



Indiana State Department of Health

The Use of Oral Health Metrics in Promoting Oral Health

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INTRODUCTION

Background

The 2000 report *Oral Health in America: A Report of the Surgeon General* states that oral health is more than healthy teeth [DHHS]. That means being free of periodontal disease, oral-facial pain, oral and pharyngeal cancers, oral soft tissue lesions, cleft lip or other birth defects, oral injuries, and scores of other diseases and disorders that affect the oral, dental, and oral-facial tissues. The report notes that oral health is integral to general health and stresses the importance of good oral health at both the individual and population levels.

In the U.S., the two most common oral diseases are dental caries and periodontal disease. Although less common, malocclusions, temporomandibular disorders, cancers of the oral cavity and pharynx, orofacial clefts (cleft lip and cleft palate), and other oral health problems can severely affect general health and quality of life.

For example, poor oral health impacts the ability to eat, communicate, and learn and affects how we look and interact with others, sometimes creating low self-esteem or making it difficult to find jobs where public interaction is important.

The occurrence of each oral disease or condition is influenced by a variety of factors including individual risk factors, environmental risk factors, access to dental care, and public health infrastructure and public policies.

Dental Caries

Dental caries has been described as the single most common chronic childhood disease [DHHS]. In 2011-2012, approximately 37% of U.S. children aged 2-8 years experienced dental caries in *primary teeth*. In addition, 21% of children aged 6-11 and 58% of adolescents aged 12-19 experienced dental caries in *permanent teeth* [Dye, NCHS brief 191]. The impact of dental caries accumulates over time; of those 20-64 years of age, 91% had caries experience [Dye, NCHS brief 197]. The prevalence of dental caries experience is generally higher in low-income and minority populations, representing a significant health disparity.

There are effective preventive interventions for dental caries. Caries prevalence and severity can be reduced by appropriate use of fluorides through community water fluoridation, personal or professional topical fluoride applications, and the use of toothpaste with fluoride. The Centers for Disease Control and Prevention (CDC) has recognized community water fluoridation as one of 10 great public health achievements of the twentieth century, yet not everyone has access to fluoridated water [CDC, 1999].

Dental sealants are another effective intervention, preventing caries development in the pits and fissures of molar teeth [Ahovuo-Saloranta]. Dental sealants can be applied in dental offices or community settings, yet far too few children are benefiting from this proven preventive service; in 2011-2012 in the U.S., only 31% of 6-8 year olds, 49% of 9-11 year olds, and 43% of 12-19 year olds had dental sealants on at least one permanent molar [Dye, NCHS brief 191].

Once dental decay is present, it needs to be treated early; otherwise, it can progress to more serious forms of decay, which may cause pain, infections, and extraction of teeth. All individuals, regardless of income or dental insurance coverage, need access to dental care to detect and treat dental decay early in its natural history.

Access to dental care is influenced by infrastructure, workforce, financing, and policy factors, including availability of low-cost clinics, dentist-to-population ratio, percent of dentists accepting government-funded dental insurance, reimbursement rates for government-funded programs, plus dental practice acts involving supervision, scope of practice, and reimbursement.

Periodontal Disease

Periodontal disease is another common public health problem in the U.S. Most forms of periodontal disease are preventable and, once present, can be treated to eliminate or control the disease and preserve the dentition.

More than 46% of adults 30 years and older have periodontal disease, with 9% having severe periodontal disease characterized by loss of the bony structure supporting the teeth. This can result in partial or total tooth loss [Eke]. Among adults aged 65 years and older, nearly two-thirds (68%) have periodontal disease, with 11% classified as severe [Eke].

The prevalence of periodontal disease is higher in men, Hispanics, adults with less than a high school education, adults below 100% of the Federal Poverty Level, and current smokers [Eke]. A common risk factor for periodontal disease is smoking. Thus, programs to prevent and stop the use of tobacco products can reduce this risk of periodontal disease. There is also evidence that uncontrolled diabetes can exacerbate periodontal disease, and programs to treat and control diabetes can reduce this risk for periodontal disease.

Cancers of the Oral Cavity and Pharynx

Although substantially less common than dental caries and periodontal disease, cancers of the oral cavity and pharynx are associated with significant morbidity and mortality and have a significant impact on the health care system. The National Cancer Institute estimates that currently in the U.S. approximately 50,000 new cases of cancer of the oral cavity and pharynx occur each year and that approximately 10,000 people die each year from these types of cancer [SEER].

Cancers of the oral cavity and pharynx are more common in men, those with a history of tobacco or heavy alcohol use, and individuals infected with human papillomavirus (HPV).

Currently, common public health strategies to reduce the occurrence of and deaths from these forms of cancer is to encourage the cessation of the use of tobacco and alcohol.

Orofacial Clefts

Orofacial clefts are generally classified and reported as either (1) cleft palate without cleft lip or (2) cleft lip with or without cleft palate. Based on 2004-2006 data from 14 state birth defects tracking programs, the estimated incidence of cleft palate without cleft lip is one in 1,574 live U.S. births (2,651 cases annually), and the incidence of cleft lip with or without cleft palate is one in 940 live births (4,437 cases annually) [Parker]. Orofacial clefts in the U.S. are most common among American Indian and Asian

children. Risk factors include maternal use of tobacco, alcohol, and illicit drugs during pregnancy. Prevention strategies include folic acid supplementation, as well as the cessation of the use of tobacco, alcohol, and illicit drugs during the prenatal period.

Disparities and Socioeconomic Factors

Significant oral health disparities exist in the U.S., and socioeconomic factors contribute to this disparity. Children in lower-income families have higher rates of dental caries than non-poor children, minority populations have worse oral health than the population in general, and rural residents have worse oral health than urban residents [DHHS]. These disparities start in childhood and persist throughout the lifecycle.

Limited or infrequent access to dental care contributes to poor oral health. Unfortunately, in the U.S. about 46% of children aged 2-17 years did not visit a dentist in 2013, with black (53%) and Hispanic children (51%) more likely to have not visited a dentist compared with white children (41%) [AHRQ]. For adults 18 years and older, 35% report having no dental visit within the past year, with substantial disparities by education, income, and race/ethnicity. For those with an annual income less than \$15,000, 57% had no dental visit compared with 20% of those with an income of \$50,000 or more [CDC, 2012 BRFSS].

Cost of Oral Disease

The cost of treating oral diseases is significant. According to the Centers for Medicare and Medicaid Services, spending for oral health services in 2014 was \$113.5 billion, with out-of-pocket personal spending accounting for approximately 40% of all dental spending [CMS].

Oral Health and Systemic Health

The relationship of oral health to systemic health is complicated. Some of these relationships have already been mentioned. There is little doubt that poor nutrition and systemic health can impact an individual's oral health. Strong evidence exists that a high carbohydrate diet, alcohol consumption, smoking, diabetes, hypertension, and various other systemic conditions can impact oral health.

There is also mounting evidence that poor oral health may impact the systemic health of individuals. Of particular interest lately is the possibility that chronic infection and inflammation associated with untreated and uncontrolled periodontal disease may impact the systemic health of an individual.

Community Oral Health Data

The Institute of Medicine recommends that public health agencies regularly assemble, analyze, and disseminate information on community health [Teutsch] [IOM].

Health data also is essential for planning, implementing, and evaluating public health activities. These data can be helpful to stakeholders and government officials when considering which policies and programs to support [Hall].

The overarching purpose of obtaining oral health data is to provide actionable health information to guide public health policy and programs [Smith].

The CDC recommends public health agencies assemble and distribute metrics on access to care and oral diseases that affect many people, require large expenditures of resources, are largely preventable, and are of public health importance [German].

After these metrics are available, it is important to 1) communicate findings to those responsible for policy and programmatic decisions and to the public, and 2) ensure data are used to inform and evaluate public health measures to prevent and control oral diseases and conditions [Phipps].

PURPOSE

Population-based oral health metrics that are of high quality and are periodically available can be helpful when trying to evaluate the current oral health status of a population and how this status changes over time.

Oral health policies and programs that are implemented to improve the oral health status of a population can benefit from having appropriate measurements to evaluate the effectiveness of these policies and programs at improving the oral health status of those individuals that the policies and programs impact.

Developing valid metrics and using these metrics to measure the oral health status of a population over time can be technically difficult, time-consuming, and costly. Fortunately, **state and federal agencies have developed oral health metrics and measure and report these data periodically.** The investment in these measurements has already been made, and these data are readily available.

Whenever possible, using established metrics to evaluate a policy or program over time would be a cost-effective strategy to help improve the oral health of a population.

The purpose of this document is to introduce existing oral health metrics that are of high quality and reported periodically. These oral health metrics may prove valuable as a basis for developing, implementing, and evaluating policies and programs to improve the oral health of the residents of Indiana.

INDICATORS

1. Percent of children aged 1-17 years who had a dental visit during the year
2. Percent of children enrolled in Medicaid/CHIP who had any dental service during the year
3. Percent of children enrolled in Medicaid/CHIP who received a dental sealant on a permanent molar during the year
4. Percent of adults who had a dental visit during the year
5. Percent of adults who have had any teeth extracted
6. Percent of adults, aged 65 years or older, who have had all their teeth extracted
7. Among people on community water systems (CWS), percent who are receiving optimal levels of fluoride in their CWS drinking water
8. Incidence of cancers of the oral cavity and pharynx
9. Deaths from cancers of the oral cavity and pharynx
10. Number of dentists with an active Indiana dental license
11. Number of dental hygienists with an active Indiana dental hygiene license

DATA SOURCES

Data on these oral health metrics are collected and made available from various state and federal agencies.

Children

- National Survey of Children’s Health (NSCH)—Prevalence of dental visits among children
 - Slightly different questions in 2012 and 2016, but appear to be approximately equivalent
- CMS-416: Annual Early Periodic Screening, Diagnosis, and Treatment (EPSDT) Program Participation Report—Among children eligible for Medicaid/CHIP, prevalence of any dental services and prevalence of a dental sealant on a permanent molar

Adults

- Behavioral Risk Factor Surveillance System (BRFSS) —Prevalence of dental visits among adults and prevalence of partial or complete tooth loss among adults of various ages

All

- Indiana State Department of Health—Among people on community water systems (CWS), prevalence of those who are receiving optimal levels of fluoride in their CWS drinking water (only reporting data for even years)
- Indiana State Cancer Registry—Incidence of oral and pharyngeal cancers and deaths from oral and pharyngeal cancers among all residents in Indiana

Workforce

- Indiana Professional Licensing Agency (IPLA)—Number of dentists and hygienists with active licenses in Indiana (only reporting data for even years)
 - Numbers include residents and non-residents of Indiana with an active license
 - Numbers vary depending on when IPLA website is accessed during a year

RECENT DATA

Recent data on these oral health metrics are available in **Appendix A**.

PRIVACY

The data presented in Appendix A are aggregated data.

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ORAL HEALTH METRIC - INDIANA	Age Group	Source	Freq.	2012	2013	2014	2015	2016	2017	2018
Preschool and School										
DENTAL VISIT DURING YEAR	1 thru 17	NSCH	4 yrs	78.3%				81.4%		
ANY DENTAL SERVICE DURING YEAR (Medicaid/CHIP)	0 thru 20	CMS	1 yr	29.6%	41.2%	48.4%	48.3%	46.1%		
DENTAL SEALANT ON PERMANENT MOLAR DURING YEAR (Medicaid/CHIP)	6 thru 9	CMS	1 yr	9.3%	20.3%	19.0%	19.4%	18.7%		
Adults and Older Adults										
DENTAL VISIT DURING YEAR	18+	BRFSS	2 yrs	62.5%		61.2%		61.8%		
ANY TEETH EXTRACTED	18+	BRFSS	2 yrs	46.8%		45.8%		45.0%		
ALL TEETH EXTRACTED	65+	BRFSS	2 yrs	19.9%		18.4%		19.1%		
Optimal Fluoride Level in Drinking Water										
AMONG THOSE ON CWS PERCENT RECEIVING OPTIMUM FLUORIDE LEVEL	All ages	ISDH	2 yrs	94.8%		94.7%		94.3%		
Cancer										
INCIDENCE OF ORAL AND PHARYNGEAL CANCER (per 100,000)	All ages	ISCR	1 yr	11.9	11.3	12.1	11.4	n/a		
DEATHS FROM ORAL AND PHARYNGEAL CANCER (per 100,000)	All ages	ISCR	1 yr	2.4	2.3	2.3	2.3	n/a		
Workforce and Infrastructure										
DENTISTS WITH ACTIVE INDIANA LICENSE	All ages	IPLA	2 yrs	4019		4095		4232		
HYGIENISTS WITH ACTIVE INDIANA LICENSE	All ages	IPLA	2 yrs	4839		5148		5325		

BRFSS - Behavioral Risk Factor Surveillance Survey

CMS - Center for Medicare and Medicaid Services

IPLA - Indiana Professional Licensing Agency

ISCR - Indiana State Cancer Registry

ISDH - Indiana State Department of Health (in collaboration with CDC)

NSCH - National Survey of Children's Health

n/a - not available at time of publication