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Executive Summary

This report examines the patterns of utilization of hospital emergency departments (E.D.s) for ambulatory care sensitive (ACS) dental conditions in Massachusetts for adults age 18 and older from 2008-2011.

Emergency departments saw over 30,000 unique patients each year from 2008-2011 for ambulatory care sensitive dental conditions, decreasing only slightly over that period (volume for total visits was also stable). Repeat visits, where individuals came three or more times for an ambulatory care sensitive dental condition, accounted for 30 percent of total dental complaint visits to the E.D. in 2011. Individuals with 10 or more such visits made up 8.7 percent of total visits.

Nearly half of visitors statewide with dental-related complaints were between the ages of 22 and 34 inclusive. Another 10 percent of visitors were ages 18-21. Non-Hispanic Blacks made up a disproportionate share of visits, visiting the E.D. at nearly twice the rate of other groups.

Dukes, Franklin and Berkshire counties had the highest rate per 1,000 residents of emergency department dental services.

The most common dental conditions for which Massachusetts residents visited the emergency department include cavities, gum disease, tooth-related headaches, abscess, and unspecified disorders (including loss of teeth through extraction or disease (non-trauma), poor fillings, or conditions related to missing teeth). These conditions are considered sensitive to ambulatory care, in that preventive care (routine cleanings) or restorative care (fillings, crowns, or denture repair) can prevent or resolve most conditions. Without access to primary or secondary treatment services, dental conditions can worsen to the extent that they require emergency treatment in tertiary care settings, such as hospital emergency departments. However, most hospital emergency departments are not equipped to treat dental emergencies other than for pain and infection.

Adult dental care is not required in the minimum benefit package of the Affordable Care Act, leaving improvement in access, prevention, utilization, and cost to oral health for adults a continuing challenge.

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1 A detailed description of the relevant diagnostic codes can be found in Section II – Data and Methodology.
I. Introduction

This report is the result of a descriptive statistical analysis of hospital emergency department (E.D.) data focused on the frequency of emergency department utilization for ambulatory care sensitive (ACS) dental conditions in Massachusetts. In addition to overall descriptors, this report presents sub-analyses of patient demographics, geographic distribution, and instances of repeat visits.3

II. Data and Methodology

The Center for Health Information and Analysis (CHIA)’s Hospital Inpatient Discharge Data (HIDD) database was utilized to analyze E.D. admissions data covering the period October 1, 2007 through September 30, 2011, corresponding to hospital fiscal years 2008, 2009, 2010 and 2011.

E.D. visit information was stratified into smaller groups appropriate for analysis, in order to develop descriptive statistics within those groups. Data sets for each year were created by first identifying pre-published ICD-9 diagnosis codes considered standard for ambulatory care sensitive (i.e. potentially preventable, with adequate health care) dental visits to the E.D.4 Existing comprehensive sets were narrowed to include only these codes, so that only E.D. dental emergencies were included. Next, all cases in which the patient was under age 18 were removed. This allowed for a data set that focused only on adults who visited an emergency room with an ACS dental concern. Analyses were then performed on the four data sets (one for each year) to address the identified areas of interest.

3 This report is published in fulfillment of Section 184 of Chapter 13 of the Acts of 2012.
4 The ICD-9 (International Classification of Diseases, 9th Edition) codes used in this report were based on those for ACS conditions published by Dr. John Billings at New York University. These codes have been used in previous studies of ACS dental conditions, including, recently, “Emergency Department Visits for Preventable Dental Conditions in California” by California Healthcare Foundation, 2009.
7 Dental benefits cut and remaining as of July 2010 attributed to: “An important message about your MassHealth benefits and Health Safety Net (HSN) copayments.” MassHealth bulletin/notice to members, May 2010.
9 MassHealth pays on a provider-specific fee schedule. The same fee is paid for every E.D. visit at a particular hospital site.
10 The cost results are limited in that MassHealth-calculated reimbursement rates for hospitals do not correspond exactly with the hospital fiscal years available in the HIDD data set. For example, the 2008 hospital fiscal year ran from Oct. 1, 2007 through Sept. 30, 2008, but MassHealth updated its reimbursement rate on Nov. 1, 2007. That rate ran through Sept. 30, 2008, but the older 2007 rates were in effect for one month. Similar discrepancies (of one or two months) existed for each year, except 2009, where the information is exact. MassHealth reimbursements, which are paid at a set rate for every procedure differing only by provider, moved up or down only by a few dollars at most during the discrepant periods.
11 To calculate MassHealth (Medicaid) costs for E.D. dental visits, visits for which MassHealth Fee for Service and MassHealth Managed Care – Primary Care Clinician were listed as the primary payer source in hospital data were included. Visits for which Medicaid (MassHealth) Managed Care organized via private health plans or out of state payers were listed as the primary payer source were not included due to data availability at the time of analysis.

Policy: 2010 Reductions to MassHealth Dental Benefits

On July 1, 2010, concurrent with statewide budget cuts, MassHealth implemented cuts to dental benefits for its members age 21 and older. The changes amounted to $56 million in funding cuts.5 Coverage for dental care for MassHealth members was eliminated for approximately 700,000 adult members.6 Benefits cut included restorative (fillings), endodontic (root canals), periodontic (gums – deep scaling, which is a plaque and stain removal procedure), crowns, dentures (full, partial or repairs), and surgical procedures related to dentures. Benefits retained included diagnostic services (exams and X-rays), preventive services (cleanings), extractions (removing teeth), emergency care visits, and some oral surgeries including biopsies and soft-tissue surgeries.

After these changes were implemented, emergency pain and infection control for dental-related concerns was still covered at hospital emergency departments.7 Moreover, the Health Safety Net (HSN) continued to pay for the restorative services cut from the MassHealth benefit when such services were performed at a community health center or a hospital-licensed health center.8

Between 2008 and 2011, annual MassHealth expenditures for emergency dental services for adults decreased from $2.9 million to $2.6 million.9,10

Year | Costs
--- | ---
2008 | $2.9 Million
2009 | $3.1 Million
2010 | $3.0 Million
2011 | $2.6 Million

Source: CHIA HIDD

While MassHealth expenditures for emergency dental services declined between 2010 and 2011, this change cannot be attributed to the policy change that reduced coverage for restorative services (which would be expected to increase emergency department costs).11

Center for Health Information and Analysis

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III. Results

A. Utilization

Figure 1. Massachusetts E.D. Dental Visits for Adults Age 18 or Older (2008-2011)

Figure 1 shows the total number of visits, by those age 18 and older, to Massachusetts hospital E.D.s for ACS dental conditions for hospital fiscal years 2008 to 2011 (top line) and the number of unique visitors during these years (bottom line).

More than 31,000 unique patients visited Massachusetts E.D.s for a potentially preventable dental condition every year during the period studied. The number of unique patients and the total volume of visits were both generally stable with a slight decrease over the period.

This relatively flat trend compares with the trend for E.D. visits during a similar time period. In an August 2012 report, “Efficiency of Emergency Department Utilization in Massachusetts,” the Division of Health Care Finance and Policy found that from 2008 to 2010 there was a slight downward trend in the annual growth rate for both total E.D. visits and preventable/avoidable E.D. visits.

12 Hospital fiscal years run from October 1 of the prior year through Sept. 30 of the year named. For example, visits occurring during FY08 occurred between October 1, 2007 and Sept. 30, 2008. Unless otherwise noted, “years” or “fiscal years” hereon in this report refer to hospital fiscal years.
Figure 2 illustrates the age distribution of adults who visited Massachusetts E.D.s in 2011 with ACS dental complaints.\textsuperscript{13} Nearly half of all visitors to E.D.s statewide with such complaints were young adults between the ages of 22 and 34. Another 10 percent of visitors were 18-21. These results are consistent with findings from a 2009 California Health Foundation report which found, “People ages 18 to 34 are significantly more likely than other age groups under age 65 to visit the E.D. [for preventable dental conditions].”\textsuperscript{14}

The age distribution of the 18+ population who visited the E.D. for an ACS dental reason contrasts with the distribution of those who visited overall. Adults ages 22-34 visited more often, and those age 55 and over visited less often, for ACS dental complaints as compared to overall visits.

\textsuperscript{13} The distributions within these demographic categories remained within 1-2\% of each other for all four years studied.

\textsuperscript{14} California Healthcare Foundation “Snapshot: Emergency Department Visits for Preventable Dental Conditions in California,” 2009, p. 2.
Figure 3.

Massachusetts Population and Adult E.D. Dental Visits, by Race/Ethnicity (2010)

- Non-Hispanic White: 78.6% (74% visits)
- Non-Hispanic Black: 5.6% (11.3% visits)
- Asian: 5.3% (0.7% visits)
- Hispanic: 8.1% (10.8% visits)
- Other: 2.4% (3.2% visits)

Source: CHIA HIDD, U.S. Census American Community Survey

Figure 3 compares the distribution of Massachusetts’ population and E.D. visits for ACS dental complaints in 2010 by race/ethnicity. Certain minority racial/ethnic groups were overrepresented among patients visiting E.D.s for ACS dental complaints. For example, non-Hispanic Blacks represented 5.6 percent of the state population in 2010, yet more than double that proportion – 11.3 percent – of all E.D. ACS dental visits. Hispanics comprised 8.1 percent of the state population, but comprised 10.8 percent of all visitors to the E.D. with an ACS dental-related condition during this year.
Figure 4.

Figure 4 depicts CHIA’s calculation of how many adult residents per 1,000, stratified by race/ethnicity, visited a Massachusetts hospital E.D. for an ACS dental-related reason in 2011. This measure shows that 17 of 1,000 non-Hispanic Blacks age 18 or older visited a hospital E.D. for a dental reason. This is approximately double the rate of visits by non-Hispanic Whites (9/1,000), the state population average (9/1,000), and Hispanics (8/1,000). Just 1.5 out of 1,000 Asian residents had an E.D. dental visit during this time. The rates did not shift significantly year over year.

Multiple visits

Patients who have multiple visits to the E.D. for ACS dental conditions represent potential missed opportunities for prevention, access, and treatment. In 2011 29.2 percent of patients who came to the E.D. for ACS dental conditions had three or more such visits, and 8.7 percent had ten or more.
B. Disproportionate Geographic Impact

Figure 5.

As Figure 5 illustrates, Dukes, Franklin and Berkshire counties had higher visit rates than other counties. While these counties are among the lowest in numbers of residents, their proportions of ACS dental E.D. visits were the highest.
Figure 6 shows visit patterns in Boston-area communities in greater detail.

We were unable to obtain data for Cohasset.
# Figure 7.

**Ambulatory Care Sensitive Adult E.D. Dental Visits per 1,000 Residents by Boston Neighborhood (2010)**

<table>
<thead>
<tr>
<th>Neighborhood (zip codes)</th>
<th>Visit rate per 1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allston (02134)</td>
<td>2.7</td>
</tr>
<tr>
<td>Back Bay (02116, 02199)</td>
<td>4.8</td>
</tr>
<tr>
<td>Beacon Hill (02114)</td>
<td>3.8</td>
</tr>
<tr>
<td>Brighton (02135)</td>
<td>3.9</td>
</tr>
<tr>
<td>Charlestown (02129)</td>
<td>7.3</td>
</tr>
<tr>
<td>Dorchester (02121, 02122, 02124, 02125)</td>
<td>19.8</td>
</tr>
<tr>
<td>Downtown and Chinatown (02109, 02110, 02111)</td>
<td>2.9</td>
</tr>
<tr>
<td>East Boston (02128)</td>
<td>5.8</td>
</tr>
<tr>
<td>Fenway (02115, 02215)</td>
<td>3.6</td>
</tr>
<tr>
<td>Hyde Park (02136)</td>
<td>6.6</td>
</tr>
<tr>
<td>Jamaica Plain (02130)</td>
<td>5.7</td>
</tr>
<tr>
<td>Mattapan (02126)</td>
<td>10.2</td>
</tr>
<tr>
<td>North End (02113)</td>
<td>2.3</td>
</tr>
<tr>
<td>Roslindale (02130)</td>
<td>7.5</td>
</tr>
<tr>
<td>Roxbury and Mission Hill (02119, 02120)</td>
<td>8.2</td>
</tr>
<tr>
<td>South Boston (02127)</td>
<td>8.1</td>
</tr>
<tr>
<td>South End (02118)</td>
<td>13.9</td>
</tr>
<tr>
<td>West Roxbury (02132)</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Figure 7 depicts the neighborhood-level rate of adult ACS dental E.D. visits within Boston during 2010.

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15 Source: CHIA HIDD data, 2010 U.S. Census and Boston Redevelopment Authority, via boston.com, zip code map from City of Boston site: [http://www.cityofboston.gov/contact/images/zip.gif](http://www.cityofboston.gov/contact/images/zip.gif). “Adult” refers to an individual age 18 or older.
IV. Discussion and Conclusion

Oral health is a key component of general health and well-being. Poor oral health can lead to the inability to chew (thus nutritional problems), to pain (hindered ability to function as effectively in daily life), and to tooth loss (thus lower quality of life and jeopardized employment). Tooth and gum health problems and infections have also been linked to ear and sinus infections, weakened immune systems, heart and lung diseases, diabetes, stroke, and risks to pregnant women of giving birth prematurely.\textsuperscript{16,17}

Utilization of E.D.s for ACS dental complaints was generally flat over the study period. The disproportionate use by people ages 22-34 and by non-Hispanic Blacks was consistent in all four years.

The finding that visitors to E.D.s for dental reasons are mostly young (within the 18-34 age range) is consistent with results from recent reviews of E.D. use for dental conditions in California (2009),\textsuperscript{18} Florida (2010),\textsuperscript{19} and Boston (2011).\textsuperscript{20} The overrepresentation of racial/ethnic minorities is consistent with the results of recent studies in Wisconsin (2008)\textsuperscript{21} and California (2009). However, in California, non-Hispanic Whites visited E.D.s for preventable dental conditions at a greater rate (57%) than the proportion of the population they represent (44%). In Massachusetts, we found that non-Hispanic Whites generally visited E.D.s at a percentage comparable to the state population, whereas non-Hispanic Blacks and Hispanics visited at percentages greater than their corresponding state representation.

The 30 percent who utilized the E.D. for an ACS dental condition three or more times in 2011 underscore missed opportunities for prevention. This observation about Massachusetts E.D. use for dental services was not found in the California study. The California study found, “Only a very small proportion, about 8 percent, visit the emergency department more than once yearly for a preventable dental condition.”\textsuperscript{22}

The distribution of E.D. visits for ACS dental complaints was not uniform across the state. Our analysis shows that E.D. dental visit rates in Berkshire, Franklin and Dukes counties were higher than elsewhere. This may suggest a lack of adequate primary dental service capacity in these low population counties and further analysis would be helpful to better understand the causes of this finding.

The federal Affordable Care Act mandates pediatric dental coverage but not adult dental coverage.\textsuperscript{23} The findings of this report suggest areas for further investigation and potential opportunities for improving dental care for adults in Massachusetts.

\textsuperscript{18} California Healthcare Foundation “Snapshot: Emergency Department Visits for Preventable Dental Conditions in California,” 2009, p. 2.
\textsuperscript{22} California Healthcare Foundation “Snapshot: Emergency Department Visits for Preventable Dental Conditions in California,” 2009, p. 18.
Figure 8 depicts the 10 hospitals in the state (of approximately 65 hospital groups/parent companies) that saw the most E.D. dental visitors overall in 2011. Many of these hospitals are located in Massachusetts’ most populous cities (Boston, Worcester, Springfield, New Bedford), which could explain the high utilization.
**Diagnosis codes**

We identified the top five specific dental diagnoses seen in emergency departments between 2008 and 2011 (each year individually). We also identified the most commonly reported “associated diagnoses” identified in the data set.

Thirty-five percent of principal diagnoses are unspecified and associated diagnoses are not recorded as consistently as principal diagnoses by hospital E.D.s, limiting the ability of this data set to provide insight into possible reasons that the emergency occurred, as well as the types of conditions that may lead to the primary dental emergency diagnosed.

**Figure 9.**

**Top Five Dental Diagnoses Reported for E.D. Visits for ACS Dental Complaints (2011)**

<table>
<thead>
<tr>
<th>Diagnosis Code</th>
<th>Diagnosis Name</th>
<th>Description</th>
<th>Frequency</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5259</td>
<td>Unspecified disorder of teeth and supporting structures</td>
<td>Includes loss of teeth through extraction or periodontal disease</td>
<td>16,282</td>
<td>34.98</td>
</tr>
<tr>
<td>5225</td>
<td>Periapical abscess w/o sinus (infection by root of tooth)</td>
<td>Abscesses originating in the blood vessels and nerve inside the tooth and/or the tissues surrounding the root of the tooth inside the jaws</td>
<td>7,379</td>
<td>15.85</td>
</tr>
<tr>
<td>52100</td>
<td>Dental caries, unspecified</td>
<td>Cavity</td>
<td>5,561</td>
<td>11.95</td>
</tr>
<tr>
<td>5224</td>
<td>Acute apical periodontitis of pulpal origin (gum disease)</td>
<td>Gum disease</td>
<td>2,501</td>
<td>5.37</td>
</tr>
<tr>
<td>7840</td>
<td>Headache</td>
<td>Can be a symptom of severe dental infection</td>
<td>1,530</td>
<td>3.29</td>
</tr>
</tbody>
</table>

**Total Cases**

<table>
<thead>
<tr>
<th>Diagnosis Code</th>
<th>Diagnosis Name</th>
<th>Description</th>
<th>Frequency</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5259</td>
<td>Unspecified disorder of teeth &amp; supporting structures</td>
<td>46,548</td>
<td></td>
<td></td>
</tr>
<tr>
<td>52100</td>
<td>Dental caries (cavity), unspecified</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5225</td>
<td>Periapical abscess w/o sinus (infection by root of tooth)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3051</td>
<td>Tobacco use disorder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7840</td>
<td>Headache</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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