Characteristics of Dental-Related Hospital Admissions in Michigan, 2009-2010

Authors: Adrienne Nickles[1], MPH; Mathew J. Reeves[2], PhD; Sarah Lyon-Callo[1], MA, MS; Christine Farrell[3], RDH, MPA

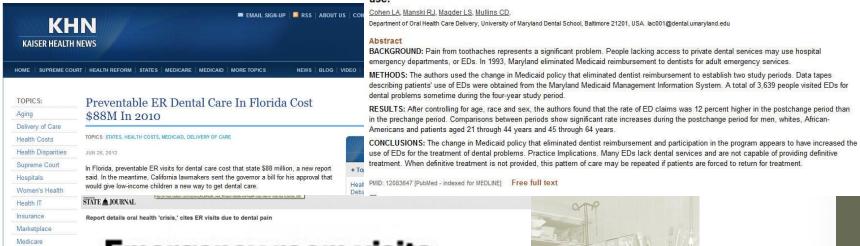[1]Michigan Department of Community Health, Chronic Disease Epidemiology Section,
[2]Michigan State University, College of Human Medicine, Department of Epidemiology,
[3]Michigan Department of Community Health, Child, Adolescent & Family Health Section

Background

- The Michigan Oral Health Surveillance System (MOHSS) was created in 2009

- The purpose of MOHSS is to systematically collect and organize data available for use in developing, implementing, and evaluating programs to improve the oral health of Michigan citizens.

- Issues:
    - Many gaps in surveillance capabilities
    - Limited access to clinical data

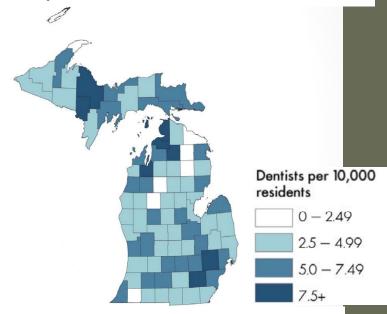# Background

Oral Health in Michigan

Children

- Approximately one in four third-grade children in Michigan (27.1%) have untreated dental disease.[1]

- In 2010 only 32.4% of Medicaid eligible children in Michigan received a dental service, compared to 39.7% of children nationally.[2]

Adults[3]

- An estimated 13.8% of Michigan adults have six or more teeth missing due to tooth decay or gum disease.

- Approximately 72.5% of adults reported that they visited a dentist or dental clinic during the previous year.

- Half (49.9%) of adults with less than a high school education and 44.5% of adults with an annual income less than $20,000 reported having visited the dentist in the past year.

Number of Licensed Dentists with a Current Michigan Address per 10,000 Population, by County, 2010

Dentists per 10,000 residents
- 0 – 2.49
- 2.5 – 4.99
- 5.0 – 7.49
- 7.5+

Bureau of Licensing & Health Professions, 2010

[1]Michigan Count Your Smiles Report, 2010
[2]Michigan Dental Association, 2010
[3]Michigan Behavioral Risk Factor Survey, 2010

Background

- Untreated dental disease can significantly impact systemic health and may result in costly hospitalizations.

- Preventable dental conditions impose a costly and unnecessary strain on national and state budgets.

- The burden of dental-related hospital admissions in Michigan has not been reported previously.

Background

- A total of 50,658 hospital admissions were primarily attributed to dental/oral health-related conditions in 2008.

- 0.127% admissions in the US were primarily attributed to dental-related conditions.

- Total US hospitalization days were 174,496 days.

- Total US hospitalization charges were $1.22 billion.

Source: Allareddy V, et. al, Hospitalizations primarily attributed to dental conditions in the United States in 2008. Oral Surg Oral Med Oral Pathol Oral Radiol. 2012 Sept;114(3):333-7.
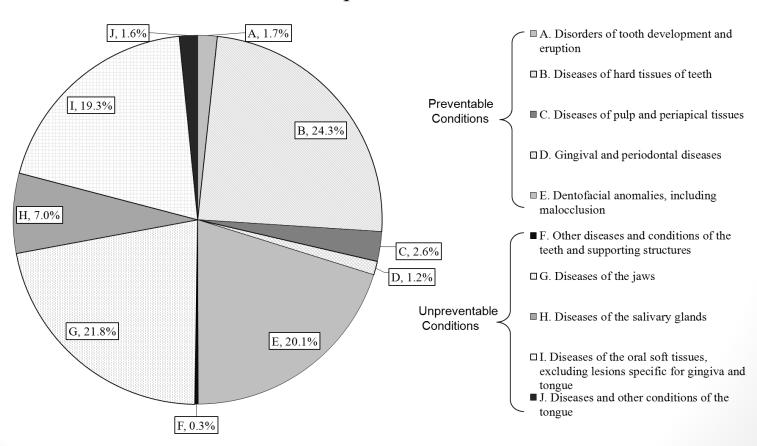
Objectives

- Describe the prevalence and characteristics of non-traumatic dental-related hospitalizations and resulting charges in Michigan from 2009-2010

- Compare characteristics of preventable versus unpreventable dental admissions

Methods

- Hospital discharge data from the Michigan Inpatient Database were assessed to determine the prevalence, characteristics, and charges resulting from preventable non-traumatic dental-related hospitalizations in Michigan over a 2 year period.

- Primary diagnosis ICD-9-CM codes (520.0-529.9) were used to identify dental hospitalizations and were stratified into preventable (521.0-523.9, 525.0-525.9, 528.0-528.9) and unpreventable admissions.

- Multivariable logistic regression was used to determine independent factors associated with preventable versus unpreventable dental admissions.

Results

Figure 1. Distribution of Primary Diagnosis ICD-9 Codes Among All Dental-Related Hospitalizations, 2009-2010

Results

- On average, there were 1978 non-traumatic dental-related hospitalizations annually during the two year period accounting for 0.15% of all hospital admissions in Michigan.

- Half (56.4%) of hospitalizations occurred to people under 45 years old, 53.3% to women, and 73.8% to white people.

- Forty-five percent of hospitalizations were charged to government insurance while 8.8% were expected to pay out-of-pocket.

- Annual charges for dental-related hospitalizations were over $25 million with over $9 million in preventable hospitalizations.

Results: Table 1

Characteristics of Dental Admissions by Preventable vs. Unpreventable Condition, 2009-2010

		Preventable		Unpreventable		χ2, p-value
		%	N	%	N	
Age Group	0-17	48.9%	363	51.1%	379	43.0, < 0.0001
	18-44	50.9%	756	49.1%	730	
	45-64	54.9%	542	45.1%	446	
	65-84	46.3%	261	53.7%	303	
	≥85	29.3%	51	70.7%	123	
Sex	Male	57.0%	1053	43.0%	795	69.8, < 0.0001
	Female	43.7%	921	56.3%	1188	
Race	White	45.7%	1325	54.3%	1573	83.2, <0.0001
	Black	62.7%	579	37.3%	345	
	Other	58.1%	61	41.9%	44	
Insurance Type	Private Insurance	58.1%	1026	41.9%	740	330.0, <0.0001
	Government	35.2%	631	64.7%	1159	
	Self-pay	80.5%	277	19.5%	67	
Admitted From	Referral*	35.4%	727	64.6%	1327	342.3, <0.0001
	Transfer**	48.5%	32	51.5%	34	
	Emergency Room	66.6%	1024	33.4%	514	
Type of Admission	Emergency	62.2%	1330	34.8%	710	841.9, <0.0001
	Urgent	62.7%	462	37.3%	275	
	Elective	13.3%	149	86.7%	974	

* Includes physician, clinic/outpatient, and HMO referral
**Transfer from hospital, skilled nursing facility, another health care facility

Results: Table 2

Preventable vs. Unpreventable Dental Hospital Admissions,
Crude and Adjusted Odds, Michigan, 2009-2010

		Crude		Adjusted	
		OR	95% CI	OR	95% CI
Age Group	0-17	Ref	---	---	---
	18-44	1.08	(0.91, 1.29)	0.71	(0.56, 0.91)
	45-64	1.27	(1.05, 1.54)	0.71	(0.56, 0.92)
	65-84	0.90	(0.72, 1.12)	0.32	(0.24, 0.43)
	≥85	0.43	(0.30, 0.62)	0.13	(0.08, 0.20)
Sex	Male	Ref	---	---	---
	Female	0.58	(0.52, 0.66)	0.64	(0.55, 0.76)
Race	White	Ref	---	---	---
	Black	1.99	(1.71, 2.32)	1.12	(0.92, 1.35)
	Other	1.65	(1.11, 2.44)	1.35	(0.83, 2.22)
Insurance Type	Government	Ref	---	---	---
	Private	0.39	(0.34, 0.45)	0.53	(0.43, 0.64)
	Self-pay	2.98	(2.25, 3.96)	1.67	(1.20, 2.34)
Admitted From	Referral	Ref	---	---	---
	Transfer	1.72	(1.05, 2.81)	1.26	(0.72, 2.21)
	Emergency Room	3.36	(3.16, 4.18)	1.15	(0.95, 1.40)
Type of Admission	Emergency	Ref	---	---	---
	Urgent	0.9	(0.75, 1.07)	1.01	(0.81, 1.25)
	Elective	0.08	(0.07, 0.10)	0.09	(0.07, 0.12)

*Adjusted by age group, sex, race, insurance type, place admitted from, and admission type

Conclusions

• There were approximately 1000 annual preventable dental-related hospitalizations in Michigan from 2009-2010.

• Over $9 million in charges due to preventable dental admissions could be avoided by regular dental care and treatment.

• Efforts should focus on increased access to preventive dental care for groups with greater odds of preventable dental admissions.

• Future studies should focus on regional differences in the burden of preventable dental admissions in Michigan.

Primary ICD-9 Codes by Diagnosis Category

ICD-9 Code Range	Diagnosis Category
521.00-521.89	Disorders of tooth development and eruption
522.00-522.80	Diseases of hard tissues of teeth
523.00-523.90	Diseases of pulp and periapical tissues
525.20-525.90	Gingival and periodontal diseases
528.00-528.90	Dentofacial anomalies, including malocclusion
520.00-520.70	Other diseases and conditions of the teeth and supporting structures
524.00-524.90	Diseases of the jaws
526.00-526.90	Diseases of the salivary glands
527.00-527.90	Diseases of the oral soft tissues, excluding lesions specific for gingiva and tongue
529.00-529.80	Diseases and other conditions of the tongue