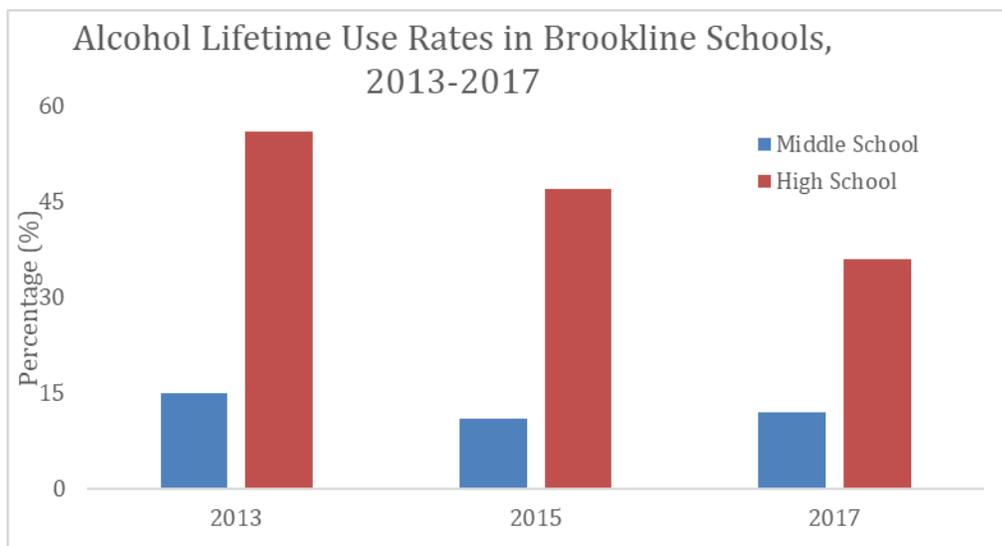
¹¹ Palmgreen, P., &Donohew, L. (2006). *Effective mass media strategies for drug abuse prevention campaigns*. In Z. Sloboda & W. J. Bukoski (Eds.), *Handbook of drug abuse prevention* (pp. 27-43, Part II, *Handbooks of Sociology and Social Research series*). New York: Springer US.

¹² Office of Applied Studies. (2014). *Results from the 2015 National Survey on Drug Use and Health: National findings*. Rockville, MD: Substance Abuse and Mental Health Services Administration. Retrieved from <http://oas.samhsa.gov>

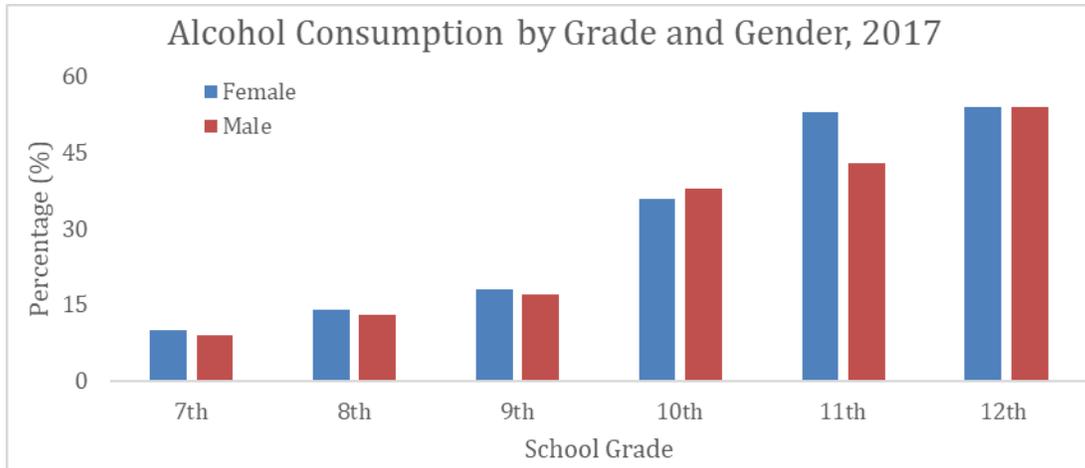
¹³ National Institutes of Health (2017). *NIDA InfoFacts: High School and Youth Trends*. Retrieved from <http://www.nida.nih.gov/infofacts/hsyouthtrends.html> on December 2015

Alcohol Use

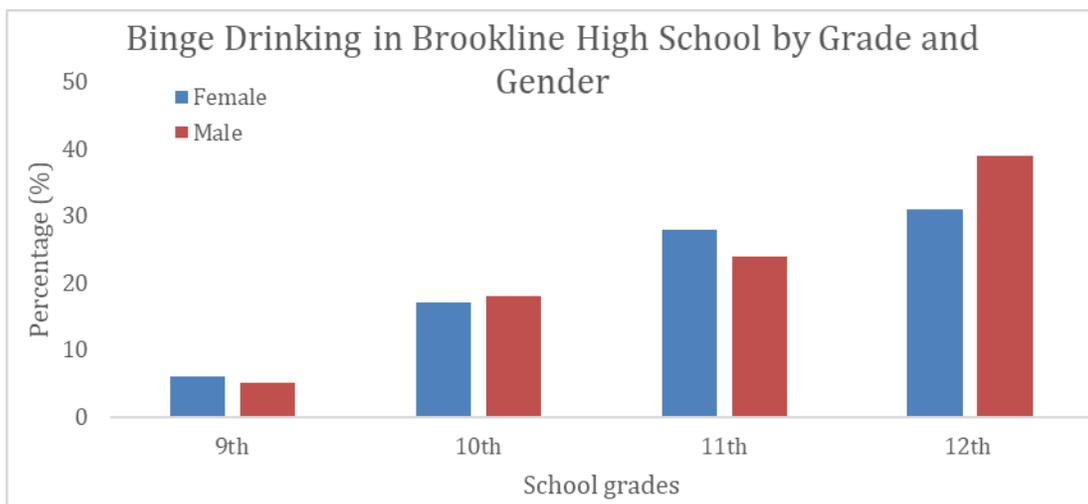
- Alcohol lifetime use rates were 36% in 2017 among high school students and 12% among middle school students. Compared to 2015 and 2013, alcohol rates among high school students are down from 47% and 56%, respectively. After declining from 2013 to 2015, lifetime alcohol use rates among middle school students in 2017 have increased from 11% in 2015.



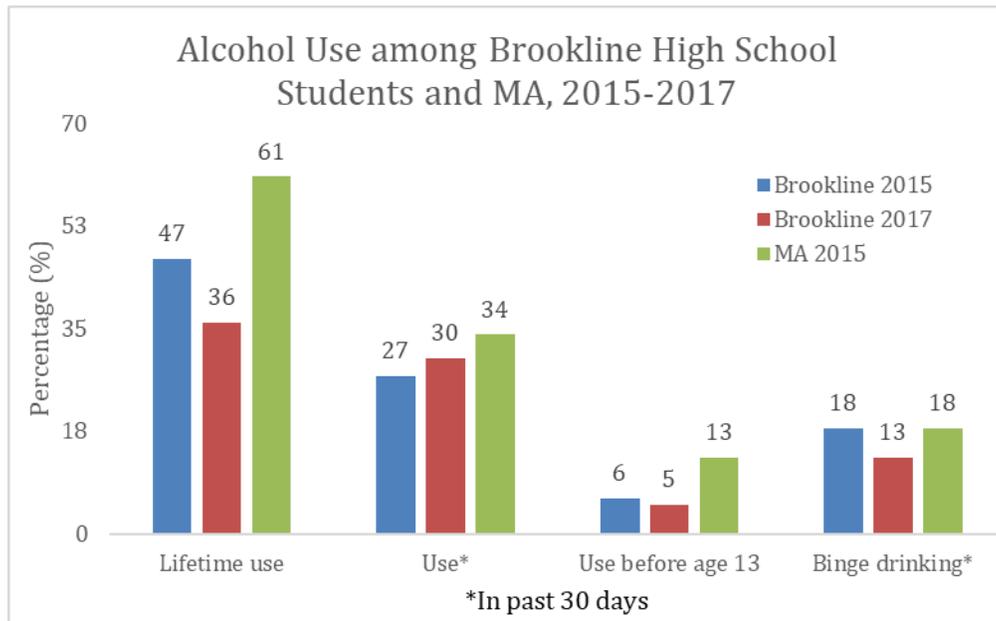
- In 2017, among Brookline 7th graders, 10% of females and 9% of males tried alcohol. This increased among 8th graders with 14% of females and 13% of males having tried alcohol. This trend continues among high school students surveyed in 2017, with 17%, 38%, 43%, and 54% of male freshman, sophomores, juniors, and seniors, respectively, reporting lifetime alcohol use rates. High school females reported similar rates, with 18%, 36%, 53%, and 54% of female freshman, sophomores, juniors, and seniors, respectively, reporting lifetime alcohol use rates.



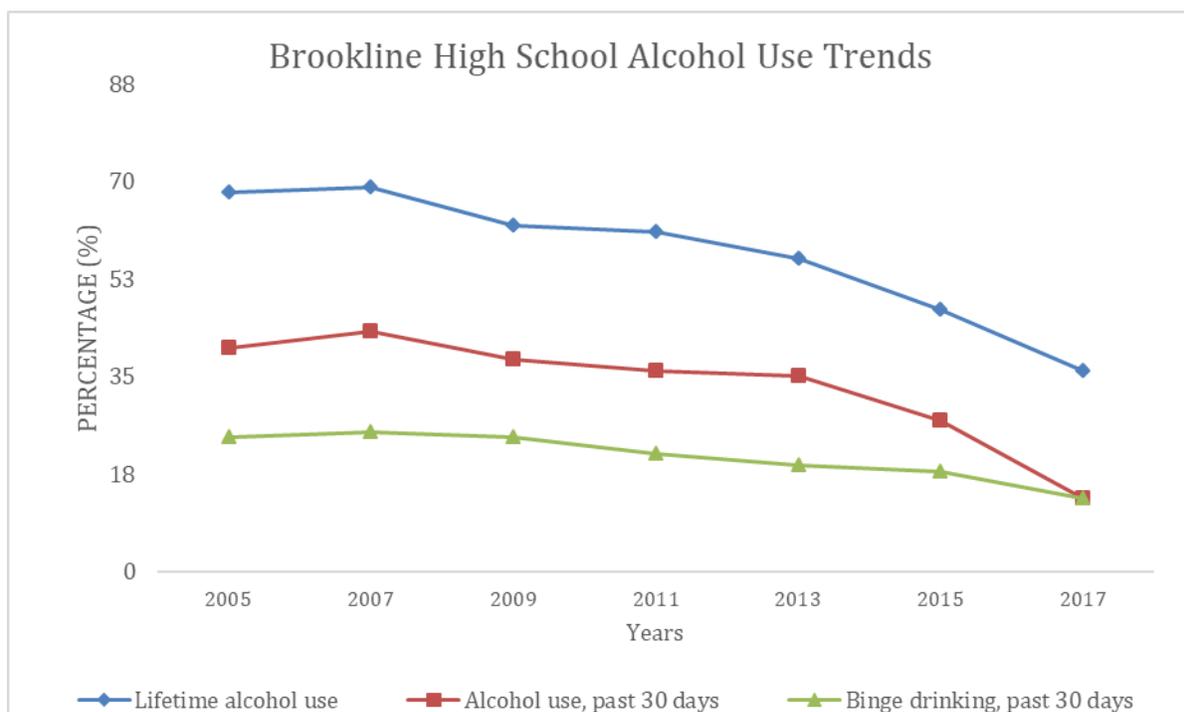
- Although, *first use* of alcohol before age 13 decreased from 6% in 2015 to 5% in 2017 among high school students surveyed, it increased from 6% to 9% among middle school students surveyed in 2015 and 2017, respectively. The percent of students in Brookline High School reporting first use of alcohol before age 13 (5%) was lower than that of both state and national levels (13% and 17%, respectively). There are no middle school surveys at the state and national level for comparisons with Brookline Middle School students.
- Although *the use in the past 30 days* among high school students went up from 27% in 2015 to 30% in 2017, rates among Brookline high school students remain lower than the state and national survey. Alcohol use for the past 30 days was 34% for Massachusetts and 33% for the US.
- Reported rates of binge drinking among high school students in the past 30 days were 13% in 2017 for Brookline. Reported rates of binge drinking for both Massachusetts and the US were 18%.



- Senior and sophomore males reported higher rates than females in their grade levels. Male rates were 39% of seniors, 24% of juniors, 18% of sophomores, and 5% of freshmen. Female rates were 31% of seniors, 28% of juniors, 17% of sophomores, and 6% of freshmen. In general, binge drinking increased with grade level—5% of freshmen, 17% of sophomores, 26% of juniors, and 35% of seniors reported binge drinking.



- Reported rates of drinking during the school day among BHS students were 15% in 2017, indicating a notable increase from 2% in 2015. Drinking during school increased with grade level — 9% of freshmen, 8% of sophomores, 16% of juniors, and 32% of seniors reported such behavior. This is higher than the 3% reported by the state. No statistics were available for the nation.
- The 2017 survey asked two questions about riding with a driver who had been drinking alcohol, distinguishing whether the driver was younger or older than 21 years of age. Five percent of BHS students reported driving with a person younger than 21 who had been drinking, as compared to 16% who rode with someone over 21.
- Females were more likely to engage in sexual activity after drinking — 3% of freshmen, 6% of sophomores, 11% of juniors and 15% of seniors. Males were less likely to engage in sexual activity after drinking across all grade levels — 1% of freshmen, 4% of sophomores, 6% of juniors, and 10% of seniors.
- Students in 7th and 8th grade who reported symptoms of depression also reported higher rates of alcohol use compared to 7th and 8th grade students who did not report symptoms of depression (25% and 10%, respectively).



Illicit Drug Use

Drug abuse and addiction have adverse implications on both individual and societal levels. Estimates of the total costs of illicit drug use in the United States, including productivity and health-/crime-related costs, approximate \$700 billion.¹ Further, the use of illegal and recreational drugs can have a negative impact on a person’s health and safety, potentially leading to injury, violence, unwanted sexual contact, teenage pregnancy, school failure, and/or delinquency.^{2,3}

Marijuana is the most commonly-used illicit drug in the United States, contributing to a variety of health effects and outcomes. Notably, the potency of THC in marijuana has increased by 300% over the past three decades.⁴ Studies suggest that this increase in THC potency may contribute to increased levels of addictive behavior with persistent marijuana use, regardless of whether it is smoked, vaped, or ingested.⁵

Heavy marijuana use has been associated with impaired short-term memory, attention, judgment, and other cognitive functions; difficulty in thinking and problem solving; loss of coordination and balance; and increased heart rate.³ Researchers have found that students who smoke marijuana are more likely to receive lower grades and less likely to graduate from high school compared to their non-smoking peers.⁷ Other studies have shown an association between chronic marijuana use and increased rates of mental health problems, including anxiety, depression, motivational syndrome, and schizophre-

nia.⁵ The age at which marijuana is first used has been implicated in assessing risk for these long-term health outcomes, with younger populations at higher lifelong risk.⁷ Finally, it is important to consider the increased risk of adverse outcomes among individuals with genetic or environmental vulnerabilities (such as early exposure to stress of violence).⁹

Evidence from both real and simulated driving studies indicate that marijuana may negatively affect driver alertness, concentration, reaction time, perception of speed, and ability to draw on information obtained from past experiences.¹⁰ These studies indicate people smoking marijuana with 3.95% potency have the same lack of coordination on standard “drunk driver” tests as people with moderate alcohol intake¹². Further, a study from the National Highway Traffic Safety Administration found that a moderate dose of marijuana is sufficient to impair driving performance, but concurrent alcohol use exacerbates these findings. According to this study, the effects of a low dose of marijuana combined with alcohol are greater than the effect of either drug alone.¹³

A small percentage of adolescents in the United States use other illicit drugs, including cocaine, heroin, hallucinogens (e.g., LSD, peyote, psilocybin, and PCP), and over-the-counter or non-prescribed prescription drugs. There are several adverse physiological effects (e.g., irregular heartbeat, high body temperature, depressed brain function) associated with these drugs, and users may be at greater risk for developing several psychological problems (e.g., anxiety disorders, phobias, depression).¹⁴

While rates of hard drug use remain low among high school students, there is a growing heroin epidemic locally and across the United States. Teens with early onset of marijuana use or heavy marijuana use in adolescence are at a higher risk of heroin use during adulthood.¹⁶ According to the most recent national Monitoring the Future (MTF) study (2017), the annual prevalence of any illicit drug use among 8th, 10th, and 12th graders increased in 2017, reversing the declining trend of the past five years.⁷ Specifically, annual use increased for marijuana, inhalants, cocaine, and tranquilizers.¹⁶

The 2017 Brookline High School Health Survey asked questions about lifetime use of a variety of illicit drugs, as well as rates of current drug use (marijuana or other), heavy use, and age of first use. In addition, students were asked to report if they used marijuana during the school day and if they drove a car or other vehicle after having used marijuana or drugs other than alcohol/marijuana. The Brookline Grades 7 and 8 Health Survey asked questions about lifetime and recent marijuana use, age of first use of marijuana, and lifetime use of other illegal drugs.

In this report, the following definitions were used:

Lifetime use: Any use during one’s life.

Recent use: Any use within the 30 days prior to the survey.

Heavy use: Reported use 100 or more times in one’s life.

Prescription painkillers: Use of prescription opiates (such as Percocet, OxyContin, or Vicodin), to get high, including Ritalin, Adderall or Concerta, or any other amphetamines without a doctor's prescription.

Cocaine use: Use of any form of cocaine, including powder, crack or freebase.

Steroid use: Use of steroids (pills or shots) without a doctor's prescription.

¹ National Institute on Drug Abuse (2015). *Trends & Statistics*. National Institute of Health, [Online] Retrieved December 2015. <http://www.drugabuse.gov/related-topics/trends-statistics>

²Salas-Wright, C., Vaughn, M., Ugalde, J. &Todic, J.(2015).*Substance use and teen pregnancy in the United States: Evidence from the NSDUH 2002–2012*. Addictive Behaviors.(45): 218-225.

³Adger, H. &Leff, M. (2002). *Substance use disorders in children and adolescents and the impact on children in families affected by substance use*. Substance Abuse 23(1): 133-141.

⁴Mehmedic, Z. Chandra, S., Slade, D.,Denham, H.,Foster, S., Patel, A.,Ross,S.,&Khan,I. (2010). *Potency Trends of Δ9-THC and Other Cannabinoids in Confiscated Cannabis Preparations from 1993 to 2008*. Journal of Forensic Science.55(5): 1209-1217.

⁵Volkow, N. D., Baler, R. D., Compton, W. M., & Weiss, S. R. Adverse Health Effects of Marijuana Use. (2014). *The New England Journal of Medicine*.

⁶National Institute on Drug Abuse (2010). *Research Report Series – Marijuana Abuse*. [Online] Retrieved from <http://www.nida.nih.gov/ResearchReports/Marijuana/Marijuana3.html>

⁷Moir, D., Rickert, W. S., Levasseur, G., Larose, Y., Maertens, R., White, P., & Desjardins, S. (2008). *A comparison of mainstream and sidestream marijuana and tobacco cigarette smoke produced under two machine smoking conditions*. Chemical Research in Toxicology. 21(2), 494-502. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/18062674>

⁸Neighmond, P. (2014). *Marijuana May Hurt The Developing Teen Brain*. Retrieved from <https://www.npr.org/sections/health-shots/2014/02/25/282631913/marijuana-may-hurt-the-developing-teen-brain> on March 22, 2018

⁹Lynskey, M. & Hall, W. (2000). *The effects of adolescent cannabis use on educational attainment: A review*. Addiction. 95(11): 1621-1630

¹⁰Center for Disease Control (2017). *Marijuana and Public Health*. Retrieved from <https://www.cdc.gov/marijuana/factsheets/teens.htm> on March 22, 2018

¹¹National Institutes of Health (2010). *NIDA InfoFacts: Drugged Driving*. Retrieved from <http://drugabuse.gov/infofacts/driving.html> on December 2015

¹²Liguori, A.,Gatto, C.P. & Robinson, J.H. (1998). *Effects of marijuana on equilibrium, psychomotor performance, and simulated driving*. Behavioral Pharmacology.(9): 599-609

¹³National Institute on Drug Abuse. *Prescription Medications*. [online] Retrieved from <http://www.drugabuse.gov/drugs-abuse/prescription-medications> on December 2015

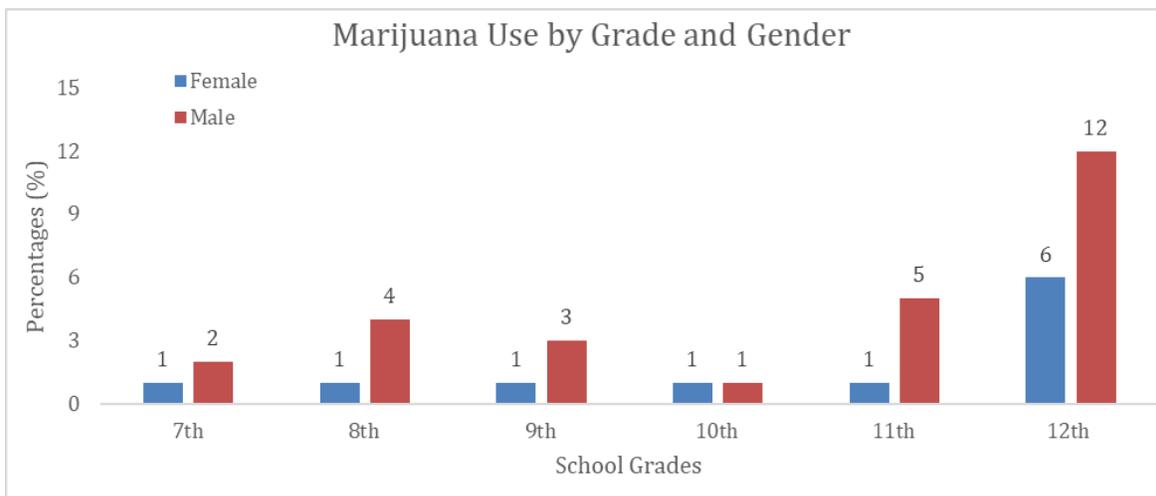
¹⁴Wu, Li-Tzy, Ringwalt, CL, Mannelli, P, Patkar, AA.(2008). *Prescription Pain Reliever Abuse and Dependence among Adolescents: A Nationally Representative Study*. Journal of the American Academy of Child and Adolescent Psychiatry 47(9):1020-1029

¹⁵A. (2017). *Pediatricians step up warnings about marijuana use by teens*. Retrieved from <https://www.cbsnews.com/news/pediatricians-step-up-warnings-about-marijuana-use-by-teens/> on March 22, 2018

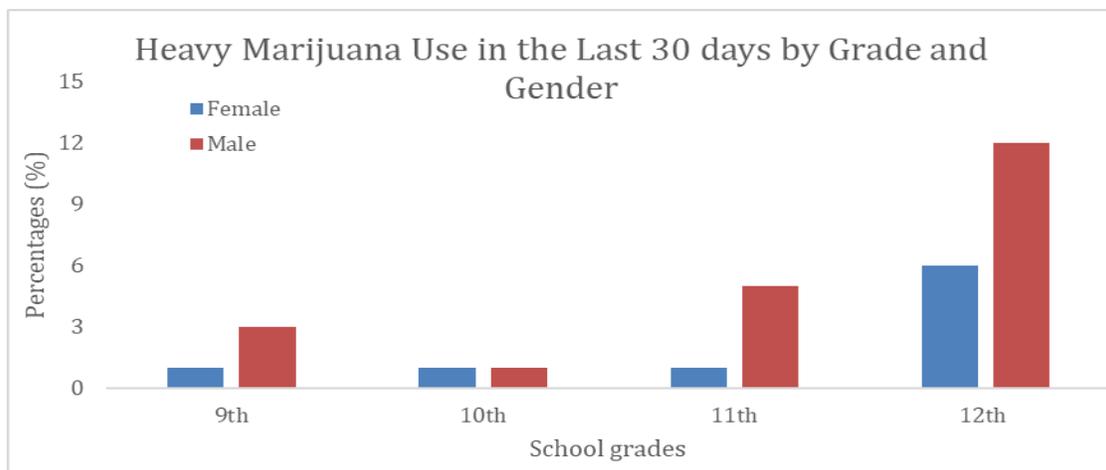
¹⁶Johnston, L. D., Miech, R. A., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Patrick, M. E. (2018). *Monitoring the Future national survey results on drug use: 1975-2017: Overview, key findings on adolescent drug use*. Ann Arbor: Institute for Social Research, The University of Michigan.

MARIJUANA USE

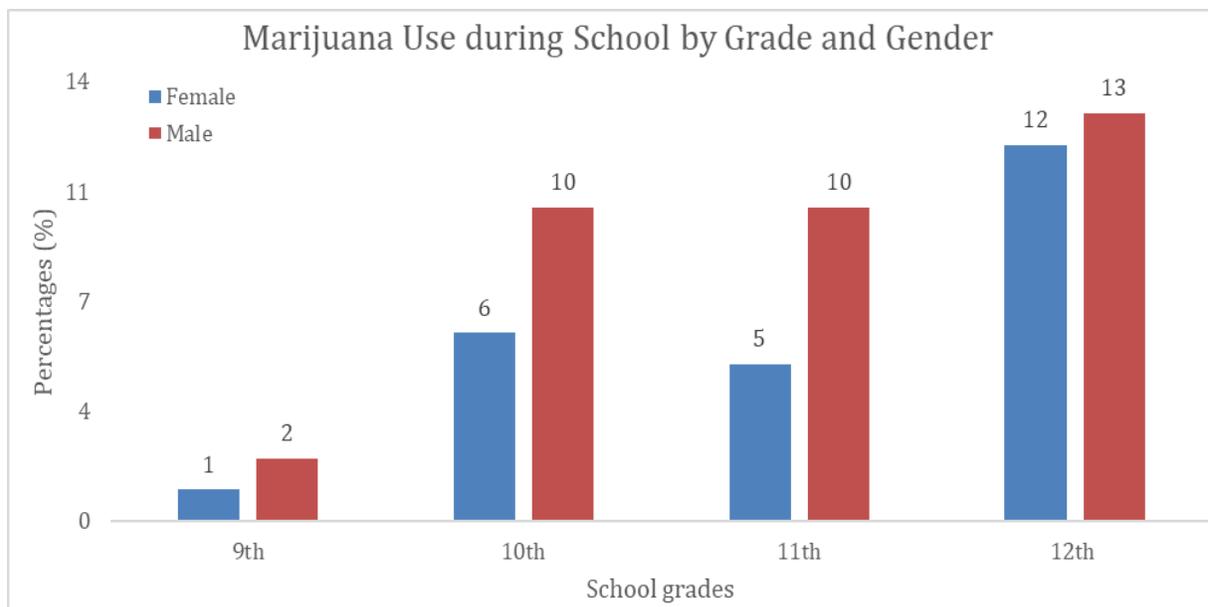
- In 2017, 2% of Brookline 7th and 8th graders reported lifetime marijuana use compared to 2% and 5% in 2015 and 2013, respectively. Among Brookline high school students, 26% reported ever having used marijuana in 2017, compared to 34% in 2013 and 27% in 2015.
- With the exception of 10th graders, males in all grades reported higher rates of marijuana use than females. Among males, 2% of 7th graders, 4% of 8th graders, 12% of freshmen, 30% of sophomores, 30% of juniors, and 44% of seniors reported use. Among females, 1% of 7th graders, 1% of 8th graders, 7% of freshmen, 25% of sophomore, 36% of junior and 43% of seniors reported ever having used marijuana.



- Among high school students, marijuana use in the past 30 days declined to 17% in 2017, compared to 21% in 2013 and 16% in 2015. These findings are lower than both state-wide and national rates (25% and 22%, respectively). Reported use of marijuana in the past 30 days among middle school students was less than 1% in 2017. There are no U.S. middle school data for comparison.



- The use of marijuana in the last 30 days increased with grade level (7% of freshmen, 16% of sophomores, 21% of juniors, and 32% of seniors).
- In 2017, 4% of Brookline high school students reported using marijuana 100 or more times.
- In all grades but 10th, males reported higher rates of heavy marijuana use than females.
- Rates of first use before age 13 remained consistent at 1% from 2015 to 2017, which is lower than the state average of 6% and the national average of 8%.
- Among 7th and 8th graders who reported they had used marijuana, 41% reported symptoms of depression as compared to 14% of students who had not used marijuana.
- Students who first tried marijuana at a younger age were more likely to have used marijuana more than 10 times in the past 30 days. A quarter (25%) of students who had used marijuana by age 12 reported using more than 10 times in the past 30 days, and 19% of those who had used by age 14 reported using more than 10 times in the past 30 days.
- 6% of Brookline High School students reported using marijuana during the school day. Males were more likely to report marijuana use during the school day than females: among freshman, 2% of males compared to 1% of females; among sophomores, 10% of males compared to 6% of females; among juniors, 10% of males compared to 5% of females; and among seniors, 13% of males compared to 12% of females.



OTHER ILLEGAL DRUG USE

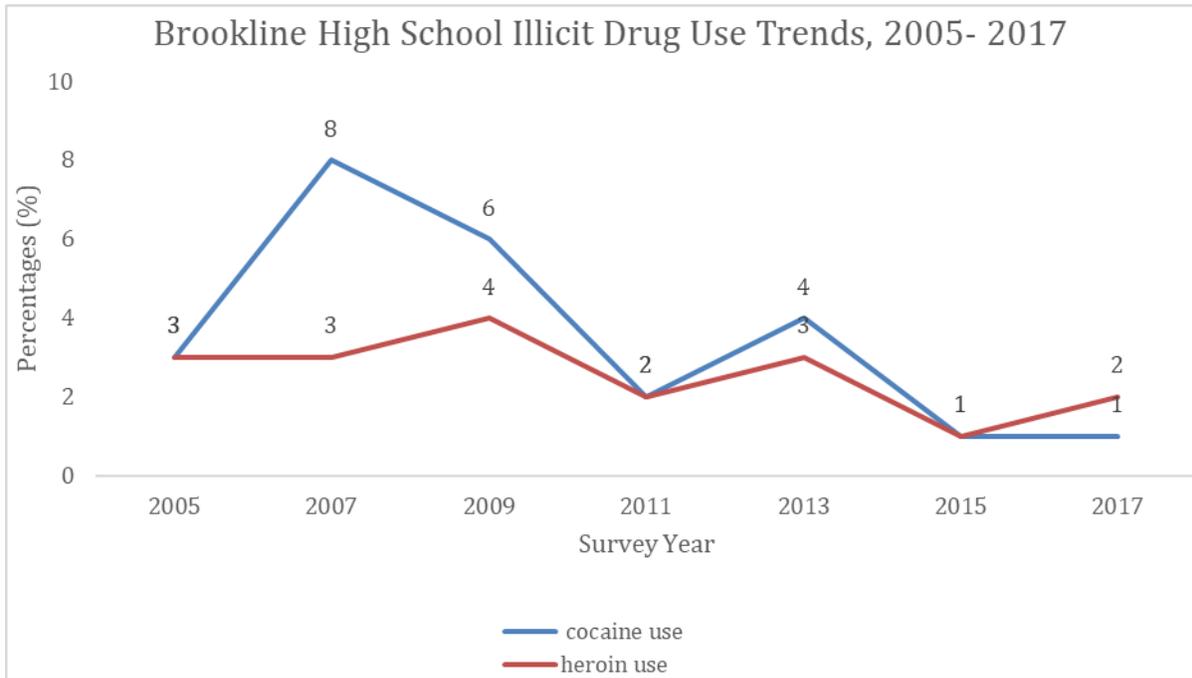
Note: Comparisons from state and national surveys only regarded use of cocaine, heroin and steroids.

- For middle school students in grades 7-8, the reported rates of illegal drug use remained relatively low at less than or equal to 1% from 2015-2017 for use of cocaine, steroids, amphetamines, and painkillers. Brookline high school students reported similarly low use, with slightly higher rates of amphetamine and painkiller use. Reported use in Brookline is lower than both statewide and national levels.

Illicit Drug Use Among Brookline Students, 2017 (%)		
Drug	Middle School	High School
Cocaine	<1%	<1%
Steroids	<1%	<1%
Amphetamines (Ritalin, Adderall, Concerta)	1%	2%
Painkillers (Percocet, Oxycodone, or Vicodin)	<1%	2%

- The rates of heroin use among high school students decreased from 1% to <1% from 2015 to 2017. This is lower than the state and national averages of 2%.
- The use of depressants among high school students (i.e., Valium, Xanax) decreased from 2% to 1% from 2017 to 2015, respectively.
- The reported use of hallucinogens among high school students decreased from 3% in 2015 to 1% in 2017. The only information collected at the state and national level for hallucinogens was for the use of ecstasy. In 2017, the lifetime use of ecstasy was 4% for Massachusetts and 5% for the US.
- The use of OTC cough/cold medicine to get high among high school students decreased from 5% in 2015 to 2% in 2017.
- Use of inhalants was less than 1% among middle school students in 2017.

Drug-Use Trends among Brookline High School Students from 2015 to 2017		
Drug Type	High School Use (% of all students) in 2015	High School Use (% of all students) in 2017
OTC cough/cold medicine	5	2
Anti-Depressants (Klonopin, Valium, Xanax, Ativan)	2	1
Prescription pain killers (Percocet, OxyContin, Oxycodone, Vicodin)	2	2
Hallucinogens, LSD, Mushrooms, Ketamine, Ecstasy	3	1
Ritalin, Adderall, Concentra, Amphetamines	4	2



Tobacco Use and Electronic Cigarettes

Despite a decades-long decline in use across the United States, tobacco remains the leading *preventable* cause of disease, disability, and death in the United States.¹ Nearly 40 million US adults smoke cigarettes, and 4.7 million middle and high school students use at least one form of tobacco product daily.² Each year, smoking causes nearly 500,000 premature deaths, predominantly as a result of cancer, stroke, and chronic respiratory illness.² Smokeless forms of tobacco use (i.e. chewing tobacco or snuff) are also associated with adverse health outcomes, including oral cancer.³

Tobacco use among young individuals is associated with a particularly increased risk. Along with adverse health outcomes, adolescent tobacco use is also associated with higher rates of drinking/illegal drug use and poorer school performance.⁴ Further, research indicates that earlier age of smoking initiation is positively associated with greater permanent lung damage and increased levels of addiction later in life.^{4,5} From 2013 to 2015, survey results showed decreases in several measures, including ever tried cigarette smoking, smoked a whole cigarette before age 13 years, currently smoked cigarettes, currently smoked cigarettes frequently, and currently smoked cigarettes daily. No changes were observed for currently used smokeless tobacco or tried to quit smoking.^{5,8} Overall, 20.8% of U.S. high school students reported use of at least one form of tobacco in the past year.⁶

Indicators of cigarette smoking substantially declined among Massachusetts high school students between 1995 to 2015 (from 23.9% in 2009 to 15.8% in 2015).⁸ The downward trend has been observed for cigars and smokeless tobacco as well. Males are more likely to smoke in all categories. Some subgroups, however, report higher use, including those considering suicide, performing poorly in school (averaging below a B level), or identifying as gay, lesbian, bisexual, or transgender.⁸

Brookline is a designated smoke-free community, with legislation prohibiting smoking in restaurants and lounges, public places and retail establishments, most worksites, and within 400 feet of Brookline High School buildings. Tobacco retailers must have permits to sell tobacco and are periodically monitored to determine whether they are selling to minors. Additionally, in 2014, Brookline raised the legal age for purchase of tobacco products to 21, and in 2015, the town passed a warrant article to include e-cigarettes in all town tobacco-related regulations.

While the use of cigarette is declining in Brookline, the use of e-cigarettes and vape pens has risen considerably. Marketing strategies may be one factor leading to the increase in cartridge-filled vape pens specifically, as advertising typically emphasizes social aspects of use without addressing health risks. Further, without fumes or visible vapors, these forms of tobacco allow adolescents to smoke in a more concealed manner. The pens are available in a wide variety of shapes (from a fake cigarette to a USB drive)

and liquid flavors. These liquids are heated in the battery-powered pen to emit a vapor for inhalation. The smokeless nature of these products may be particularly attractive to younger users who would otherwise refrain from tobacco use. Additionally, vape pens are increasingly being used as delivery methods for marijuana.⁹

The 2017 Brookline High School Health Survey asked students to report their history and current use of cigarettes. Additionally, students reported recent use of all tobacco products, attempts to quit smoking, and age of first use. The Brookline Grades 7 and 8 Health Survey asked similar questions.

In this report the following definitions were used:

Lifetime use of any tobacco products: including cigarettes, cigars, smokeless tobacco, shisha, hookah, and electronic vapor products

Recent use of tobacco: Any cigarette smoking or electronic vapor products in the 30 days before the survey.

Recent use of chewing tobacco, snuff or dip: Any use of these products in the 30 days before the survey.

Recent use of other forms of tobacco: Any use of tobacco other than the above, such as smoke-free and dissolvable forms (such as Snus and Orbs), tip cigars, cigarillos, or other flavored cigars (such as Phillies Blunt or Black and Mild).

¹ <https://www.drugabuse.gov/drugs-abuse/tobacconicotine-e-cigs>

² https://www.cdc.gov/tobacco/data_statistics/index.htm

³ Public Health Service. (1986). *The health consequences of using smokeless tobacco: A report of the advisory committee to the Surgeon General*. NIH Publication. Bethesda, MD: U.S. Department of Health and Human Services. No. 86-2874

⁴ Eaton, D., Brener, N., & Kann, L. (2008). *Associations of health risk behaviors with school absenteeism. Does having permission for the absence make a difference?* Journal of School Health. 78(4):223-229

⁴ Public Health Service (1994). *Preventing tobacco use among young people: A report of the Surgeon General*. Washington, DC: U.S. Government Printing Office.

⁵ Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2014). *Monitoring the Future national results on adolescent drug use: Overview of key findings*. Ann Arbor, MI: Institute for Social Research, The University of Michigan.

⁶ SAMHSA, Center for Behavioral Health Statistics and Quality. *National Survey on Drug Use and Health, 2014*. Retrieved from <http://www.samhsa.gov/data/sites/default/files/NSDUH-FRR1-2014/NSDUH-FRR1-2014.pdf> on November 23, 2015

⁷ https://www.cdc.gov/healthyyouth/data/yrbs/pdf/trends/2015_us_tobacco_trend_yrbs.pdf

⁸ <http://www.mass.gov/eohhs/docs/dph/tobacco-control/youth-tobacco-report-2015.pdf>

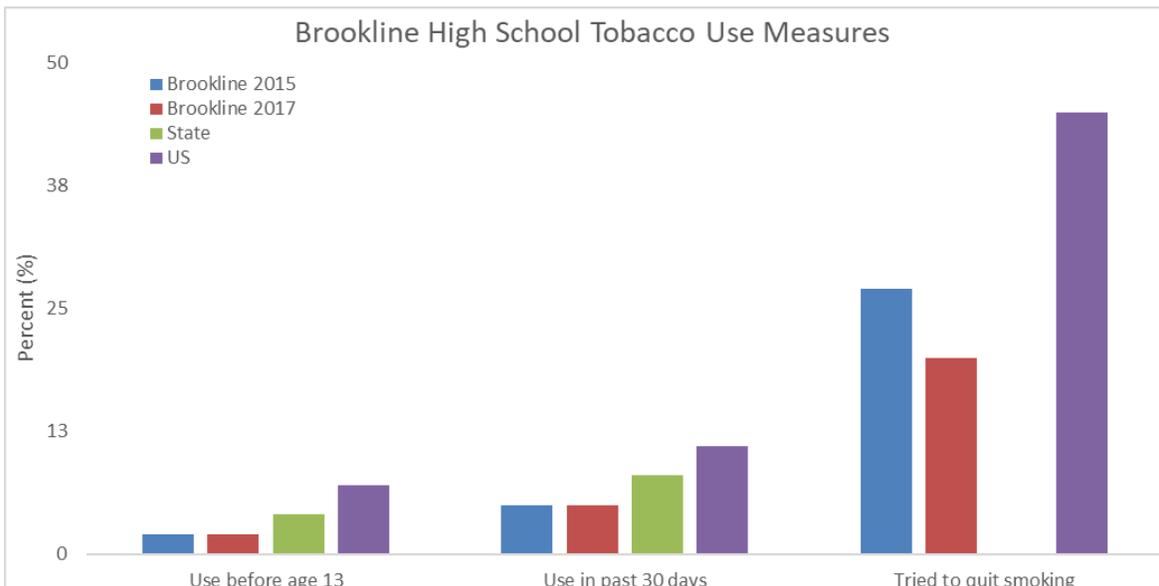
⁹ Lee, Dustin C et al. (2016). "Online survey characterizing vaporizer use among cannabis users." Drug and Alcohol Dependence. (159): 227-33. doi:10.1016/j.drugalcdep.2015.12.020

Tobacco Use and Electronic Cigarettes

In 2017, the survey question "ever used" changed to include both tobacco cigarettes and electronic cigarettes without differentiation. The survey found the rate of lifetime

tobacco use in Brookline middle school to be 3%. Among high school students, lifetime tobacco use increased from 15% in 2015 to 17% in 2017. The rates in Brookline remain significantly lower than those for high school students state-wide and nationally (29% and 31%, respectively). There is no state middle school survey for comparison of Brookline middle school.

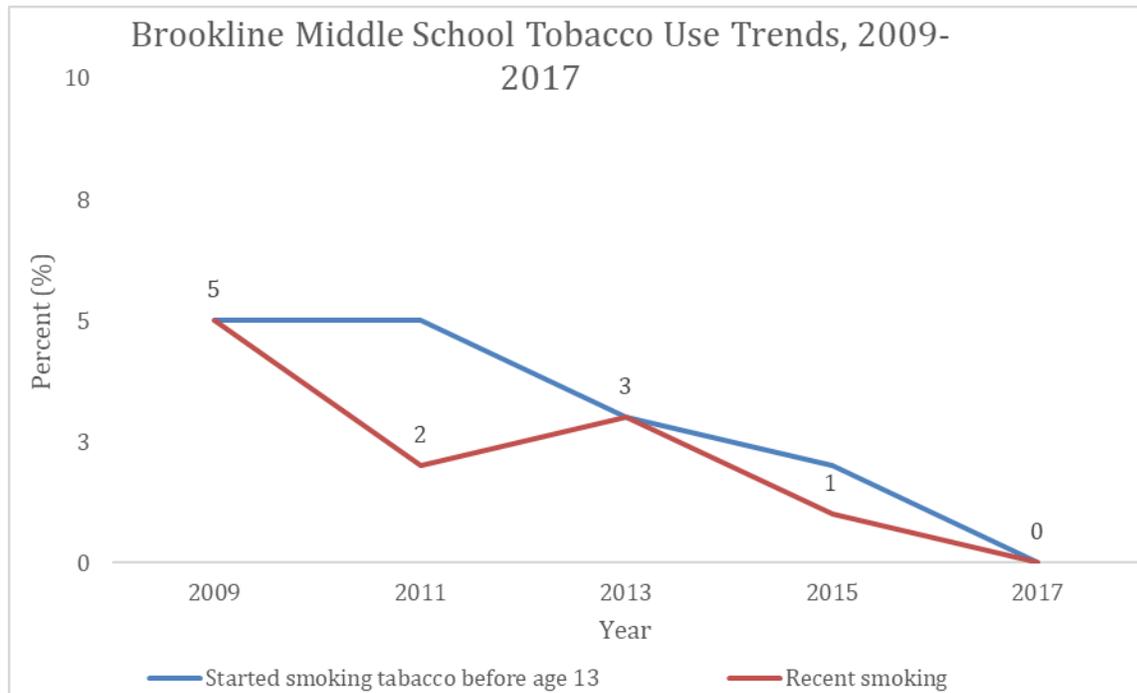
- Among middle school students, 2% of males and 2% of females in 7th grade reported lifetime use of any tobacco products, increasing to 2% of females and 8% of males in 8th grade. Among Brookline high school students, 19% of males and 17% of females had ever used any tobacco products.



- The rates of first use of tobacco before age 13 among high school students remained at 2% from 2015 to 2017. Similarly, among middle schoolers surveyed, 2% of 7th and 8th grade students reported starting to smoke cigarettes before age 13. The trend of first tobacco use before age 13 among middle school students remained the same as in 2015.
- In Brookline High School, the rate of recent use of chewing tobacco, snuff, or dip was 3% in 2017, compared to 2% in 2015. This is less than the state average of 6%. Use of chewing tobacco among middle school students remained the same between 2015 to 2017 (1%). Finally, use of other forms of tobacco (i.e. flavored products, cigarillos) among middle schoolers decreased from 4% in 2015 to 1% in 2017.
- Use in the past 30 days remained the same from 2015 to 2017 at 5% among high school students. This is lower than the state average of 8%. Among middle school students, the number of students who reported having smoked either a tobacco cig-

arete or e-cigarette at least once in the last month decreased from 5% in 2015 to 3% in 2017.

- In 2017, 20% of Brookline high school smokers had tried to quit smoking cigarettes at least once, as compared to 27% in 2015.



- For the first time in 2017, the national “Monitoring the Future” survey asked high school students about vaping habits. Vaping at any point in the previous year was reported by 13% percent of 8th graders, 24% of 10th graders, and 28% of 12th graders nationally.

Physical Safety and Violence-Related Behaviors

Violence related behaviors such as carrying weapons, fighting, and bullying pose serious risks to the health and safety of young people. Nationally, homicide is the third leading cause of death for people aged 15 to 24 (behind unintentional injury and suicide).¹ On average in 2013, there were more than 12 adolescent homicides per day in the US.¹ Of these homicides, 86% involved firearms.² According to the nationwide 2015 Youth Risk Behavior Survey, 22% of high school students reported involvement in a physical fight, and more than 6% had been threatened or injured by a weapon in the 12 months before the survey.⁸ According to the Massachusetts Youth Risk Behavior Survey (2015), 19% reported involvement in a physical fight in the 12 months before the survey, and 4% had been threatened or injured by a weapon in the same time period.³

According to the American Academy of Pediatrics, adolescents are more likely to experience sexually violent crimes than any other age group.⁴ Sexual violence, including sexual coercion and assault, can have a lasting impact on psychological development.⁵ Teen dating violence has been associated with long-term consequences, including as a possible precursor to future domestic violence during adulthood. Young females in particular are at higher risk on college campuses—as many as 1 in 5 female college students are survivors of sexual assault.⁵ Out of these women, 70% knew the perpetrator.⁵

Bullying is generally defined as the repeated and intentional intimidation, harassment, or physical harm of victims who are perceived as unable to defend themselves. In the past several years, national, state, and local attention has been directed towards bullying. With the goal of further raising stigma against bullying, the American Academy of Pediatrics continues to assert bullying may lead to serious physical and mental health consequences.⁷ Nationally, 20% of high school students reported being bullied in the past 12 months on school property.⁸ More females reported being bullied in the past 12 months. Females were more likely to be bullied irrespective of grade level or race/ethnicity.⁸

There is increasing awareness of the internet, cell phones, and social networking as emerging venues for electronic bullying or cyberbullying. Cyberbullying occurs when a person under 18 years old is tormented, threatened, harassed, humiliated, embarrassed, or otherwise targeted by another child under 18 years old using the internet or other digital technology (including cell phones).⁶ Cyberbullying offers a unique set of challenges, as anonymity, rapid information dissemination, separation of the victim and perpetrator, and lack of adult oversight may make it difficult to address.

Finally, automobile safety is included in this section, as seatbelt use, technology use, and driving under the influence all contribute to physical safety of students.

The 2017 Brookline High School and Middle School Health Surveys asked questions about bullying, electronic bullying, weapon-carrying, physical fighting, perceived safety at school, dating violence, and automobile safety behaviors. Perceived safety questions included questions about witnessing derogatory remarks made about gay, lesbian, bisexual, and transgendered people. Perceived safety questions also included questions about witnessing derogatory remarks about different races and ethnicities.

In this report, the following definitions were used:

Past 12 months or past year: Participation in the reported behavior at least once during the 12 months prior to the survey

Recent or past month: Participation in the reported behavior on at least one of the 30 days prior to the survey.

Ever: Participation in the reported behavior at any time during the student's lifetime.

Electronic Bullying: Bullied through e-mail, chat rooms, instant messaging, websites, or texting (cell phones)

Carried a weapon: In the high school survey, weapons exclude firearms. The middle school survey includes firearms as part of the survey.

¹Center for Disease Control and Prevention.(2014). *National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WIQARS)*[online]. Retrieved from www.cdc.gov/injury

²Kann L, McManus T, Harris WA, et al. (2015). *YouthRisk Behavior surveillance- United States, 2015 MMWR Morb Mortal Surveil Summ.* 65(SS-06):1-174. Retrieved from <http://www.cdc.gov/mmwr/volume/65/ss/pdfs/ss6506.pdf>

³Massachusetts Department of Education and Massachusetts Department of Public Health. (2015). *Health and Risk Behaviors of Massachusetts Youth.*

⁴American Academy of Pediatrics (2008). *Care of the Adolescent Sexual Assault Victim.* *Pediatrics*, 122 (2): 462-470.

⁵Krebs, Lindquist, Berzofsky, Shooks-Sa & Peterson. (2015). *Washington Post-Kaiser Family Foundation Survey*

⁶Department of Health and Human Services, Department of Education, and Department of Justice. Retrieved from www.stopbullying.gov on December 2015.

⁷Committee on Injury, Violence, and Poison Prevention (2009). *Role of the Pediatrician in Youth Violence Prevention.* *Academy of Pediatrics.* 124 (1):393-402.

⁸Centers for Disease Control and Prevention. (2015). *Youth Risk Behavior Survey* Retrieved from www.cdc.gov/yrbbs

⁹Parks, SE, Johnson LL, McDaniel DD, Gladden M; Centers for Disease Control and Prevention (2014). *Surveillance for violent deaths - National Violent Death Reporting System, 16 states, 2010.* *Morbidity and Mortality Weekly Report Surveillance Summary*, 63(1): 1-33.

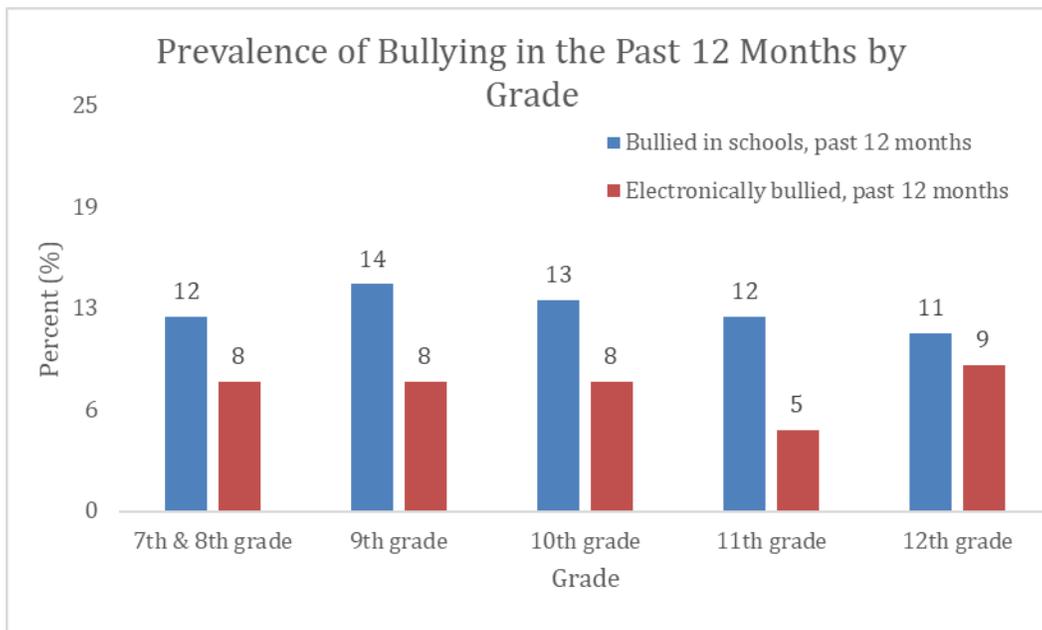
Physical Safety and Violence-Related Behaviors

Note: Although there are US high school data for comparison, there are no US middle school data for comparison.

Bullying in Brookline

- 17% of Brookline high school students have felt unsafe at home or in the community in the past month.
- In 2017, 3% of BHS students reported missing school due to feeling unsafe in the past month compared to 4% in 2015. These data are comparable to the state (5%) and national (6%) levels. All grade levels reported nearly the same percent of students—4% of freshmen, 3% of sophomore, 2% of juniors, and 5% of seniors.
- The number of high school students who reported being bullied at school in the past 12 months was 13% in 2017, increasing from 9% in 2015. In 2017, bullying at school decreased with seniority: 14% of freshmen, 13% of sophomore, 12% of juniors, and

11% of seniors reported being targets of bullying. Among Brookline middle school students, 12% reported having been bullied on school property during the past 12 months.



- Of the 15% of high school students and 18% of middle school students who reported they were bullied, one third reported that they did not tell anyone.
- Among high school students, 7% reported having been electronically bullied in the past 12 months compared to 6% in 2015. Electronic bullying remained steady across high school grades - 8% of freshmen, 8% of sophomores, 5% of juniors, and 9% of seniors. Similarly, 8% of Brookline middle school students reported having been electronically bullied in the past 12 months. This represents a decrease from 13% in 2015 among Brookline middle schoolers and a lower rate than the state average of 15%.
- Among high school students, 19% of gay or lesbian students and 20% of bisexual students reported being bullied on school property, compared to 12% of heterosexual students. There is a greater disparity in bullying by sexual orientation among middle school students. Among Brookline middle school students, 43% of gay or lesbian students and 26% of bisexual student reported having bullied on school property in the past 12 months compared to 1% of heterosexual students.

Bullied in the past 12 months (%)	Bullied at school	Bullied electronically	Bullied at school	Bullied electronically
Heterosexual	10	6	1	6
Gay/Lesbian	19	27	43	29
Bisexual	20	11	26	17

- Among high school students, 27% of gay or lesbian students and 11% of bisexual students reported being electronically bullied, as compared to 6% of heterosexual students. Among middle school students, gay/lesbian (29%) and bisexual (17%) students also reported higher rates of electronic bullying than heterosexual students (6%).
- The prevalence of Brookline high school students that reported hearing derogatory remarks regarding sexual orientation at school decreased from 68% in 2015 to 55% in 2017. Among middle school students, 45% of 7th and 8th graders reported hearing negative comments towards gay, lesbian, bisexual, or transgendered people while outside of school, down from 61% in 2015. Similarly, 41% of 7th and 8th grade students reported hearing negative comments about gay, lesbian, bisexual, or transgendered people while at school in the past 30 days, down from 54% in 2015.
- In 2017, Brookline high school students were asked for the first time about hearing derogatory remarks regarding racial, ethnic, immigrant, and/or religious groups. The prevalence of BHS students that reported hearing derogatory remarks regarding racial, ethnic, immigrant, and/or religious groups was 70% in 2017.

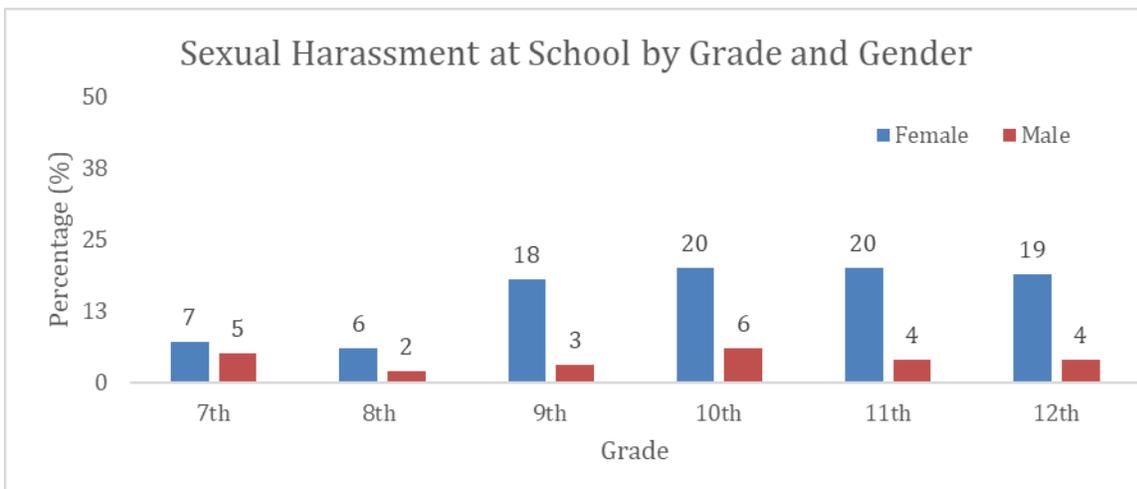
Physical safety and weapons

- Among high school students, 5% reported being in a physical fight on school property in the past 12 months. Among middle school students, 7% reported having ever been in a physical fight resulting in injury that required medical attention.
- In 2017, 2% of BHS students reported carrying a weapon, such as a knife or club, on school property at least once during the 30 days prior to the survey. This has remained the same since 2015.
- At the High School level, Brookline's rates of students (2%) carrying a weapon at school were lower than state (13%) and national rates (16%). Rates were slightly higher among Brookline 7th-8th grade students with 3% of middle school students reporting having ever carried a weapon (including gun, knife, or club) to school in 2017. Three percent of middle school students reported having access to a gun. This is the same as the findings in 2015.

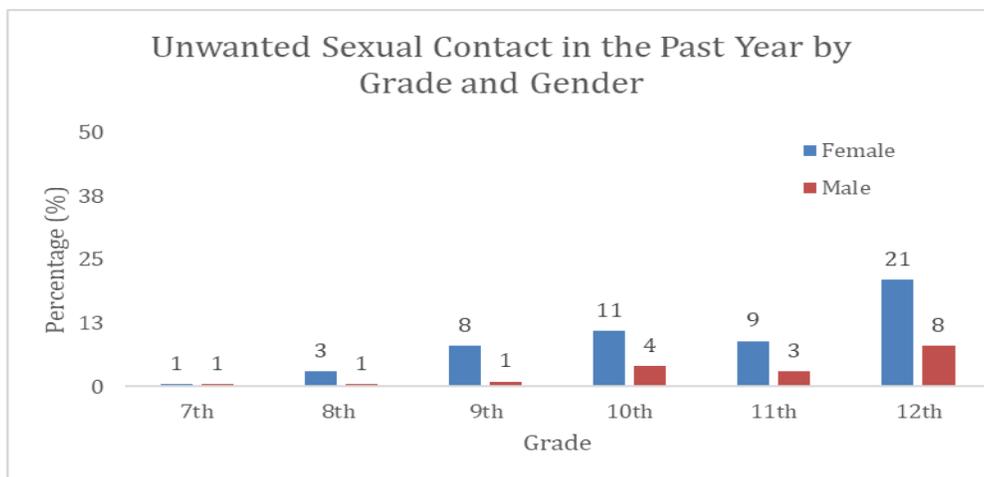
- Less than 1% of BHS students reported carrying a gun in the past month. This has declined from 1% in 2015. In 2015, state and national levels were 3% and 5%, respectively.

Sexual harassment

- The survey asked about sexual harassment at school for the first time in 2017. Sexual harassment was higher for females at all grade levels— 7% of 7th grade females compared to 5% of 7th grade males, 6% of 8th grade females compared to 2% of 8th grade males, 18% of freshmen females compared to 3% of freshmen males, 20% of sophomore females compared to 6% of sophomore males, 20% of junior females compared to 4% of junior males, and 19% of senior females compared to 4% of senior males.



- BHS Students were asked about unwanted sexual contact. In 2017, 6% reported they had experienced sexual contact against their will, as compared to 8% in 2015 and 7% in 2013.



- Unwanted sexual contact in the past 12 months, on average, was higher for females than males: 3% of 8th grade females compared to less than 1% of 8th grade males, 8% of freshmen females compared to 1% of freshmen males, 11% of sophomore females compared to 4% of sophomore males, 9% of junior females compared to 3% of junior males, and 21% of senior females compared to 8% of senior males. Less than 1% of 7th grade females reported unwanted sexual contact.
- 4% of Brookline high school students reported experiencing forced sexual contact with someone they were dating in 2017. Forced sexual contact with a significant other was higher for females than males— 4% of freshmen females compared to 0% of freshmen males, 8% of sophomore females compared to less than 1% of sophomore males, 2% of junior females compared to 1% of junior males, and 8% of senior females compared to 4% of senior males.
- 1% of BHS students reported physical abuse by someone they were dating, including being hit, slammed into something, or injured with an object or weapon.
- Less than 1% of Brookline 7th-8th grade students reported ever being intentionally hit, slapped or physically hurt by a significant other.

Automobile Safety Behaviors:

- When driving a car, 94% of Brookline high school students always wear seatbelts, 4% wear seatbelts most of the time, <1% wear seatbelts sometimes, <1% wear seatbelts rarely, and <1% wear seatbelts never. Among Brookline middle school students, 70% of students always wear seatbelts, 22% wear seatbelts most of the time, 6% wear seatbelts sometimes, 2% wear seatbelts rarely, and 1% wear seatbelts never.
- When someone else is driving, 63% of Brookline high school students always wear a seatbelt. 23% wear one most of the time, 6% sometimes wear one, and 3% rarely or never wear one.
- Among Brookline high school students who drive, 58% drove a car or another vehicle while using a cellphone or other handheld device (iPod, iPad, Blackberry, etc.) during the past 30 days.
- 16% of Brookline high school students rode in a car or other vehicle driven by someone over 21 under the influence of alcohol in the past 30 days.
- Among Brookline high school students who drive, 17% drove a car or another vehicle in the past 30 days while drinking alcohol. Among middle school students, 13% rode in a car or other vehicle in the past 30 days driven by someone who had been drinking alcohol.

- Among Brookline high school students who drive, 28% drove in a car or another vehicle in the past 30 days while using marijuana. Among middle school students, 6% of students rode in a car or other vehicle in the past 30 days driven by someone who had been using marijuana.

Sexual Behavior

Adolescents engaging in sexual behavior without proper sexual education may result in unforeseen consequences. Early sexual activity, multiple sexual partners, and lack of condom or other contraceptive use increase the likelihood of unintended pregnancy and sexually transmitted diseases (STDs), such as gonorrhea, chlamydia or HIV.¹ While only some STDs are curable (such as gonorrhea or chlamydia), all may result in long-term implications on an individual's health if left untreated.

For the past several years, the teenage birth rate has been declining.² In 2015, the teenage birth rate was 22.3 per 1,000 females aged 15-19 in the US, representing an 11% decrease from 2014.² Overall, the number of births attributed to teenage mothers was 229,715.² The rates of both teenage pregnancy and teenage abortion are the lowest they have been in the past 40 years. Most of the decline has been attributed to increased contraceptive use, but a small portion may be attributed to a reported reduction in sexual activity.³ Massachusetts follows national trends with declining teen birth rate. In 2015, the state's teen birth rate reached an all-time low of 9.4 per 1,000 women. This represents a 56% decline since 2007, when it was 21.4 births per 1,000 women.²

Sexually transmitted diseases contribute to illness and death among adolescents, young adults, and newborns. According to the Center for Disease Control, one half of the twenty million new STD infections each year occur among young persons between the ages of 15 and 24, and 1 in 4 sexually active adolescent females has an STD.^{4,5} Compared to adults, teenagers may be at a higher risk for disease due to various cultural, educational, or behavioral factors.⁵ Further, those who contract STDs may be at increased risk for severe consequences, including pelvic inflammatory disease, ectopic pregnancy, infertility, and cervical cancer.⁵ Most STDs are preventable with correct and consistent use of condoms.

Research has shown that formal, comprehensive sexual education programs may be successful in delaying the onset of sexual activity and increasing condom use among youth.⁶ Clear parent-adolescent communication can also be a strong deterrent to risky sexual behavior among youth. It is important that families communicate their values and expectations regarding sexual behavior to adolescents. Several recent studies have

demonstrated that parent-teenager discussions about sexuality and sexual risk were associated with lower rates of adolescent risk behavior.^{7,8}

The 2017 Brookline High School Health Survey posed questions about age at first sexual intercourse, number of sexual partners, forced sexual contact, condom usage, and sexual behavior that occurred after alcohol use.

The 2017 Brookline Middle School Health Survey posed questions about oral sex, age of first sexual intercourse, number of sexual partners, condom usage, and pressure to have oral sex and sexual intercourse.

¹Committee on Adolescence. (2013). *Condom Use by Adolescents*. *Pediatrics*, 132 (5): 973-981.

²J A Martin, BE Hamilton, M J K Osterman, A K Driscoll, T J Mathews. (2017). *Births: Final Data for 2015*. *National Vital Statistics Reports*. (66) Num 1. Retrieved from https://www.cdc.gov/nchs/data/nvsr/nvsr66/nvsr66_01.pdf

³Santelli JS et al. (2007). *Explaining recent declines in adolescent pregnancy in the United States: the contribution of abstinence and improved contraceptive use*. *American Journal of Public Health*. 97(1):150–156.

⁴<https://www.cdc.gov/std/life-stages-populations/adolescents-youngadults.html>

⁵Mueller TE, Gavin LE, Kulkarni A. (2008). *The association between sex education and youth's engagement in sexual intercourse, age at first intercourse, and birth control use at first sex*. *J Adolesc Health*. 42 (1).

⁶Hadley, W., Brown, L., Lescano, C., Kell, H., Spalding, K., DiClemente, R., Donenberg., et al. (2009). *Parent-adolescent sexual communication: Associations of condom use with condom discussions*. *AIDS Behavior*. 13(5): 997-1004.

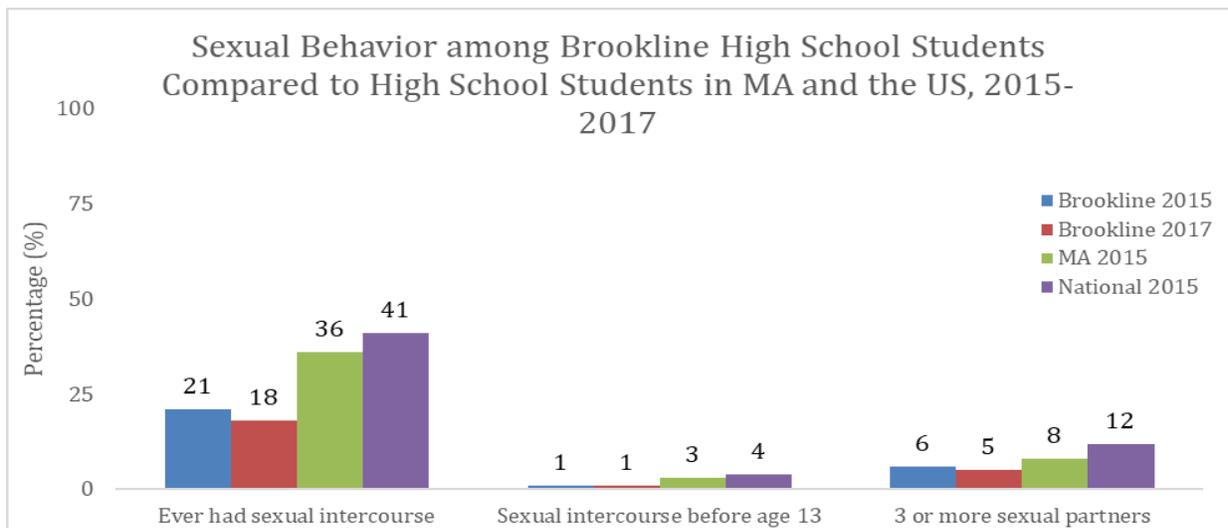
⁷Blake, S., Simkin, L., Ledsky, R., Perkins, C., Calabrese, J., (2001) *Effects of a parent-child communications intervention on young adolescents' risk for early onset of sexual behavior*. *Family Planning Perspectives*.(33): 52-62.

⁸<http://www.mass.gov/eohhs/docs/dph/research-epi/teen-births-2013.pdf>

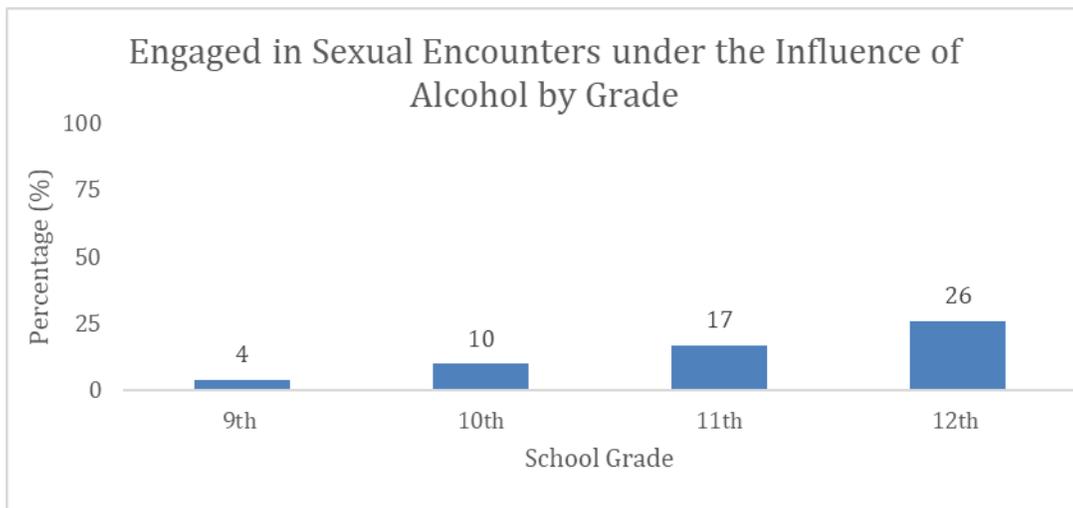
Sexual Behavior

- In 2017, 18% of Brookline high school students reported ever engaging in sexual intercourse, compared to 23% in 2013 and 21% in 2015. This rate is considerably lower than both the 2015 MA rate of 36% and US rate of 41%. Among Brookline middle schoolers, 2% reported engaging in sexual intercourse, compared to 6% in 2013 and 2% in 2015. There are no state and national middle school surveys for comparison.

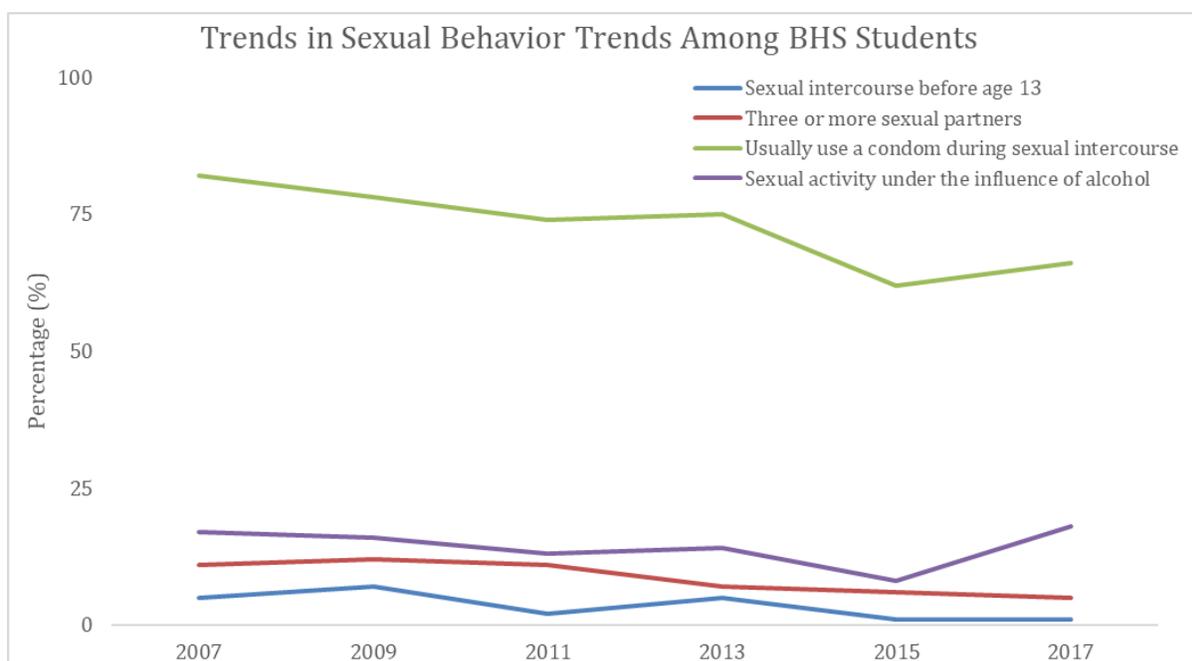
- In 2017, 5% of BHS students reported having intercourse with 3 or more sexual partners.
- 8th grade boys reported higher rates of sexual intercourse than girls (4% vs 1%, respectively). Among middle school students, 3% reported ever having participated in oral sex. More males than females reported having participated in oral sex: 2% of 7th grade boys compared to 1% of 7th grade girls and 5% of 8th grade boys compared to 2% of 8th grade girls.



- Alcohol was an important mediator for sexual activity. In 2017, 26% of BHS seniors reported engaging in sexual activity where alcohol was an important factor (i.e. the encounter would not have occurred in the absence of alcohol). This finding decreased with decreasing age— 17% of juniors, 10% of sophomores, and 4% of freshmen reported engaging in sexual activity under the same circumstances.



- Among sexually active BHS students, condom use during sexual intercourse slightly increased from 62% in 2015 to 66% in 2017. Reported condom use peaked in 2013 at 75% of students.
- Those who recently engaged in binge drinking were less likely to use a condom; 62% of students who reported recent binge drinking usually used condoms as compared to 67% of students who had not recently engaged in binge drinking.



Mental Health

As of 2015, suicide is the second leading cause of death nationally for 15 to 24 year olds and the third leading cause of death for 10 to 14 year olds.¹ An important risk factor for adolescent suicide is undiagnosed, untreated, or under-treated mental illness. Other risk factors include bullying, physical or sexual abuse, stressful life events, substance abuse, and easy access to firearms or other weapons.

The large percent of students across the nation who report high levels of stress is an increasing cause of concern, as sustained stress may be detrimental to students' mental and physical health. While optimal levels of stress support learning and growth, feeling overstressed may actively impair school performance. Additionally, sleep patterns and decision-making processes may be disturbed.

The prevalence of teen depression is also rising, both in Brookline and nationally. Almost 8% of Americans aged 12 and over have experienced depression with moderate to severe symptoms in the past 2 weeks.³ About 3% of all Americans aged 12 and over reported severe depressive symptoms. 78% reported no depressive symptoms. 90% of those with severe depressive symptoms reported difficulty with work, home, or social activities as a result.³

The 2017 Brookline High School and Middle School Health Surveys elicited information about feelings of overwhelming stress and anxiety, depression, and suicidal thoughts and behaviors.

Specifically, students were asked about symptoms of depression with the question, "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?"

Students were also asked about suicidal ideation given the following choices:

Yes but I did not make a plan or act on my feelings

Yes I seriously considered suicide and made a plan

Yes I attempted suicide, resulting in an injury, poisoning, or overdose that had to be treated by a doctor or nurse.

The Middle School survey also asked about self-harm (like cutting or self-burning).

¹Center for Disease Control and Prevention. (2015). *Suicide Facts at a Glance*. National Center for Injury and Prevention Control. Division of Violence Prevention. Retrieved from <https://www.cdc.gov/violenceprevention/pdf/suicide-datasheet-a.pdf>

²Center for Disease Control and Prevention. (2017). *Youth Risk Behavior Surveillance Systems*. Retrieved from <https://www.cdc.gov/healthyyouth/data/yrbs/overview.html>

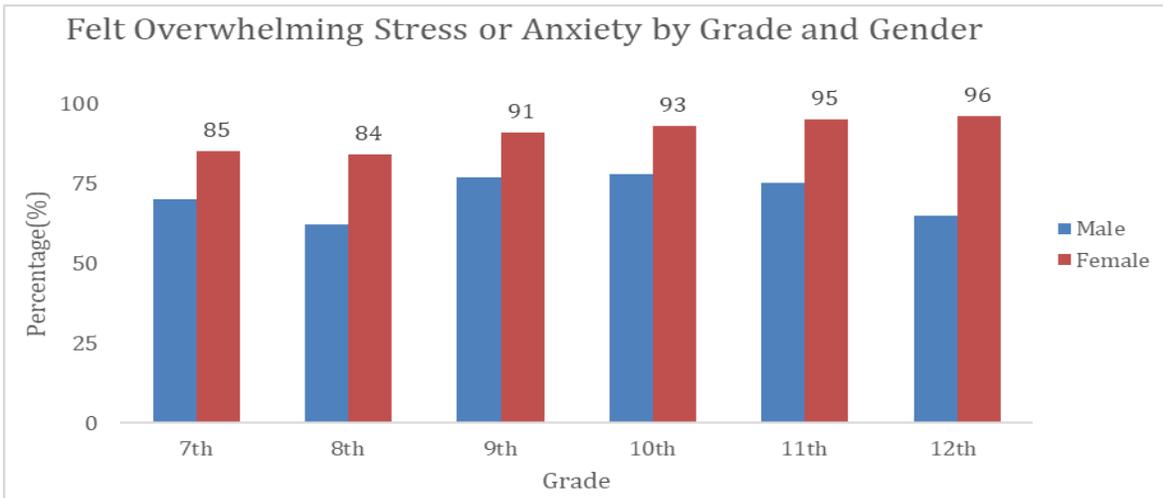
³Center for Disease Control and Prevention. (2014). *Depression in the US Household Population 2009-2012*. NCHS Data Brief No. 172. Retrieved from <https://www.cdc.gov/nchs/data/databriefs/db172.html>

Mental Health

The rate of Brookline high school students who reported feeling overwhelming stress or anxiety during the past 12 months rose from 82% in 2015 to 84% in 2017. Among students who reported feeling overwhelming stress or anxiety, 50% of students responded that they felt overwhelming stress or anxiety *on occasion*, and 34% responded that they felt overwhelming stress or anxiety *frequently*. Similarly, among Brookline middle school students, 76% of Brookline 7th and 8th grade students reported feeling overwhelming stress or anxiety occasionally (54%) or frequently (22%) during the 12 months prior to the survey.

All grade levels experienced similar levels of overwhelming stress or anxiety in the last year: 77.5% of 7th graders, 73% of 8th graders, 83% of freshmen, 86% of sophomores, 85% of juniors, and 82% of seniors.

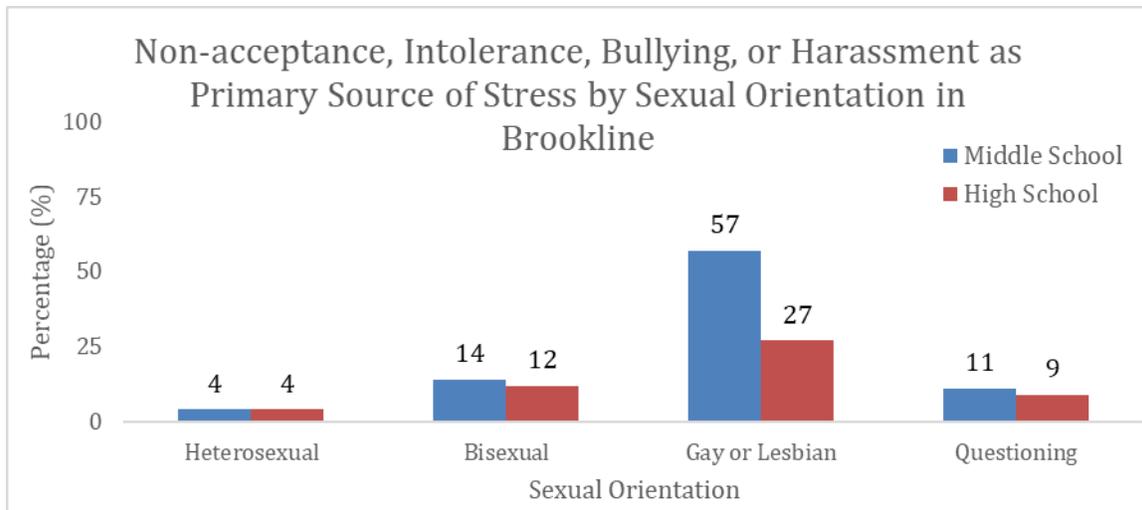
Across all grade levels, females were more likely to report stress and anxiety than males. Among females, 85% of 7th graders, 84% of 8th graders, 91% of 9th graders, 93% of 10th graders, 95% of 11th graders, and 96% of 12th graders reported stress or anxiety. Among males, 70% of 7th graders, 62% of 8th graders, 77% of 9th graders, 78% of 10th graders, 75% of 11th graders, and 65% of 12th graders reported stress or anxiety.



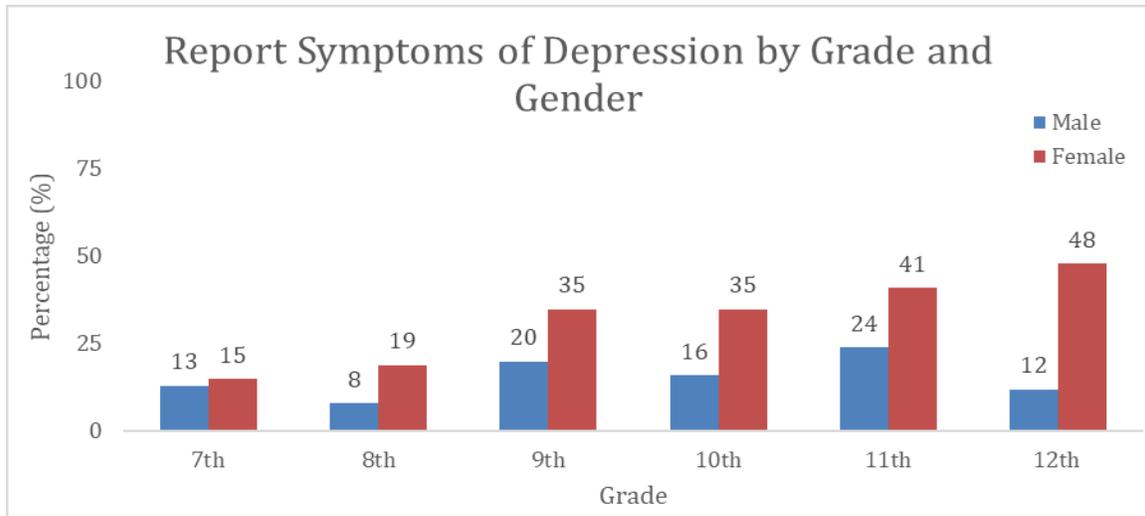
- Among high school students, 84% of freshmen, 87% of sophomores, 89% of juniors, and 74% of seniors reported schoolwork or academic work was the primary cause of stress. Identification of schoolwork as the main contributor to stress was similar across most racial and ethnic groups

Schoolwork as Primary Cause of Stress for Brookline High School Students by Race/Ethnicity	
Reported race/ethnicity	% of students
Armenian	50
Asian	84
Black/African American	87
Hispanic	87
Middle Eastern	88
Mixed-ethnicity	86
Other	68

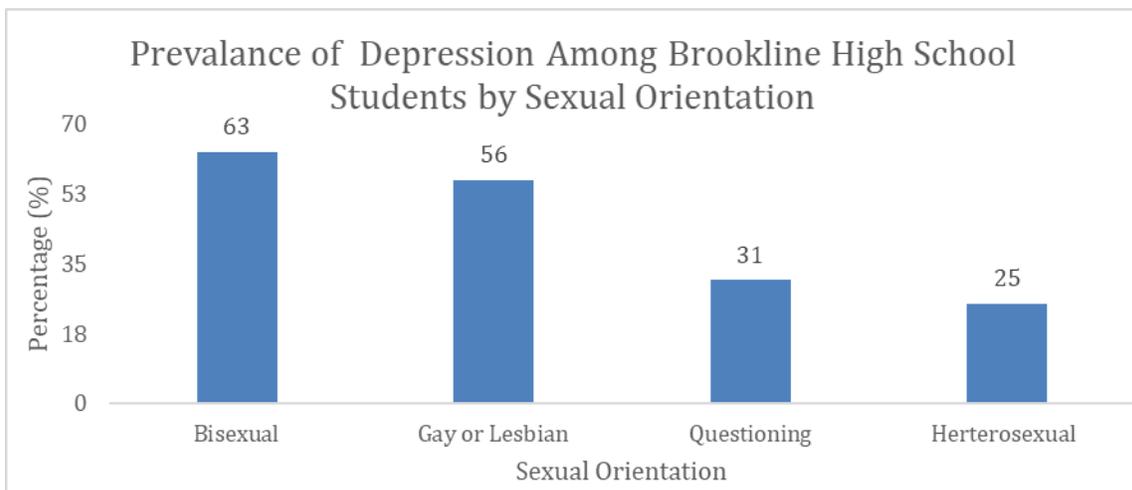
- Gay, lesbian and bisexual students were more likely to report non-acceptance, intolerance, bullying, or harassment as their primary source of stress. Among Brookline middle school students, 14% of bisexual students, 57% of gay or lesbian students, and 11% of questioning students (listed as “not sure”) reported non-acceptance, intolerance, bullying or harassment as their primary source of stress compared to 4% of heterosexual students.
- Similarly, among Brookline high school students, 12% of bisexual students, 27% gay or lesbian students, and 9% of questioning (or “not sure”) reported non-acceptance, intolerance, bullying or harassment as their primary source of stress compared to 4% of heterosexual students.



- The survey further asked if students had stopped participating in normal activity as a result of feeling sad or hopeless for more than 2 weeks in a row. Among middle schoolers, 14% of 7th and 8th grade students reported this symptom of depression over the past year. In BHS, 29% of students reported this symptom of depression compared to 25% in 2015.
- Females were more likely to report symptoms of depression. Among females, 15% of 7th graders, 19% of 8th graders, 35% of freshmen, 35% of sophomores, 41% of juniors and 48% of seniors reported symptoms of depression. Among males, 13% of 7th graders, 8% of 8th graders, 20% of freshmen, 16% of sophomores, 24% of juniors, and 12% of seniors reported similar feelings.

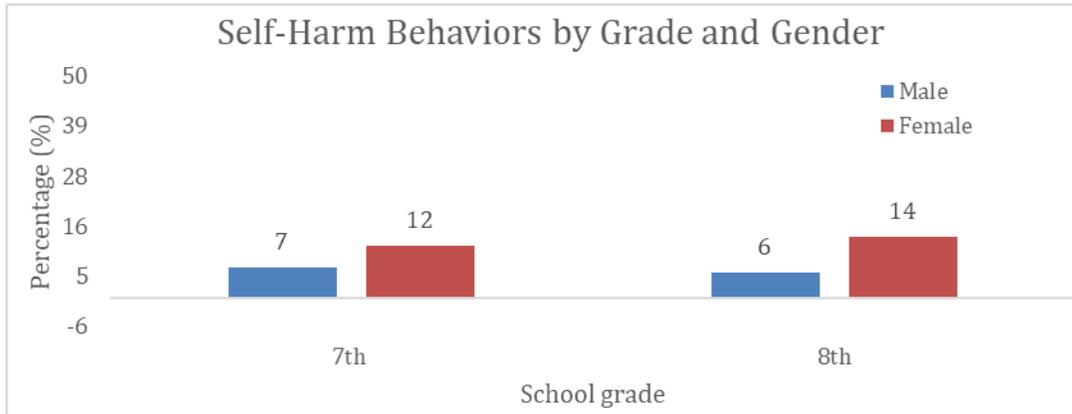


- Among Brookline high school students, Hispanic/Latino students reported the highest rate of depressive symptoms in the past 12 months (37%). Students who identified as American Indian/Alaskan Native or Black reported higher levels of depression (33%) compared to students who identified as Asian, Hawaiian/other Pacific Islander, and White.
- BHS students identifying as LGBTQ were more likely to report symptoms of depression than heterosexual students: 56% of lesbian or gay students, 65% of bisexual students, and 31% of questioning students. Notably, only a quarter of heterosexual students reported similar feelings.

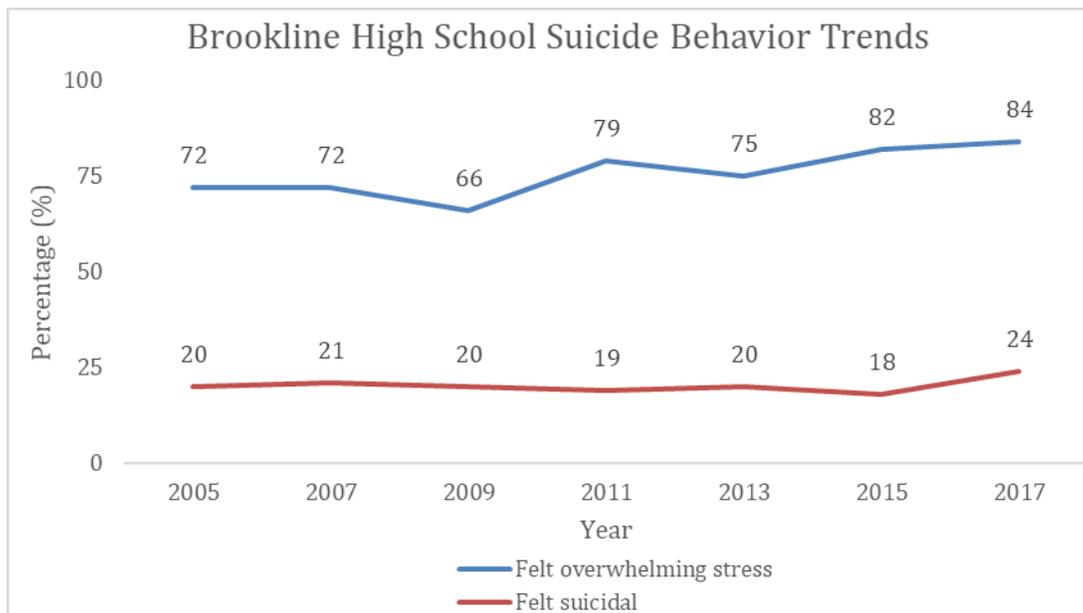


- The middle school survey asked 7th and 8th grade students about deliberate self-harm. 11% of Brookline 7th and 8th grade students reported ever having attempted self-harm (i.e. cutting, burning) compared to 14% in 2015. Females par-

participated in more self-harm behaviors (12% of 7th graders and 14% of 8th graders) compared to males (7% of 7th graders and 6% of 8th graders).



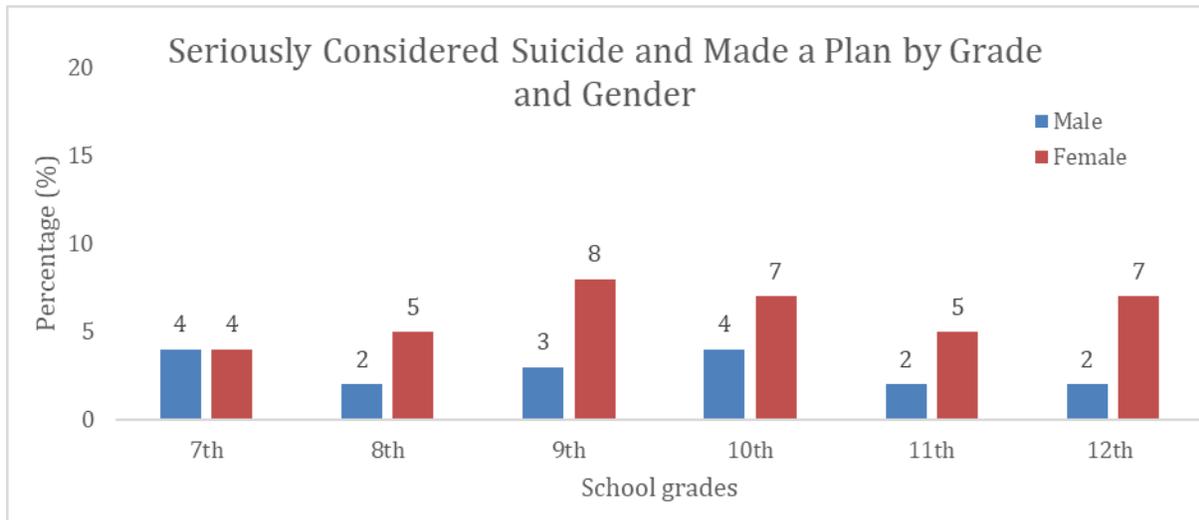
- Among Brookline middle school students, 20% of Brookline 7th and 8th grade students reported feeling suicidal at least once in the past 12 months. Among Brookline high school students, reported rates of feeling suicidal in the past 12 months increased from 18% in 2015 to 24% in 2017.



- Among Brookline middle school students who reported feeling suicidal in the past 12 months, 15% reported serious consideration of suicide, and 3% reported making a plan to act. Of these students, 1% attempted suicide resulting in injury, poisoning, or overdose that had to be treated by a doctor or nurse.
- The amount of Brookline high school students who reported seriously considering suicide and making a suicide plan *in the past 12 months* increased from 2% in

2013 and 2015 to 4% in 2017. The national rate of high school students who reported they had ever seriously considered suicide and made a suicide plan was 15%. In Massachusetts, the rate was 12%. Of note, Brookline data only reflects the past 12 months.

- Overall, females were more likely to report seriously considering suicide and making a plan in the past 12 months: 5% of 8th graders, 8% of freshmen, 7% of sophomores, 5% of juniors, and 7% of seniors. By comparison, reported rates were lower among males: 2% of 8th graders, 3% of freshmen, 4% of sophomore, 5% of juniors, and 7% of seniors. Rates for 7th grade males and 7th grade females were similar (4% for both).



- Of middle school students who reported symptoms of depression, 25% also reported alcohol consumption at least once. By comparison, only 10% of students who did not report symptoms of depression also reported lifetime alcohol consumption.
- Of high school students who reported feeling stressed, 19% engaged in binge drinking in the past 30 days. Of students who did not report feeling stressed, 15% engaged in binge drinking in the past 30 days.
- Of middle school students who reported feeling symptoms of depression, 5% also reported lifetime use of marijuana. Of students who did not report symptoms of depression, 2% reported lifetime use of marijuana.
- Of high school students who reported feeling stressed, 18% also reported use of marijuana in the past 30 days. Of students who did not report feeling stressed, 15% reported use of marijuana in the past 30 days.

- Of high school students who reported feeling symptoms of depression, 27% engaged in binge drinking in the past 30 days. Of those who did not report symptoms of depression, 15% engaged in binge drinking in the past 30 days
- Of high school students who reported feeling symptoms of depression, 24% used marijuana in the past 30 days. Of those who did not report symptoms of depression, 14% used marijuana in the past 30 days.
- 41% of middle school students who recently used marijuana reported symptoms of depression as compared to 14% of students who had not recently used marijuana.
- Female students were more likely than male students to seek professional help (social worker, counselor, psychologist, and psychiatrist) for an emotional or mental health issue: 19% of 7th grade females compared to 14% of 7th grade males; 24% of 8th grade females compared to 15% of 8th grade males.

Physical Health, Activity and Use of Technology

Proper nutrition, healthy eating habits, and regular physical activity are all important aspects in maintaining a healthy body weight, muscle strength, and bone health.¹ Such healthy habits are also critically important in the prevention and maintenance of chronic disease. However, millions of Americans are afflicted by chronic illnesses that are often preventable (excluding genetic cases), including coronary heart disease, diabetes, osteoporosis, certain cancers, and high blood pressure.^{2,3,4,5,6}

Participating in physical activity increases life expectancy and is associated with good mental health and self-esteem.^{1,6} School physical education programs have specifically been found to have a positive effect on the health and fitness of young people. In addition, there is evidence that participation in a health-related physical education program can have a positive effect on academic performance; students who are physically active have better grades and attend school more often.⁷ The national recommendation is that children and adolescents have at least 60 minutes of moderate to vigorous aerobic activity each day.⁸ Bone and muscle strengthening should also be included in physical activity at least 3 times a week.⁸

Though use of technology is an important aspect of communication and schoolwork, excessive screen time may be detrimental to self-esteem, academic performance, and levels of physical activity. The American Academy of Pediatrics (AAP) is the presiding organization in releasing guidelines for technology use among adolescents. Recognizing the role of technology in modern society, the AAP has adjusted their

recommendations in the past years to include use for academic and communication purposes. Importantly, these recommendations still include implementation of tech-free zones and time limits.⁹

The 2017 Brookline High and Middle School Student Health Surveys asked students about participation in cardiovascular and strengthening exercises, TV use, and technology use.

In this report the following definitions were used:

Past week: Participation in the reported behavior at least once during the 7 days prior to the survey.

Average School Day: Participation in the reported behavior on a typical school day when school is in session.

¹World Health Organization (2010). Global recommendations on physical activity for health. Switzerland. Retrieved from http://www.who.int/dietphysicalactivity/factsheet_young_people/en/index.html

²American Heart Association. (2011). *Heart Disease and Stroke Statistics- 2011 Update*. Circulation, 123. e18-e209.

³Centers for Disease Control and Prevention.(2014) *National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014*. Atlanta, GA: US Department of Health and Human Services.

⁴American Cancer Society.(2012). *Cancer Facts & Figures 2012*. Atlanta: American Cancer Society

⁵National Institutes of Health (2010). *Physical Activity and Weight Control*. NIH Publication: 03-4031. Updated March 2010.

⁶Samitz, G., Egger, M., Zwahlen, M. (2011). *Domains of physical activity and all-cause mortality: systemic review and dose-response meta-analysis of cohort studies*. International Journal of Epidemiology. 40 (5) 1382-1400.

⁷Prosper, M. H., Moczulski, V. L., Qureshi, A., Weiss, M., & Bryars, T. (2009). *Healthy for life/pe4me: Assessing an intervention targeting childhood obesity*. Californian Journal of Health Promotion, 7 (Special Issue), November 16, 2009.

⁸Center for Disease Control and Prevention. *Physical Activity Facts*. Retrieved from <https://www.cdc.gov/healthyschools/physicalactivity/facts.html>

⁹Shapiro J.(2015). *The American Academy of Pediatrics Just Changed Their Guidelines on Kids and Screen Time*. *Forbes*. Retrieved from <https://www.forbes.com/sites/jordanshapiro/2015/09/30/the-american-academy-of-pediatrics-just-changed-their-guidelines-on-kids-and-screen-time/#69a754fb5c40>

Physical Health and Activity

- Among Brookline middle school students, males were more likely to participate in regular physical activity (5 days to 7 days) for at least 60 minutes per day (67% of 7th grade and 56% of 8th grade males vs. 47% of 7th grade and 39% of 8th grade females).

- 45% of Brookline high school students reported participating in at least 60 minutes of cardiovascular activity for at least 5 days per week.
- 59% of high school students reported participating in at least one BHS sports team in the past 12 months and 35% reported participating in a community sports team (e.g. recreational league, travel, or club).
- Among 7th and 8th graders surveyed, 38% of students reported suffering a blow or jolt to the head leading to symptoms of concussion (e.g. pressure in the head, headaches, dizziness or seeing stars, double or blurry vision, confusion, memory problems, nausea or vomiting, or temporary loss of consciousness) while playing sports, and 17% reported experiencing concussion symptoms more than once. Comparatively, only 23% of Brookline high school students reported suffering a blow or jolt to the head leading to symptoms of concussions while playing on a sports team.
- 63% of Brookline 7th and 8th grade students reported sleeping 8 or more hours on average and 16% of students reported sleeping 6 or less hours per night on average. In comparison, only 25% of BHS students reported sleeping 8 or more hours on average and 39% of students reported sleeping 6 or less hours per night on average.

Use of Technology

- Almost all Brookline High School students reported having internet access at home – 100% of White or Caucasian, Black or African-American, American Indian or Alaskan Native, Armenian, Middle Eastern, and multi-race students and 98% of Asian and Hispanic/Latino students.
- In 2017, 51% of BHS students reported using handheld devices for non-school-related activities for three or more hours a day. In 2015, 16% watched TV for three or more hours on an average school day, and 39% used computers for recreational purposes on an average school day.
- Students with symptoms of depression were more likely to use technology for three or more hours a day (60% of students who reported symptoms of depression compared to 48% of students who did not report symptoms of depression).
- Among all grades, 8th graders and 12th graders were more likely to report spending three or more hours per day using TV, computer, phone or other handheld devices for non-school related activities.

- Males and females across all grade levels reported similar levels of screen time.
- 35% of 7th and 8th graders reported talking to strangers online. 6% reported arranging an in-person meeting with someone they met online. 12% have felt threatened or scared when online.

Body Weight and Dietary Behaviors

Latest obesity trends show more than one third (39.8%) of US adults are obese, and approximately 18.5% of 2-19 year olds are obese.¹ The prevalence of obesity is 13.9% for ages 2-5, 18.4% for ages 6-11, and 20.6% for ages 12-19.¹ Diet is arguably the most important mediator to high levels of obesity. In particular, sugar-sweetened beverages contribute extensively to the amount of calories consumed and are linked to weight gain, metabolic syndrome, dental cavities, and type II diabetes in adults.²

American culture places extraordinary importance on physical appearances, weight, diet, and exercise. These trends may promote exercise and healthy eating habits among adolescents but have the potential to be harmful when taken to extremes. For teenagers, self-esteem has been tied to body shape and weight, potentially leading to excessive or rigid exercise routines and unhealthy dieting. An overemphasis on thinness during adolescence may contribute to some eating disorders, including anorexia nervosa and bulimia nervosa. These conditions have long-term health implications, including mental health disorders, amenorrhea, infertility and death in severe cases. Across the US, body dysmorphia is prevalent across age and weight groups. Approximately 30% of children and adolescents ages 8 to 15 in the United States misperceive their weight status, and nearly 81% of overweight males and 71% of overweight females are unaware of their weight status.³

Lifetime dietary patterns are often established during childhood and adolescence. It is important for adolescents to adopt healthy eating and exercise habits in order to promote lifelong behaviors. Further, obesity in adolescence may persist into adulthood, increasing risk for chronic conditions such as diabetes, heart disease, high blood pressure, stroke, and certain cancers. Obesity during adolescence is also related to psychological stress, depression, problems with family relations, and poor school performance.

Dietary approaches may help to reduce long-term health consequences. In recent years, the most effective strategies and recommendations have emphasized healthy eating *patterns* rather than strict diets. Researchers have identified patterns low in

saturated fat, trans fat, and cholesterol as the most beneficial for long-term health.⁴ Specifically, consumption of fruits, vegetables, low-fat dairy foods, whole grains, poultry, fish, lean meats, beans, and nuts are recommended.⁴

Certain racial groups have higher rates of obesity than others—the overall prevalence is higher among non-Hispanic blacks (22%) and Hispanics (25.8%) than among non-Hispanic whites (14.1) and non-Hispanic Asians (11%). There is no significant difference in the prevalence of obesity between boys and girls overall or by age group.

The 2017 Brookline High and Middle School Health Surveys asked students questions about their perception of their own weight, dietary habits, and dieting practices.

In this report, the following definitions were used:

Past 12 months or past year: Participation in the reported behavior at least once during the 12 months prior to the survey.

Recent or past month: Participation in the reported behavior on at least one of the 30 days prior to the survey.

Ever: Participated in the behavior at any time in the student's life.

¹ C M Hales, M D Carroll, C D Fryar and C L Ogden. (2017). *Prevalence of Obesity among Adults and Youth: United States, 2015-2016*. Centers for Disease Control and Prevention. NCHS Data Brief No. 288. Retrieved from <https://www.cdc.gov/nchs/products/databriefs/db288.htm>

² A Rosinger, K Herrick, J Gahche and S Park. (2017). *Sugar-sweetened Beverage Consumption Among US Adults, 2011 to 2014*. Center for Disease Control and Prevention. NCHS Data Brief No. 270. Retrieved from <https://www.cdc.gov/nchs/products/databriefs/db270.html>

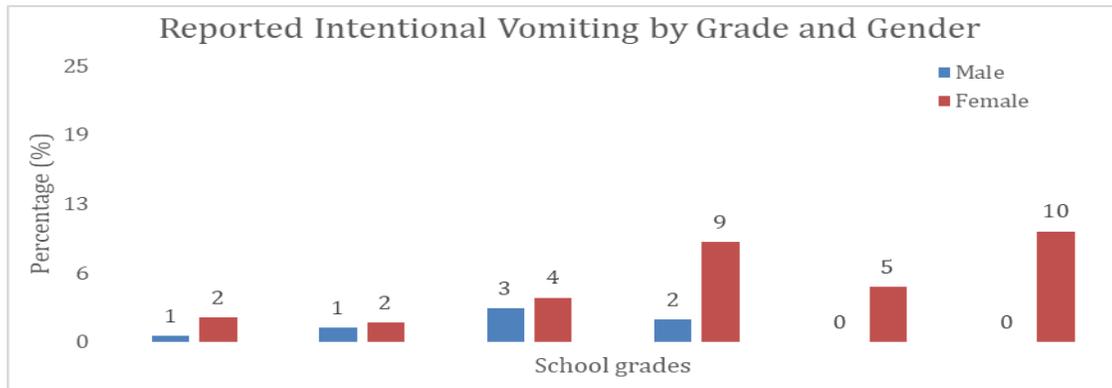
³ N Sarafrazi, J P Hughes, L Borrud, V Burt, R Paulose-Ram. (2014). *Perception of Weight Status in US Children and Adolescent Aged 8-15 Years, 2005-2012*. Center for Disease Control and Prevention. NCHS Data Brief No. 158. Retrieved from <https://www.cdc.gov/nchs/products/databriefs/db158.htm>

⁴ Dash ranked Best Diet Overall for eight year in a row by US News and World Report. (2018). National Heart, Lung, and Blood Institute. Retrieved from <https://www.nhlbi.nih.gov/news/2018/dash-ranked-best-diet-overall-eighth-year-row-us-news-and-world-report>

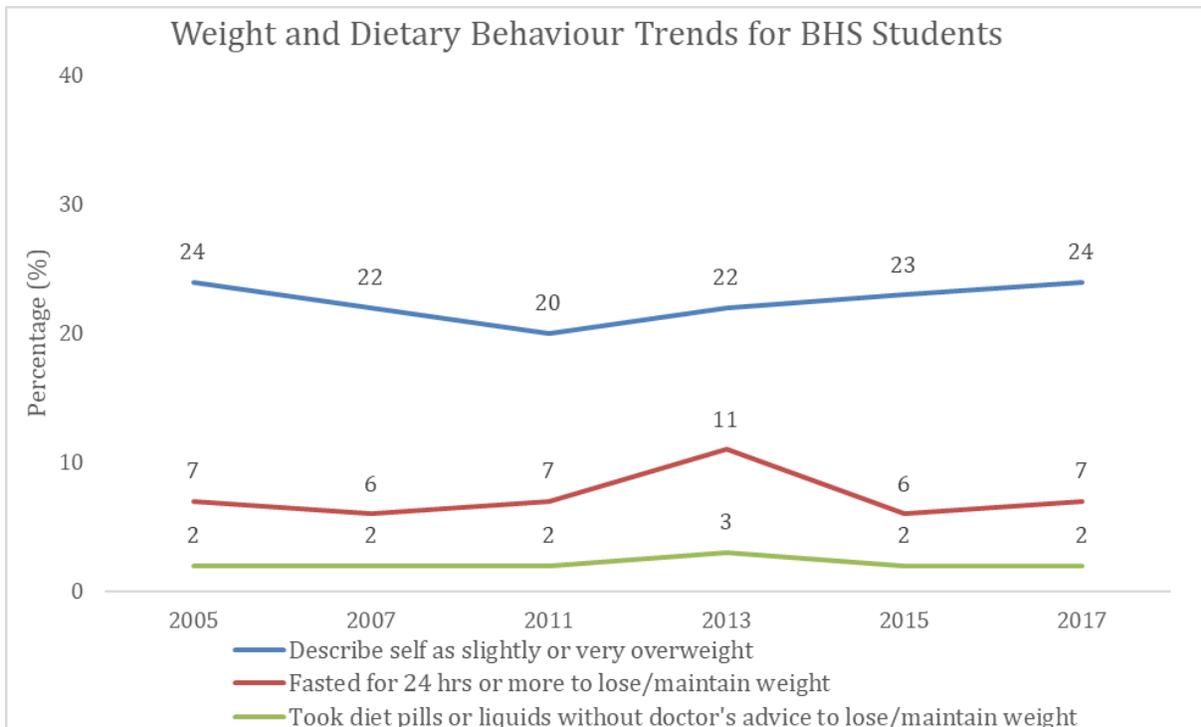
Body Weight and Dietary Behaviors

- Similar to prior years, 23% of 7th and 8th grade students described themselves as slightly overweight or very overweight in 2017, compared to 20% across Massachusetts and 24% across the nation. Rates for Brookline high school students have also remained stable with 24% of BHS students describing themselves as slightly overweight or very overweight in 2017. This is compared to 32% for both Massachusetts and the nation.
- Over the past 12 months, 2% of Brookline middle school students and 4% of Brookline high school students reported vomiting on purpose after eating or taking

laxatives. 5% of Brookline middle school students and 2% of Brookline high school students reported fasting to lose or maintain weight.



- More females reported vomiting to lose or maintain weight. Among females, 2.2% of 7th graders, 1.7% of 8th graders, 4% of 9th graders, 9% of 10th graders, 5% of 11th graders, and 10% of 12th graders reported this behavior. Among males, 0.5% of 7th graders, 1.3% of 8th graders, 3% of 9th graders, 2% of 10th graders reported intentionally vomiting.



Attitudes and Perceptions

The attitudes and perceptions of teenagers, their peers and their families have the ability to affect teenage drug use. Individual and environmental risk factors may additionally influence perceptions and decision making. These factors include low self-esteem, anxiety, abuse, peer pressure, and school/family environment.¹ Strong correlations exist between use of a drug and attitudes/beliefs about that drug. Specifically, self-perception of risks, availability, and parental/peer judgement may affect individual rates of use. Individuals who believe use of a particular drug involves risk of harm and/or who disapprove of its use are less likely to use that drug. Students who use a given drug are less likely to disapprove of its use or to see its use as dangerous.³ As a result, as perceived risk of alcohol and marijuana use decreases, the prevalence of use increases.²

Perceived level of substance use by peers can be a factor in adolescent decision-making. Overall, likelihood of use for any substance by a single individual corresponds directly to that individual's perception of use among peers—that is, if the individual perceives high rates of use among peers, he/she is more likely to use him/herself.⁴ Finally, the pressure to conform socially is particularly high during middle school years. As a result, peer pressure in this age group has been associated with higher levels of initiating substance use or continuation of use.

The 2017 BHS Health Survey included several measures of perceptions and attitudes among students. These included: (1) perception of harm of while using substances, (2) perception of parent approval or disapproval, (3) perceived accessibility of substances, and (4) use of substances in relation to parental approval or disapproval. The 7th and 8th Grade Health Survey also examined measures of perceptions and attitudes including: (1) perception of harm of using substances, (2) perception of parent approval or disapproval, (3) perceived accessibility of substances, and (4) use of substances in relation to parental approval or disapproval.

¹Bjarne, J., Ahmadi, G., Sanchez, G., Cadena's, N., de Marco, M., Hynes, M., and Camille, F. (2011). "Perception of Risk and Drug Use: An Exploratory Analysis of Explanatory Factors in Six Latin American Countries." *The Journal of International Drug, Alcohol and Tobacco Research*, Vol. 1, No. 1, 9–17. Bethesda, MD: National Institute on Drug Abuse.

² Adolescent Substance Abuse Knowledge Base. *Factors of Teen Drug Use*. <http://www.adolescent-substance-abuse.com/>

³Johnston, L.D., O'Malley, P.M., Bachman, J.G., & Schulenberg, J.E. (2006). *Monitoring the Future national survey results on drug use, 1975-2006: Volume I, Secondary school students*. NIH Publication.

⁴ D'Amico, Elizabeth J., Ph.D., and McCarthy, Denis M., Ph.D. (2006). "Escalation and Initiation of Younger Adolescents' Substance Use: The Impact of Perceived Peer Use." *Journal of Adolescent Health*, 39: 481–487.

Attitudes and Perceptions

Perception of Risk

- 25% of Brookline 7th and 8th grade students reported perceiving slight or no risk and 75% reported perceiving moderate or great risk if people use marijuana *occasionally*. 82% reported perceiving moderate or great risk if people use marijuana *regularly* (1 to 3 times per week).
- 68% of BHS students reported perceiving slight or no risk if people use marijuana *occasionally*, and 43% reported perceiving slight or no risk if people use marijuana *regularly* (1 to 3 times per week).
- 20% perceived slight or no risk if people occasionally use prescription stimulants (such as Ritalin, Adderall, Concerta) that are not their own.

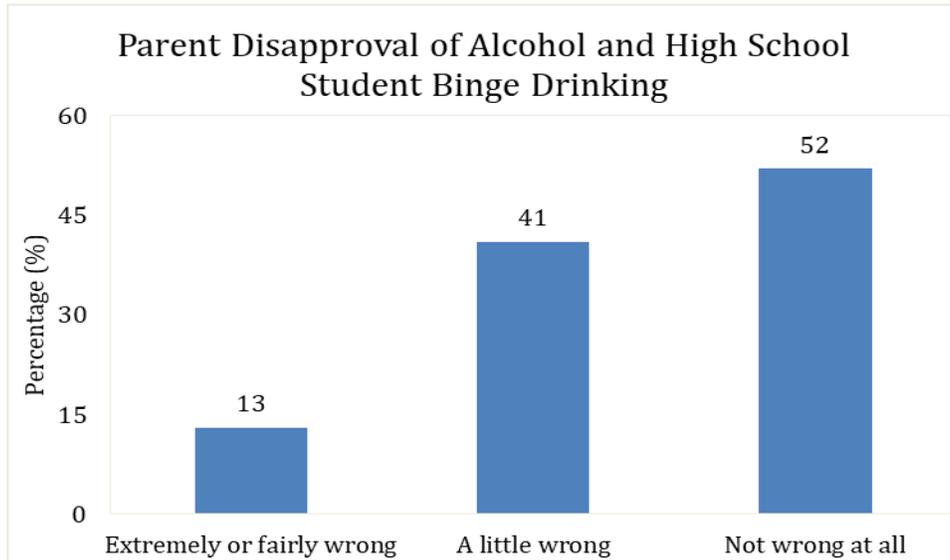
Perception of Access

- Generally, as grade level increased, perceived ease of access (responses of fairly or very easy to access) of each drug type increased.
- Among 7th and 8th graders, 47% said it would be fairly or very easy to access alcohol, and 25% said it would be fairly or very easy to access cigarettes.
- 55% of BHS students said it would be fairly or very easy to access marijuana as compared to 53% in 2015, and 69% reported ease of access to alcohol as compared to 72% in 2015.

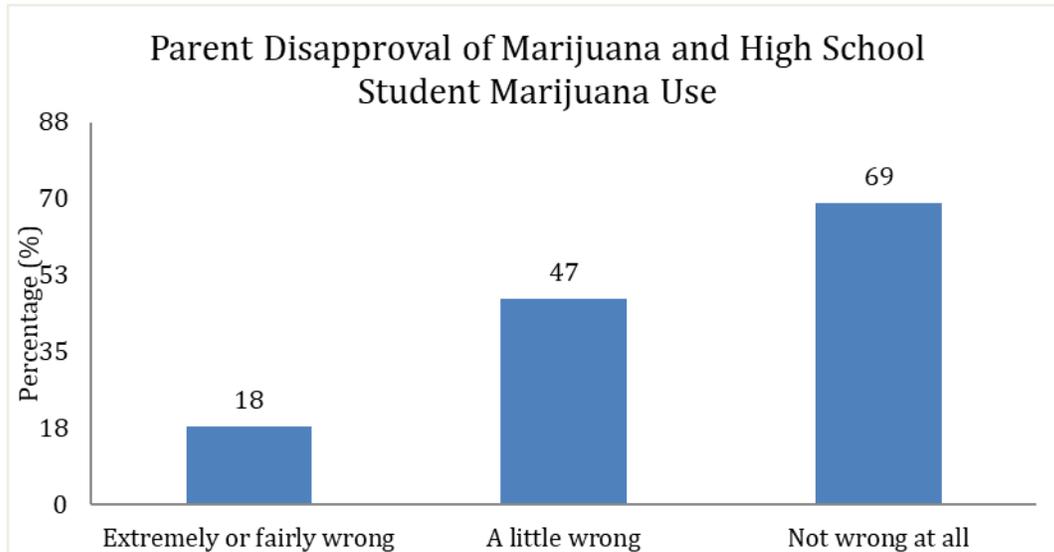
Perception of Parent Disapproval

- Students who perceived stronger parent disapproval were less likely to have had 5 or more consecutive drinks of alcohol within a couple of hours.
- 8% of middle school students whose parents thought it was "wrong or very wrong" to drink had used alcohol compared to 29% of students whose parents thought it was "a little bit wrong."

- 52% of Brookline high school students (9th-12th graders) whose parents thought drinking was “not at all wrong” or a “little bit wrong” reported binge drinking. Comparatively, 41% of high school students whose parents thought drinking was “a little bit wrong” and 13% of students whose parents believed it was “wrong or very wrong” reported binge drinking behavior.



- Students who perceived stronger parent disapproval were less likely to have used marijuana.
- Among 7th and 8th grade students, 1% of those whose parents thought it was “wrong or very wrong” had used marijuana as compared to 10% of students whose parents thought it was “a little bit wrong.”
- Among Brookline High School students, 18% of students whose parents thought it was “wrong or very wrong” had used marijuana, compared to 47% of students whose parents thought it was “a little bit wrong” and 69% of students whose parents thought it was “not at all wrong.”



- High School students who perceived stronger parent disapproval were less likely to have reported heavy marijuana use. 5% of students whose parents thought it was “wrong or very wrong” had used marijuana heavily, compared to 18% of students whose parents thought it was “a little bit wrong” and 9% of students whose parents thought it was “not at all wrong.”

Resiliency and Protective Factors

Research suggests that young people who do not become involved in risk behaviors share a common set of characteristics (termed “resiliency”) that enable them to make healthy choices. Children may develop resiliency through a variety of protective factors, including those found within themselves, their families, their schools, and their communities. Risk and protective factors include variables that operate at different stages of development and reflect different areas of influence (ranging from micro- to macro-levels).^{1,2,3} Strategies to prevent substance use or other risk behaviors generally are designed to reduce the influence of risk factors and to enhance the effectiveness of protective factors.

Potential protective factors include academic achievement, significant relationships with a parent or caregiver, significant relationships with an adult member of the school community, and involvement in community service. Research has shown that these factors are associated with lower rates of risk behaviors, including emotional distress, suicidal ideation and behavior, violence, substance use, and early sexual initiation.⁴⁻⁷ In addition, participation in extracurricular activities can positively influence a student’s behavior. Compared to their peers, students who participate in

extracurricular activities feel more connected to school, and therefore may be less likely to engage in risk behaviors.⁸⁻¹¹

The 2017 BHS Health Survey included several measures of potential protective factors among students. These included: (1) academic achievement, (2) perceived teacher or other adult support (in school or outside of school), (3) participation in volunteer work or community service, (4) participation in organized extracurricular activities, and (5) participation on Brookline High School athletic teams.

¹ Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, 112(1):64-105.

² Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2012). *Monitoring the Future national survey results on drug use, 1975-2011: Volume I, Secondary school students*. Ann Arbor: Institute for Social Research, The University of Michigan. Retrieved from http://monitoringthefuture.org/pubs/monographs/mtf-vol1_2011.pdf

³ Bellatorre, A., Choi, K., Bernat, D. (2015). *The influence of the social environment on youth smoking status*. *Preventive Medicine*, (81):309-313.

⁴ Resnick, M.D., Harris, L., & Blum, R. (1993). *The impact of caring and connectedness on adolescent health and well-being*. *Journal of Pediatric Child Health*, 29, S3-S9.

⁵ Franke, T. (2000). *The role of attachment as a protective factor in adolescent violent behavior*. *Adolescent and Family Health*, (1):40-51.

⁶ Hawkins, J. Catalano, R., Kosterman, R., et al. (1999). *Preventing adolescent health risk behaviors by strengthening protection during childhood*. *Archives of Pediatric and Adolescent Medicine*, 153:226-234

⁷ Kopak, A.M., Chen, A.C., Haas, S.A., Gillmore, M.R. (2012). *The importance of family factors to protect against substance use related problems among Mexican heritage and White youth*. *Drug and Alcohol Dependence*, (124): 34-41.

⁸ Neal, R.B. (1999). *Participation in high school extracurricular activities: Investigating school effects*. *Social Science Quarterly*, (80): 291-309.

⁹ Mahoney, J.L. (2000). *School extracurricular activity participation as a moderator in the development of antisocial patterns*. *Child Development*, (71):502-516.

¹⁰ Northeastern University (2008, March 21). *Can Involvement In Extra-curricular Activities Help Prevent Juvenile Delinquency?* Science Daily. Retrieved from <http://www.sciencedaily.com/releases/2008/03/080321174211.html> on March 8, 2012,

¹¹ Fredricks, J.A., Eccles, J.S. (2006). *Is extracurricular participation associated with beneficial outcomes? Concurrent and longitudinal relations*. *Developmental Psychology* 42(4), 698-713.

¹² National Institute on Drug Abuse. (2003). *Preventing Drug Use among Children and Adolescents*. Retrieved from <http://www.drugabuse.gov/publications/preventing-drug-abuse-among-children-adolescents/> on December 15, 2015

¹³ Lipari RN, Williams MR. (2016). *Risk and Protective Factors and Estimates of Substance Use Initiation: Results from the 2015 National Survey on Drug Use and Health*. National Survey on Drug Use and Health. Retrieved from <https://www.samhsa.gov/data/sites/default/files/NSDUH-PreventionandInit-2015/NSDUH-PreventionandInit-2015.html>

Protective Factors

- 58% of Brookline 7th and 8th graders said they have at least one adult they can talk to in school and 88% said they have an adult they can talk to outside of school if they have a problem.
- 62% of Brookline High School students reported they have at least one teacher or other adult in the school they could approach if they have a problem.

Among Brookline High School Students:

- Among male students, 62% of freshmen, 56% of sophomores, 73% of juniors, and 68% of seniors reported they did talk to at least one teacher or adult in the school when they had a problem.
- Among female students, 49% of freshmen, 59% of sophomores, 62% of juniors, and 72% of seniors reported they did talk to at least one teacher or adult in the school when they had a problem.
- 67% of Armenian, 62% of Asian, 64% of Black/ African-American, 65% of Hispanic / Latino, 64% of Middle Eastern, 57% of multi-race, and 58% of students of other races reported they have at least one teacher or other adult in the school they could talk to if they had a problem.
- 85% of students reported they have an adult to talk to outside of the school (family, non-family adults, parent, or other family member) if they have a problem. There were not significant differences between gender or grade regarding students who reported the presence of such an individual.
- 83% of Armenian, 84% of Asian, 80% of Black / African-American, 84% of Hispanic / Latino, 97% of Middle Eastern, 83% of multi-race and 84% of students of other races reported they have an adult to talk to outside of the school if they have a problem.
- 47% of BHS students reported they are involved in volunteer work, community service or helping people outside the home without getting paid.
- Students who participated on at least one BHS athletic team (83%) reported lower rates of stress than students who did not participate on any BHS athletic team (87%).
- 25% of students who participated on at least one BHS athletic team reported symptoms of depression as compared to 35% of students who did not participate on any BHS athletic team.

- Students who participated on athletic teams reported higher rates of alcohol use in the past 30 days: 22% of students on 0 teams, 36% of students on 1 team, 33% of students on 2 teams, and 39% of students on 3 or more teams.

Among Middle School students:

- In the past 12 months, 21% of 7th-8th grade students participated on 1 sports team, 25% participated on 2 sports teams, and 30% participated on 3 or more sports teams.

Report Limitations

The findings in this report are subject to various limitations. First, the data apply only to youth who a) attend Brookline High School and Brookline Middle Schools and b) fully completed the survey. Therefore, the data are not designed to be wholly representative of all persons in this age group who live in Brookline, as those who a) were not present on the day of administration, b) did not complete the survey fully, or c) do not attend these schools are not included. Second, all findings in this report are based on self-reported data. Interpretations of the results should consider reporting biases that may result in partially inaccurate survey results. Despite assurances of confidentiality and requests for honesty, students may have been inclined to give misleading answers, either overestimating or underestimating their actual behaviors.