Sexual Orientation and Depressive Symptoms in Adolescents

Jeremy W. Luk, PhD, Stephen E. Gilman, ScD,a Denise L. Haynie, PhD, MPH,a Bruce G. Simons-Morton, EdD, MPHa

OBJECTIVES: Sexual orientation disparities in adolescent depressive symptoms are well established, but reasons for these disparities are less well understood. We modeled sexual orientation disparities in depressive symptoms from late adolescence into young adulthood and evaluated family satisfaction, peer support, cyberbullying victimization, and unmet medical needs as potential mediators.

METHODS: Data were from waves 2 to 6 of the NEXT Generation Health Study (n = 2396), a population-based cohort of US adolescents. We used latent growth models to examine sexual orientation disparities in depressive symptoms in participants aged 17 to 21 years, conduct mediation analyses, and examine sex differences.

RESULTS: Relative to heterosexual adolescents, sexual minority adolescents (those who are attracted to the same or both sexes or are questioning; 6.3% of the weighted sample) consistently reported higher depressive symptoms from 11th grade to 3 years after high school. Mediation analyses indicated that sexual minority adolescents reported lower family satisfaction, greater cyberbullying victimization, and increased likelihood of unmet medical needs, all of which were associated with higher depressive symptoms. The mediating role of cyberbullying victimization was more pronounced among male than female participants.

CONCLUSIONS: Sexual minority adolescents reported higher depressive symptoms than heterosexual adolescents from late adolescence into young adulthood. Collectively, low family satisfaction, cyberbullying victimization, and unmet medical needs accounted for >45% of differences by sexual orientation. Future clinical research is needed to determine if interventions targeting these psychosocial and health care–related factors would reduce sexual orientation disparities in depressive symptoms and the optimal timing of such interventions.

WHAT'S KNOWN ON THIS SUBJECT: Sexual orientation disparities in depressive symptoms are well established, but it is unclear whether the magnitude of these disparities changes over time. Moreover, researchers have previously tested family- and/or peer-level factors as mediators but did not include unmet medical needs.

WHAT THIS STUDY ADDS: Sexual minority status was associated with the baseline but not changes in depressive symptoms. We identified cyberbullying victimization and unmet medical needs as novel mediators of sexual orientation disparities in depressive symptoms above and beyond the effect of low family satisfaction.


DOI: https://doi.org/10.1542/peds.2017-3309

Accepted for publication Feb 14, 2018

*Health Behavior Branch, Division of Intramural Population Health Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, Maryland; and Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland

Dr Luk identified and formulated the research questions, conducted the literature review, structured and ran the statistical analyses, and drafted the initial manuscript; Dr Gilman contributed to the conceptualization of the study and the statistical analyses and critically revised the manuscript; Dr Haynie supervised data collection, contributed to the conceptualization of the study, and critically revised the manuscript; Dr Simons-Morton designed the parent study, contributed to the conceptualization of the study, and critically revised the manuscript; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

WHAT'S KNOWN ON THIS SUBJECT:

WHAT THIS STUDY ADDS:
Disparities between sexual minority and heterosexual adolescents (i.e., sexual orientation disparities) in depressive symptoms, major depression, and suicidality are well documented. Adolescent depressive symptoms, as early signs of psychological maladjustment, can be used to prospectively predict major depression, anxiety disorders, substance use problems, as well as suicidal ideation and attempts during adulthood. To optimize prevention efforts targeting depressive symptoms among sexual minority adolescents, it is important to understand whether sexual orientation disparities in depressive symptoms increase, decrease, or remain stable during the critical developmental transition from adolescence into young adulthood (to determine the appropriate timing of prevention programs) and identify factors that may explain why these disparities exist (to determine intervention targets).

Although many researchers have examined sexual orientation disparities in depressive symptoms at specific time points, few have modeled trajectories of depressive symptoms by sexual orientation during the transition from adolescence into young adulthood. Initial evidence concerning sexual orientation disparities in depressive symptoms trajectories comes from the National Longitudinal Study of Adolescent to Adult Health (NLSSA). Using 4 waves of National Longitudinal Study of Adolescent to Adult Health data covering a 13-year period (from wave 1 in 1994–1995 to wave 4 in 2007–2009), trajectory analyses revealed that sexual orientation disparities in depressive symptoms were present as early as adolescence (grades 7–12) and persisted into early adulthood (ages 24–32 years), and these disparities were more pronounced among female participants.

Trajectory studies using more recent samples revealed conflicting evidence. In a Chicago sample of sexual minority adolescents aged 16 to 20 years, depressive symptoms were found to decrease over a 3.5-year period. In the Dutch Tracking Adolescents’ Individual Lives Survey cohort, sexual minority status was associated with increases in depressive symptoms among younger adolescents who were longitudinally followed from age 11 to 22 years. To more fully understand whether these mixed findings are due to variations in the measurement of sexual orientation, when and where the study took place, or differences in the developmental stage examined, trajectory studies of depressive symptoms using more recent population-based samples are needed.

According to the minority stress theory, sexual minorities face heightened social stress in a hostile cultural environment and perceive reduced support and greater rejection in interpersonal relationships. Consistent with this theory, empirical studies indicate that lower parental support, increased parental rejection, and more frequent peer harassment or victimization experienced by sexual minority adolescents contributed to higher depressive symptoms. However, these studies were typically focused on 1 or 2 psychosocial mediators in the parental or peer context. Potential mechanisms in alternative contexts are understudied.

In the current study, we tested cyberbullying victimization and unmet medical needs as novel mediators reflecting negative experiences in cyberspace and health care settings. Past research revealed that victimization from both general bullying and homophobic name-calling was associated with higher depressive symptoms. Furthermore, peer harassment or victimization and sexual minority–related victimization were significant mediators of the association between sexual minority status and depressive symptoms. However, empirical evidence on whether this extends to cyberbullying victimization remains unclear because traditional bullying was a stronger correlate of depression than cyberbullying victimization in 1 study. Although less frequent than traditional bullying victimization, the adverse impact of cyberbullying victimization tends to be more pervasive because it can occur beyond the school setting. Thus, understanding whether cyberbullying victimization contributes to sexual orientation disparities in depressive symptoms would fill an important knowledge gap.

The medical setting is a context in which sexual minority adolescents could acquire medical care and tangible support from their health care providers. Barriers to health care and unmet medical needs among sexual minority adults have been previously reported. The smaller but growing literature on adolescents and young adults reveals that sexual minority youth tend to report more unmet medical needs and may be more afraid of what their providers would say or do, be more worried about sexual identity disclosure to their parents, and are more likely to feel embarrassed to use mental health services than their heterosexual peers. The lack of a secure environment for disclosing sexual orientation may be an important barrier to quality health care and the effective screening of depression. Critically, no previous study has documented unmet medical needs as a mediator of sexual orientation disparities in depressive symptoms. Thus, it is unclear if improving medical care access has the potential to reduce depressive symptoms among sexual minority adolescents.
In the current study, we had 3 goals. First, we examined the association of sexual minority status with the initial level of and change in depressive symptoms from 11th grade to 3 years after high school. Next, we tested 4 mediators (family satisfaction, peer support, cyberbullying victimization, and unmet medical needs) of sexual orientation disparities in depressive symptoms. Specifically, we tested cyberbullying victimization and unmet medical needs as novel mediators while controlling for previously established psychosocial mediators in the parental and peer context. This approach allows us to control for potential shared variance in the mediational pathways and can shed light on the relative importance of different mediators. Finally, we examined sex differences in both the direct and indirect paths from sexual minority status to depressive symptoms.

METHODS

Participants

The NEXT Generation Health Study (NEXT) is an ongoing 7-year longitudinal study of a nationally representative sample of US adolescents. By using a 3-stage stratified design, a diverse sample of 2785 adolescents enrolled in US high schools from 22 states was obtained and followed annually since the 2009–2010 year. For these analyses, we used data from waves 2 to 6 because sexual orientation was first measured in wave 2 (n = 2439; 87.6% of the full sample). The current analytic sample consisted of 2396 adolescents (98.2% of the wave 2 sample; mean age = 17.2 years) who provided valid data. Mean age = 17.2 years) who provided valid data. In the past couple of months, how often have you been bullied at school or work using a computer, e-mail messages, or cell phone? Responses were coded as low (0–5), moderate (6–7), high (8–9), and very high (10).

Peer Support (Wave 2)

Participants were asked to nominate up to 3 of their closest male friends and up to 3 of their closest female friends and then indicate (0 [no] and 1 [yes]) whether they have talked with each of these friends about a problem in the last 7 days. Responses were coded as 0 (0 friends), 1 (1 to 2 friends), 2 (3 to 4 friends), and 3 (5 to 6 friends).

Cyberbullying Victimization (Wave 2)

Participants were first given a definition of bullying, emphasizing the deliberate and repeated nature of bullying between 2 parties of unequal power, and then were asked, “In the past couple of months, how often have you been bullied at school or work using a computer, e-mail messages, or cell phone?” Responses options were coded as 0 (none), 1 (once or twice), and 2 (2 to 3 times a month, approximately once a week, or several times a week).

In Table 1, we present the frequencies and percentages of responses endorsing attraction to opposite sex, attraction to same sex, attraction to both sexes, or questioning at wave 2. Because of low frequencies, the last 3 categories were combined as a sexual minority group for analyses. In this study, those who reported sexual attraction only to the opposite sex are referred to as heterosexual adolescents.

Family Satisfaction (Wave 2)

Participants were asked to rate on a ladder scale (0 [very bad] to 10 [very good]) how satisfied they were with the relationships in their families. Responses were coded as low (0–5), moderate (6–7), high (8–9), and very high (10).

Measures

Sexual Orientation (Wave 2)

Sexual attraction is considered the most important dimension of sexual orientation during adolescence because adolescents typically find it harder to answer questions about sexual behavior and/or identity. Thus, participants were asked, “Which of the following best describes your sexual orientation?” In Table 1, we present the frequencies and percentages of responses endorsing attraction to opposite sex, attraction to same sex, attraction to both sexes, or questioning at wave 2. Because of low frequencies, the last 3 categories were combined as a sexual minority group for analyses. In this study, those who reported sexual attraction only to the opposite sex are referred to as heterosexual adolescents.

| TABLE 1 Measure of Sexual Orientation and Corresponding Level of Depressive Symptoms at Wave 2 by Sex |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Which of the Following Best Describes Your Sexual Orientation? | Male Participants, n = 1050 | Female Participants, n = 1346 |
| | Frequency (%) | Weighted Mean of Depressive Symptoms (SE) | Frequency (%) | Weighted Mean of Depressive Symptoms (SE) |
| Attracted to opposite sex | 953 (94.6) | 0.82 (0.05) | 1198 (89.0) | 1.22 (0.06) |
| Attracted to same sex | 26 (2.5) | 0.93 (0.27) | 19 (1.4) | 1.67 (0.47) |
| Attracted to both sexes | 20 (1.9) | 1.76 (0.21) | 98 (7.4) | 1.93 (0.25) |
| Questioning | 11 (1.1) | 2.03 (0.56) | 39 (2.9) | 1.25 (0.29) |

This same measure was administered in waves 3 and 4 of the NEXT Generation Health Study. Considering the last 3 categories as sexual minority youth, 86.8% (n = 2080) of the sample endorsed sexual attraction to the opposite sex throughout waves 2–4, 9.1% (n = 217) endorsed both heterosexual and sexual minority statuses across waves 2–4, and 4.1% (n = 98) endorsed sexual minority status throughout waves 2–4.
Unmet Medical Needs (Wave 2)
Participants were asked if they thought they should but did not get medical care in the past 12 months (0 [no unmet needs] vs 1 [yes, unmet needs]).

Depressive Symptoms (Waves 2–6)
The mean scores of the 8-item pediatric Patient-Reported Outcomes Measurement Information System scale were used. Sample items include, “I felt like I couldn’t do anything right,” “I feel lonely,” “I feel sad,” and “I thought that my life was bad.” Response options ranged from 0 (never) to 4 (almost always) in the last 7 days. Cronbach’s alphas across waves ranged from 0.94 to 0.96.

Statistical Analysis
We used latent growth curve models to estimate sexual orientation differences in depressive symptoms from waves 2 to 6, conduct mediation analyses for the involvement of family satisfaction, peer support, cyberbullying victimization, and unmet medical needs in sexual orientation disparities (Fig 1), and evaluate sex differences. Unconditional latent growth models were used to capture mean levels of depressive symptoms at baseline (intercept) and potential linear and nonlinear patterns (slope and quadratic factors) in depressive symptoms over time. Conditional latent growth models controlling for race and/or ethnicity and family affluence were used to examine sexual orientation disparities in depressive symptoms. Mediation analyses were conducted in 2 steps and were focused on significant associations between sexual orientation and the depressive symptoms identified in the conditional latent growth model. First, single-mediator models were fitted. For each mediator, sex differences were evaluated by using χ² difference tests of the indirect effects between male and female participants in multiple-group analyses. Unless the χ² difference test result was significant, indirect effects were estimated for male and female participants together.

RESULTS
Descriptive Statistics
Descriptive statistics for the 4 mediators and depressive symptoms across waves are presented in Table 2. Sexual minority adolescents, who comprised 6.3% (weighted) of the sample, reported lower family satisfaction, more frequent cyberbullying victimization, and a greater likelihood of unmet medical needs but did not differ in peer support when compared with heterosexual adolescents. Sexual minority adolescents consistently reported higher depressive symptoms than heterosexual adolescents over time. This pattern is illustrated in Fig 2.

Trajectory of Depressive Symptoms
Fit statistics for a series of latent growth models are presented in Table 3. In the initial unconditional model (model 1), the intercept means were significant for both male (mean = 0.82; SE = 0.06; P < .001) and female (mean = 1.26; SE = 0.04; P < .001) participants. The slope means were nonsignificant for male (mean = 0.01; SE = 0.01; P = .190) but were significant for female (mean = −0.03; SE = 0.01; P = .035) participants. In the second unconditional model (model 2), the quadratic factor was not significant among male or female participants and was excluded from subsequent models.

Subsequently, all significant mediators were simultaneously included in a final mediation model.

Analyses accounting for the complex survey design were conducted in Stata 14 (StataCorp, College Station, TX) and Mplus 7.4. Mediation effects were tested by using the model indirect command, with the bias-corrected 95% confidence intervals (CIs) of the mediated effects being obtained via bootstrapping (with replicate weights) in Mplus. Missing data were handled by using the full information maximum likelihood method.

FIGURE 1
Conceptual latent growth model of depressive symptoms with mediation. W2, wave 2; W3, wave 3; W4, wave 4; W5, wave 5; W6, wave 6.
Examining Sexual Orientation and the Trajectory of Depressive Symptoms

The conditional latent growth models (models 3a and 3b) fit the data well. Sexual minority status was associated with the intercept but not the slope of depressive symptoms. These estimates (intercept: mean = 0.43, SE = 0.18, P = .020; slope: mean = 0.01, SE = 0.04, P = .889) remained consistent after controlling for race and/or ethnicity and family affluence (model 4) and did not vary between male and female participants.

Mediators of Sexual Orientation Disparities

Mediation tests were conducted for paths from sexual orientation to depressive symptoms. Unstandardized path coefficients and the bootstrapped mediated effects from the single-mediator models are presented in Fig 3 (models 5–8). Examination of sex differences revealed that only the path from cyberbullying victimization to depressive symptoms was stronger among male than female participants. Individually, sexual orientation was associated with all the mediators in the expected direction except for peer support, whereas all mediators were associated with depressive symptoms in the 11th grade. In the final mediation model (model 9; Fig 4), the indirect paths through family satisfaction (mediated effect = 0.09; 95% CI = 0.04–0.15), cyberbullying...
victimization (male participants: mediated effect = 0.11, 95% CI = 0.05–0.26; female participants: mediated effect = 0.08, 95% CI = 0.04–0.14), and unmet medical needs (mediated effect = 0.03; 95% CI = 0.01–0.07) remained significant and attenuated the direct association between sexual orientation and depressive symptoms. The combined indirect effects were 0.23 (95% CI = 0.15–0.38) among male and 0.20 (95% CI = 0.13–0.28) among female participants, whereas the total effects were 0.47 (95% CI = 0.11–0.91) among male and 0.43 (95% CI = 0.09–0.84) among female participants. The proportions of the total effect mediated by these 3 mediators were 49.5% among male and 45.3% among female participants.

**DISCUSSION**

In a recent cohort of US adolescents, sexual orientation disparities in depressive symptoms were observable among 11th-graders and persisted into young adulthood within a 5-year time frame. These findings are important within the context of past research revealing a diminishing gap in depressive symptoms between sexual minority and heterosexual adolescents with age as well as popular press messages suggesting that depressive symptoms among sexual minority adolescents may decrease with age (eg, the “it gets better” media campaign). We caution against an overoptimistic message because reductions in depressive symptoms may not occur naturally at the population level and/or may not happen until later in development (eg, after 21 years old). Different from the Dutch Tracking Adolescents’ Individual Lives Survey study, we did not find any increase in depressive symptoms, which likely occurred earlier in development and coincided with pubertal changes and sexual identity development. Because sexual minority adolescents had higher levels of depressive symptoms than heterosexual adolescents at all 5 assessment time points, our findings reveal that the developmental period from late adolescence to young adulthood remains a critical window for the intervention of depressive symptoms among sexual minority adolescents. Importantly, the early prevention of depressive symptoms among sexual minority adolescents needs to begin before the 11th grade. Future longitudinal studies are needed to examine the emergence of sexual orientation disparities in depressive symptoms during early- to mid-adolescence.

This study is unique in that we simultaneously examined 4 mediators from multiple contexts. Although the relative importance of peer to parental influence may increase during the transition from late adolescence into young adulthood, our findings reveal that family satisfaction was a significant mediator, whereas peer support was not. Consistent with past research, peer support was associated with lower levels of

---

**TABLE 3 Model Fit Statistics From the Multiple-Group Latent Growth Models of Depressive Symptoms**

<table>
<thead>
<tr>
<th>Models</th>
<th>χ²</th>
<th>df</th>
<th>P</th>
<th>RMSEA (95% CI)</th>
<th>CFI</th>
<th>TLI</th>
<th>χ² Difference Test P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unconditional with intercept and slope</td>
<td>47.769</td>
<td>20</td>
<td>.001</td>
<td>0.034 (0.022–0.047)</td>
<td>0.962</td>
<td>0.962</td>
<td>—</td>
</tr>
<tr>
<td>2. Unconditional with intercept, slope, and quadratic</td>
<td>29.922</td>
<td>12</td>
<td>.003</td>
<td>0.035 (0.019–0.051)</td>
<td>0.976</td>
<td>0.960</td>
<td>—</td>
</tr>
<tr>
<td>3a. Conditional with sexual minority status freed</td>
<td>61.012</td>
<td>26</td>
<td>&lt;.001</td>
<td>0.034 (0.023–0.045)</td>
<td>0.957</td>
<td>0.950</td>
<td>—</td>
</tr>
<tr>
<td>3b. Conditional with sexual minority status fixed</td>
<td>57.923</td>
<td>28</td>
<td>.001</td>
<td>0.030 (0.019–0.041)</td>
<td>0.963</td>
<td>0.961</td>
<td>.829</td>
</tr>
<tr>
<td>4. Sexual minority status with covariates freed</td>
<td>106.548</td>
<td>60</td>
<td>.001</td>
<td>0.025 (0.017–0.033)</td>
<td>0.954</td>
<td>0.946</td>
<td>—</td>
</tr>
</tbody>
</table>

Sex differences in the direct and indirect mediation paths were tested by using χ² difference tests within a multiple-group analysis framework. "Free" refers to the specified parameters being freed across groups. "Fix" refers to the specified parameters being fixed across groups. Mediation paths "a" (predictor to mediator) and "b" (mediator to outcome) in models 5–8 are referred to as "both paths." Nonsignificant χ² difference tests revealed no significant variation by sex. Because the omnibus χ² difference test in model 7b was significant, models 7c and 7d were estimated to test whether only 1 or both mediation paths differed across sex. The regression path from cyberbullying victimization to depressive symptoms (model 7d) was more pronounced among male than female participants. CFI, comparative fit index; df, degrees of freedom; RMSEA, root mean square error of approximation; TLI, Tucker-Lewis index; —, not applicable.
depressive symptoms. However, sexual minority adolescents did not receive less peer support, reflecting that by the time they reached late adolescence, sexual minority adolescents may have developed a circle of supportive friends. Importantly, lower family satisfaction remained apparent in late adolescence and was associated with elevated depressive symptoms. More research is needed to understand whether family dissatisfaction during this stage may be driven by parental rejection, struggling with the coming-out process, and/or the perception of being a burden to loved ones.

Cyberbullying victimization and unmet medical needs were significant mediators in the final model, in which the pathway through low family satisfaction was included. The mediating role of cyberbullying victimization may reflect an extension of bullying in traditional and/or school settings to the cyberspace. Recent studies reveal that sexual minority adolescents could benefit from accessing information and resources related to their sexual identity through electronic means, although this might also make them more vulnerable to the experience of cyberbullying. Possibly, the collective adverse effects of bullying subtypes could have contributed to the stronger association with depressive symptoms among male participants.

A central study limitation concerns omitted confounders related to the mediators and depressive symptoms. Notably, traditional and/or school bullying was not controlled for, which limits our interpretation regarding cyberbullying victimization as a unique mediator. Another key limitation concerns the measurement of sexual orientation by using a single item on sexual attraction. Although adolescents generally prefer being asked about their sexual attraction than identity and/or behavior, measuring multiple dimensions of sexual orientation would be preferable, especially because disparities in internalizing psychopathology may vary on the basis of how sexual orientation was measured.

Third, because
of low frequencies, we combined adolescents who were attracted to the same sex and both sexes and were questioning for analyses, and we were not able to explore sexual minority subgroup differences.

Fourth, data regarding the treatment of depression were not available. Fifth, the NEXT study began in late adolescence and the analysis did not capture the initial emergence of sexual orientation disparities in depressive symptoms; relatedly, we did not address sexual minority status that emerged for the first time after wave 2 (11th grade). Finally, unmet medical needs were assessed by using a single item. An improved assessment of various aspects of unmet medical needs will further inform targeted intervention.

CONCLUSIONS

Sexual orientation disparities in depressive symptoms persisted from late adolescence into young adulthood and were partially explained by low family satisfaction, cyberbullying victimization, and unmet medical needs. Pediatricians and health care providers may be particularly well positioned to address both the psychosocial and medical needs experienced by sexual minority adolescents. The identified mediators warrant further evaluation as intervention targets in future clinical research.

ABBREVIATION
CI: confidence interval
REFERENCES


44. Juvonen J, Gross EF. Extending the school ground?—Bullying experiences in cyberspace. *J Sch Health*. 2008;78(9):496–505


47. Kahle L. Are sexual minorities more at risk? Bullying victimization among lesbian, gay, bisexual, and questioning youth [published online ahead of print July 1, 2017]. *J Interpers Violence*. doi: 1177/0886260517718830


## Sexual Orientation and Depressive Symptoms in Adolescents

Jeremy W. Luk, Stephen E. Gilman, Denise L. Haynie and Bruce G. Simons-Morton

*Pediatrics* originally published online April 16, 2018;

<table>
<thead>
<tr>
<th>Updated Information &amp; Services</th>
<th>including high resolution figures, can be found at:</th>
</tr>
</thead>
<tbody>
<tr>
<td>References</td>
<td>This article cites 48 articles, 0 of which you can access for free at:</td>
</tr>
<tr>
<td>Subspecialty Collections</td>
<td>This article, along with others on similar topics, appears in the following collection(s):</td>
</tr>
<tr>
<td></td>
<td>Adolescent Health/Medicine</td>
</tr>
<tr>
<td></td>
<td>Public Health</td>
</tr>
<tr>
<td></td>
<td>LGBTQ+</td>
</tr>
<tr>
<td>Permissions &amp; Licensing</td>
<td>Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:</td>
</tr>
<tr>
<td>Reprints</td>
<td>Information about ordering reprints can be found online:</td>
</tr>
</tbody>
</table>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®

Downloaded from www.aappublications.org/news by guest on August 20, 2021
Sexual Orientation and Depressive Symptoms in Adolescents
Jeremy W. Luk, Stephen E. Gilman, Denise L. Haynie and Bruce G. Simons-Morton

Pediatrics originally published online April 16, 2018;

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pediatrics.aappublications.org/content/early/2018/04/12/peds.2017-3309