

## Research Brief

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# Majority of Dental-Related Emergency Department Visits Lack Urgency and Can Be Diverted to Dental Offices

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## Key Messages

- *Based on triage status, dental emergency department (ED) visits were less likely than non-dental ED visits to be categorized as immediate or urgent and more likely to be categorized as semi-urgent or non-urgent.*
- *About two-thirds of dental ED visits occurred outside of normal business hours. Also, a dental ED visit was more likely to occur outside of normal business hours than a non-dental ED visit.*
- *The triage status of dental ED visits and arrival time at the ED did not vary by primary payer.*
- *The majority of dental ED visits can be diverted to a dental office. The savings from diverting these ED visits, estimated to be up to \$1.7 billion per year, could be used to fund Medicaid premiums, preventive dental visits or other more cost-effective interventions.*

## Introduction

The use of emergency departments (EDs) for non-urgent or preventable medical conditions is a growing public health concern in the United States.<sup>1</sup> As a result, many policymakers believe that it is essential to shift emergency department use for non-urgent health problems to primary care settings in the community to relieve crowded emergency departments, lower the cost of care and improve quality.<sup>2</sup>

Dental-related ED visits have been increasing in the United States.<sup>3,4,5,6</sup> One study reported that ED visits for non-traumatic dental conditions accounted for 1.4 percent of all ED visits in 2007. From 1997 through 2007, there was a 4 percent annual increase in non-traumatic ED dental visits.<sup>7</sup> Many researchers argue that patients receiving dental care in hospital emergency rooms could instead be seen in a more appropriate setting such as a dental

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office or community clinic due to the availability of continuous and definitive care, the increased likelihood of maintaining a dental home and reduced cost.<sup>8,9,10</sup>

The nature of ED visits for dental conditions, particularly the urgency of those conditions, is unclear. Previous research based on ICD-9 CM diagnostic codes is problematic. ICD-9-CM is the official system of assigning codes to diagnoses and procedures associated with hospital utilization in the United States.<sup>11</sup> Previous studies have defined the type of dental ED visits based on ICD-9 CM codes and one code in particular, ICD-9 CM 525.9 (unspecified disorder of the teeth and supporting structures) accounts for nearly half of total dental ED visits.<sup>12,13,14</sup> As a result, the true nature and severity of almost half of all dental ED visits is difficult to determine.

One alternative to using ICD-9 diagnostic codes to identify non-traumatic ED visits focuses on defining the “urgency” of an ED visit based on the level of immediacy (in minutes/hours) assigned upon arrival at the ED by hospital triage staff.<sup>15</sup> According to this schema, patients are assigned by hospital triage staff to one of five categories ranging from immediate (patient needs to be seen immediately) to non-urgent (needs to be seen in 2-24 hours). Patient visits categorized as non-urgent have the highest probability of being shifted to other primary care settings.<sup>16</sup>

This research brief examines the urgency of ED visits for dental conditions in the United States. We examine the triage status assigned to ED patients, as well as the time of arrival of ED visits for dental conditions, to better understand the nature of dental ED visits. We discuss the policy implications of our findings.

## Data & Methods

We used annual data from the National Hospital Ambulatory Medical Care Survey (NHAMCS) Emergency Department sample.<sup>17</sup> The NHAMCS is

based on a national probability sample of visits to emergency departments of non-federal general and short-stay hospitals in the United States. The NHAMCS includes data on the demographic characteristics of patients, expected source(s) of payment, patients' complaints, diagnoses, diagnostic/screening services, procedures, medication therapy, disposition, types of providers seen, causes of injury, and certain characteristics of the facility, such as geographic region and metropolitan status. We combined the 2009 and 2010 (most recent year available) NHAMCS surveys to increase sample size.

We used two methods of ICD-9 diagnostic code classification to define a dental ED visit. The first criterion utilizes Clinical Classification Software Category 136 – disorders of the teeth and jaw.<sup>18</sup> The second criterion is based on the Ambulatory Care Sensitive dental conditions defined by Dr. John Billings.<sup>19</sup> Combining these two definitions, the following ICD-9 codes determined a dental ED visit in our analysis: 520.0 to 526.9, 528.0 to 528.9, 78492, V523, V534, V585 and V722.

We created a four-level triage variable based on a question in the survey regarding the immediacy with which the patient should be seen as determined by hospital triage staff: (1) Immediate (less than 15 minutes), (2) Urgent (15 to 60 minutes), (3) Semi-urgent (1 to 2 hours) and (4) Non-urgent (2 to 24 hours). If the hospital did not conduct nursing triage, we excluded the visits from our analysis.<sup>20</sup> We compared dental ED visits to non-dental ED visits based on their triage status.

We created a three-level diversion status variable based on triage status and time of arrival: (1) Not likely to divert, (2) Likely to divert with current workforce schedule, and (3) Potential to divert with workforce schedule expansion. No matter the time of arrival, dental ED visits with a triage status of immediate or urgent are least likely to be diverted to a dental office.

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Irrespective of arrival time, dental ED visits with a triage status of non-urgent are likely to be diverted to a dental office. Patients that arrive at the ED during normal business hours with semi-urgent dental conditions are likely to be diverted. However, semi-urgent dental ED visits outside of normal business hours are divertible only if a dentist is available. We defined non-business hours as from 5:00 pm to 8:00 am Monday through Friday and on weekends.<sup>21</sup>

We provided a breakdown of dental ED visits by primary payer: (1) Private health insurance – charges paid in-part or in-full by a private insurer, (2) Medicare – charges paid in-part or in-full by a Medicare plan, (3) Medicaid/CHIP – charges paid in-part or in-full by a Medicaid or Children's Health Insurance Plan and (4) Self-pay – charges to be paid by the patient or patient's family, which will not be reimbursed by a third party.

We tested for statistical significance between subgroups using a chi-squared test. Our point estimates and statistical inferences took into account the complex survey design of the NHAMCS.

## Results

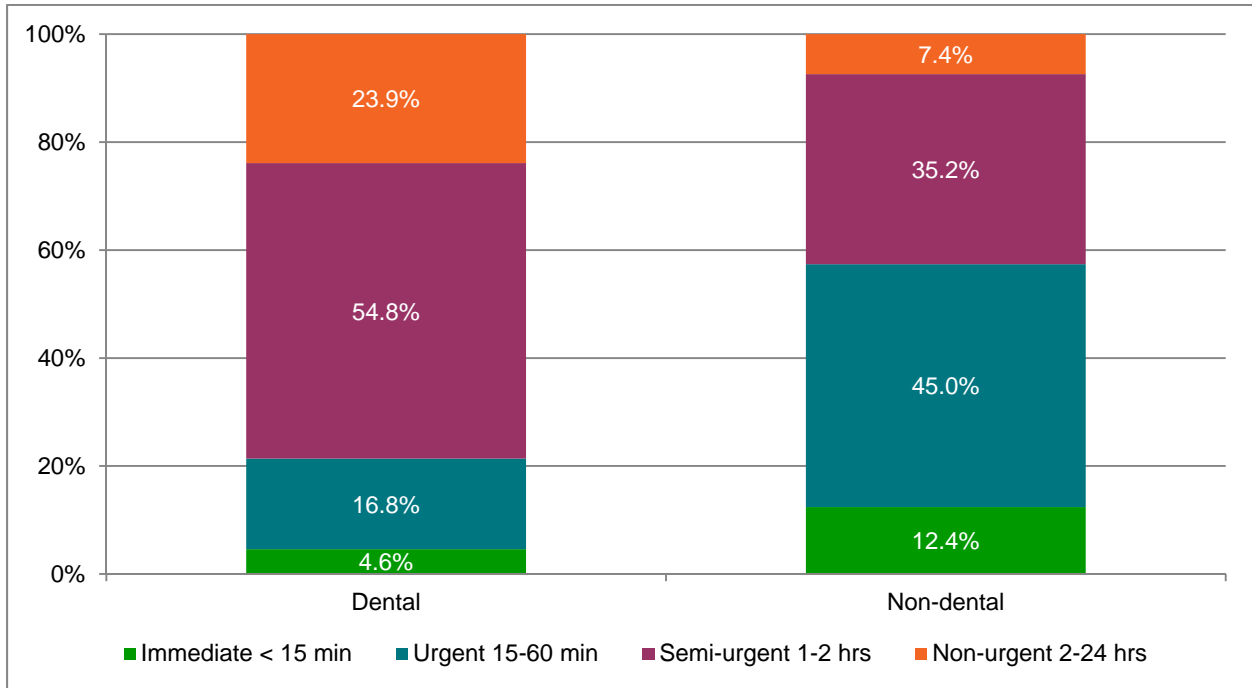
Figure 1 shows the percentage of dental ED visits and non-dental ED visits by triage status. Compared to non-dental ED visits, smaller percentages of dental ED visits were considered immediate (4.6 percent) or urgent (16.8 percent), while larger percentages were considered semi-urgent (54.8 percent) or non-urgent (23.9 percent). These differences were found to be statistically significant. There was little difference in triage status by payer (Figure 2).

The arrival time for 69.5 percent of dental ED visits was outside normal business hours compared to 64.7 percent of non-dental ED visits, a statistically

significant difference (Figure 3). The time of arrival for dental ED visits did not differ by payer (not shown).

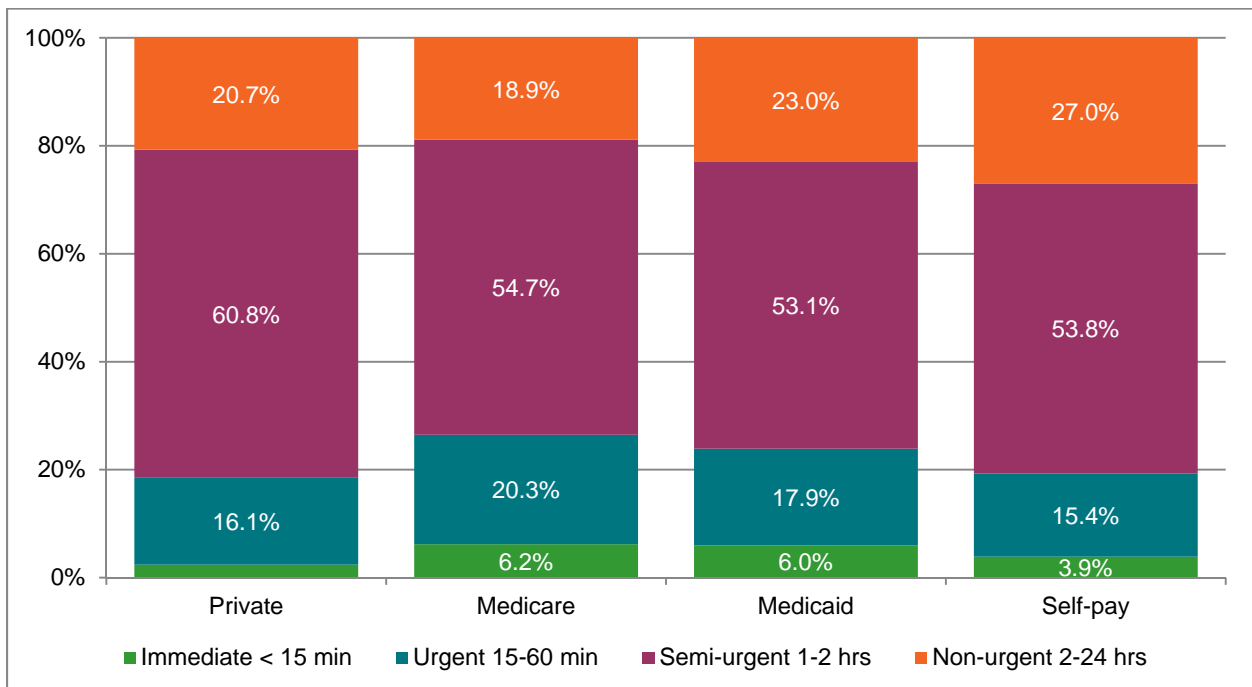
As shown in Figure 4, we estimate that 21.4 percent of all dental ED visits are least likely to be diverted to a dental office. This is the volume of dental ED visits that are classified as immediate or urgent. The category "likely to divert with current workforce schedule" consists of dental ED visits classified as non-urgent and visits classified as semi-urgent that occur during normal business hours (40.8 percent of all dental ED visits). The remaining 37.9 percent of all dental ED visits are due to semi-urgent conditions that are treated outside of normal business hours. These ED visits are potentially divertible if a dentist were available in a dental office, health center, or some other community-based setting.

**Figure 1:** Percentage of Emergency Department Visits by Triage Status



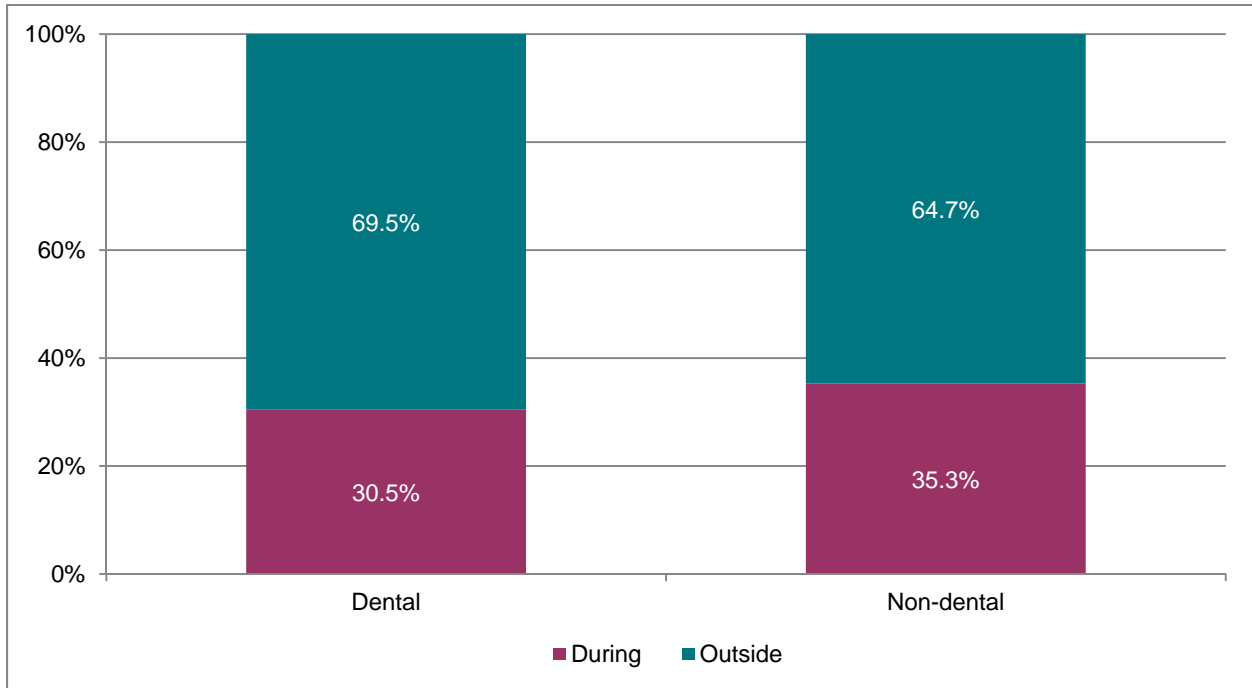
**Source:** 2009 and 2010 NHAMCS. **Note:** Differences in triage status by “Dental” and “Non-dental” are significant at the 1 percent level.

**Figure 2:** Triage Status of Dental Emergency Department Visits by Primary Payer



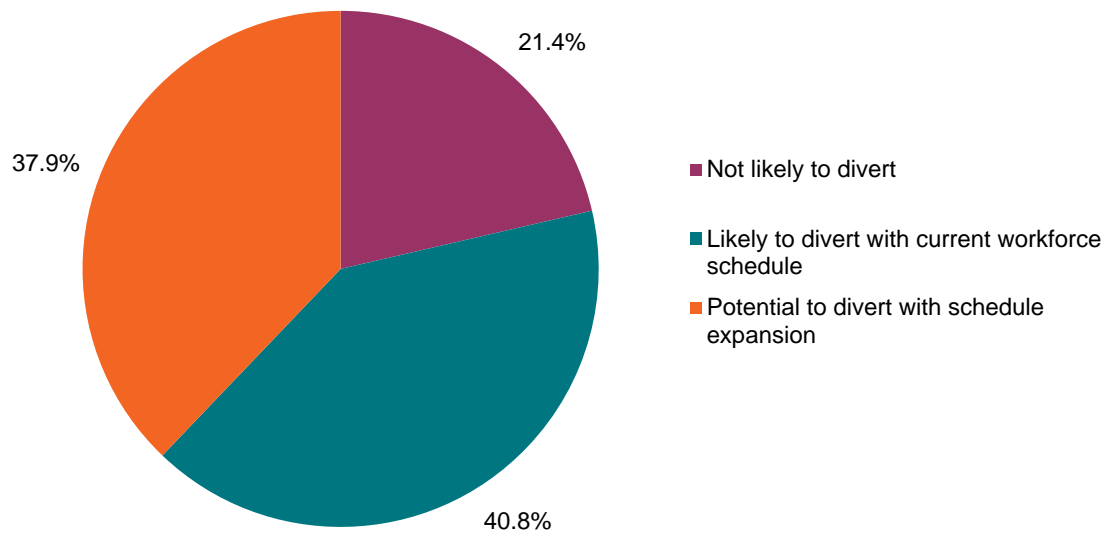
**Source:** 2009 and 2010 NHAMCS. **Note:** Differences across type of insurance payer are not statistically significant.

**Figure 3:** Percentage of Emergency Department Visits During and Outside of Normal Business Hours



**Source:** 2009 and 2010 NHAMCS. **Note:** Measured differences between the “Dental” and “Non-dental” emergency department visits categories are statistically significant at the 5 percent level.

**Figure 4:** Dental Emergency Department Visits by Diversion Status



**Source:** 2009 and 2010 NHAMCS.

## Discussion

Dental ED visits were less likely than non-dental ED visits to be categorized as immediate (less than 15 minutes) or urgent (15 to 60 minutes) and more likely to be categorized as semi-urgent (1 to 2 hours) or non-urgent (2 to 24 hours). In addition, the arrival time at the ED for a dental condition is more likely to be outside of normal business hours than for a non-dental ED visit. Prior attempts to measure ED dental utilization have not assessed the percentage of dental ED visits that are likely to be shifted to a dental office setting. We presented a method for assigning each dental ED visit to a diversion status category based on triage status and time of arrival at the ED.

We assumed that dental ED visits categorized as immediate or urgent are least likely to be diverted. Conversely, those categorized as non-urgent are most likely to be diverted. Depending on whether a dental ED visit occurred during normal business hours, some semi-urgent visits can be diverted to a dental office. Previous research has estimated that there are up to 2.1 million ED dental visits each year in the United States.<sup>22</sup> Thus, we estimate that up to 1.65 million dental ED visits can be diverted out of hospital settings.

According to recent ADA surveys,<sup>23,24</sup> dentists in private practice reported working an average of 34.9 hours per week in the office. Forty-five percent of dentists reported working on Saturday and 4 percent reported working on Sunday. Semi-urgent dental ED visits occurring during normal business hours are likely to be diverted to a dental office. However, for semi-urgent dental ED visits that occur outside of normal business hours, increasing the number of dentists

outside of normal business hours to attend to such visits is essential for any effort to shift dental care utilization from the ED to a dental office.

The triage status of dental ED visits and time of arrival at the ED were not found to vary by insurance status. Studies have shown that ED patients with a dental complaint are more likely to have Medicaid or no health insurance compared to those with a non-dental complaint.<sup>25,26</sup> This finding has led some to speculate that these patients may seek dental care in the ED because they lack access elsewhere.<sup>27</sup> Additional research is needed to explore the reasons why patients with Medicaid and those with no insurance coverage are more likely to appear at the ED with a dental condition.

Pilot projects in several states have demonstrated the effectiveness of ED diversion programs targeted to patients with a dental-related complaint.<sup>28,29</sup> For example, a Virginia program diverted ED patients with a dental complaint to a special urgent dental care clinic located in the hospital's oral and maxillofacial surgery clinic.<sup>30</sup> Dental ED visits decreased more than 52 percent during the first year of the pilot program.

It was estimated that ED charges for dental complaints totaled up to \$2.1 billion in 2010.<sup>31</sup> Assuming that 79 percent of dental ED visits can be shifted to a dental office (see Figure 4), this translates to a potential cost savings amount of up to \$1.7 billion per year. These cost savings could be used to fund Medicaid premiums, preventive dental office visits, oral health literacy efforts, or other more cost-effective interventions.

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This Research Brief was published by the American Dental Association's Health Policy Institute.

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## References

- <sup>1</sup> National Center for Health Statistics. Health, United States, 2012: With Special Feature on Emergency Care. Hyattsville, MD. 2013.
- <sup>2</sup> Cunningham P. Nonurgent Use of Hospital Emergency Departments. Center for Studying Health System Change. May 2011. Available from: <http://hschange.org/CONTENT/1204/1204.pdf>. Accessed July 17, 2014.
- <sup>3</sup> Okunseri C, Okunseri E, Thorpe J, Xiang Q, Szabo A. Patient characteristics and trends in nontraumatic dental condition visits to emergency departments in the United States. *Clinical, Cosmetic and Investigational Dentistry*. 2012;4:1-7.
- <sup>4</sup> Pew Center on the States. A costly dental destination. Pew Children's Dental Campaign Issue Brief. February 2012.
- <sup>5</sup> Seu K, Hall KK, Moy E. Emergency department visits for dental-related conditions, 2009. HCUP Statistical Brief #143. Agency for Healthcare Research and Quality, Rockville, MD. November 2012. Available from: <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb143.pdf>. Accessed July 17, 2014.
- <sup>6</sup> Wall T, Nasseh K. Dental-related emergency department visits on the increase in the United States. Health Policy Institute Research Brief. American Dental Association. May 2013. Available from: [http://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief\\_0513\\_1.ashx](http://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0513_1.ashx). Accessed July 15, 2014.
- <sup>7</sup> Okunseri C, Okunseri E, Thorpe J, Xiang Q, Szabo A. Patient characteristics and trends in nontraumatic dental condition visits to emergency departments in the United States. *Clinical, Cosmetic and Investigational Dentistry*. 2012;4:1-7.
- <sup>8</sup> Okunseri C, Okunseri E, Thorpe J, Xiang Q, Szabo A. Patient characteristics and trends in nontraumatic dental condition visits to emergency departments in the United States. *Clinical, Cosmetic and Investigational Dentistry*. 2012;4:1-7.
- <sup>9</sup> Wall T. Recent trends in dental emergency department visits in the United States – 1997/1998 to 2007/2008. *J Public Health Dent*. 2012;72:216-220.
- <sup>10</sup> Shortridge E, Moore J. Use of emergency departments for conditions related to poor oral health care. August, 2010. Rural Health Research & Policy Centers.
- <sup>11</sup> Centers for Disease Control and Prevention. International Classification of Diseases, 9th Revision, Clinical Modification. ICD-9-CM. Available from: <http://www.cdc.gov/nchs/icd/icd9cm.htm>. Accessed 7/25/2014.
- <sup>12</sup> Lloyd K, Delia D and Cantor J. Use of emergency departments for non-traumatic oral care in New Jersey. Rutgers Center for State Health Policy. March, 2014.
- <sup>13</sup> Lewis C, Lynch H, Johnson B. Dental complaints in emergency departments: a national perspective. *Ann Emerg Med*. 2003;42(1):93-99.
- <sup>14</sup> Shortridge E, Moore J. Use of emergency departments for conditions related to poor oral health care. August, 2010. Rural Health Research & Policy Centers.
- <sup>15</sup> Cunningham P. Nonurgent Use of Hospital Emergency Departments. Center for Studying Health System Change. May 2011. Available from: <http://hschange.org/CONTENT/1204/1204.pdf>. Accessed July 15, 2014.
- <sup>16</sup> Cunningham P. Nonurgent Use of Hospital Emergency Departments. Center for Studying Health System Change. May 2011. Available from: <http://hschange.org/CONTENT/1204/1204.pdf>. Accessed July 15, 2014.
- <sup>17</sup> Centers for Disease Control and Prevention. 2009-2010 NHAMCS micro-data file documentation: National Center for Health Statistics. Available from: <http://www.cdc.gov/nchs/ahcd.htm>. Accessed July 17, 2014.
- <sup>18</sup> Elixhauser A, Steiner C, Palmer L. Clinical Classifications Software (CCS), 2011. US Agency for Healthcare Research and Quality. Available from: <http://www.hcup-us.ahrq.gov/toolsoftware/ccs/ccs.jsp>. Accessed July 17, 2014.
- <sup>19</sup> Billings J. Ambulatory Care Sensitive conditions. Available from: [http://wagner.nyu.edu/files/admissions/acs\\_codes.pdf](http://wagner.nyu.edu/files/admissions/acs_codes.pdf). Accessed July 17, 2014.



<sup>20</sup> For the 2009 and 2010 NHAMCS, the Patient Record Form (PRF) requested responses using a 1-5 scale. PRF responses were evaluated with reference to responses on the Ambulatory Unit Form, completed during induction, to the question, "How many levels are in this Emergency Service Area's (ESA) triage system?" ESAs using a 3- or 4-level triage systems had their responses rescaled to fit the 5-level system, such that, for 3-level ESAs, responses of 1, 2, and 3 were recoded to 2, 3, and 4. For ESAs using a 4-level system, responses were recoded from 1-4 to 2-5. The rescaling method was determined in consultation with subject matter experts and based on record analysis. Rescaling was required for about 15 percent of records. Triage level was imputed for 19.4 percent of records for ESAs that conducted nursing triage in 2009 and 20.4 percent of records for ESAs that conducted nursing triage in 2010. Imputation was performed using a hot deck (i.e. current year's data) to identify donor records. In 2009, 4.1 percent and in 2010, 4.6 percent of dental ED visits occurred in ED that did not conduct nursing triage and these visits were excluded from analyses based on the triage variable.

<sup>21</sup> Niska, R, Bhuiya F, and Xu J. National Hospital Ambulatory Medical Care Survey: 2007 Emergency Department Summary. National health statistics reports; no 26. Hyattsville, MD: National Center for Health Statistics. 2010.

<sup>22</sup> Wall T, Nasseh K. Dental-related emergency department visits on the increase in the United States. Health Policy Institute Research Brief. American Dental Association. May 2013. Available from: [http://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief\\_0513\\_1.ashx](http://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0513_1.ashx). Accessed July 15, 2014.

<sup>23</sup> American Dental Association, Health Policy Institute. 2010 Survey of Dental Practice: Characteristics of Dentists in Private Practice and Their Patients. Chicago: American Dental Association; 2012.

<sup>24</sup> American Dental Association, Health Policy Institute. 1999 Survey of Career Patterns. Chicago: American Dental Association; 2001.

<sup>25</sup> Lewis C, Lynch H, Johnson B. Dental complaints in emergency departments: a national perspective. *Ann Emerg Med.* 2003;42(1):93-99.

<sup>26</sup> Seu K, Hall KK, Moy E. Emergency department visits for dental-related conditions, 2009. HCUP Statistical Brief #143. Agency for Healthcare Research and Quality, Rockville, MD. November 2012. Available from: <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb143.pdf>. Accessed July 17, 2014.

<sup>27</sup> Lewis C, Lynch H, Johnson B. Dental complaints in emergency departments: a national perspective. *Ann Emerg Med.* 2003;42(1):93-99.

<sup>28</sup> McCormick AP, Abubaker AO, Laskin DM, Gonzales MS, Garland S. Reducing the burden of dental patients on the busy hospital emergency department. *J Oral Maxillofac Surg.* 2013;71(3):475-78.

<sup>29</sup> American Dental Association. Reduce health care costs by treating dental disease in the dental practice instead of the ER. Council on Access, Prevention & Interprofessional Relations.

<sup>30</sup> McCormick AP, Abubaker AO, Laskin DM, Gonzales MS, Garland S. Reducing the burden of dental patients on the busy hospital emergency department. *J Oral Maxillofac Surg.* 2013;71(3):475-78.

<sup>31</sup> Wall T, Nasseh K. Dental-related emergency department visits on the increase in the United States. Health Policy Institute Research Brief. American Dental Association. May 2013. Available from: [http://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief\\_0513\\_1.ashx](http://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0513_1.ashx). Accessed July 15, 2014.

## Suggested Citation

Wall T, Nasseh K, Vujicic M. Majority of dental-related emergency department visits lack urgency and can be diverted to dental offices. Health Policy Institute Research Brief. American Dental Association. August 2014. Available from: [http://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief\\_0814\\_1.ashx](http://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0814_1.ashx).