Association Between Suicidality and Risky Driving Among US Adolescents—Results From the 2019 Youth Risk Behavior Survey

Suicidality (eg, suicidal ideation, suicidal behaviors) contributed to nearly 32% of all deaths among adolescents aged 12 to 18 years in 2019. Risky driving behaviors, such as distracted driving via use of a cell phone, infrequent use of seat belts, driving while under the influence of alcohol, and driving with someone under the influence of alcohol, are also common among adolescents. Engagement in risky driving behaviors may explain why motor vehicle traffic crashes, representing nearly 62% of unintentional injury deaths, were the leading cause of death among adolescents aged 12 to 18 years in 2019. Novelty seeking, sensation seeking, and impulsivity have been identified as overlapping psychological traits implicated in both suicidality and engagement in risky driving behaviors among adolescents. However, no known research has explored the association between these behaviors, which was the aim of this study.

Methods | In this cross-sectional study, data were obtained from the 2019 National High School Youth Risk Behavior Survey (13 677 adolescents). The Youth Risk Behavior Survey is conducted bimannually by the Centers for Disease Control and Prevention to monitor health risk behaviors among adolescents. The Youth Risk Behavior Survey uses a 3-stage cluster sampling method to collect a nationally representative sample of US high school students. Data were collected on self-reported race and ethnicity (survey question options included American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, and White). Both suicidality and risky driving behavior were measured using 4 distinct items (eMethods in the Supplement). The unadjusted percentage of risky driving behaviors by suicidality were estimated. The Youth Risk Behavior Survey uses active and passive written parental consent and is approved by the Centers for Disease Control and Prevention Institutional Review Board. In accordance with the University of Toronto’s Research Ethics Board policies on exempted research, this study was

Figure. Unadjusted Percentage of Risky Driving Behaviors by Suicidality Among Adolescent Participants in the 2019 National High School Youth Risk Behavior Survey

The sample included a total of 13 677 adolescents. Preconstructed sample weighting was applied to all analyses. Significant differences between suicidality groups were ascertained by the adjusted F, a variant of the second-order Rao-Scott adjusted χ² statistic.

* P < .05.
** P < .01.
*** P < .001.
Among 13,677 Adolescents in the 2019 National High School Youth Risk Behavior Survey

<table>
<thead>
<tr>
<th>Suicidality</th>
<th>Risky driving behavior</th>
<th>In frequent seat belt use</th>
<th>Drove with drunk driver, past 30 d</th>
<th>Drove drunk, past 30 d</th>
<th>Texted or emailed while driving, past 30 d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PR (95% CI)</td>
<td>P value</td>
<td>PR (95% CI)</td>
<td>P value</td>
<td>PR (95% CI)</td>
</tr>
<tr>
<td>Suicidal ideation in the past 12 mo</td>
<td>1.20 (1.03-1.41)</td>
<td>.02</td>
<td>1.09 (0.94-1.27)</td>
<td>.24</td>
<td>1.43 (1.01-2.02)</td>
</tr>
<tr>
<td>Suicidal plan in the past 12 mo</td>
<td>1.17 (0.97-1.42)</td>
<td>.09</td>
<td>1.20 (1.03-1.41)</td>
<td>.02</td>
<td>1.49 (1.06-2.08)</td>
</tr>
<tr>
<td>1 or more suicide attempt in the past 12 mo</td>
<td>1.39 (1.08-1.77)</td>
<td>.01</td>
<td>1.33 (1.10-1.60)</td>
<td>.003</td>
<td>2.02 (1.36-3.01)</td>
</tr>
<tr>
<td>Suicide injury in the past 12 mo</td>
<td>2.42 (1.53-3.82)</td>
<td>&lt;.001</td>
<td>1.42 (1.06-1.89)</td>
<td>.02</td>
<td>2.50 (1.47-4.23)</td>
</tr>
</tbody>
</table>

Abbreviation: PR, prevalence ratio.

*Preconstructed sample weighting was applied to all analyses. The PR in each cell represents the abbreviated output from a series of Poisson regression models with robust error variance to estimate prevalence ratios (PRs) while controlling for potential confounders. Statistical significance was defined as 2-sided P < .05. All analyses included preconstructed sample weighting and were conducted using Stata, version 17 (StataCorp, LLC).

**Results** | The nationally representative sample from the survey included data obtained from 13,677 adolescents (51% male and 49% female individuals). Of these individuals, 26% were aged 16 years. The participants self-identified as Asian (5%), non-Hispanic Black (12%), Hispanic (26%), White (51%), multiracial (5%), and other race or ethnicity (1%, which included American Indian or Alaska Native and Native Hawaiian or Other Pacific Islander). Among the overall sample, 19% of participants self-reported suicidal ideation in the past 12 months, 16% of participants self-reported a suicide plan in the past 12 months, 9% of participants self-reported 1 or more suicide attempt in the past 12 months, and 3% of participants who self-reported a suicide attempt also self-reported a suicide-related injury.

Texting or emailing while driving was the most commonly reported form of risky driving behavior among participants, and reports of all risky driving behaviors were significantly more common among adolescents who self-reported suicidality compared with those who did not (Figure). For example, 44% of participants who self-reported suicidal ideation, 45% of participants who self-reported suicide planning, 47% of participants who self-reported 1 or more suicide attempt, and 54% of participants who self-reported a suicide injury also self-reported texting or emailing while driving. Adjusted analyses (Table) revealed that adolescents who self-reported 1 or more suicide attempt in the past 12 months vs those who reported none were 39% more likely to self-report infrequent seat belt use (PR, 1.39; 95% CI, 1.08-1.77; P < .01), 33% more likely to self-report driving with a drunk driver (PR, 1.33; 95% CI, 1.10-1.60; P = .003), and more than twice as likely to self-report driving drunk (PR, 2.02; 95% CI, 1.36-3.01; P < .001). Adolescents who self-reported a suicide injury in the past 12 months vs those who did not had the highest likelihood of reporting all 4 risky driving behaviors. For example, participants who self-reported a suicide injury were more than twice as likely to self-report driving drunk (PR, 2.50; 95% CI, 1.47-4.23).

**Discussion** | Suicide and motor vehicle crashes are 2 of the most common causes of death among adolescents aged 12 to 18 years. This study of a nationally representative sample of adolescents found that self-reported suicidality is associated with risky driving behaviors. Overall, the findings revealed a pattern showing that as severity of suicidality increased (ie, from suicidal ideation to suicide attempt), so, too, did self-reported risky driving. Adolescents who self-reported a suicide injury were most likely to also self-report all 4 risky driving behaviors. Moreover, adolescents who self-reported suicidal ideation, the most common form of suicidality, including 19% of participants in this study, were more likely to self-report infrequent seat belt use and drunk driving.

Limitations of the study include the use of self-reported data and cross-sectional study design. Given these findings, consideration of the association between suicidality and risky driving behaviors is warranted when health care professionals assess and treat adolescents.

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Incidence of New-Onset Type 1 Diabetes Among US Children During the COVID-19 Global Pandemic

Type 1 diabetes (T1D) is a disorder of autoimmune-mediated pancreatic β-cell destruction and decreased insulin production. Although the incidence of this disease is increasing globally each year, 1 our local experience at Rady Children's Hospital San Diego, the tertiary care center for children in San Diego, California, and surrounding counties, was that the incidence of new-onset T1D during the COVID-19 global pandemic in 2020 and 2021 appeared to have increased compared with previous years. We performed a 6-year retrospective review of the medical record to evaluate whether the perceived increased incidence was significant and whether or not more children had diabetic ketoacidosis (DKA) at presentation or required pediatric intensive care unit (PICU) admission (at our institution for altered mental status or severe acidosis only) as a measure of the severity of illness at diabetes onset.

Methods | For this cross-sectional study, we used a self-service reporting tool included in the electronic medical record at our institution (Epic Systems) to survey the patient population. Ethics board approval and a Health Insurance Portability and Accountability Act waiver were obtained from the University of California, San Diego because deidentified patient data were used. Inclusion criteria included admission to Rady Children's Hospital San Diego, patient age younger than 19 years, and at least 1 positive T1D antibody titer. Age, sex, hemoglobin A1c, body mass index z score, COVID-19 infection results, DKA as evidenced by use of insulin infusion, and PICU admission were extracted from each patient's medical record. Patient race and ethnicity were not reported owing to concerns regarding missing data. Patients were tested for acute COVID-19 infection on admission (not for antibodies to diagnose prior infection). The COVID-19 year was defined as the year after California's stay-at-home orders, from March 19, 2020, to March 18, 2021. Five years of prior data from March 19, 2015, to March 18, 2020, were analyzed to ensure that the increase in new-onset T1D diagnoses was not due to previous annual rates of increase. An autoregressive integrated moving average was performed to forecast the predicted trend of new-onset T1D cases during the COVID-19 year. Data were analyzed using R, version 4.0.2 (R Core Team). All P values were 2-sided and calculated using a t test with significance set at P = .05.

Results | From March 19, 2020, to March 18, 2021, 187 children (mean [SD] age, 9.6 [4.2] years; 106 girls [56.7%]; 81 boys [43.3%]) were admitted for new-onset T1D compared with 119 children admitted the previous year, which represents an increase of 57%. For part of the COVID-19 year (July 2020 through February 2021), the number of new diagnoses of T1D exceeded the number of patients anticipated within the 95% CI based on a quarterly moving average of the preceding 5 years (July 2020: 15 diagnoses; 10 forecasted diagnoses; 95% CI, 6.79-13.89; February 2021: 21 diagnoses; 10 forecasted diagnoses; 95% CI, 6.88-13.54) (Figure). Only 4 of 187 patients (2.1%) had COVID-19 infection at the time of presentation. There was an increase in the percentage of patients who presented with DKA, but no difference in mean (SD) age at presentation (9.6 [4.2] years vs 9.7 [4.2] years), body mass index z score (−0.39 [1.78] vs −0.43 [1.61]), hemoglobin A1c (11.6% [1.8%] vs 11.7% [1.9%]), or percentage of children requiring PICU admission (16 of 187 [8.6%] vs 41 of 641 [6.4%]) between the COVID-19 year and any of the prior 5 years. We observed a significant increase in the frequency of DKA at the time of T1D diagnosis, with 93 of 187 patients (49.7%) requiring an insulin infusion during the COVID-19 pandemic, which increased from 261 of 641 patients (40.7%) in the 5 years before the COVID-19 pandemic (Table).