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Inequities in sleep duration among gender and sexual minority adolescents

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Abstract

Objectives: Gender and sexual minority adolescents face health inequities compared to cisgender, heterosexual peers, including lower sleep duration. Our ability to measure these inequities recently expanded, as the 2023 Youth Risk Behavior Survey's updated gender/sexuality items provide an opportunity to examine these inequities in a large, nationally-representative sample of adolescents.

Methods: Analyses (n=20,103 students, 2023 national YRBS, grades:9–12) estimated survey-weighted prevalence of three sleep duration outcomes across gender and sexuality groups: sufficient sleep (8+ hours/night), short sleep (≤ 6) and extremely limited sleep (≤ 4). Survey-weighted logistic regressions compared outcomes between gender/sexual minority groups and cisgender/ heterosexual peers, adjusting for demographic confounding.

Results: Sleep duration was consistently lower for gay/lesbian, bisexual, “another unlisted sexual identity” and transgender adolescents, plus those unsure of their gender or sexual identity (e.g., adjusted aOR for extremely limited sleep [“another unlisted sexual identity” vs. heterosexual]:3.14; 95%CI: 2.00–4.92). For many gender and sexual minority groups, extremely limited sleep was more common than sufficient sleep.

Conclusions: Sleep duration is limited among adolescents, and this, in conjunction with inequities on the basis of gender/sexuality, warrants intervention.

Keywords

Sleep; Sexual Orientation; Transgender; Inequities; Adolescent

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Introduction:

Gender and sexual minority adolescents face a wide variety of health inequities compared to their cisgender, heterosexual peers. These inequities occur across a number of domains, including mental health,^{1–3} substance use^{4,5} and related risk factors such as experiences of bullying and violence.^{6,7} These inequities can be explained with a minority stress framework, wherein marginalized gender and sexual minority groups face stressors like prejudice, stigma, discrimination and victimization that elicit stress, trauma and despair, as well as worsened physical and mental health.^{8,9} In recent years, gender and sexual minority youth have faced substantial stressors. Nearly 6 in 10 experienced past-year bullying or mistreatment in school, with more than half of these youth targeted specifically due to their sexual identity, gender identity, or gender expression.¹⁰ Over 40% of gender and sexual minority youth report feeling critical about themselves when thinking about their identity.¹⁰ These stressors can lead to a number of health sequelae,^{8,11} impacting the health and behavior of these young people.

Gender and sexual minority adolescents face inequities in a behavior critical to their mental health and physical well-being: sleep. Sleep inequities are manifold: gender and sexual minority adolescents were more likely to report short sleep duration,^{9,12–14} sleep disturbances,^{12,14} and poor sleep quality.⁹ These inequities are particularly important to address given the health benefits of sleep. Among young people, low sleep duration was linked to reduced cardiometabolic fitness,^{15,16} with specific outcomes like high blood pressure^{16,17} and obesity¹⁸ associated with shorter sleep. Additionally, low sleep duration has been linked to worse academic performance,¹⁹ increased likelihood of depressed or anxious mood,²⁰ and even elevated risk of suicidality.²¹ Sleep duration is critical across a number of health domains, and thus inequities among gender and sexual minority adolescents require urgent attention.

Available studies of national US health inequities among gender and sexual minority adolescents are largely based on the Youth Risk Behavior Survey, a national study of adolescent health risk behaviors, which queries sexual identity and behavior. However, in 2023 data, the YRBS offers an expanded sexual identity item, as well as an item on gender identity, allowing us to re-examine the sleep inequities above with greater thoroughness. The aim of this study was to use these items to examine inequities in sleep duration among gender and sexual minority adolescents. Producing strong, nationally-representative, updated estimates for these inequities may guide future efforts to ensure the sleep health and well-being of US adolescents while incorporating nuance and leveraging new, more inclusive YRBS items.

Methods:

The Youth Risk Behavior Survey includes a series of cross-sectional surveys administered every two years to US students in grades 9 through 12. These surveys capture behaviors and experiences of adolescents, and the publicly available 2023 national data release features 20,103 respondents. The resulting dataset is nationally representative, and includes public, parochial, and private schools, each with more than 40 students combined in grades 9–12.²²

The YRBS used a three-stage cluster sampling design, examining a subset of classrooms in specific schools within selected counties, groups of small adjacent counties, or designated parts of larger counties. The Centers for Disease Control and Prevention Institutional Review Board approved the protocol. We analyzed de-identified publicly available data. Of the 20,103 respondents in the overall sample, sexual identity analyses examined 16,408 and gender identity analyses examined 16,690. The construction of these samples is detailed below.

Measures

The YRBS had the following item on sleep duration: “On an average school night, how many hours of sleep do you get?” with response options starting at “4 or less hours” and increasing incrementally by hour through “10 or more hours”. In alignment with our prior research,¹³ we investigated three sleep duration outcomes: Sufficient Sleep (≥ 8 hours a night), Short Sleep (≤ 6 hours a night), and Extremely Limited Sleep (≤ 4 hours a night).

The YRBS also assessed self-reported sexual orientation and gender identity. Sexual orientation was assessed with the item “Which of the following best describes you?” with response options of “Heterosexual”, “Gay or Lesbian”, “Bisexual”, “I describe my sexual identity some other way”, “I am not sure about my sexual identity (questioning)” and “I do not know what this question is asking”. This set of response options was expanded in 2023 from the former options of heterosexual, bisexual, gay/lesbian and “not sure”. Gender identity was assessed with the item “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?” with response options of “No, I am not transgender”, “Yes, I am transgender”, “I am not sure if I am transgender” and “I do not know what this question is asking”. The 2023 data release is the first national YRBS sample to include an item on transgender identity.

The first set of analyses in this study were centered on sexual orientation groups. Overall, after restricting to those with data on sleep duration and sexual orientation, there were 16,408 individuals in this set of analyses. The heterosexual group ($n=12,336$) was compared with gay/lesbian ($n=621$), bisexual ($n=1,937$), another unlisted sexual identity ($n=710$), and not sure/questioning groups ($n=804$).

The second set of analyses in this study focused on gender identity, using those with available data on both gender identity and sleep duration. People who responded that they were cisgender ($n=15,717$) were compared against those who were transgender ($n=569$) and those who were unsure ($n=404$), for an overall sample size of 16,690 for this set of analyses.

Additional items included in adjusted analyses as potential confounders include sex (female/male), race/ethnicity (American Indian/Alaskan Native, Asian, Black or African American, Native Hawaiian/Other PI, White, Hispanic/Latino, Multiple-Hispanic, Multiple-Non-Hispanic), and grade (9th/10th/11th/12th/ Ungraded or other grade).

Analysis

Analyses accounted for the complex sampling design of the YRBS by employing survey procedures in SAS 9.4, incorporating sampling weights and generating survey-weighted estimates, both prevalences and odds ratios. We examined the weighted prevalence of sleep outcomes by sexual orientation and by gender identity. Then, the relationships between sexual orientation and sleep outcomes were examined with logistic regressions, unadjusted and then adjusted for potential confounding. Lastly, the relationships between gender identity and sleep outcomes were examined with logistic regressions, unadjusted and then adjusted for potential confounding.

Results:

Sleep Outcomes by Sexual Orientation

Sleep duration was low across sexual orientation groups. Only 24.9% of heterosexual adolescents reported eight or more hours of sleep a night (Figure 1), and reported prevalence was even lower for all other groups reported. By sexual orientation, sufficient sleep was lowest for those in the “Another Unlisted Sexual Identity” group (Figure 1, prevalence: 13.7%, 95%CI: 9.6–17.8), followed by bisexual (16.1%, 95%CI: 13.9–18.3), questioning (16.5%, 95%CI: 11.2, 21.8) and gay/lesbian respondents (17.0%, 95%CI: 12.3–21.7). These groups also exhibited higher prevalences of short sleep (six or fewer hours) and extremely limited sleep (four or fewer hours) compared with heterosexual peers.

These inequities are reflected in our adjusted associations (Table 1). Sufficient sleep inequities were strongest for bisexual respondents (adjusted aOR vs. heterosexual adolescents: 0.52, 95%CI: 0.37–0.75). The magnitude of associations among gay/lesbian, “another unlisted sexual identity”, and “not sure/questioning” respondents were comparable to the magnitude for bisexual respondents, all with significantly lower odds of sufficient sleep compared with heterosexual peers. Odds of short sleep were elevated for all sexual minority groups compared with heterosexual peers, ranging from 1.77 (for questioning respondents, 95%CI: 1.38, 2.28) to 1.84 (for bisexual respondents, 95%CI: 1.58, 2.14). Odds of extremely limited sleep were higher for all sexual minority groups compared with heterosexual peers, but were highest for respondents in the “another unlisted sexual identity” category (adjusted OR: 3.14, 95%CI: 2.00, 4.92).

Sleep Outcomes by Gender Identity

Sufficient sleep was much less common among transgender (15.2%) and “not sure” (13.2%) respondents than their cisgender counterparts (23.9%, Figure 2), while short sleep and extremely limited sleep were much more common.

Sufficient sleep differences persisted after adjustment for confounding (Table 2, aOR for transgender vs. cisgender respondents: 0.62, 95%CI: 0.41–0.93; aOR for “not sure” vs. cisgender respondents: 0.52, 95%CI: 0.31–0.87). Differences also persisted for short sleep (adjusted aOR for transgender respondents: 2.47, 95%CI: 1.85–3.30; for “not sure” respondents: 1.89, 95%CI: 1.27–2.83) and extremely limited sleep (adjusted aOR for

transgender respondents: 3.06, 95%CI: 2.03–4.62; for “not sure” respondents: 2.77, 95%CI: 1.92–3.99).

Discussion:

The present study identified consistently poor sleep duration among adolescents and inequities in sleep duration across gender and sexuality groups. Gender and sexual minority adolescents exhibited the lowest prevalence of sufficient sleep and the highest prevalence of short or extremely limited sleep. Sleep duration is so poor among many of these groups that “another unlisted sexual identity” and transgender adolescents, as well as those unsure of their gender identity, were more likely to have extremely limited sleep (four or fewer hours of sleep a night) than sufficient sleep (eight or more hours of sleep a night). The group “another unlisted sexual identity”, which likely includes adolescents who identify as queer, pansexual, asexual and other identities not represented elsewhere, exhibited the lowest prevalence of sufficient sleep and the highest prevalence of extremely limited sleep of any sexual identity group in this study. Transgender respondents had the highest prevalence of short or extremely limited sleep of any group in this study, with those questioning their gender identity as a close second. While these gender inequities align with research conducted elsewhere,^{9,23} these results are the first to use a nationally-representative YRBS sample.

Future research should continue to ensure that the assessment of gender and sexual identity accounts for the rich diversity of labels used by adolescents. The latest iteration of the YRBS makes significant strides in assessing this diversity, both by allowing space for less commonly studied identities and by allowing space for ambiguity and questioning of identities. Those questioning their sexual orientation or their gender identity had consistent inequities in all sleep duration outcomes. Incorporating uncertainty and label diversity in surveys of adolescent identity is vital, given that adolescence is a period of identity formation and development. Indeed, current cohorts of adolescents frequently use labels of gender and sexual identity not commonly addressed by surveys,^{24–26} like asexual, pansexual, queer and non-binary, with one study suggesting that nearly 24% of gender and sexual minority adolescents use nontraditional labels.²⁵ More broadly, qualitative work on gender and sexual minority communities has found a desire for survey items that allow for greater fluidity and complexity, potentially with write-in response options.²⁷ Allowing for this self-description, especially at a time of identity development, may yield further insights on how best to understand this generation of adolescents. In the meantime, further examination of those with a sexual identity in the “another unlisted sexual identity” category, or those questioning their sexual or gender identity, may lead to the identification of further inequities among modern adolescents.

Persistently low sleep outcomes, and consistent inequities in sleep duration, among adolescents warrant major interventions. For instance, particularly for adolescents in high school, delayed school start times have been consistently linked to longer sleep duration, as well as other outcomes like reduced sleepiness.^{28–30} Additional interventions for the general adolescent population have been proposed, such as school-based efforts focused on sleep education^{31,32} and clinical interventions based on cognitive-behavioral approaches,³³

though given the consistency of low adolescent sleep duration over time, it appears than any successful interventions are underutilized.

Other intervention efforts specifically aimed at gender and sexual minority adolescents may work to reduce the influence of minority stressors that could, in turn, lead to stress and worsened sleep outcomes. Anti-violence and anti-discrimination policies at school and elsewhere may yield subsequent benefits in terms of gender and sexual minority adolescents' sleep,¹² though this potential avenue of intervention requires further study. Additionally, sources of emotional support may be beneficial for the sleep health of gender and sexual minority adolescents. For instance, prior research has suggested that transgender and gender non-conforming youth engaged in gender-affirming therapy have better sleep outcomes than those not engaged in gender-affirming therapy, including disorders related to sleep duration like insomnia and hypersomnolence.³⁴

These strategies to address minority stressors and support the well-being of gender and sexual minority adolescents are particularly important now given the current sociopolitical climate. Approximately 90% of gender and sexual minority young people reported that their well-being was negatively impacted by recent politics, with over half saying they were impacted "a lot".³⁵ Gender and sexual minority youth are presently being subjected to discriminatory policies across the nation. Transgender and gender diverse youth face bans on sports participation, bans on use of school facilities aligned with their gender, widespread bans on accessing gender-affirming healthcare, and outing by schools to their families.^{36,37} Many gender and sexual minority youth live in states that block LGBTQ-inclusive Title IX protections and face censorship of LGBTQ topics in school curricula.³⁸ These policies act as structural stigma which can lead to minority stress and worsened health for gender and sexual minority populations.^{39,40} Addressing the health consequences of this stigma, and advocating for affirming policies, remain important public health goals in the pursuit of adolescent health equity.

This study features a number of strengths and limitations. The YRBS provides a nationally-representative sample of US adolescents in grades 9 through 12, and the expanded items available on gender and sexuality provided an opportunity for nuanced analysis of groups not typically assessed. That said, additional updates would provide new avenues for further examination of gender and sexual minority groups, such as a gender item (with options like agender or non-binary), and more options for sexual orientation that disentangle the "another unlisted sexual identity" category. Additionally, the YRBS could examine dimensions of sleep beyond sleep duration, such as subjective sleep quality, daytime sleepiness, or more complex sleep disorders. Measures like the Epworth Sleepiness Scale or Pittsburgh Sleep Quality Index may offer useful insights on adolescents' subjective sleep health.^{41,42} If these expanded items or scales are not feasible for YRBS given restricted questionnaire space, expanded, nuanced examinations of sleep should be considered a priority in other large, nationally representative datasets instead.

Conclusion:

This study is the first to examine inequities in sleep duration for both gender minority and sexual minority adolescents using national YRBS data. Sleep duration was consistently shorter for gay, lesbian, and bisexual adolescents, adolescents whose sexual identity was not captured elsewhere, transgender adolescents, and adolescents who reported being unsure of their sexual or gender identity. Sleep duration continues to be poor among the vast majority of adolescents, and this finding, in conjunction with inequities on the basis of gender and sexuality, warrants substantial interventions in the pursuit of improved adolescent sleep.

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Data Availability:

The data that support the findings of this study are openly available at the following link - <https://www.cdc.gov/yrbs/data/index.html>

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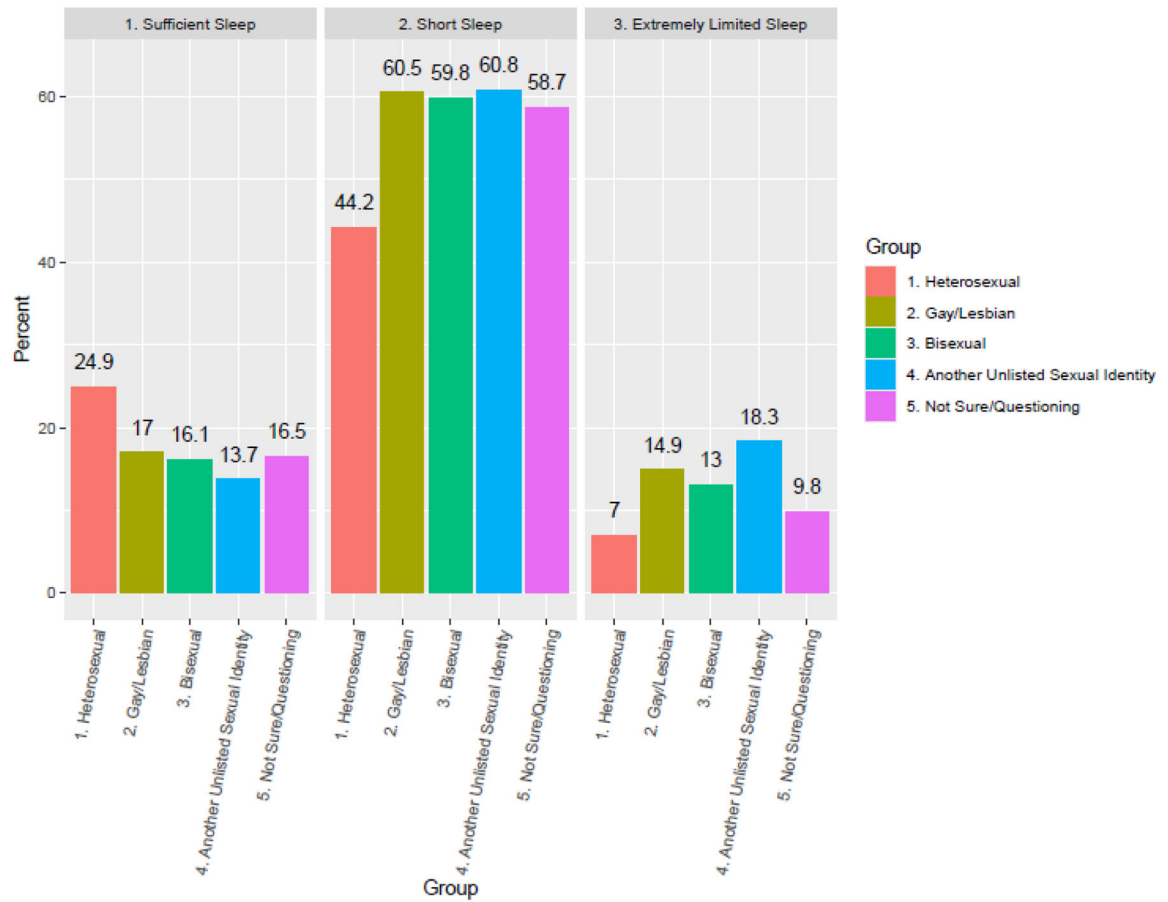


Figure 1:
Percent with sleep outcomes by sexual orientation

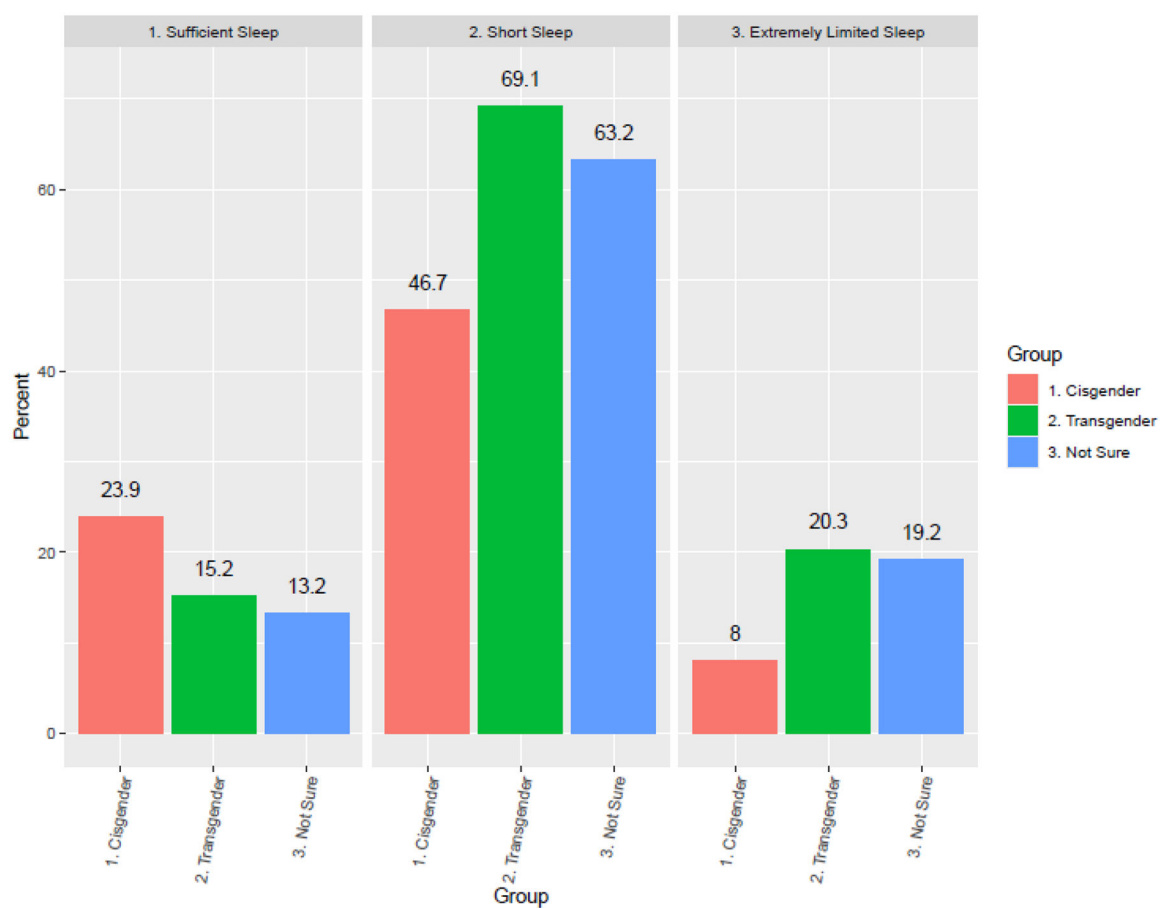


Figure 2:
Percent with sleep outcomes by gender identity

Table 1:

Odds ratios and 95% CI's by sexual orientation category, outcome, and model

Outcome: Sufficient Sleep (≥8 hours a night)				
(Ref = Heterosexual)	Gay/Lesbian	Bisexual	Another Unlisted Sexual Identity	Not Sure/Questioning
Model	OR (95% C.I.)	OR (95% C.I.)	OR (95% C.I.)	OR (95% C.I.)
1	0.62 (0.44, 0.86)	0.58 (0.50, 0.68)	0.48 (0.34, 0.68)	0.60 (0.42, 0.85)
2	0.66 (0.48, 0.92)	0.59 (0.50, 0.69)	0.52 (0.37, 0.75)	0.58 (0.40, 0.85)
Outcome: Short Sleep (≤6 hours a night)				
(Ref = Heterosexual)	Gay/Lesbian	Bisexual	Another Unlisted Sexual Identity	Not Sure/Questioning
Model	OR (95% C.I.)	OR (95% C.I.)	OR (95% C.I.)	OR (95% C.I.)
1	1.94 (1.38, 2.72)	1.88 (1.62, 2.17)	1.96 (1.54, 2.50)	1.80 (1.42, 2.28)
2	1.82 (1.31, 2.52)	1.84 (1.58, 2.14)	1.80 (1.38, 2.34)	1.77 (1.38, 2.28)
Outcome: Extremely Limited Sleep (≤4 hours a night)				
(Ref = Heterosexual)	Gay/Lesbian	Bisexual	Another Unlisted Sexual Identity	Not Sure/Questioning
Model	OR (95% C.I.)	OR (95% C.I.)	OR (95% C.I.)	OR (95% C.I.)
1	2.31 (1.72, 3.11)	1.97 (1.49, 2.60)	2.96 (2.00, 4.37)	1.43 (1.05, 1.94)
2	2.32 (1.73, 3.12)	2.04 (1.48, 2.79)	3.14 (2.00, 4.92)	1.47 (1.09, 1.99)

Model 1: Unadjusted Association.

Model 2: Adjusted for Sex, Race, and Grade.

Table 2:

Odds ratios and 95% CI's by gender identity, outcome, and model

Outcome: Sufficient Sleep (≥ 8 hours a night)		
Ref = Cisgender	Transgender	Not Sure
Model	OR (95% C.I.)	OR (95% C.I.)
1	0.57 (0.39, 0.83)	0.48 (0.29, 0.80)
2	0.62 (0.41, 0.93)	0.52 (0.31, 0.87)
Outcome: Short Sleep (≤ 6 hours a night)		
Ref = Cisgender	Transgender	Not Sure
Model	OR (95% C.I.)	OR (95% C.I.)
1	2.54 (1.94, 3.34)	1.96 (1.38, 2.77)
2	2.47 (1.85, 3.30)	1.89 (1.27, 2.83)
Outcome: Extremely Limited Sleep (≤ 4 hours a night)		
Ref = Cisgender	Transgender	Not Sure
Model	OR (95% C.I.)	OR (95% C.I.)
1	2.93 (1.90, 4.54)	2.75 (1.91, 3.96)
2	3.06 (2.03, 4.62)	2.77 (1.92, 3.99)

Model 1: Unadjusted Association.

Model 2: Adjusted for Sex, Race, and Grade.