INVITED PAPER

Oral health trends in Maryland

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Abstract

Objectives: This paper describes the trends in oral health in Maryland over the past decade.
Methods: Data were compiled from several surveillance systems and then summarized to assess the trends in oral health in Maryland over the past ten years.
Results: The percentage of Maryland children with dental sealants increased from 33.8 to 42.8 percent; the percentage of children that have had a dental visit increased from 18.9 to 47.5 percent; and the percentage of children that received "dental treatment" increased from 8.4 to 22.4 percent.
Conclusions: Maryland has made considerable progress in improving the oral health care for children covered by Medicaid. The availability of affordable oral health care for new mothers, adults, and elderly persons is a problem that goes beyond the Maryland boundaries. Following national trends, edentulism and deaths due to oral cancer have declined.

Maryland characteristics

Maryland is one of the richest states in the country, ranking third for the highest median income in 2009 (1). Several of Maryland's counties are also noted as the wealthiest in the United States (1). On the other hand, Maryland has large rural and inner-city areas whose residents live below the federal poverty level (2). Consequently, disparities in oral health and oral health care continue to exist among Maryland residents given that accessing dental care is highly dependent on a person's income and place of residence (3).

Maryland has a strong dental workforce. The state has one dental school and five dental hygiene schools. In 2010, there were 4,149 and 2,615 actively practicing dentists and dental hygienists, respectively, which correspond to 71.9 dentists and 45.3 dental hygienists per 100,000 people, respectively (2). In addition, physicians and nurse practitioners who participate in the Early Periodic Screening, Diagnosis and Treatment and Medicaid programs are reimbursed by Medicaid for fluoride varnish applications provided to beneficiaries 9 months to 3 years of age during their scheduled well-child visits. However, Maryland, like most other states, has problems derived from provider maldistribution as most providers practice in the wealthier urban areas of the state. Montgomery, Prince George's, and Baltimore counties have the highest number of active dentists, whereas poorer and more rural areas, such as Dorchester, Garrett, Kent, and Somerset counties, have the lowest (4).

The circumstances of oral health in Maryland were fundamentally changed by a regrettable event in 2007, the death of 12-year-old Deamonte Driver. This was not the first time a child had died in the United States because of a dental-related infection (3). However, this occurrence gained immediate notoriety because Deamonte lived in Prince George's county, just a few miles from the capital of the United States, and, as such, it was reported in a major Washington, DC newspaper. In the immediate aftermath of the press report, Congressman Elijah Cummings of Maryland took a strong and passionate interest in this case, adding to its mounting notoriety and traction. Papers in this issue of the journal by Congressman Cummings and Thuku *et al*. present federal and state policy actions that were taken and which resulted in positive changes in the oral health arena in Maryland.

This paper describes trends in oral health status in Maryland over the past 10 years. The data are derived from a diverse range of sources. For comparison purposes, and as

available, data from the United States will be presented for each indicator. The policy changes that occurred after the death of Deamonte Driver have not been in place for a long enough time to be reflected in the data presented; however, these data provide the baseline from which to evaluate the results of those policy changes in the future.

Preventive care

Over the past several years, Maryland has taken steps to improve the oral health of its residents, and preventive care is at the forefront of this effort. Maryland has been very successful in meeting seven of the eight benchmarks created by Pew Charitable Trusts (5). The Pew Center on the States compiled its dental benchmarks using proven approaches to ensure good dental health and access to care for children, and then collected oral health data to rank how well each state had achieved these benchmarks. Selected preventive measures taken in Maryland include support for water fluoridation, monitoring dental visits, and provision of dental sealants for children.

Water fluoridation is one aspect of prevention in which Maryland excels. In 2002, 93.7 percent of the Maryland population on public water systems received fluoridated water. By 2010, that percentage increased to 99.8 percent (Table 1) surpassing the Healthy People 2020 goal of 79.6 percent (6).

Regular dental visits, based on disease risk, allow the dentist to provide timely preventive measures and early diagnosis and treatment of oral diseases (3). The standard measure of care for Medicaid is an annual dental visit. In Maryland, the percentage of Medicaid eligible children under 21 years of age who had a dental visit in the past year more than doubled between 2001 and 2010 (18.9 and 47.5 percent, respectively) (Table 2). This increase has moved Maryland from being well below the US average to being within the US average. As dental visits are required to receive preventive services and treatment, the data indicate that the vast majority of Medicaid eligible children who had these visits received disease preventive services. In addition, close to half of the children who had a visit received dental treatment. Between 2009 and 2010, the percentage of Medicaid eligible children who had a preventive visit in Maryland increased 27 percent, from 33.8 to 42.8 percent (Table 2). This increase may partially be a result of children receiving oral health-related preventive services from physicians and nurse practitioners who are participating in Maryland's Mouths Matter, a fluoride varnish and oral health screening program for children under the age of three.

While dental visits among children have presented positive changes in the past 10 years, the dental visits among adults have not shown improvement. According to data from the Behavioral Risk Factor Surveillance System (7), the percentage of Maryland adults reporting a dental visit in the past year did not change between 2002 and 2010 (76 and 75.5 percent, respectively) (Table 1). The prevalence of dental visits for all US adults was slightly lower, but also similar for both years at 70.9 and 69.9 percent (Table 1).

Sealants are an effective intervention to prevent dental caries (3). Data on dental sealants placed on children between 2002 and 2005 reveal that the percentage of Maryland children with sealants almost doubled from 23.7 to 42.4 percent (Table 1). This increase is likely due to school-based sealant programs, allowing sealant access to children who otherwise would not be able to receive them. The state of Maryland does not have a defined "statewide" sealant program. However,

Table 1 Trends in Oral Health Status and Programs

Data from the National Oral Health Surveillance System†		
	Percentage*	
	2002	2010
Community fluoridated water		
Maryland	93.7	99.8
US	67.4	68.0
Data from the Behavioral Risk Factor Surveillance Survey‡		
	Percentage	
	2002	2010
Adults who visited the dentist in past year		
Maryland	76.0	75.5
US	70.9	69.9
Adults 65+ with all natural teeth extracted		
Maryland	19.5	13.6
US	22.4	16.9
Data from the National Oral Health Surveillance System†		
	Percentage	
	2001	2005
Sealants		
Maryland	23.7	42.4
US	N/A	–
Data from The Burden of Oral Diseases in Maryland and Survey of Oral Health Status of Maryland School Children¶		
	Percentage	
	2001	2005
Children's caries experience	42	N/A
Children's untreated decay	25	30

* Population residing in areas with public water systems.
Sources:
† National Oral Health Surveillance System. Oral Health Indicators. URL: http://www.cdc.gov/nohss/ [accessed on September 19, 2011].
‡ Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System. Prevalence and Trends Data: Oral Health. URL: https://www.cms.gov/MedicaidEarlyPeriodicScrn/03_StateAgencyResponsibilities.asp#TopOfPage [accessed on August 8, 2011].
¶ Altema-Johnson D. The Burden of Oral Diseases in Maryland.
N/A, not available.

Table 2 Medicaid Eligible Children and Percentage of Children Who Received Dental Care, United States and Maryland

	2001	2002	2003	2004*	2005†	2006	2007	2008	2009	2010‡
	Number of Eligible Children (in thousands)									
Total eligible from US	24,845	26,824	27,727	28,844	30,480	31,675	31,507	32,245	32,337	N/A
Total eligible from Maryland	426	458	482	493	501	507	514	523	523	591
	Percentages									
Children with any dental visit										
US	26.6	27.9	30.6	29.9	32.9	31.6	34.2	36.2	39.9	N/A
Maryland	18.9	22.5	26.5	28.1	30.8	30.7	33.5	37.2	38.9	47.5
Children with a preventive visit										
US	21.7	23.0	25.1	21.7	27.6	27.7	29.4	31.5	34.7	N/A
Maryland	14.4	18.1	22.5	23.4	25.4	25.4	28.3	31.6	33.8	42.8
Children who received dental treatment										
US	14.3	15.2	16.7	15.7	17.5	19.4	17.8	18.0	19.4	N/A
Maryland	8.4	10.3	11.6	11.0	13.0	13.0	14.6	16.4	16.1	22.4

* Missing data from Idaho, Maine, New Hampshire, Oklahoma, Pennsylvania, and West Virginia.
† Missing data from Maine and Kentucky.
‡ Data include fluoride varnish application by nondental providers.
Source: Centers for Medicare and Medicaid Services: State Agency Responsibilities.
N/A, not available.

local health departments may apply for annual funding from the Department of Health and Mental Hygiene, Office of Oral Health (OOH) to carry out their own sealant programs.

Oral diseases

Dental caries

Dental caries is a problem nationwide (3), and Maryland is working to address the issue. The percentage of third grade children with caries experience [decayed/filled primary teeth (dft) > 0 or decayed/missing/filled permanent teeth (DMFT) > 0] in Maryland in 2001 was 42 percent (Table 1). This percentage is lower than the Healthy People 2020 goal of 49 percent for children 6-9 years old (6). Untreated caries among third graders increased between 2001 (25 percent) and 2005 (30 percent) (Table 1). However, these numbers for caries experience and untreated caries cannot be compared directly because the sample for the second survey included a larger proportion of children who were eligible for free or reduced lunch. Still, the focus on decreasing caries experience in children is at the forefront of oral health programs and policies, and the current prevalence is close to the Healthy People 2020 objective of 25.9 percent of 6- to 9-year-olds with untreated caries (6).

Edentulism

Data from the Maryland Behavioral Risk Factor Surveillance Survey indicate that total tooth loss among persons 65 and over in Maryland declined from 19.5 percent in 2002 to 13.6 percent in 2010 (Table 1). Edentulism in the United States, for the same population, is higher but presents the same declining trend. This difference can be attributed to the methodology used for the data collection: phone interview versus dental examination. Some underreporting based on social desirability is expected when there is no physical contact between interviewer and interviewee (8).

Oral cancer

The age-adjusted oral cancer incidence and mortality rates in Maryland are similar to what is reported in the United States (Figure 1). For both Maryland and the United States, there has been a small downward trend in oral cancer incidence. It is pertinent to note that Maryland was ranked the seventh highest state in oral cancer mortality between 1995 and 1999 and currently is not included in the 20 states with the highest oral cancer mortality (9).

Challenges

Although Maryland's progress in oral health has been very encouraging, there are still several areas in which the state needs to improve. For example, there is no coverage for dental care of low-income adults. In 1993, Maryland's Medicaid program suspended the coverage of dental emergencies for adults, which resulted in an increase of adults' emergency department visits for dental services by 12 percent (10). Currently, limited dental care for adults is provided at a reduced cost by Federally Qualified Health Centers and some local health departments. In addition, some Medicaid Managed

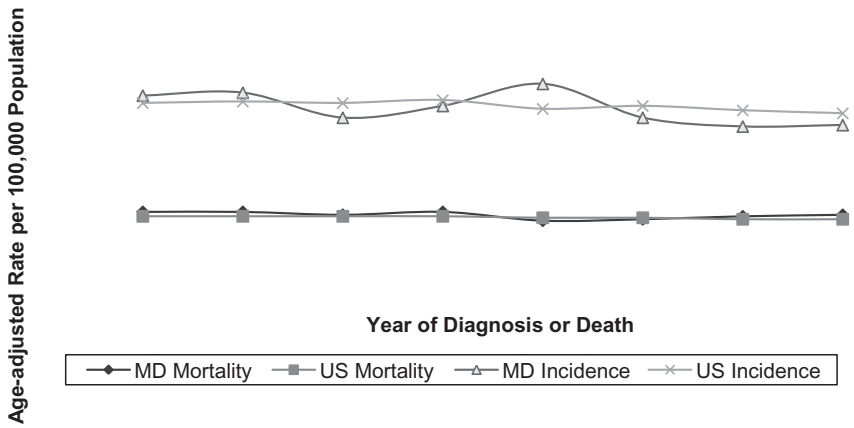

Figure 1 Oral cancer incidence and mortality rates by year of diagnosis or death, Maryland and US (SEER), 1999-2006. Source: Altema-Johnson D. The Burden of Oral Diseases in Maryland.

Care Organizations provide limited adult coverage (11). Also, oral health access for low-income new mothers suffered a setback recently. Medicaid coverage for oral health care for pregnant women was reduced from 6 weeks postpartum to the day of the birth (12).

Moreover, there are socially disadvantaged groups who endure serious difficulties with accessing needed dental care. Maryland, like most other states, has very few oral health care programs for the elderly. Some local health departments provide dental care to this population, and dental hygienists can work in long-term care facilities under certain terms. Unfortunately, Medicare does not include provisions to cover dental care except in limited cases when needed for certain medical procedures; therefore, dental coverage under Medicare is largely excluded (3). There is also limited dental care coverage for low-income, uninsured children who are either undocumented or born in the United States but have undocumented parents who fear that obtaining Medicaid coverage for their children places their permanency in the country in jeopardy.

Between 2001 and 2009, there was an increase in the number of Medicaid eligible children in both the United States and Maryland (Table 2). This increase means that the states have a larger population needing oral health services. There are several possible explanations for this increase in Medicaid eligible children. There was an increase in births through 2007 resulting in larger raw numbers (13). The downturn of the economy has led to more job losses resulting in an unemployment rate of 9.6 percent in 2010 compared with 4.0 percent in 2000 (14). Consequently, the percentage of children living in poverty was recorded as 20 percent in 2009, which represents the 14,657,000 children living in poverty in the United States (15). In addition, enrollment in the Children's Health Insurance Program (CHIP) program has been steadily increasing since its creation in 1997. With Children's Health Insurance Program Reauthorization Act's (CHIPRA) approval in 2009, enrollment will most likely increase rapidly because states have increased their income eligibility levels, with 17 states now accepting those at or below 300 percent of the federal poverty line (16).

Discussion

The oral health status of children in Maryland has improved considerably in the last 10 years (Tables 1 and 2); it is expected that new policies implemented since the death of Deamonte Driver will continue to support this progress. For adults, on the other hand, the limited data on oral health status indicate that they are not sharing the same level of improvement in oral health seen in children. A major issue that affects the oral health of residents in Maryland, as well as many other states, is the lack of available, affordable oral health care for new mothers, adults, elderly persons, and low-income children born outside the United States.

To have a clear understanding of the oral health needs of our populations, there has to be a stronger surveillance system with uniform methods of data collection. A major difficulty in establishing oral health trends in Maryland is related to the characteristics of the available data. Available data for Marylanders come from many different sources, are collected using different methodologies, and are collected for different purposes. Even when different agencies collect data on the same population, they usually use different subgroups within that population. Also, in most cases the state data would not be comparable to the national data. Ideally, regular survey and examination of Maryland's population would be required to obtain state data comparable over time and comparable with other states. In order to strengthen its surveillance system, Maryland's OOH, enabled by a 5-year Centers for Disease Control and Prevention Cooperative Agreement,

has recruited an oral health epidemiologist who has the role of augmenting and standardizing Maryland's oral health surveillance system.

Conclusion

Maryland has made considerable progress in improving the oral health care for children. The lack of availability of affordable oral health care for new mothers, adults, elderly persons, and low-income children born outside the United States remains a problem for Maryland and also for these populations beyond the Maryland boundaries. Building the state's surveillance system will allow better monitoring of the oral health status of Marylanders.

Conflict of interest

The authors declare no conflict of interest.

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