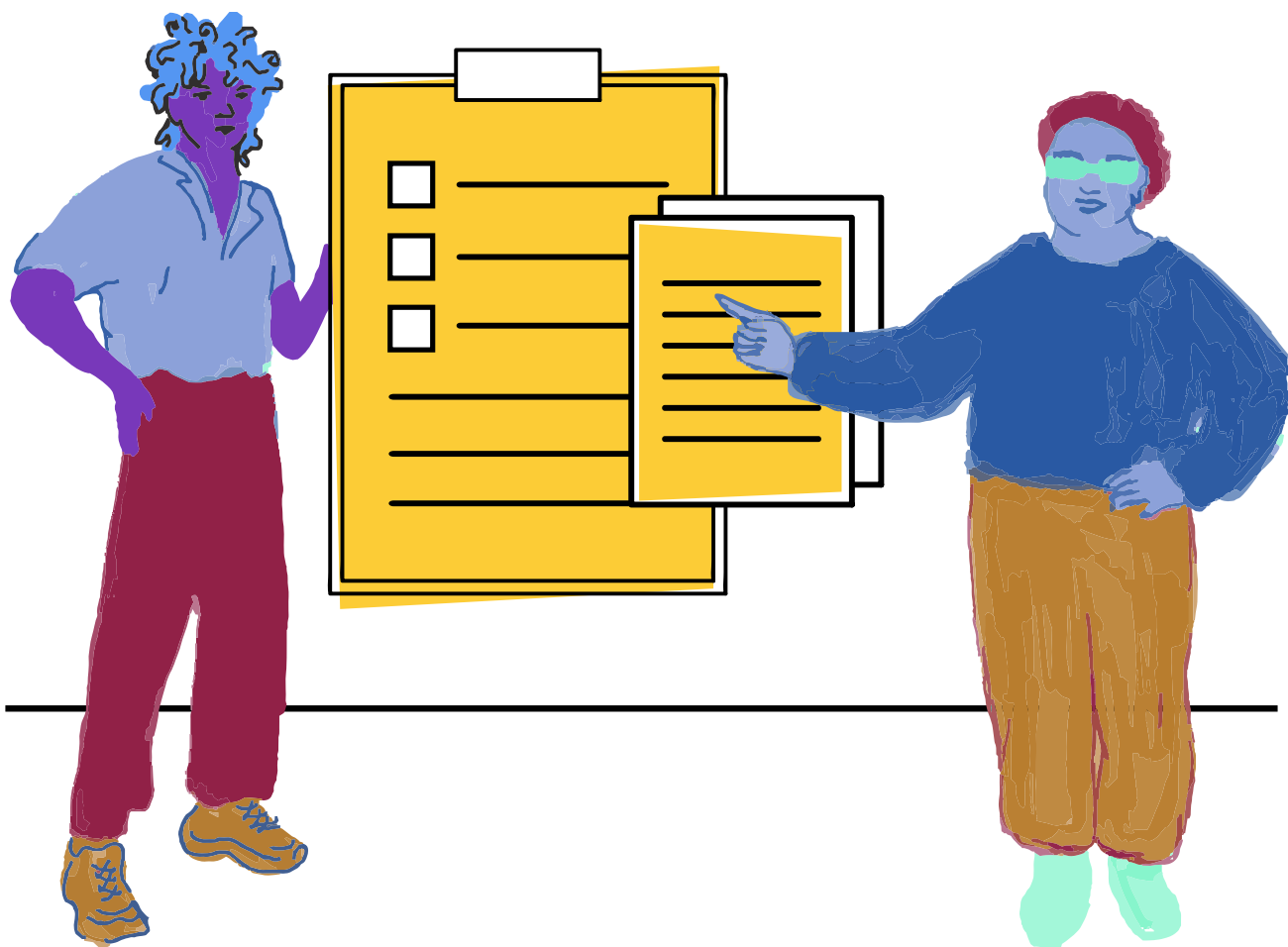


Exploring How Disparities in Experiences of Violence and Substance Use Between Transgender and Cisgender Students Differ by Gender Expression



Rights.
Respect.
Responsibility.

Advocates
for Youth
Rights. Respect. Responsibility.

Credits & Acknowledgements

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About Advocates For Youth

Advocates for Youth (Advocates) envisions a society in which all young people are valued, respected and treated with dignity; sexuality is accepted as a healthy part of being human; and youth sexual development is normalized and embraced. In such a world, all youth and young adults are celebrated for who they are and afforded honest, affirming, inclusive sex education; access to confidential, universal sexual health services; and the economic, educational, and social power to exercise their bodily autonomy and make informed decisions regarding their health and well-being. www.advocatesforyouth.org

Advocates' *Rights, Respect, Responsibility* philosophy underpins all of the organization's work:

Rights: Youth have the inalienable right to honest, inclusive sex education; confidential, universal sexual health services; and the economic, political and social power that supports their agency, bodily autonomy, and self-determination.

Respect: Youth are due respect. They are leading the fight for equity and justice. Young people must be meaningfully involved in the design, implementation and evaluation of systems, policies and programs that affect their health and well-being.

Responsibility: Society has the responsibility to examine and dismantle systems of oppression that drive sexual health disparities and other inequities and to instead champion community initiatives, programs, policies, and systems that ensure equity and justice for all young people, their families and communities.

About Rhodes Perry Consulting

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Executive Summary

This report, *Exploring How Disparities in Experiences of Violence and Substance Use Between Transgender and Cisgender Students Differ by Gender Expression*, explores how a student's perceived gender expression intersects with their gender identity to inform health risk. A robust and growing set of evidence shows that transgender youth face higher rates of violence, substance use and other negative health outcomes. This report looks at both the rates of negative outcomes within transgender students across three categories of gender expression and also at the disparities (or gaps) between cisgender and transgender students across these categories. We use the categories "perceived feminine", "perceived androgynous" and "perceived masculine" to examine gender expression (see Figure 1 on page 6). **We recognize that, with few exceptions, transgender perceived feminine youth are both most likely to experience health risks. Additionally, there are larger gaps between cisgender and transgender perceived feminine youth (compared to the gaps between cisgender and transgender perceived masculine youth or cisgender and transgender perceived androgynous students).**

Previous [research](#) developed by Advocates for Youth details the profound health disparities androgynous students, and transgender students, and particularly [transgender students of color](#), endure relative to their gender conforming and cisgender peers.¹ This project extends the previous work and contributes to answering additional questions about how transgender identity and perceived gender expression interact to explain health risks in violence and substance use.

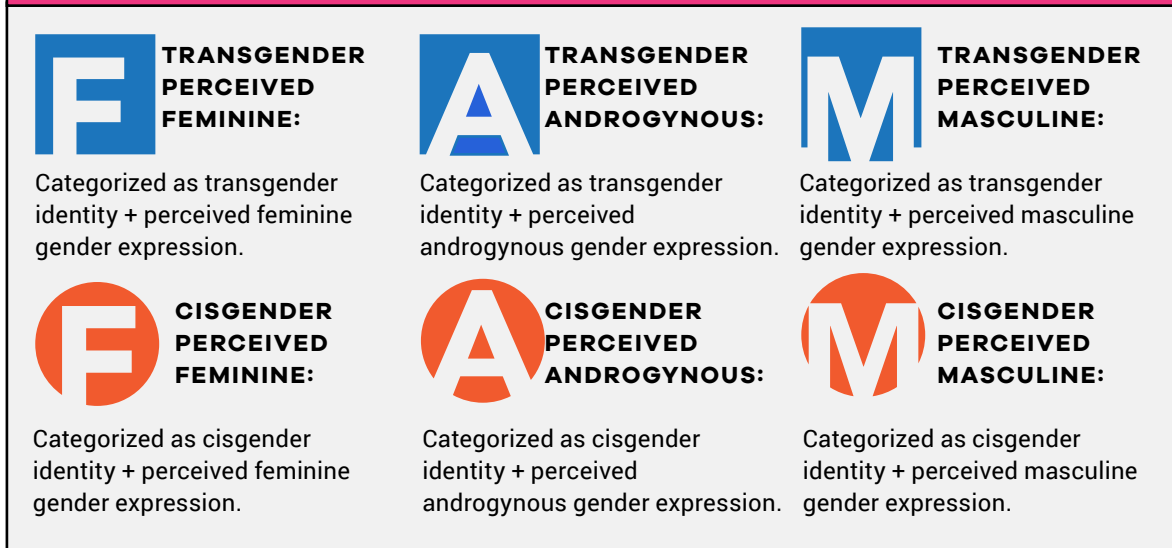
Background

Previous research has demonstrated that transgender adults are at increased risk for violence relative to their cisgender peers, as well as for engaging in health risk behaviors that can increase the likelihood of adverse health conditions (e.g., substance use) as a maladaptive coping mechanism in response to encountered violence and stigma. Further, there is a body of evidence demonstrating that there are disparities within transgender groups—that is, between transgender women, transgender men, and nonbinary people. However, these studies have not produced a consensus on how gender identity and expression affect which health disparities when the three groups are compared. Though data on transgender youth is less readily available, existing evidence suggests that these health disparities extend into youth and adolescence as well—though, to date, analyses have largely compared transgender to cisgender youth with less attention paid to gender expression. This report builds on existing findings to explore within-transgender disparities in violence and substance use across gender expression in a population-based sample of US high school-aged youth.

Key Findings

We analyzed more than 105,000 Youth Risk Behavior Survey (YRBS) respondents (1.8% of whom were transgender) in the seven states and 11 districts who were asked both the gender identity and perceived gender expression question in the same survey year. Data from both the 2017 and 2019 YRBS were used in order to ensure sufficient sample size to detect differences across groups which are described on the graphic on the next page.

We found that transgender students were significantly more likely than their cisgender peers to report lifetime and current tobacco and illicit drug use, and were significantly more likely to experience or be involved with physical violence. We extend this work by examining the differences within transgender students and the differences in the size of the disparities between cisgender and transgender students by perceived gender expression.

FIGURE 1:

Respondents were categorized into one of six groups:

Recommendations

The following recommendations will help key stakeholders cultivate affirming, respectful, and supportive learning environments for all students—including transgender students across all perceived gender expressions— by preventing school violence and substance abuse.

For Advocates: Build Transgender-Inclusive School Coalitions. Expand existing school coalitions and organizations by empowering transgender students and advocates to ensure that school violence/gun safety and substance abuse prevention is recognized as a transgender rights and health issue. Given the increased risk for violence victimization, and engaging in tobacco and illicit drug use, among transgender students—and transgender perceived feminine students in particular—coalition materials, resources, and programs must be inclusive of and relevant to the specific needs of transgender youth and all other students to reduce these risks for all students effectively.

For Educators: Design Gender-Inclusive Prevention Programs. Revise existing school violence/gun safety and substance abuse prevention programs by collaborating with school health professionals, Title IX coordinators, transgender student coalitions, and advocacy organizations, along with other subject matter experts—including experts who are also transgender people—to ensure these programs, along with supplemental resources and other materials, are inclusive of the specific needs of transgender students.

For Policymakers: Implement Gender Inclusive Policies and Laws. Allocate additional education and public safety resources to establish inclusive health standards incorporating the specific needs of transgender students addressing school violence like gun safety and substance abuse prevention programs. Equip essential school health professionals with the specific knowledge, skills, and confidence to implement these inclusive health standards to fully support the physical, mental, and emotional health of transgender students. Advocate for the passage of federal legislation like [the LGBTQ Data Inclusion Act](#), [the Safe Schools Improvement Act](#), and [the Equality Act](#), and state and local legislation that protects the health and well-being of transgender students.

For Researchers: Ask Gender-Inclusive Survey Questions. Revise the standardized sex question on the YRBSS to explicitly ask about sex assigned at birth and add the transgender identity question to the standardized questionnaire. By using the 'two-step process' to assess gender identity, the question would then be in line with best practices as recommended elsewhere (e.g., see NASEM, 2022). In addition, it will allow population-based surveys like the YRBSS to be better positioned to elucidate existing health disparities across the spectrum of gender identities and gender expressions, and provide data that can inform the school violence and substance abuse prevention efforts of advocates, policymakers, and educators.

Introduction

This report, *Exploring How Disparities in Experiences of Violence and Substance Use Between Transgender and Cisgender Students Differ by Gender Expression Report*, explores how a student's perceived gender expression intersects with their gender identity to inform health risk. In doing so, the report aims to address the following research question: **"How do demonstrated health disparities between cisgender and transgender students differ across gender expression -- namely, between perceived feminine, masculine, and androgynous students?"**

To answer this question, we examined differences in outcomes related to physical violence and substance use between cisgender and transgender students in three different perceived gender expression groups: feminine, masculine, and androgynous (e.g., 'equally feminine or masculine'). In doing so, this report builds upon the findings of multiple studies that have demonstrated that transgender, gender nonconforming, nonbinary, and gender expansive (TGX) adults—those whose current gender identity does not align with their sex assigned at birth—are at increased risk for numerous adverse health risks, relative to their cisgender peers.

Previous studies have found that transgender adults are at increased risk for experiencing physical and sexual violence,¹⁻⁵ and for using substances, including tobacco products and illicit drugs.⁶⁻¹¹ Available data similarly suggest that these disparities persist in adolescence and young adulthood. For example, in a national sample of over 5,500 youth aged 13-18, more than 82% of transgender or gender nonconforming youth reported being bullied in the previous year, compared with approximately 58% each of both cisgender girls and cisgender boys; transgender youth were also significantly more likely to report using cigarettes, marijuana, and other illicit drugs in the prior year.¹² Studies using population-based data from single states such as California, Colorado, and Minnesota,¹³⁻¹⁵ as well as systematic reviews of both population-based data and small non-representative samples,¹⁶⁻¹⁸ have repeatedly found that transgender high school students are significantly more likely than their cisgender peers to report recent, prior year, and lifetime use of tobacco, marijuana, and other illicit drugs, as well as to experience violence, bullying, and harassment. In a report using data from the 19 sites that collected data on gender identity in the 2017 Youth Risk Behavior Survey (YRBS), approximately a quarter of transgender youth reported being threatened or injured with a weapon at school, compared to only 6% of cisgender boys and 4% of cisgender girls; a quarter of transgender youth had been forced to have sexual intercourse, compared with 4% of cisgender boys and 10.5% of cisgender girls; and approximately a quarter or more of transgender youth reported ever using cocaine, heroin, methamphetamines, and other illicit drugs, compared to less than 5% each of cisgender boys and girls.¹⁹

Less is known, however, about how gender identity intersects with other aspects of gender—namely gender expression—to affect differences in risk for adverse health within transgender youth (e.g., transgender girls/women compared with transgender boys/men), and/or between youth of different gender expressions (e.g., transgender girls/women compared with cisgender girls/women).

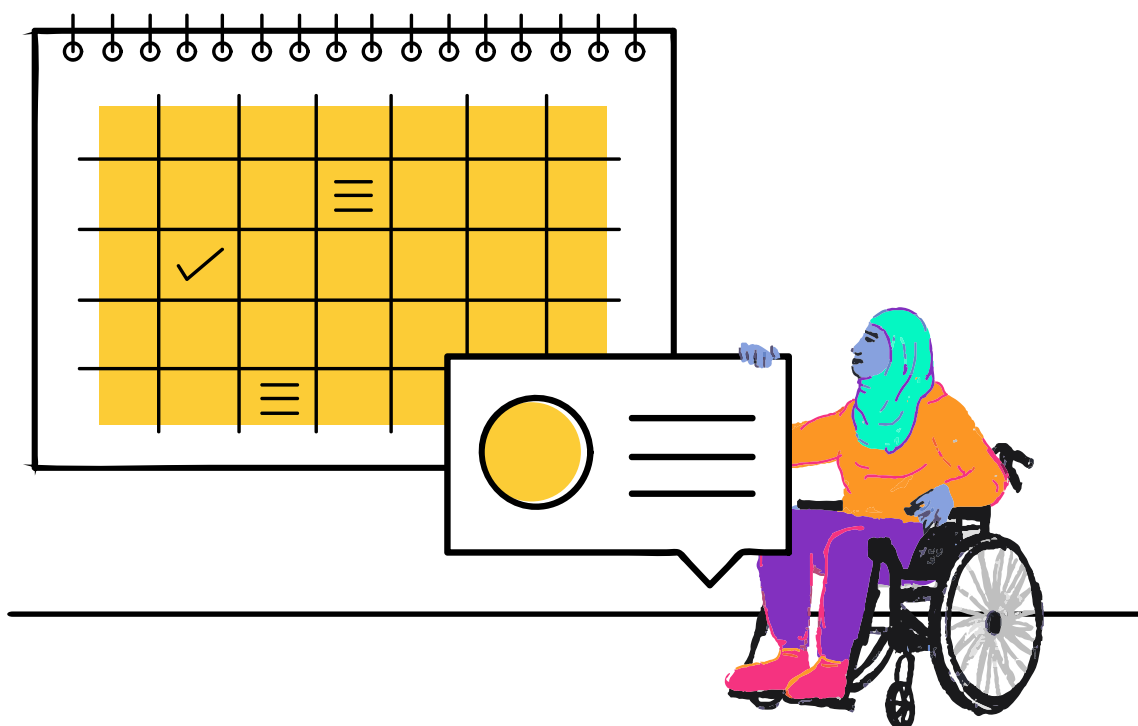
Evidence from studies of adults has found that transgender women—those who are girls/women and were assigned male sex at birth—are more likely than transgender men (and cisgender men and women) to experience violence.^{2,3,20} Several studies in adult populations have found that transgender men—those who are boys/men and were assigned female at birth—are more likely than transgender women to use tobacco products, including cigarettes, e-cigarettes/vapes, and cigars, though differences were only statistically significant in half of these studies.^{7,9,21,22} Mixed evidence exists on differences between ‘nonbinary’ transgender adults – those whose gender is both male and female or something different altogether such as a person being nonbinary, genderqueer, gender expansive, or gender nonconforming – and ‘binary’ transgender women and men. For instance, one systematic review notes that across the handful of studies making this comparison, nonbinary trans adults were at increased risk for some alcohol disorders, but not tobacco or illicit drug use.²³ Among youth, however, within-gender comparisons have rarely been made, and differences in the way gender identity has been measured make it difficult to draw cross-study conclusions.

Though several studies have explored within-transgender youth disparities in violence and victimization, results are limited by small sample size/non-representative data, as well as inconsistency in how gender is measured. Studies suggest that gender nonconformity and feminine gender expression are both risk factors for experiences of violence among transgender youth.^{25–27}

One study, a national sample of over 11,000 LGBTQ+ youth, found differences in substance use between transgender girls and boys compared to nonbinary youth, but the differences depended on the substance (e.g., marijuana versus tobacco).²⁸

Our research focus aims to gain more clarity on these distinctions using available YRBSS data.

Methodology



Survey History and Overview

The Youth Risk Behavior Surveillance System (YRBSS) is a biennial school-based survey of adolescents in grades 9 through 12. The YRBSS, administered by the Centers for Disease Control and Prevention (CDC), has been conducted since 1991 by most states and some larger school districts.²⁹ The YRBSS consists of a set of standard questions about demographics, injuries, violence, suicide, sexual behavior, tobacco use, alcohol and other drug use, and dietary behaviors and physical inactivity, supplemented by states and districts with optional questions from a list recommended by the CDC (CDC Survey, 2019 and CDC Questionnaire, 2019).

The survey method is designed to be representative of the population of high school students in that state or district. The purpose of the YRBSS is to identify the prevalence and trends of health outcomes nationally and in specific states and districts to improve policy and decision-making related to youth education, health, and safety. Data from the YRBSS are widely used to understand and improve public health for students in the United States. Health outcomes identified through the YRBSS can result in a better understanding of students' health. These data collected and analyzed can support educators, policymakers, researchers, and advocates to prioritize interventions that can reduce health risk and enhance positive outcomes for high school students.

YRBSS Questions Used in this Report

(Trans)gender Identity

With few exceptions, federal population-based surveys have not had the capacity to differentiate transgender people or identify correlative health outcomes from cisgender people. History was made in 2017, when the Youth Risk Behavior Surveillance System (YRBSS), administered by the CDC, was the first federal population-based survey to recommend an appropriate survey question to allow assessment of a student's transgender identity, thereby allowing population-based analyses of transgender students. This question, available as a standard question in 2023, uses a single-item approach for respondents to report their (trans)gender identity, asking "Are you transgender?" (full text of question found below). Those who answered "Yes, I am transgender" are categorized as 'Transgender.' Those who answered anything else, including "No, I am not transgender," "I am not sure if I am transgender," and "I do not know what this question is asking," were collapsed into a single 'Not Transgender' group, referred to throughout as 'Cisgender.'

Gender Expression

This report looks at within-transgender differences across gender expression by using the optional YRBSS measure of gender expression listed below, and first available to be included in the YRBSS in 2013. For this report, gender expression was collapsed into three categories, regardless of the respondents' stated sex and/or gender identity: 'Perceived Feminine' ("other people at school would describe" them as "Very," "Mostly," or "Somewhat Feminine"); 'Perceived Masculine' ("other people at school would describe" them as "Very," "Mostly," or "Somewhat Masculine"); and 'Perceived Androgynous' ("other people at school would describe" them as "Equally feminine and masculine"). We have retained the language describing students in the midpoint between masculine and feminine as "androgynous" from Advocates' 2016 report [Health Risk Factors Among Gender Expansive Students](#) in order to provide continuity between the reports. However, it is important to acknowledge that those students may identify as non-binary or "neither feminine nor masculine" or some other term, rather than as "androgynous" per se.

Measuring Gender Identity and Gender Expression

The questions recommended by the CDC and used in both the 2017 and 2019 YRBS reads:

Some people describe themselves as transgender when their sex at birth does not match the way they think or feel about their gender. Are you transgender?

- A. No, I am not transgender
- B. Yes, I am transgender
- C. I am not sure if I am transgender
- D. I do not know what this question is asking

A person's appearance, style, dress, or the way they walk or talk may affect how people describe them. How do you think other people at school would describe you?

- A. Very feminine
- B. Mostly feminine
- C. Somewhat feminine
- D. Equally feminine and masculine
- E. Somewhat masculine
- F. Mostly masculine
- G. Very masculine

Health Outcome Measures

This report examines differences across gender identity and gender expression among high school-aged youth in three health categories. Included in this report, each health category is presented as its own section with several different outcomes. (See [Appendix II](#) for the full list of included outcome measures and question text).

1. Physical Violence ([Table 4](#))
2. Tobacco Use ([Table 5](#))
3. Marijuana and other illicit drug use ([Table 6](#))

The choice of outcomes was driven by a few factors. As described further in the [Statistical Analysis section](#), we only examined those YRBSS outcomes on the standard questionnaire for which we have sufficient sample size, and for which there is a significant interaction effect – meaning the association between the outcome and gender identity is significantly different across gender expression. Observing that most outcomes that met sample size and statistical significance criteria were in these three categories, we focused on those categories where the highest number of outcomes met our inclusion criteria, allowing for a more in-depth and nuanced exploration of the selected categories of violence victimization and substance use.



Data Key

As discussed in the introduction, this paper builds on the technique introduced in our earlier report, [On All Sides: How Race, Ethnicity, and Gender Influence Health Risk for Transgender Students](#), to look at intersectionality through the lens of quantitative research on transgender students living at the intersections of gender identity and gender expressions.¹ Intersectionality is not just additive, it is multiplicative – meaning that the risk for a person with A and B characteristics is not simply the sum of the individual risks associated with A and B, but rather a wholly new risk profile created by the lived experience of being both A and B. In statistical terms, this is described as an “interaction effect” or an “interaction term,” which is used in statistical analyses to explicitly compute the multiplicative interacting effect of multiple characteristics.

This box describes how we’ve chosen to represent complex statistical ideas in colorful, easy-to-read graphics, that clearly depict differences across the six gender identity-by-gender expression groups for each of the health outcomes explored. For ease of reading, all graphics use the same legend, with the same colors and symbols representing the same things across all charts. The letter of the symbol represents gender expression, and the color of the symbol represents gender identity:

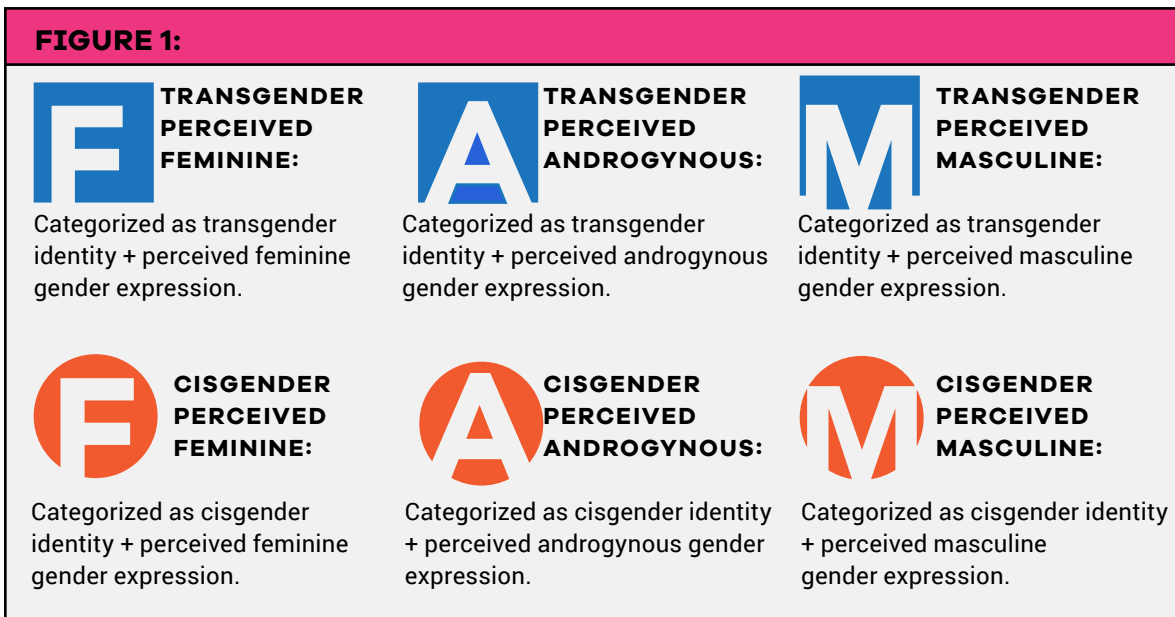
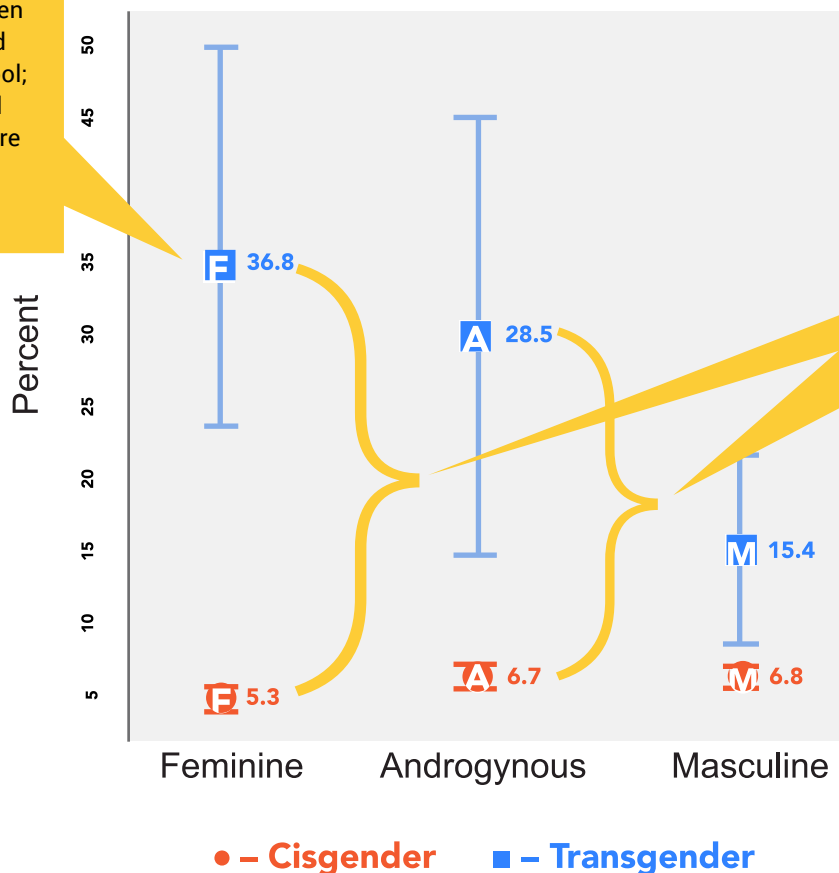


Figure 2, on the next page, shows the percent of cisgender and transgender students, separately by gender expression, who report having been threatened or injured with a weapon on school property.

When we compare cisgender and transgender students by gender identity, we can see that although transgender students are consistently more likely than cisgender students to have been threatened or injured with a weapon on school property, this pattern varies by gender expression. Most notably, in addition to the percent of students experiencing an outcome differing across gender identity, **the size of the gap between transgender and cisgender students differs as well, meaning the size of the effect of being transgender differs across gender expression.**

FIGURE 2: WERE THREATENED OR INJURED WITH A WEAPON ON SCHOOL PROPERTY



Transgender perceived feminine students were most likely to have been threatened or injured with a weapon at school; cisgender perceived feminine students were the least likely (36.8% vs. 5.3%)

Among perceived androgynous and perceived masculine students, the size of the gap between transgender and cisgender students is smaller than that for perceived feminine students. This means that being transgender (vs. cisgender) has a much smaller effect on the risk of being threatened or injured with a weapon on school property for androgynous and masculine students.

Prevalence

The percentages shown on the graphs are “predicted prevalences,” meaning they show the prevalence among a subgroup (such as transgender perceived feminine students or cisgender perceived androgynous students), **produced by regression analyses** including the main effects of gender identity and gender expression, as well as their interaction terms.

Because these are predictions produced by regression, they are **slightly different from sample percentages shown in tables** – which come from **bivariate analyses** of the percent of students in each of the six gender identity-by-gender expression groups experiencing an outcome, without any additional interaction effects.

Findings

Sample Characteristics

This section shows the sample's demographics, tables showing the percentage of each of the six gender identity-by-gender expression groups experiencing the violence and substance use outcomes assessed in this report, and graphs showing selected, illustrative interaction effects.

FIGURE 3 – DATASET: ALL STUDENTS BY GENDER IDENTITY

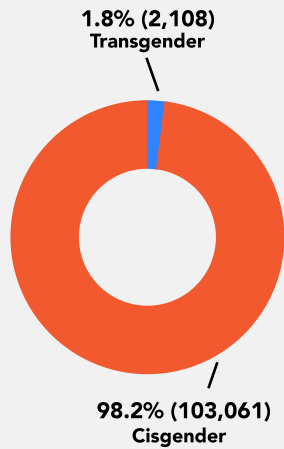


FIGURE 4 – DATASET: TRANSGENDER STUDENTS BY GENDER EXPRESSION

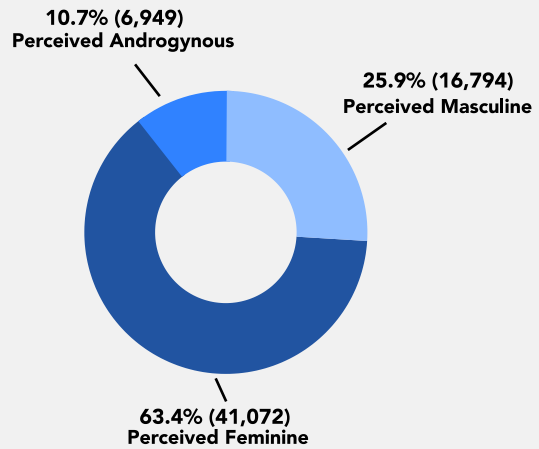
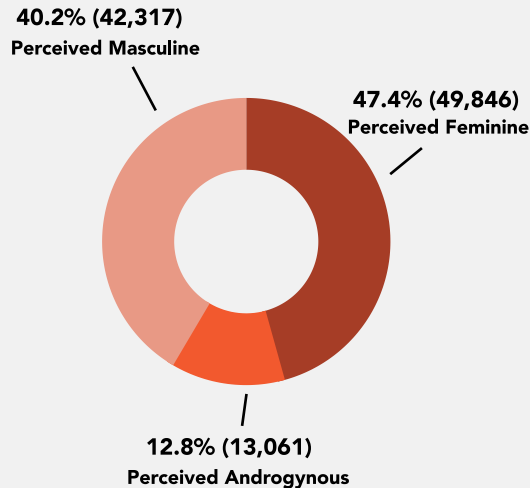


FIGURE 5 – DATASET: CISGENDER STUDENTS BY GENDER EXPRESSION



DATASET: CISGENDER STUDENTS BY GENDER EXPRESSION Geographic Distribution

The sample includes data from the 18 state and district YRBSS sites which included both the transgender identity and gender expression questions in the same year (Table 1). This sample was drawn disproportionately from state-level YRBSS data (84.3% were from states, compared to 15.7% from districts).

TABLE 1: STATE AND DISTRICT DISTRIBUTION				
Site	Survey Years	Unweighted N	Weighted N	Weighted %
Boston, MA	2017 – 2019	2,448	14,524	0.4
Broward County, FL	2017 – 2019	1,934	59,567	1.7
California	2017 – 2019	2,279	1,293,489	35.9
Chicago, IL	2019	1,235	55,586	1.5
Delaware	2017	2,690	36,937	1.0
Los Angeles, CA	2017 – 2019	2,486	89,963	2.5
Maryland	2017	44,982	217,984	6.1
Massachusetts	2017	2,990	266,708	7.4
Nashville, TN	2019	1,299	15,926	0.4
New York	2019	9,625	670,328	18.6
New York City, NY	2017 – 2019	17,263	239,987	6.7
Oakland, CA	2017 – 2019	2,644	8,402	0.2
Pennsylvania	2019	2,069	510,363	14.2
Philadelphia, PA	2019	1,004	27,317	0.8
Rhode Island	2017 – 2019	3,561	39,816	1.1
San Diego, CA	2017 – 2019	3,528	25,852	0.7
San Francisco, CA	2019	1,960	14,524	0.4
Seattle, WA	2019	1,172	12,200	0.3

Demographics by Gender Identity

On the next page, Table 2 shows the demographics of transgender and cisgender students, including the unweighted number of survey respondents (“Sample N”) in each category, and the weighted number and percent (95% confidence interval) of students in the included geographic regions these respondents reflect (“Weighted N/% /95% CI”).

TABLE 2: DEMOGRAPHICS BY GENDER IDENTITY								
Predictor	Identifies as Transgender				No/Not Know/Not Understand			
	Sample N	Weighted N	Weighted %	Confidence Interval	Sample N	Weighted N	Weighted %	Confidence Interval
Gender Expression								
Feminine	1,190	41,072	63.4%	52.9--72.7	48,656	1,614,589	45.7%	44.1--47.3
Androgynous	285	6,949	10.7%	7.5--15.1	12,721	452,061	12.8%	12.0--13.7
Masculine	633	16,794	25.9%	18.1--35.6	41,684	1,468,009	41.5%	40.0--43.1
Sex								
Female	871	34,614	53.4%	42.5--64.0	54,034	1,785,816	50.5%	49.0--52.1
Male	1,237	30,201	46.6%	36.0--57.5	49,027	1,748,844	49.5%	47.9--51.0
Age								
12-14 years old	479	12,061	18.6%	12.0--27.7	19,133	560,785	15.9%	13.9--18.1
15 years old	486	18,531	28.6%	21.5--36.9	26,639	848,901	24.0%	22.3--25.8
16 years old	497	12,694	19.6%	14.6--25.8	27,233	917,404	26.0%	23.9--28.1
17 years old	460	14,436	22.3%	16.9--28.8	23,138	827,789	23.4%	21.9--25.1
18 years old	186	7,092	10.9%	6.9--16.8	6,918	379,781	10.7%	9.6--12.1
Grade								
9th	573	18,353	28.3%	21.4--36.4	27,490	916,885	25.9%	22.9--29.2
10th	528	20,616	31.8%	20.8--45.3	26,887	875,900	24.8%	22.4--27.3
11th	489	11,341	17.5%	12.2--24.4	26,515	887,367	25.1%	22.6--27.8
12th	475	14,332	22.1%	16.1--29.6	22,047	853,311	24.1%	21.8--26.6
Ungraded	43	173	0.3%	0.1--0.6	122	1,196	<0.1%	<0.1--0.1
Race & Ethnicity								
API	147	2,780	4.3%	2.6--6.9	10,982	338,197	9.6%	8.0--11.3
Black	482	7,668	11.8%	7.6--17.9	21,196	479,665	13.6%	11.9--15.4
Latinx	615	28,617	44.2%	30.1--59.3	28,476	1,172,026	33.2%	29.9--36.5
White	697	23,598	36.4%	26.9--47.2	35,834	1,378,374	39.0%	35.8--42.3
All Other POC	167	2,151	3.3%	1.8--6.0	6,573	166,398	4.7%	4.2--5.3
Sexual Identity								
Heterosexual	844	33,492	53.2%	41.3--64.7	84,882	2,955,428	84.4%	83.5--85.3
Gay or lesbian	431	9,980	15.8%	10.2--23.8	2,709	91,221	2.6%	2.3--3.0
Bisexual	463	16,001	25.4%	19.2--32.8	8,835	288,326	8.2%	7.7--8.8
Not sure	249	3,529	5.6%	3.3--9.3	5,381	166,079	4.7%	4.3--5.3

Gender Identity and Gender Expression

Table 3 shows, separately for transgender and cisgender high school students of each perceived gender expression, what percent identified their sex as female or male.

Among perceived feminine youth, transgender students are much less likely than cisgender students to identify their sex as female (62.1% vs. 90.3%). They are instead much more likely to identify their sex as male (37.9% vs. 9.7%).

The reverse is seen among perceived masculine youth: transgender perceived masculine students are much more likely than cisgender perceived masculine students to identify their sex as female (31.7% vs. 4.7%), and are much less likely to identify their sex as male (68.3% vs. 95.3%).

For perceived androgynous youth, however, transgender students are similar to cisgender students in that they are about equally likely to identify their sex as female (54.8% vs. 57.4%).

Gender Expression	Perceived Feminine		Perceived Androgynous		Perceived Masculine	
	Identify Sex as Female	Identify Sex as Male	Identify Sex as Female	Identify Sex as Male	Identify Sex as Female	Identify Sex as Male
Transgender	62.1% (48.7--73.8)	37.9% (26.2--51.3)	54.8% (40.6--68.2)	45.2% (31.8--59.4)	31.7% (22.7--42.3)	68.3% (57.7--77.3)
Cisgender	90.3% (89.1--91.3)	9.7% (8.7--10.9)	57.4% (54.3--60.5)	42.6% (39.5--45.7)	4.7% (4.0--5.4)	95.3% (94.6--96.0)

YRBSS Health Risk Categories

The next section shows that transgender perceived feminine students are most at risk for nearly all health outcomes in the areas of **physical violence, tobacco use, and marijuana and other drug use**. With few exceptions, the gap between cisgender and transgender students' experiences of risk is largest for perceived feminine students as well. This pattern suggests unique vulnerabilities associated with the combination of being transgender and being perceived to be feminine.

Physical Violence

Transgender perceived feminine students are more likely than all other groups to have: been in a physical fight (on or off school property), been threatened with a weapon on school property, carried a weapon, and carried a gun. The gap between cisgender and transgender students experiences of these risks is also largest among perceived feminine students with one exception. Figure 6 shows that not only are transgender perceived feminine students most frequently being threatened or injured with a weapon on school property (36.8%) than are the other groups in this study, but the gap between the prevalence of these threats experienced by transgender feminine students and those experienced by cisgender feminine students (5.3%) is much larger than the gap between those faced by cisgender and transgender perceived androgynous students (28.5% vs. 6.7%) and cisgender and transgender perceived masculine students (15.4% vs. 6.8%).

The one exception was getting into a physical fight on school property, for which transgender and cisgender perceived androgynous youth do not differ significantly ($p=0.076$) given the statistical significance criteria used for this report.

FIGURE 6 – WERE THREATENED OR INJURED WITH A WEAPON ON SCHOOL PROPERTY

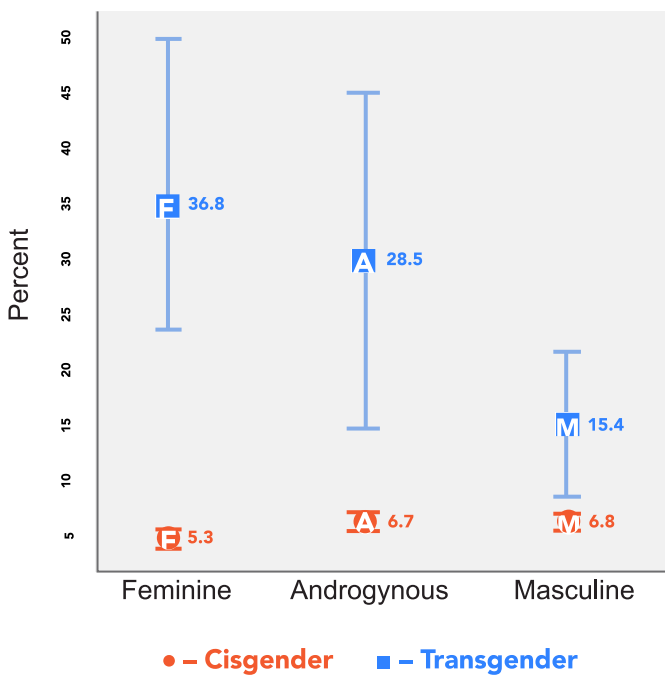
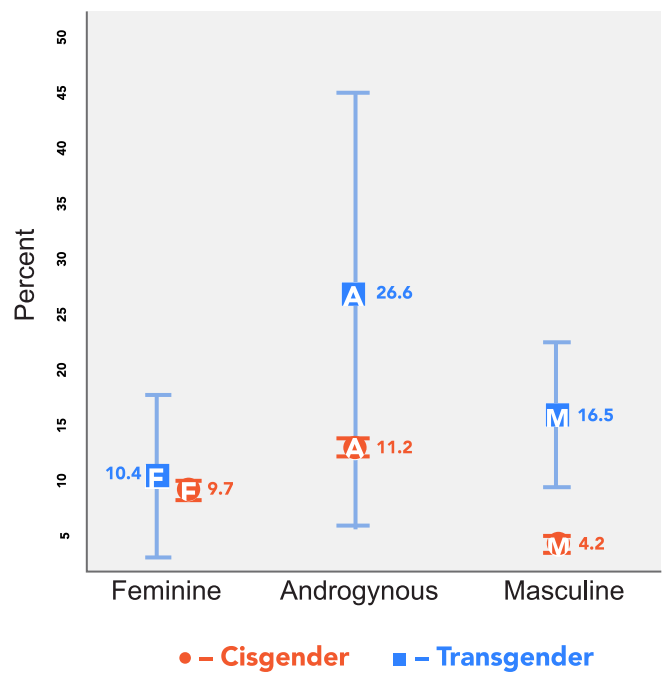


FIGURE 7 – WERE EVER PHYSICALLY FORCED TO HAVE INTERCOURSE



In another departure from the pattern observed for other violent outcomes, being physically forced to have intercourse was most prevalent among transgender perceived androgynous (26.6%) not transgender perceived feminine students. Further, the gap in prevalence between cisgender and transgender students for this outcome was largest for perceived androgynous students. We include a discussion of this deviation from the expected findings (that transgender perceived feminine youth would both have the highest prevalence of each health risk and that the largest cisgender/transgender gap in the prevalence of each health risk would be observed within perceived feminine youth) to illustrate the importance of conducting a comprehensive analysis of outcomes by transgender identity and perceived gender expression.

Tobacco Use

Transgender perceived feminine students are more likely than all other groups in this study to: currently smoke cigarettes, ever have used an electronic vapor product, get their own electronic vapor products by buying them, currently use smokeless tobacco, and currently smoke cigars. The gap between cisgender and transgender experiences of tobacco-related risks is also largest for perceived feminine students.

Figures 8 and 9 show examples of this pattern, illustrating that not only are current use of cigarettes (17.2%) and lifetime use of electronic vapor products (67.4%) most prevalent among transgender perceived feminine students, but the gaps between cisgender and transgender experiences of these risks are larger among perceived feminine students (17.2% vs. 4.3% for current cigarette use and 67.4% vs. 43.7% for lifetime electronic vapor product use) compared to the gaps between cisgender and transgender youth among perceived masculine or perceived androgynous students.

FIGURE 8 – CURRENTLY SMOKES CIGARETTES

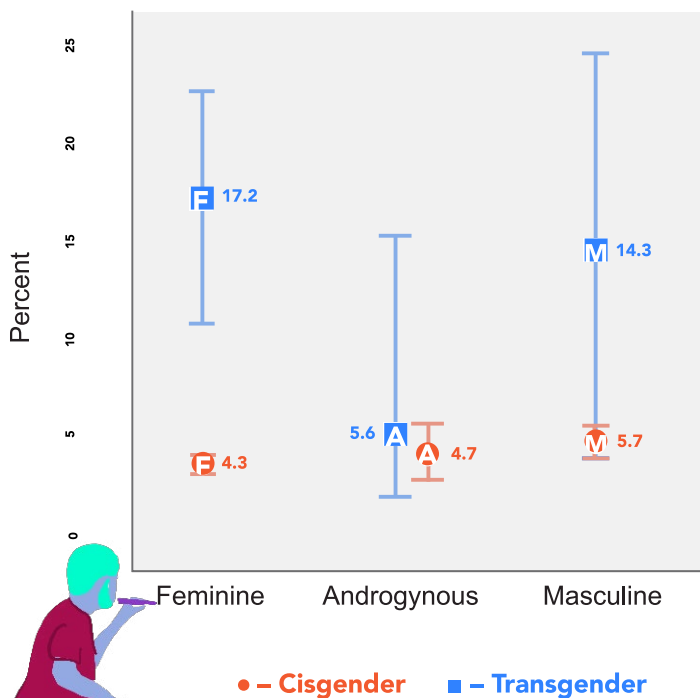
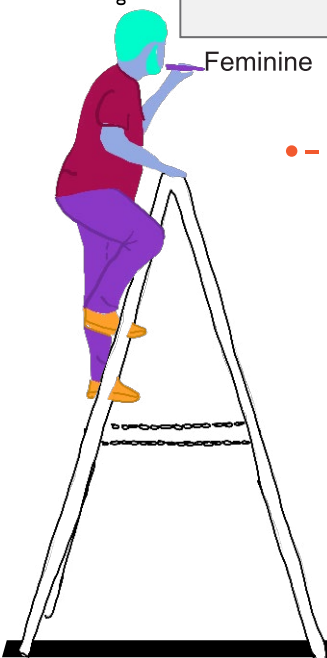
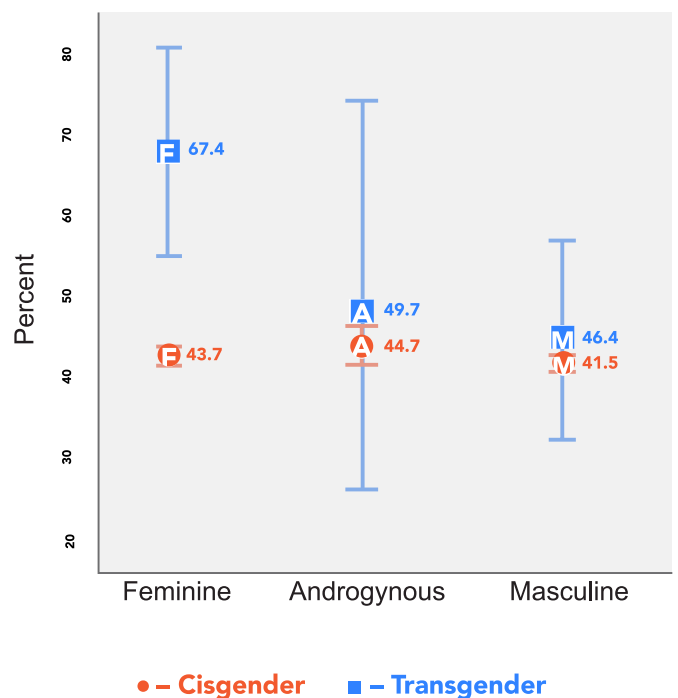


FIGURE 9 – EVER USED AN ELECTRONIC VAPOR PRODUCT

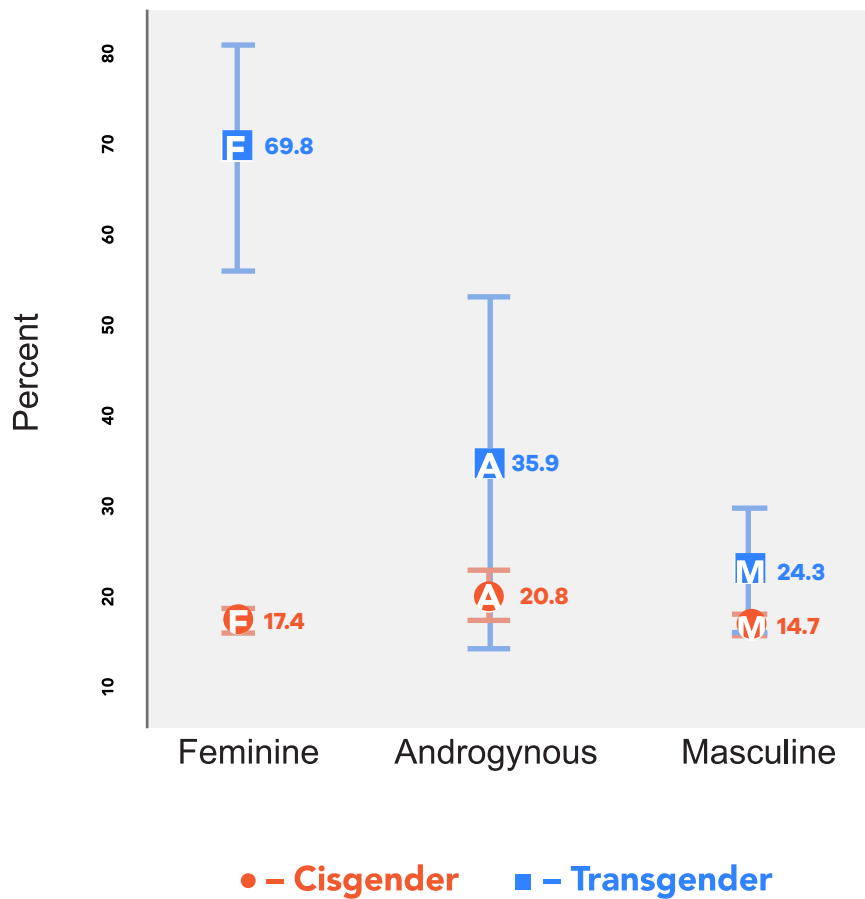


Marijuana and Other Illicit Drugs

Transgender perceived feminine students are more likely than all other groups to: have tried marijuana before 13, have ever used any illegal drug (other than marijuana), have ever used cocaine, heroin, methamphetamines, ecstasy, synthetic marijuana, steroids, or prescription pain medication (without a doctor’s prescription), have injected any illegal drug and to be offered and to have sold or been given an illegal drug on school property. For all but one of these outcomes (misuse of prescription pain medication), the gap between cisgender and transgender students was also largest among perceived feminine students.

Figure 10 shows that nearly one in seven (69.8%) transgender perceived feminine students had used an illegal drug other than marijuana, higher than any other group studied. Further, the gap in the prevalence of this risk between transgender and cisgender (17.4%) students was larger among perceived feminine students than among perceived androgynous or perceived masculine students.

FIGURE 10 – EVER USED AN ILLEGAL DRUG OTHER THAN POT



Conclusion

After categorizing respondents into one of six groups, we found that transgender students were significantly more likely than their cisgender peers to report lifetime and current tobacco and illicit drug use, as well as were significantly more likely to experience or be involved with physical violence, replicating findings from the 2020 *On All Sides* report.¹ Building on these findings, we show that for most outcomes, transgender perceived feminine students were the most likely group to experience an outcome; and the gap between cisgender and transgender students was largest among perceived feminine students.

Taken together, our results show that gender expression and gender identity operate intersectionally in predicting health risk, offering a more in-depth and nuanced way to look at transgender youth health disparities.

Limitations

This report is notable for its use of a large, population-based sample, to explore within-transgender youth differences in health risk across gender expression, and the differing size of the disparities between cisgender and transgender youth across perceived gender expression. This analysis offers much-needed evidence of the increased risk faced by transgender feminine youth in particular. However, results are limited by how the YRBSS assesses sex, gender identity, and gender expression.

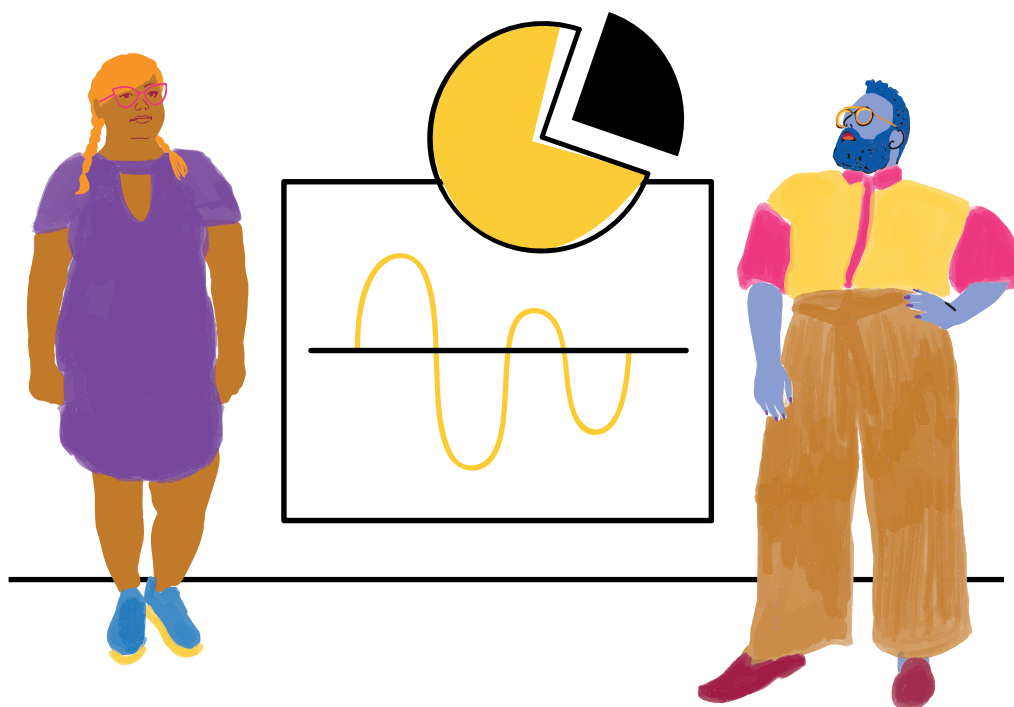
While these findings are a first step towards understanding how gender expression and transgender identity interact to affect health outcomes among youth, future analyses would benefit from more robust measurement of constructs related to sex, transgender identity, and gender expression. A recent report by the National Academies of Sciences, Engineering and Medicine (NASEM) recommends that population-based surveys ask first about sex assigned at birth (male, female) and then about current gender (male, female, transgender etc.).³⁵ The YRBSS asks a single question about sex (male, female) and then a question about whether the student identifies as transgender, which limits the ability of researchers to interpret responses to the two questions in relation to one another. For example, a young person who responds that their sex is male and that they are transgender could be a person whose sex assigned at birth was male but who currently identifies as a woman or someone whose sex assigned at birth was female and who currently identifies as a transgender boy.

The question asked on the YRBSS about gender expression requires respondents to assess others' perceptions of their gender expression; this is difficult for respondents to report on reliably, further complicating the measurement issues described above. In addition, since the transgender question is optional, we cannot identify transgender youth in sites without this question, as the use of a single-sex question essentially assumes that current gender identity is congruent with sex (assigned at birth). As a result, we are only able to explore gender identity differences in a fraction of the YRBSS population surveyed, reducing sample size and power to detect effects, as well as to explore how gender identity and other demographics intersect to impact health.

Future Research Questions

Further research is needed to better understand the relationship between health risks (e.g., violence, tobacco use, other drug use), transgender identity, gender expression, and the interplay between transgender identity and gender expression. Future studies may explore relationships between other mediating and moderating factors that have been found to affect health risks, including both those that are measured in the YRBSS (e.g., race, ethnicity, and sexual orientation) and those that are not (e.g., socioeconomic status, community support, immigration status, and experiences of transphobia).³⁶⁻³⁸

Both qualitative and quantitative research are needed in order to expand upon what is known about the links between transgender identity, gender expression, and health risks. For example, minority stress theories suggest that it is not being transgender per se that places transgender students at higher risk for negative health outcomes but rather that the additional strain of transphobia adds to the stress all adolescents feel.^{4,6,18,36-39} Stress is associated with negative health outcomes because people who experience high levels of stress may resort to coping mechanisms that have harmful health effects (e.g., smoking or alcohol use) and because stress causes reactions in the body that harm future and current health. The interplay between gender expression and transgender identity is not well understood in the context of what is known about minority stress; further research is needed to better understand these connections.



Recommendations

The following recommendations will help key stakeholders cultivate affirming, respectful, and supportive learning environments for all students—including transgender students across all perceived gender expressions—by preventing school violence and substance abuse.

For Advocates: Build Transgender-Inclusive School Coalitions. Expand existing school coalitions and organizations by empowering transgender students and advocates to ensure that school violence/gun safety and substance abuse prevention is recognized as a transgender rights and health issue. Given the increased risk for violence victimization, and engaging in tobacco and illicit drug use, transgender students—and transgender feminine students in particular—endure, coalition materials, resources, and programs must be inclusive of, and relevant to, the specific needs of transgender youth, as well as all other students, to reduce these risks for all students effectively.

For Educators: Design Gender Inclusive Prevention Programs. Revise existing school violence/gun safety and substance abuse prevention programs by collaborating with school health professionals, Title IX coordinators, transgender student coalitions, and advocacy organizations, along with other subject matter experts—including experts who are also transgender people—to ensure these programs, along with supplemental resources and other materials, are inclusive of the specific needs of transgender students.

For Policymakers: Implement Gender Inclusive Policies and Laws. Allocate additional education and public safety resources to establish inclusive health standards incorporating the specific needs of transgender students addressing school violence like gun safety and substance abuse prevention programs. Equip essential school health professionals with the specific knowledge, skills, and confidence to implement these inclusive health standards to fully support the physical, mental, and emotional health of transgender students. Advocate for the passage of federal legislation like [the LGBTQ Data Inclusion Act](#), [the Safe Schools Improvement Act](#), and [the Equality Act](#), and state and local legislation that protects the health and well-being of transgender students.

For Researchers: Ask Gender Inclusive Survey Questions. Revise the standardized sex question on the YRBSS to explicitly ask about sex assigned at birth. By using the ‘two-step process’ to assess gender identity, the question would then be in line with best practices as recommended elsewhere.³⁵ In addition, it will allow population-based surveys like the YRBSS to be better positioned to elucidate existing health disparities across the spectrum of gender identities and gender expressions, as well as provide data that can inform the school violence and substance abuse prevention efforts of advocates, policymakers, and educators. The youth we have identified as transgender perceived feminine may identify as transgender girls, but they might also be nonbinary people assigned female at birth, transgender boys who are read by their peers as feminine, or a variety of other identities.

Appendix I:

Glossary of Terms and Acronyms

Androgynous

refers to a person who is and/or expresses their gender as neither distinguishingly masculine nor feminine.

Centers for Disease Control and Prevention (CDC)

refers to the federal agency that administers the Youth Risk Behavior Surveillance System (YRBSS).

Cisgender

refers to people whose gender identity is congruent with their sex assigned at birth.

Gender Expansive

describes people who expand notions of gender expression beyond perceived or expected societal notions of gender norms of being masculine or feminine based on a person's assigned sex at birth.

Gender Expression

the external presentation of an individual's gender-related attributes, including aspects such as dress, voice, activities, appearance, and mannerisms. It is distinct from gender identity, which refers to an individual's internal sense of gender. All people, regardless of their sexual orientation or gender identity, have a gender expression.

Gender Identity

relates to a person's internal view of their gender. It describes one's innermost sense of being man, woman, or another gender, which may or may not align with the person's body or assigned sex at birth.

Gender Minority

refers to people whose gender identities differ from the majority of the surrounding society. The term is primarily used to refer to transgender, nonbinary and gender nonconforming individuals. In this report, youth who selected "transgender" are referred to as gender minority youth.

Health Disparities

differences in health status between two or more groups, typically between a majority group—one which has more power, status, and resources—and minority group(s). This is usually presented or discussed as the absolute (e.g., xx percentage points higher) or relative (e.g., xx times higher) difference in the percentage or proportion of each group experiencing an outcome or risk behavior. In the present report, the health disparities discussed are between either cisgender majority youth and transgender gender minority youth (e.g., transgender youth are more likely than cisgender youth to currently smoke cigarettes), or between transgender youth of different gender expressions (e.g., transgender perceived feminine youth are more likely than perceived masculine or perceived androgynous youth to have been in a physical fight at school).

Intersectionality

is a term first conceptualized and coined by legal scholar, Kimberlé Williams Crenshaw, describing how aspects of a person's social and group identities combine to create different modes of discrimination and privilege. Used in this paper, intersectionality examines how different gender identities and gender expressions intersect and result in health disparities experienced by transgender students across three perceived gender expressions compared to their cisgender peers.

Minority Stress

describes high levels of stress faced by members of stigmatized minority groups

Nonbinary

refers to someone who does not identify as a man or a woman and exists beyond the gender binary. They could identify as both a man and a woman, identify as another gender entirely, or not a part of any gender category at all.

Population-Based Data

are data collected using sampling procedures that allow for analyses and statistical inferences that can be generalized to a population. This report obtains population-based data through the Youth Risk Behavior Surveillance System which collects data among secondary school-age students. Results are representative of the population of high school-aged youth in the 18 sites/locations whose data were used in this report (see [Table 1](#) for full list).

Predictors

are factors associated with outcomes that come temporally prior to them. For example, people typically understand themselves as having a gender or race before they participate in health behaviors or outcomes.

Sex Assigned at Birth (SAAB)

is a phrase used to intentionally recognize a person's assigned sex often based on the body. Most commonly people are assigned female or male at birth, though a small number of states are allowing an X for neither male nor female on birth certificates.

Sites

refer to state and local education and health agencies who receive cooperative agreement funding from the CDC to conduct their own YRBS surveys.

Transgender People

are those whose gender identity is not congruent with their assigned sex at birth. Some transgender people may identify as nonbinary, but not all transgender people are nonbinary.

Transphobia

encompasses a range of negative attitudes, feelings, or actions toward transgender people. Transphobia can include fear, aversion, hatred, violence, anger, or discomfort felt or expressed towards people who do not conform to social gender expectations.

Trans-Specific services

refers to programs, resources, or other materials created by and for transgender students with an emphasis on the voices and experiences of transgender students who have lived experiences with the subject matter covered (e.g., school violence or substance abuse).

Youth Risk Behavior Surveillance System (YRBSS)

refers to the federal population-based survey that collects data on health risk behavior among students.

Appendix II: Outcome Tables

PHYSICAL VIOLENCE RISK BEHAVIORS						
Predictor	Feminine		Androgynous		Masculine	
	Transgender	Cisgender	Transgender	Cisgender	Transgender	Cisgender
Were in a physical fight	60.9 (39.4--78.8)	14.5 (13.1--16.0)	46.3 (28.9--64.7)	20.2 (17.8--22.8)	35.6 (23.8--49.4)	23.2 (21.8--24.6)
Were in a physical fight on school property	67.7 (41.6--86.0)	5.6 (4.4--7.2)	20.8 (6.2--50.8)	6.9 (5.4--8.9)	19.3 (10.2--33.4)	8.2 (7.2--9.4)
Were threatened or injured with a weapon on school property	36.8 (24.4--51.2)	5.3 (4.3--6.5)	28.5 (14.5--48.4)	6.7 (5.5--8.1)	15.4 (9.9--23.3)	6.8 (6.0--7.6)
Carried a weapon	38.3 (30.7--46.5)	4.7 (4.1--5.4)	14.2 (5.9--30.1)	11.1 (9.1--13.3)	21.0 (14.4--29.7)	15.1 (13.4--17.0)
Carried a gun	26.7 (19.2--35.9)	2.0 (1.6--2.4)	23.0 (8.7--48.4)	3.6 (2.8--4.8)	12.1 (7.3--19.4)	5.0 (4.2--5.9)
Were ever physically forced to have sexual intercourse	10.4 (4.5--22.2)	9.7 (8.7--10.9)	26.6 (10.8--51.9)	11.2 (9.5--13.1)	16.5 (9.7--26.6)	4.2 (3.5--5.1)

*** p≤.001 ** p≤.01 * p≤.05

See Physical Violence, [page 18](#)

TOBACCO USE RISK BEHAVIORS						
Predictor	Feminine		Androgynous		Masculine	
	Transgender	Cisgender	Transgender	Cisgender	Transgender	Cisgender
Currently smokes cigarettes	17.2 (12.1--23.8)	4.3 (3.8--5.0)	5.6 (3.4--9.1)	4.7 (3.6--6.1)	14.3 (7.9--24.6)	5.7 (4.8--6.8)
Ever used an electronic vapor product	67.4 (54.1--78.3)	43.7 (41.9--45.5)	49.7 (26.9--72.7)	44.7 (42.0--47.3)	46.4 (34.6--58.6)	41.5 (39.6--43.5)
Usually got their own electronic vapor products by buying them in a store	19.6 (8.1--40.2)	11.3 (9.1--14.0)	9.1 (3.3--22.9)	10.5 (7.1--15.1)	3.2 (1.3--7.9)	13.9 (10.9--17.5)
Currently used smokeless tobacco	43.3 (32.3--54.9)	2.8 (1.8--4.1)	19.1 (4.9--51.7)	2.5 (1.7--3.6)	11.8 (5.4--23.9)	4.0 (3.3--4.8)
Currently smokes cigars	32.0 (25.7--39.1)	4.2 (3.7--4.7)	9.4 (5.3--16.2)	5.0 (4.1--6.1)	13.1(8.9--18.8)	6.7 (5.9--7.5)

See Tobacco Use, [page 19](#)

MARIJUANA AND OTHER ILLICIT DRUG USE RISK BEHAVIORS

Predictor	Feminine		Androgynous		Masculine	
	Transgender	Cisgender	Transgender	Cisgender	Transgender	Cisgender
Tried marijuana for the first time before age 13 years	22.8 (13.6--35.8)	4.6 (4.0--5.2)	11.5 (6.2--20.3)	6.6 (5.3--8.0)	9.8 (6.2--15.3)	6.7 (5.9--7.6)
Ever used any illegal drug other than pot	69.8 (56.0--80.7)	17.4 (15.8--19.0)	35.9 (18.9--57.4)	20.8 (18.1--23.8)	24.3 (16.9--33.5)	14.7 (13.6--15.9)
Ever used cocaine	29.9 (22.3--38.8)	3.4 (2.7--4.1)	10.9 (6.3--18.3)	4.5 (3.6--5.7)	10.2 (6.7--15.3)	3.7 (3.2--4.2)
Ever used heroin	32.1 (19.1--48.6)	2.1 (1.8--2.5)	10.4 (6.2--16.9)	2.5 (1.9--3.3)	11.7 (7.8--17.3)	2.3 (1.9--2.8)
Ever used methamphetamines	38.1 (27.4--50.1)	2.6 (1.9--3.6)	29.2 (11.9--55.7)	2.1 (1.5--2.9)	12.3 (6.8--21.3)	2.0 (1.6--2.6)
Ever used ecstasy	38.9 (28.9--49.8)	3.0 (2.3--3.9)	6.4 (3.1--12.6)	3.4 (2.5--4.8)	16.4 (8.5--29.5)	3.3 (2.7--4.1)
Ever used synthetic marijuana	24.3 (15.0--36.8)	6.0 (5.4--6.8)	17.4 (5.1--45.1)	8.1 (6.7--9.7)	12.2 (7.7--18.8)	5.8 (5.1--6.6)
Ever took steroids without a doctor's prescription	47.8 (37.1--58.7)	2.6 (1.7--3.9)	3.2 (1.1--9.3)	1.9 (1.0--3.4)	5.0 (1.7--14.2)	2.3 (1.5--3.4)
Ever took prescription pain medication without a doctor's prescription	19.2 (8.6--37.4)	13.4 (11.7--15.3)	10.3 (5.1--19.7)	16.7 (13.7--20.2)	24.0 (13.4--39.4)	10.8 (9.6--12.1)
Ever injected any illegal drug	36.2 (27.0--46.5)	2.2 (1.8--2.8)	5.7 (3.0--10.7)	1.5 (1.0--2.1)	6.7 (3.8--11.6)	1.8 (1.4--2.5)
Were offered, sold, or given an illegal drug on school property	67.1 (46.1--82.9)	24.5 (22.8--26.3)	29.7 (13.3--53.7)	24.7 (22.1--27.5)	30.0 (19.3--43.3)	25.1 (23.5--26.7)

See Marijuana and Other Illicit Drugs, [page 20](#)

Appendix III:

YRBSS Question Descriptions

All question text copied from Youth Risk Behavior Surveillance System 2019 YRBS National, State, and District Combined Datasets User's Guide

Physical Violence

Were in a physical fight

Original Text: During the last 12 months, how many times were you in a physical fight?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or 7 times
- F. 8 or 9 times
- G. 10 or 11 times
- H. 12 or more times

Recorded Version Used in Analysis: Were in a physical fight (in the past year)

- 0 = No (Answered A)
- 1 = Yes (Answered B, C, D, E, F, G, H)

Were in a physical fight

Original Text: During the last 12 months, how many times were you in a physical fight?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or 7 times
- F. 8 or 9 times
- G. 10 or 11 times
- H. 12 or more times

Recorded Version Used in Analysis: Were in a physical fight on school property (in the past year)

- 0 = No (Answered A)
- 1 = Yes (Answered B, C, D, E, F, G, H)

Threatened or injured with a weapon on school property

Original Text: During the past 12 months, how many times has someone threatened or injured you with a weapon such as a gun, knife, or club on school property?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or 7 times
- F. 8 or 9 times
- G. 10 or 11 times
- H. 12 or more times

Recorded Version Used in Analysis: Were in a physical fight (in the past year)

- 0 = No (Answered A)
- 1 = Yes (Answered B, C, D, E, F, G, H)

Carried a weapon

Original Text: During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club?

- A. 0 day
- B. 1 day
- C. 2 or 3 days
- D. 4 or 5 days
- E. 6 or more days

Recorded Version Used in Analysis: Carried a weapon 1+ time (in the past 30 days)

- 0 = No (Answered A)
- 1 = Yes (Answered B, C, D, or E)

Carried a gun

Original Text: During the past 12 months, on how many days did you carry a gun? (Do not count the days when you carried a gun only for hunting or for a sport, such as target shooting.)

- A. 0 day**
- B. 1 day**
- C. 2 or 3 days**
- D. 4 or 5 days**
- E. 6 or more days**

Recorded Version Used in Analysis: Carried a gun 1+ time (in the past year)

0 = No (Answered A)

1 = Yes (Answered B, C, D, or E)

Physically Forced to Have Sexual Intercourse

Original Text: Have you ever been physically forced to have sexual intercourse when you did not want to?

- A. Yes**
- B. No**

Recorded Version Used in Analysis: Ever physically forced to have sexual intercourse

0 = No (Answered B)

1 = Yes (Answered A)

Appendix IV: Background

In order to draw the sample for the YRBSS, sites use a custom software program to draw two-stage cluster samples of schools and classes within sampled schools; the first sampling stage selections are drawn with proportional probability by the number of students enrolled in the school. The district sites featured in this report include only students in the funded school district (e.g., the San Diego Unified School District, not greater San Diego).²⁹

The sites studied use passive consent, meaning that students are surveyed unless their parents, guardians, and caregivers elect that their children opt-out by submitting a form. A standardized script was read to students by a survey administrator during the survey, and the students then complete self-reported questionnaires. Information about the schools and the relevant population are used to weigh the data. Data weights are created by Westat, the contractor tasked by the CDC with providing technical assistance for the YRBSS. These data are used to create a representative sample for each site. The data can then be analyzed in various statistical programs to account for the complex sampling design and weights.³⁰

Once we selected the final list of health categories and outcome variables, binary re-coded versions of each outcome variable, created and released by the CDC, were used, where 1=yes and/or selected response of interest, and 0 = no and/or selected alternate responses.

For example, the outcome included in this report, “Tried marijuana for the first time before age 13 years,” is a binary variable released by the CDC that is a re-coded version of a question in the actual questionnaire that includes a wider range of outcomes. For the question, “How old were you when you first tried marijuana for the first time?”, all respondents who selected B, C, or D on the original questionnaire question were coded as 1=yes, tried marijuana before age 13 years in the binary variable used in this report. In contrast, those who had never used marijuana (selected A) or had first used it at age 13 or older (selected E, F, or G) were coded as 0=no, did not try marijuana before age 13.

A Note About the Gender Measures Used in this Report

Implications for current analysis: Despite limitations in the ability to explicitly identify transgender girls, boys, and nonbinary people from the available measures, we are able to use the transgender identity question and the gender expression measure to approximate this comparison. Prior research has found the socially ascribed or perceived gender expression measure does reasonably well at reflecting respondents’ own gender identity and expression,³¹ and is, in fact, included as an alternate recommended measure by The GenIUSS Group which endorsed the transgender identity question.³² As a result, we are able to use this measure as a proxy for gender identities, allowing us to capture within-transgender differences between transgender girls (those categorized as transgender perceived feminine), transgender boys (those categorized as transgender perceived masculine), and transgender nonbinary youth (those categorized as transgender perceived androgynous).

Sample Outcome Measure Recoding Example: Tried Marijuana for the First Time

Original Question Text /Answers: How old were you when you first tried marijuana for the first time?	Recoded Version Used in Analysis: Tried marijuana for the first time before age 13
A) I have never tried marijuana	---> 0 / No
B) 8 years old or younger	---> 1 / Yes
C) 9 or 10 years old	---> 1 / Yes
D) 11 or 12 years old	---> 1 / Yes
E) 13 or 14 years old	---> 0 / No
F) 15 or 16 years old	---> 0 / No
G) 17 years old or younger	---> 0 / No

Statistical Analysis

Assembling and Cleaning the Dataset

Authors requested data from all sites in 2017 and 2019 that asked both the gender expression and transgender identity question approved for use by the CDC, or an alternate question about transgender identity within the same year; all sites but two in 2019 (Massachusetts and Washington, DC) provided data along with permission for the CDC to release their data that includes information about transgender identities.

In addition, the publicly available state and district datasets from each year were downloaded from the CDC website. Each individual data set was checked for agreement with the codebooks provided by each site to confirm the accuracy of the released data. Once confirmed for accuracy, the individual site datasets were appended alongside the CDC released datasets, first by years (e.g., all 2017 sites; all 2019 sites), and then across year (e.g. 2017 and 2019 data were appended into a single dataset), in order to account for changes in question numbering across sites.

After comparing the single combined dataset against the codebooks provided by each site to confirm appending was done correctly, the final dataset was cleaned to create all analysis variables, including the gender expression and six gender identity-by-gender expression groups described elsewhere. All data merges and subsequent cleaning were conducted in Stata (version 15), a commonly used statistical package that can account for the complex sampling design used in the YRBSS.³⁰

While the CDC does consistency checks, and cleaning of the dataset, and creates the weights that researchers are advised to use during analysis, researchers often decide to do additional cleaning. In this case, to be included in the dataset, respondents must have valid answers for age, race/ethnicity, sex, grade, and both the transgender identity question and gender expression.

Data Analysis

Firstly, frequencies were explored to determine which outcomes met sufficient sample size for inclusion: following the criteria established by the CDC for sexual minority youth,^{29,33} we do not report statistics that represent fewer than 25 respondents (unweighted) in the denominator. In addition, we do not report any data that include categories with five or fewer respondents in the numerator due to potential concerns about confidentiality. To be included, an outcome had to meet sample size criteria for the entire sample, as well as within each of the six gender identity-by-gender expression groups.

Once outcomes with sufficient sample size were identified, univariate and bivariate analyses were conducted in order to determine the overall weighted and unweighted frequency (e.g., number of respondents), and weighted proportion (e.g., percent of respondents), to determine the number of youth in the entire sample experiencing each outcome, as well as within each of the six gender identity-by-gender expression groups.

From there, logistic regression was used to separately examine if (1) the main effect of transgender identity was significantly associated with the outcome, and (2) if the main effect of gender expression was significantly associated with each outcome of interest. Unless otherwise specified, the cutoff for statistical significance for an individual statistic is a p-value less than or equal to .05.

Finally, if both main effects were statistically significant, then a third logistic regression was conducted to assess if the gender identity and gender expression interaction effect was statistically significant. To be included in the report, an outcome had to have a statistically significant odds ratio in a logistic regression with gender identity alone as the predictor and also have a statistically significant ($p \leq .20$) interaction effect in a regression controlling for the main effects of gender identity and gender expression.

All statistical analyses were performed in Stata by the 2nd author (SK Goldberg), and all statistical analyses were checked for accuracy by a second analyst. Following the guidance available from the CDC, all proportions and regressions were calculated in Stata using the SVY family of procedures which allows weighted analyses to be representative of high school students in the locations included in this report; weights were adjusted to account for multiple years of data.³⁰ Stata code for replication purposes is available upon request to the authors.

Presentation of Findings

Initial analyses, presented in the **Sample Characteristics section**, reflect the weighted and unweighted frequency and proportion of the sample falling into specific demographic categories, as described above. We present both weighted and unweighted analyses because the unweighted numbers reflect the number of answers to the survey and the weighted analyses more closely represent how the number approximate the number of people that the survey data represent in the population.

Analyses reflecting the associations between gender identity, gender expression, and health outcomes are then presented, with a separate report section for each category of outcomes **Physical Violence**; **Tobacco Use**; and **Marijuana and Other Illicit Drug Use**. Each section follows a similar pattern, with written discussions highlighting emerging patterns across the six gender identity/expression groups and noting when these are statistically significantly different, accompanied by tables and figures. Note that the tables and figures present final results in two slightly different ways.

The tables depict the weighted prevalence (and corresponding 95% confidence intervals) of the sample experiencing an outcome. Each of the six identity-by-gender expression groups were graphed separately and no confounders or covariates were included in these calculations. Weighted percentages and confidence intervals were rounded to two one digit past the decimal.

This is followed by one or two illustrative graphs showing the “predicted prevalence” of the outcome at the intersection of gender identity and gender expression. For these graphs, the prevalences (percents) depicted might differ slightly from those seen in the table; this is due to the additional control variables and interaction effects used in the analyses in the graphs (**see the Data Key for more information**). Note that odds ratios from these logistic regressions are not presented in the report, except where described in-text.

Appendix V: Works Cited

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