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## Development and Testing of an Emergency Department Quality Measure for Pediatric Suicidal Ideation and Self-Harm

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### Abstract

**Objective**—To develop and test a new quality measure assessing timeliness of follow-up mental health care for youth presenting to the emergency department (ED) with suicidal ideation or self-harm.

**Methods**—Based on a conceptual framework, evidence review, and a modified Delphi process, we developed a quality measure assessing whether youth 5–17 years old evaluated for suicidal ideation or self-harm in the ED and discharged to home had a follow-up mental health care visit within 7 days. The measure was tested in four geographically dispersed states (California,

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Pennsylvania, South Carolina, Tennessee) using Medicaid administrative data. We examined measure feasibility of implementation, variation, reliability, and validity. To test validity, adjusted regression models examined associations between quality measure scores and subsequent all-cause and same-cause hospital readmissions/ED return visits.

**Results**—Overall, there were 16,486 eligible ED visits between 9/1/2014 and 7/31/2016; 53.5% of eligible ED visits had an associated mental health care follow-up visit within 7 days. Measure scores varied by state, ranging from 26.3% to 66.5%, and by youth characteristics: visits by youth who were non-White, male, and living in an urban area were significantly less likely to be associated with a follow-up visit within 7 days. Better quality measure performance was not associated with decreased re-utilization.

**Conclusions**—This new ED quality measure may be useful for monitoring and improving the quality of care for this vulnerable population; however, future work is needed to establish the measure's predictive validity using more prevalent outcomes such as recurrence of suicidal ideation or deliberate self-harm.

### Keywords

suicidal ideation; self-harm; quality measure; emergency department; follow-up care

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Suicidal ideation and deliberate self-harm is a major health concern in the pediatric population. Suicide is the second-leading cause of death among children, adolescents, and young adults aged 10 to 24.<sup>1</sup> In 2019, almost 19% of United States high school students reported seriously considering suicide, 16% made a plan to kill themselves, and 3% made a suicide attempt that required medical attention.<sup>2</sup> It is estimated that 1.12 million emergency department (ED) visits by children and adolescents 5–17 years old (referred to as youth from here forward) in 2015 were due to suicide attempts and suicidal ideation, almost double the estimated number of such visits in 2007.<sup>3</sup>

In light of the high prevalence of suicidal ideation and self-harm and the associated burdens of morbidity and mortality, recent federal health policies have made quality improvement and optimizing care for pediatric mental health conditions a national goal.<sup>4,5</sup> One potential target for quality improvement has been timely follow-up after discharge from the ED. The days immediately following discharge from the ED for youth with suicidal ideation or self-harm are high-risk. Yet rates of follow-up in this population are variable, ranging from 39%–87%, with a higher likelihood of follow-up among those with an existing psychiatric diagnosis.<sup>6–10</sup>

In order to develop and evaluate the validity of pediatric quality measures related to mental health care, the Pediatric Quality Measures Program (PQMP) funded Center of Excellence on Quality of Care Measures for Children with Complex Needs was charged with developing quality measures to assess hospital-based mental health services for youth. In this paper, we describe the development and testing of a new quality measure that assesses whether youth presenting to the ED for suicidal ideation or self-harm received timely follow-up mental health care.

Specifically, the measure assesses whether a follow-up visit with a mental health care provider occurred within seven days of the index ED visit. Evidence supporting this measure includes previous findings that timely follow-up after an ED visit for suicidal ideation/self-harm is associated with a longer period of time to the next ED visit, and lower rates of subsequent suicidal ideation/self-harm.<sup>7,11–17</sup> In addition, prior work has shown that active engagement strategies based on cognitive analytic or behavioral therapies, such as Therapeutic Assessment and Family Intervention for Suicide Prevention, can be effective in facilitating mental health treatment access and ongoing participation.<sup>18–21</sup> While there is no common standard for how soon after discharge the appointment should occur, within one week parallels other recommendations and published studies and was judged to be a reasonable amount of time for the appointment to occur by a Delphi panel (see Method) that assessed the face validity of this measure.<sup>9,22–24</sup>

## Method

### Measure Development

Measure development began with the creation of a conceptual framework<sup>25</sup> and a thorough review of existing clinical practice guidelines<sup>26,27</sup> and existing literature on hospital-based care for youth with suicidal ideation/self-harm; details of this literature review are described elsewhere.<sup>28</sup> Based on this framework and evidence review, we developed draft quality measures to assess hospital-based care for youth with suicidal ideation or self-harm. Using the RAND–University of California, Los Angeles, modified Delphi method, a multistakeholder panel evaluated and scored each measure on validity and feasibility. This approach was used to identify measures for further development and testing.<sup>28</sup> This method resulted in 21 measures endorsed for potential field-testing: 4 measures to be assessed using a caregiver survey<sup>25</sup>, 16 measures to be assessed using medical record abstraction<sup>28</sup>, and 1 measure to be assessed using administrative (claims) data.

In this paper, we focus on the development and testing of the one administrative data quality measure endorsed by the panel, which concerned timely follow-up care for youth presenting to the ED with suicidal ideation/self-harm and discharged to home (development and testing of the remaining 20 measures has been described elsewhere<sup>25,28</sup>).

### Measure Definition

**Denominator:** Eligible ED visits attended by youth 5–17 years old with a diagnosis (not necessarily primary) of suicidal ideation or self-harm who were discharged to home. For the visit to be eligible, the youth had to be enrolled in the health plan (in this case Medicaid) at the time of the ED visit and for at least one month after the ED visit. ED visits followed by an inpatient admission within 7 days were not eligible because these patients may have had an appointment scheduled with an outpatient mental health provider within the 7-day window but were admitted and so could not attend the appointment. ED visit eligibility was determined using administrative billing codes and an algorithm that indicated the presence of Evaluation & Management Current Procedural Terminology (CPT) codes and a Place of Service code 23 (emergency room-hospital), or a revenue center code of 0450–0459 (emergency room) or 0981 (professional fees-emergency room). Visits for suicidal ideation

or self-harm were identified using International Classification of Diseases, Ninth Revision (ICD-9) codes of E950-E959, V62.84, or 300.9 or ICD-10 codes; see Appendix for ICD-10 codes.<sup>29–31</sup>

**Numerator:** Eligible ED visits that were followed by a mental health care visit (including tele-health) within 7 days of discharge. CPT codes associated with mental health care service provision were used to identify follow-up visits that fulfilled this measure definition (see Appendix for further details).

The quality measure was dichotomously scored: if a youth having an ED visit for suicidal ideation or self-harm subsequently had a follow-up mental health care visit (including tele-health) within seven days of ED discharge, the measure score was one, otherwise the measure score was zero. At the State Medicaid health plan level, the measure score was calculated as the percentage of scores that were equal to one, with higher percentages indicating better quality of care.

### Field Test Sample

We tested the measure in four State Medicaid insurance programs: South Carolina (SC), California (CA), Tennessee (TN), Pennsylvania (PA). Specifically, we assessed the feasibility of using existing administrative data to score this quality measure, examine variation in measure performance, and evaluate the predictive validity of the measure. In state Medicaid administrative data, we identified all eligible ED visits (defined above) between 9/1/2014 and 7/31/2016. Although the measure specifications require continuous enrollment for only one month following the index ED visit, here we required the youth to be continuously enrolled in Medicaid for two months immediately following the ED visit to allow for validation metric availability, described below. For youth with multiple eligible ED visits between 9/1/2014 and 7/31/2016, only the first eligible ED visit was included (that is, a youth may only contribute to the measure denominator one time). As described above, to pass the quality measure and be counted in the numerator, a youth with an eligible ED visit had to have an associated administrative claim indicating a mental health care follow-up visit occurred within seven days of ED discharge. *Validation Metrics*

We used four validation metrics to examine the measure's predictive validity: (1) all-cause ED return visits within 8–30 days of the index ED visit; (2) all-cause inpatient admissions within 8–30 days of the index ED visit; (3) same-cause ED return visits within 8–30 days of the index ED visit; and (4) same-cause inpatient admissions within 8–30 days of the index ED visit. Codes used to identify same-cause visits/admissions were the same codes used to assess eligibility for the measure (see Appendix). ED visits within the first 7 days of the index ED visit were not counted as return visits (N=1,675; 84% of these were among youth in CA, 39% were among Hispanic youth, 37% were among White youth) because it is possible that an ED return visit occurring within this timeframe might have occurred prior to a scheduled mental health care follow-up visit (which we hypothesized may prevent such reutilization). Based on previous work showing that engagement in treatment can reduce future suicidal ideation,<sup>12–14</sup> we hypothesized that better performance

on the quality measure would be associated with decreased 30-day ED return visits and hospital admissions.

### Measure Testing

Measure feasibility was evaluated by examining the eligibility counts by state. Variation in measure scores by youth characteristics was assessed using multivariate logistic regression. We examined the independent association between performance on the quality measure and age, gender, race/ethnicity, and residence in a metropolitan statistical area (MSA).

Since this measure was developed primarily for implementation at the health plan level, we assessed health plan-level (managed care organization [MCO]) and hospital-level (1) variability and (2) reliability using an intraclass correlation coefficient (ICC) which assesses the extent to which the quality measure can differentiate between hospitals/health plans in terms of performance. The ICC was used to calculate the number of eligible visits per hospital/health plan needed to achieve excellent reliability using the Spearman-Brown formula.<sup>32</sup> This assessment of reliability parallels the National Quality Forum measure evaluation criteria which states that a measure must be well-defined and precisely specified so it can be implemented consistently within and across organizations and allow for comparability.<sup>33</sup> Health plan information was not available for SC and thus, SC was only included in the hospital-level reliability assessment.

Predictive validity was examined using logistic regression models (pooling all states) adjusted for state, race/ethnicity, age, and gender where the outcomes were the validation metrics described above. Study procedures and use of data were approved by each state's Medicaid agency and the institutional review board of the RAND Corporation.

## Results

### Feasibility

Overall, there were 16,486 eligible ED visits: 1,161 in South Carolina, 9,930 in California, 2,178 in Tennessee, and 3,217 in Pennsylvania. These eligible ED visits occurred in a total of 2,288 hospitals.

Over one-third of eligible visits were among youth 16–17 years old, more than half were among females, 43% were among White youth, and the majority were among youth living in an MSA (Table 1). Distributions of all characteristics significantly differed across states. As expected, differences in the race/ethnicity distribution by state reflect the different composition of the states' populations;<sup>34</sup> for example, CA had a much higher percentage of visits by Hispanic youth (45.9% in CA vs. 2.9% in SC, 3.1% in TN, 11.6% in PA).

### Measure Performance, Variation, and Reliability

Overall performance was 53.5% across all eligible ED visits in all states. The measure scores differed dramatically by state: from 26.3% in Tennessee to 66.5% in California (Table 2,  $p < .0001$ ). Visits by non-White youth were significantly less likely to result in a follow-up visit within 7 days compared to White youth, whereas females and those not living in an

MSA were more likely to have a follow-up visit within 7 days compared to males and those living in an MSA, respectively.

With respect to variability, health-plan level measure scores ranged from 0% to 100% with a median of 67.9%, a mean of 64.4%, and an interquartile range (IQR) of 43.4% to 88.8%. Hospital level scores ranged from 0% to 100% with a median, mean, and IQR of 46.2%, 46.6%, and 0% to 100%, respectively. With respect to reliability, the health-plan level and hospital-level ICCs were 0.30 and 0.36, respectively. Based on the Spearman-Brown formula<sup>32</sup>, this means that 21 eligible visits per health plan or 16 eligible visits per hospital would be needed to achieve a reliability of .90, respectively. *Validation*

Overall, 1,436 (8.7%) of the eligible ED visits were followed by a return ED visit (for any reason) within 8–30 days and 414 (2.5%) were followed by an inpatient admission (for any reason) within 8–30 days; 121 (0.7%) were followed by a same-cause return ED visit within 8–30 days and 72 (0.4%) were followed by a same-cause inpatient admission within 8–30 days. Having a mental health care follow-up visit within 7 days after the index ED visit was not significantly associated with either 30-day ED return visits (odds ratio = 1.08; 95% confidence interval = 0.96, 1.21;  $p > .05$ ), 30-day inpatient admissions (odds ratio = 1.07; 95% confidence interval = 0.87, 1.31;  $p > .05$ ), 30-day same-cause ED return visits (odds ratio = 1.08; 95% confidence interval = 0.74, 1.58;  $p > .05$ ), or 30-day same-cause inpatient admissions (odds ratio = 0.91; 95% confidence interval = 0.55, 1.50;  $p > .05$ ).

## Discussion

This paper describes the development and testing of a new quality measure that assesses mental health follow-up care for youth aged 5–17 years presenting to the ED with suicidal ideation or self-harm. Given the high prevalence of depression in this age group,<sup>35,36</sup> and the associated risk of suicide, the relatively low scores observed in our study should be of concern to clinicians and policymakers. Overall, only 53.5% of ED visits for suicidal ideation or self-harm resulting in a discharge to home were followed by a mental health care follow-up visit within seven days, and this percentage was even lower (< 40%) in three of the four states where it was assessed.

Our results are relatively consistent with previous work which has shown moderate rates of follow-up in this population ranging from 39%–87%.<sup>6–8,24</sup> From a provider perspective, it is important to consider the barriers to accessing follow-up care that these youth and their caregivers may face. Caregiver concerns about lengthy evaluations, long waiting periods, billing procedures, provider availability, and time off work/school may contribute to lack of follow-up.<sup>37,38</sup> In addition, caregiver perceptions regarding the severity of their child's mental health conditions may hinder follow-up.<sup>39</sup> Mental health care provider capacity may in part explain the wide range of measure performance across states. For example, the lowest measure score was observed in TN at 26.3% and TN, of the four states, also has the lowest mental health provider capacity (e.g. 41 counties in TN versus less than 10 in each of the other three states have less than one psychologist per 10,000 children aged 0–17 years).<sup>40,41</sup> Certainly, lack of mental health provider capacity would limit the ability of providers and caregivers to ensure timely follow-up.

Our examination of reliability at the health-plan and hospital-level demonstrates that excellent reliability can be achieved with a relatively moderate sample size i.e., 21 per health plan or 16 per hospital, thus implying that this measure can usefully distinguish between health plans/hospitals with respect to performance. Future use of measure scores may be helpful in identifying high vs. low measure performance and thus, help with targeting quality improvement interventions as needed.

Based on our conceptual framework and prior evidence showing decreased recurrence of suicidal ideation and suicide attempts,<sup>11,16,17</sup> we hypothesized that a mental health care follow-up visit within 7 days would be associated with lower odds of both 30-day ED return visits and inpatient admissions; however, we did not find an association between quality measure scores and these utilization outcomes (all-cause or same-case). There are a few possible explanations for this observed lack of association. First, while a notably high percentage (8.7%) of visits were followed by a return ED visit within 30 days, the utilization outcomes were relatively uncommon events e.g., 2.5% for 30-day inpatient admissions, <1% for same-cause outcomes, making small effect sizes difficult to detect without a larger sample size. Second, it may be necessary to consider the use of additional outcome validation measures more closely linked to the potential benefits associated with meeting this quality metric, such as future suicidal ideation,<sup>9</sup> longer-term ongoing mental health follow-up (e.g. 90 or 180 days), improvement in Patient Health questionnaire (PHQ-9)<sup>42</sup> scores, time to return to school, or school performance, though importantly, these are not available in claims data. Additional work is needed to better understand the relationship between receipt of appropriate follow-up care and outcomes including those described above and future hospital-based utilization in this population of youth.

Our results demonstrating a lower likelihood of follow-up within 7 days among non-White youth compared to White youth are concerning and add to existing work showing that minority youth are less likely to receive appropriate mental health care.<sup>43–46</sup> Such racial/ethnic disparities in mental health care may be driven by a multitude of factors including differences in past experiences with the quality of care received from mental health providers, access to care, stigma, distrust in the mental healthcare system, and/or provider behavior.<sup>47–49</sup> These findings indicate that it is important for providers to consider the development and implementation of interventions to increase access to services and outreach for these youth and their families.

Interestingly, adjusted analyses highlighted significantly higher quality scores among youth living outside an MSA. Previous work examining access to and utilization of mental health care services has demonstrated the opposite, with individuals living in more urban settings having more access and utilization.<sup>50–52</sup> One possible explanation for our finding is the growing availability of telehealth services for mental health care.<sup>53,54</sup> If youth living outside an MSA are more likely to engage in telehealth services, that may explain these findings. Importantly, state laws and Medicaid policies regarding telemedicine vary dramatically from state to state While the utilization of telehealth has substantially increased during the COVID-19 pandemic, we note that this study was conducted in 2014–2016. According to a 2018 report, CA was identified as having progressive telemedicine Medicaid program policies, while TN was identified as moderate, and both PA and SC were identified as



having restrictive telemedicine policies.<sup>55</sup> It is possible that differences in the availability of telehealth programs, telehealth utilization, and telehealth policies may partially explain our observed differences by state and/or our MSA findings. Unfortunately, it was not possible to differentiate between in-person and telehealth follow-up visits in our study, so future research in this area is warranted. If in fact youth in rural areas are more likely than those in urban areas to engage in telemedicine mental health services, this may lead to reductions in suicide rates in rural areas which historically tend to be higher than in urban areas.<sup>56,57</sup>

The development and testing of this new quality measure is an important first step toward addressing the dearth of quality measures available to assess pediatric hospital-based mental health care. Attempting suicide is a leading predictor of subsequent suicide attempts.<sup>58–61</sup> Thus, implementing best practices for youth presenting to the ED with suicidal ideation or self-harm has the potential to improve the care of a large proportion of those at risk for future suicide attempts. Previously established guidelines have explicitly recommended mental health follow-up care for this population.<sup>19,62</sup>

This study has some limitations. First, since this measure was only tested in four states among youth with Medicaid coverage, our understanding of the implementation and performance on this measure for youth in other states, with other types of insurance, and with different resources and demographic compositions is limited. Second, we may not have identified all eligible youth or all follow-up visits due to imperfect sensitivity/specificity of the codes used, inconsistent or incorrect use of codes, or potential errors or missingness in the administrative data. Though we parallel previous work in our selection of diagnosis codes to identify youth with suicidal ideation or self-harm, there are limitations to relying on diagnosis codes alone (as opposed to in combination with medical record abstraction and/or natural language processing).<sup>29,30</sup> Similarly, it is possible that there is incorrect or inconsistent (e.g. across states) use of codes to identify mental health follow-up visits. Third, we acknowledge that the content and quality of follow-up visits likely varies, and the administrative data measure we developed does not allow us to assess this variation in care or how it may influence outcomes. Fourth, though we adjust for individual characteristics including race/ethnicity, age, and gender in our validation analysis, there may be important unmeasured confounders such as severity of illness not available in administrative data. Lastly, as noted earlier, given the low rates for some of the utilization outcomes (e.g., <1% for same-cause outcomes), our study may have been underpowered to detect small effect sizes. In addition, quality measures calculated using administrative claims data are difficult to monitor in real-time since claims may take weeks or months after the index visit to be finalized and made available for quality measurement and improvement purposes. However, while more readily available in real-time, quality measures requiring medical record abstraction are comparatively more resource intensive and burdensome.

In conclusion, this new quality measure evaluates a key aspect of ED care for youth with suicidal ideation or self-harm and may facilitate assessing and improving quality of care for this vulnerable population. The development and testing of this measure is an important first step toward understanding the quality of care received by youth with suicidal ideation or self-harm in the ED setting. This measure could be used in the future to examine and monitor rates of timely follow-up within a hospital, health plan or state over time and/or to

examine changes in timely follow-up rate that may occur following mental-health related quality improvement interventions in a hospital or health plan. Though our results reflect no association between measure performance and hospital-based reutilization outcomes over a 30-day follow-up period, previous findings have established that timely follow-up after an ED visit for suicidal ideation or self-harm is associated with a longer period of time to the next ED visit, and lower rates of subsequent suicidal ideation and deliberate self-harm.<sup>7,11–17</sup> Nonetheless, future work is needed to establish this measure's predictive validity using more prevalent outcomes, e.g. recurrence of suicidal ideation.

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## Appendix

ICD-10 codes used to identify ED visits for suicidal ideation or self-harm T1491, R45851, X71.8XXA, X71.9XXA, X72.XXXA, X73.0XXA, X73.1XXA, X73.2XXA, X73.9XXA, X75.XXXA, X74.01XA, X74.02XA, X74.9XXA, X78.9XXA, X80.XXXA, X81.8XXA, X76.XXXA, X77.2XXA, X83.2XXA, X83.1XXA, X82.8XXA, X83.0XXA, X83.8XXA, X79, X76, X77.9, X77.2, X77.3, X77.8, X77.0, X77.1, X77.0, X83.2, X82.0, X82.8, X82.1, X82.2, X83.0, X78.9, X78.2, X78.0, X78.1, X78.8, X71.9, X71.0, X71.3, X71.8, X71.1, X71.2, X83.1, X75, X76, X74.9, X74.01, X72, X73.1, X73.9, X73.8, X73.2, X73.0, X74.8, X83.8, X81.8, X77.0, X81.0, X81.1, X80

Current Procedural Terminology (CPT) codes used to identify mental health care follow-up

CPT codes: 2014: 90785, 90791–90792, 90832–90834, 90836–90838, 90839–90840, 90845–90847, 90849, 90853, 90863, 90865, 90867–90870, 90875–90876, 90880, 96101, 96103, 96153, 96154, 97770, 96155, 96120, 96151

2016: added 99354, 99355, 99415, 99416, 98968, 99443

HCPC codes: H2010, H2011, H2015, S0201, S9480

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**What's New**

We developed and tested a new quality measure to assess timeliness of follow-up mental health care for youth presenting to the emergency department with suicidal ideation/self-harm. Results demonstrate poor measure scores overall with substantial variation by state and patient characteristics.

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**TABLE 1.**

Characteristics of Youth with an Eligible ED Visit for Suicidal Ideation/Self-Harm

	Overall N=16,486	South Carolina N=1,161	California N=9,930	Tennessee N=2,178	Pennsylvania N=3,217
	N (%)	N (%)	N (%)	N (%)	N (%)
<b>Youth characteristics</b>					
Age ***					
5–12 years	2842 (17.2%)	301 (25.9%)	1452 (14.6%)	397 (18.2%)	692 (21.5%)
13–15 years	7364 (44.7%)	499 (43.0%)	4530 (45.6%)	955 (43.9%)	1380 (42.9%)
16–17 years	6280 (38.1%)	361 (31.1%)	3948 (39.8%)	826 (37.9%)	1145 (35.6%)
Gender ***					
Male	5980 (36.3%)	457 (39.4%)	3337 (33.6%)	873 (40.1%)	1313 (40.8%)
Female	10506 (63.7%)	704 (60.6%)	6593 (66.4%)	1305 (59.9%)	1904 (59.2%)
Race/ethnicity ***					
Hispanic	5033 (30.5%)	34 (2.9%)	4559 (45.9%)	67 (3.1%)	373 (11.6%)
White	7090 (43.0%)	526 (45.3%)	3061 (30.8%)	1312 (60.2%)	2191 (68.1%)
African American	2111 (12.8%)	357 (30.8%)	932 (9.4%)	284 (13.0%)	538 (16.7%)
Asian/Pacific Islander	319 (1.9%)	3 (0.3%)	289 (2.9%)	9 (0.4%)	18 (0.6%)
Other/Unknown	1933 (11.7%)	241 (20.8%)	1089 (11.0%)	506 (23.2%)	97 (3%)
Lives in MSA ***					
No	2297 (13.9%)	315 (27.2%)	574 (5.8%)	765 (35.1%)	643 (20.0%)
Yes	14182 (86.1%)	843 (72.8%)	9353 (94.2%)	1412 (64.9%)	2574 (80.0%)

Notes: Significance indicates differences in characteristics between states:

\*\*\*  
p<.001

MSA = metropolitan statistical area



**TABLE 2.**

Measure Scores Overall, by State, and by Youth Characteristics

	Measure Score (0–100%)	
Overall	53.5%	
State <sup>*** a</sup>	Measure Score (0–100%)	
South Carolina	32.3%	
California	66.5%	
Tennessee	26.3%	
Pennsylvania	39.2%	
Youth characteristics	Measure Score (0–100%)	Adjusted Odds Ratio (95% Confidence Interval) <sup>b</sup>
Youth age		
5–12 years (ref)	51.5%	1.00
13–15 years	54.6%	0.95 (0.86, 1.04)
16–17 years	53.1%	0.88 (0.80, 0.97)**
Youth gender		
Male (ref)	50.7%	1.00
Female	55.0%	1.10 (1.03, 1.18)**
Youth race/ethnicity		
Hispanic	62.9%	0.84 (0.77, 0.92)***
White (ref)	51.0%	1.00
African American	43.6%	0.73 (0.65, 0.81)***
Asian/Pacific Islander	57.7%	0.69 (0.54, 0.87)**
Other/unknown	48.1%	0.79 (0.71, 0.88)***
Lives in MSA		
No	47.5%	1.43 (1.29, 1.58)***
Yes (ref)	54.4%	1.00

Notes: Measure is percentage of eligible ED visits where a follow-up visit with a mental health care provider occurred within seven days of the ED visit, MSA = metropolitan statistical area

<sup>a</sup>Significance indicates differences in measure scores between states

<sup>b</sup>Odds ratio and significance logistic regression results examining differences in measure scores by youth characteristic, adjusted for state and all other youth characteristics in this table

\* p<.05

\*\* p<.01

\*\*\* p<.001

ref indicates the reference group when testing for differences in measure scores by characteristic.

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