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The Oral Health of East-Central IA



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Oral Health in East-Central Iowa

Oral health is an important component of obtaining good overall health; this implies that an individual is free from chronic mouth and facial pain and that the teeth, gums, and mucosa are intact and free from disease (World Health Organization [WHO], 2015a). To maintain good oral health it is recommended that an individual regularly engages in positive oral hygiene habits such as brushing at least twice a day, using fluoride toothpaste, cleaning between teeth daily, and attending regular dental visits (American Dental Association [ADA], 2014b). Engaging in these simple habits reduces the likelihood that an individual will experience dental issues, such as dental cavities, periodontal (gum) disease, gingivitis, and bad breath. Unfortunately, some 100 million Americans still fail to see a dentist annually; the most common reason for which is financial barriers (ADA, 2014b; Bloom, Simile, Adams, and Cohen, 2012). According to Bloom et al. (2012), the greatest financial disparity in accessing dental care exists among low-income, non-elderly adults.

Poor Oral Health

Despite improvements in oral health at the population-level, disparities still exist for many living in Iowa. In 2012, only 71.1% of adults in Iowa and 72.4% of adults residing in Linn, Benton, and Jones counties reported having visited a dentist or dental clinic within the last year (Centers for Disease Control and Prevention [CDC], 2015d). Of the adults in Iowa who received dental services between 2006 and 2010, 14.8% were classified as experiencing poor oral health, as defined as having six or more permanent teeth extracted within the designated time period due to tooth decay, gum disease, or infection (Community Commons, n.d.). Over the same time period, the percentage of adults with poor oral health in the East-Central Iowa service area (Linn, Benton, Iowa, Johnson, and Jones counties) differed slightly compared to Iowa as a whole (See Figure 1). The percentage of adults with poor oral health in Iowa County slightly exceeded that of Iowa, with 16.5%; while the percentage of adults with

poor oral health in Johnson County was drastically less than that of Iowa with 7.5% (Community Commons, n.d.).

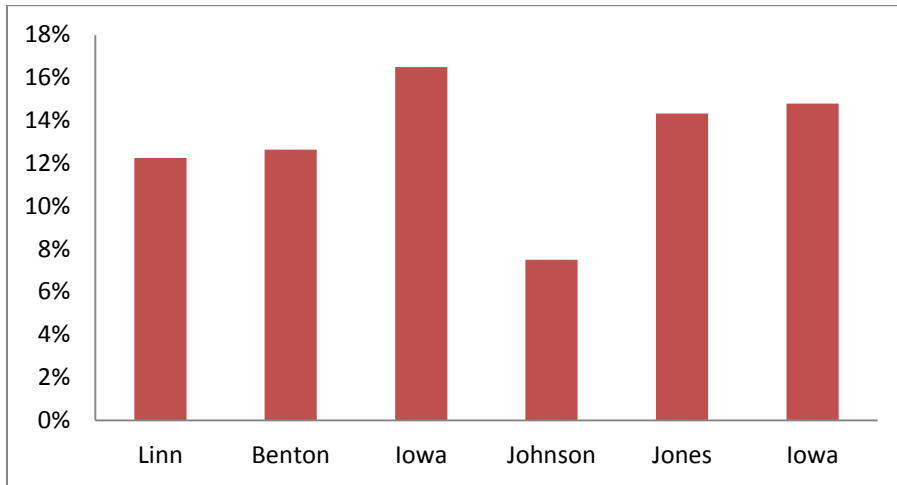


Figure 1. Percent of Poor Oral Health in East-Central, IA (Community Commons, n.d.)

Oral Disease. Between 2009 and 2013, the rate of hospitalizations due to oral disease in the state of Iowa was 10.8 per 100,000; which differs significantly when compared at the local level. With the exception of Benton County, the rate of oral disease hospitalizations in the East-Central Iowa Service Area during the same period was significantly higher than that of the state, ranging from 12.05 per 100,000 in Iowa County to 21.49 per 100,000 in Jones County (See Figure 2, IDPH, 2015b). Oral disease may be mitigated at an early stage through basic oral care; however, if left untreated the oral disease becomes permanent and increases in severity creating systemic issues that affect a person’s overall health.

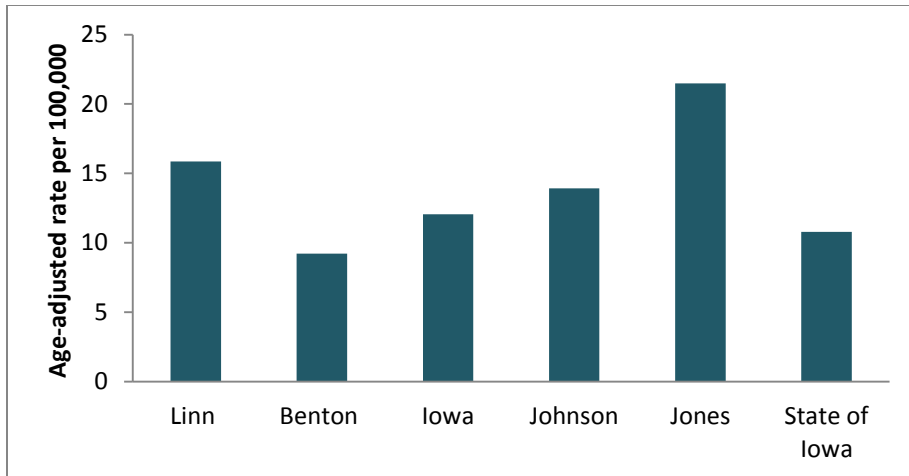


Figure 2. Oral Disease Hospitalization Rates – 2009-2013 (IDPH, 2015f)

Racial disparity. In both the United States and Iowa, Non-Hispanic Black adults account for the largest percentage (21.6% and 17.4%, respectively) of poor oral health compared to adults of other racial and ethnic groups (See Figure 3). According the results of the 2012 Iowa Behavioral Risk Factor Surveillance Survey [BRFSS] (Iowa Department of Public Health [IDPH], 2013), just over half of Black, Hispanic, and Multi-racial respondents compared to 73% of White respondents reported having visited a dentist or dental clinic within the last year (See Table 1). In addition to differences between racial and ethnic groups, differences were also noted between levels of education and income; with individuals of lower-income and lower levels of education being less likely to have received dental services within the year prior to survey compared to their higher income and higher educated counterparts.

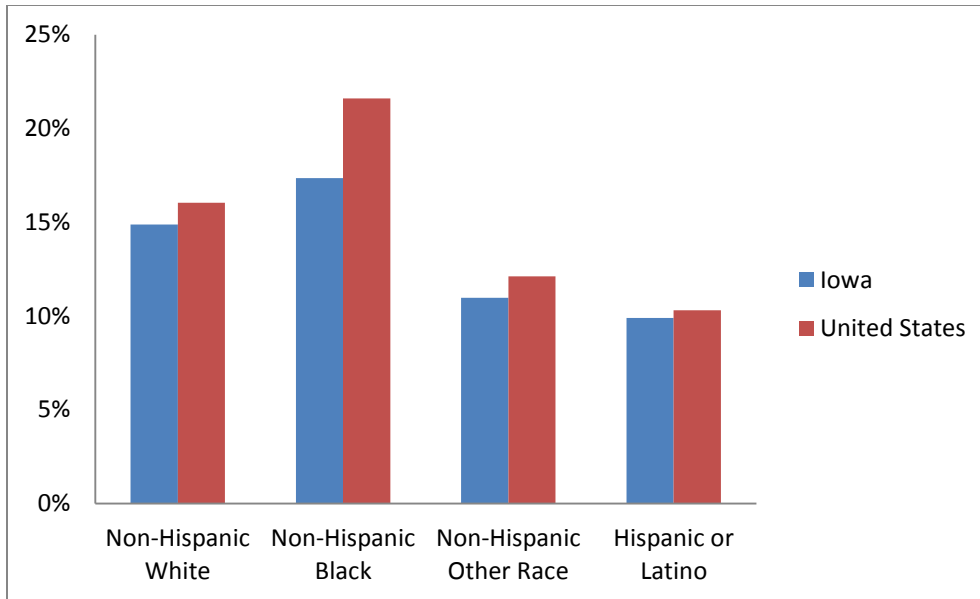


Figure 3. Percentage of Adults with Poor Oral Health by Race and Ethnicity (Community Commons, n.d.)

Table 1: Percentage of Iowans with Dental Visits within the Past 12 Months, 2012

Demographic Groups	Dental Visit Within 12 Months	
	%	CI (95%)
Total	71.1	(69.7-72.5)
Sex		
Male	66.9	(64.7-69.1)
Female	75.2	(73.4-77.0)
Race/Ethnicity		
White/Non-Hispanic	72.5	(71.1-73.9)
Non-White or Hispanic	58.8	(53.0-64.7)
Age		
18-24	69.2	(63.9-74.5)
25-34	68.0	(64.1-71.9)
35-44	72.4	(68.9-75.9)
45-54	74.2	(71.3-77.1)
55-64	74.3	(71.8-76.8)
65-74	68.8	(66.9-72.6)
75+	67.4	(64.3-70.4)
Education		
Less than High School	49.4	(43.3-55.5)
High School or GED	65.1	(62.7-67.5)
Some College	74.0	(71.6-76.4)
College Graduate	84.9	(83.1-86.7)
Household Income		
Less than \$15,000	49.1	(43.8-54.4)
\$15,000-24,999	52.5	(48.6-56.4)
\$25,000-34,999	64.4	(60.1-68.7)
\$35,000-49,999	70.8	(67.3-74.3)
\$50,000-74,999	78.3	(75.2-81.4)
\$75,000+	87.1	(84.9-89.3)

(IDPH, 2013)

Risk Factors related to Oral Health

Poor oral health can significantly impact the quality of life one experiences and reduces the individual's ability to eat, sleep, and function without pain. Among children, poor oral health also leads to problems associated with speaking, playing, and learning (Centers for Disease Control and Prevention [CDC], 2014). Negative side effects related to oral health are typically associated with the presence of untreated tooth decay or cavities. Within the United States, one in five children aged 5 to 11 years, one in seven adolescents 12 to 19 years, and one in three adults live with at least one untreated decayed tooth (CDC, 2013a & 2014). Tooth decay and poor oral health may be caused by multiple risk factors including an unhealthy diet, tobacco use, excessive alcohol consumption, and poor oral hygiene (WHO, 2015a). The level of oral health an individual may experience is influenced by access to community water fluoridation, income, level of education, nutrition, engaging in proper brushing and flossing techniques, and access to regular dental services.

Water Fluoridation

Though, all water sources contain some level of fluoride, the levels naturally available are not sufficient to prevent tooth decay (CDC, 2015a). To reach an optimal level of fluoride for public health benefit, fluoride is added to the community water supply, also known as the process of water fluoridation (CDC, 2015a). Water fluoridation poses significant benefit to adults and children throughout their life including, fewer and less severe cavities, reduced tooth decay and development and maintenance of stronger adult teeth (CDC, 2015a). Fluoridation of the community water supply is the single most cost effective method of delivering fluoride to all regardless of age, educational attainment, or socioeconomic standing (CDC, 2015a).

As of 2008, 72.4% of people in the U.S. were served by community water systems with optimally fluoridated water (U.S. Department of Health and Human Services [DHHS], 2015). Within Iowa, 92.7% of the population is served by fluoridated water; however, in some counties the rate of

individuals with access to a fluoridated water supply is much lower (CDC, 2015c). In East-Central Iowa, the rate of individuals served by a fluoridated water supply ranges from 46.9% in Iowa County to 95% in Linn County (See Figure 4).

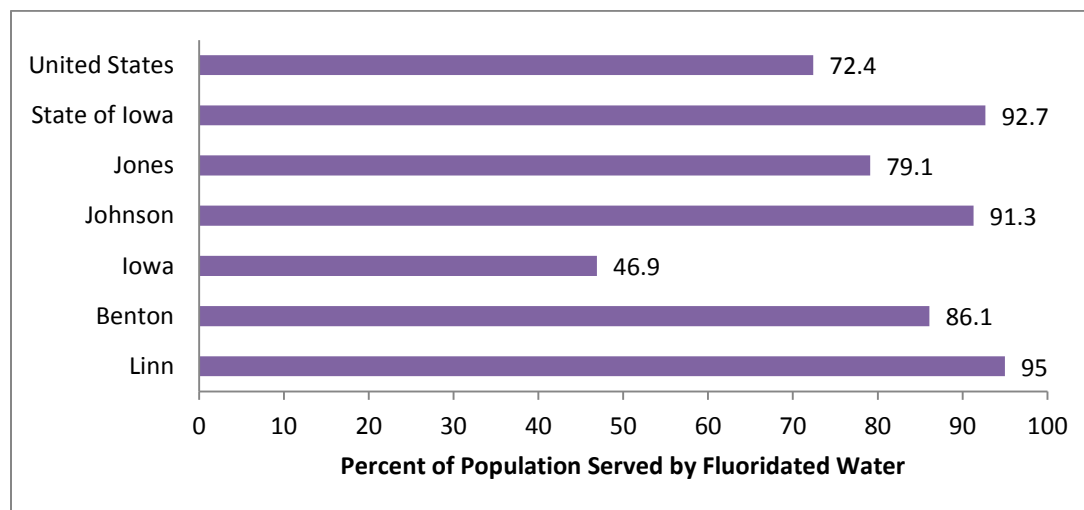


Figure 4. Percent Population Served by Fluoridated Water (CDC, 2015c; DHHS, 2015).

Social Determinants of Health

The conditions and social context in which an individual lives, significantly impacts their quality of life as well as overall health. Individuals who live and work in low socioeconomic conditions are at an increased risk for mortality, morbidity, engaging in unhealthy behaviors, and receipt of inadequate health services (CDC, 2011). Socioeconomic status is most commonly defined by level of income and educational attainment. Both low income and low educational attainment have been associated with a decreased access to dental services and an increase in poor oral health (Bloom et al., 2012; CDC, 2011). Examination of differences in the percent of adults in Iowa who report having visited a dentist within the year prior to survey demonstrates a direct relationship between report of dental visit and income level, with increased income relating to an increased likelihood of having visited a dentist in the prior year (IDPH, 2013). The same relationship was noted between report of dental visit and level of educational attainment.

Income. As is the case with many other health conditions, the most significant disparity in attaining oral health and access to oral health services is noted among low income populations. In the state of Iowa, there are approximately 367,414 (12.4%) individuals who are estimated to be at or below the poverty level; approximately 48,010 of whom reside in one of the five counties within the East-Central Iowa service area (U.S. Census Bureau, 2015c; See Table 2). The largest percentage of those at or below poverty level in both Iowa and East-Central Iowa are among single family homes with children under the age of 18 where the female is the head of the household.

In 2010, just over half of people in Iowa making less than \$15,000 attended a dental visit, and less than half of this population had a dental cleaning (CDC, 2015d; See Figures 5 & 6). Individuals making over \$50,000 a year were over 30% more likely to attend a dental visit or have a dental cleaning compared to those making less than \$15,000 (CDC, 2015d). The difference in receipt of dental services by income has stayed consistent over the last decade, with low-income individuals continuing to be much less likely to receive basic dental services annually compared to their higher income counterparts. The percentage of individuals who reported having received dental cleanings within the last year demonstrated a significant decline among adults making less than \$15,000 a year from 63.1% in 1999 to just 49.3% in 2010 (See Figure 6).

Table 2: Socioeconomic Measures in Iowa and East-Central Iowa

Socioeconomic Measure	East-Central Iowa Service Area by County						State
	Benton	Iowa	Johnson	Jones	Linn	Total	Iowa
Core Indicators							
Employment							
Percent unemployed (16 years and older)	5.2	4.1	4.3	5.8	5.5	5.0	5.8
Percent Below Poverty Level							
<i>Families</i>	6.3	7.2	6.7	5.0	5.8	6.1	8.1
With children under 18 years	11.2	14.0	10.9	8.5	9.3	10.1	13.9
<i>Families with female householder, no husband</i>	25.2	26.1	25.4	21.8	23.3	24.1	30.3
With children under 18 years	35.4	29.6	32.4	21.0	30.4	30.5	30.8
<i>Individuals</i>	8.4	10.9	17.7	8.3	9.7	13.6	12.4
Under 18 years	12.6	17.7	14.0	10.9	10.8	13.2	16.1
<i>Related children under 18 years</i>	12.3	17.7	13.9	9.8	10.2	11.7	15.7
18 to 64 years	7.4	9.0	20.5	7.7	10.1	13.1	12.2
65 years and over	5.2	7.8	4.3	6.7	6.1	5.7	7.4
Percentage of the Population Below Poverty by Sex							
Male	9.0	10.5	17.5	7.8	8.8	11.6	11.2
Female	7.8	11.2	17.9	8.7	10.6	12.7	13.5
Percentage of the Population Below Poverty by Level of Educational Attainment							
<i>Educational Attainment (25 years and older)</i>	6.8	7.6	8.0	6.8	7.1	8.3	8.8
Less than high school graduate	23.0	22.0	20.1	17.2	17.9	21.3	22.1
High school graduate/ GED	7.4	7.7	8.8	8.1	9.5	8.8	10.1
Some college, Associate's degree	5.7	8.0	10.4	5.1	7.3	8.5	8.5
Bachelor's degree or higher	0.7	2.5	5.2	2.5	2.6	7.0	3.3

(U.S. Census Bureau, 2015b, c, d)

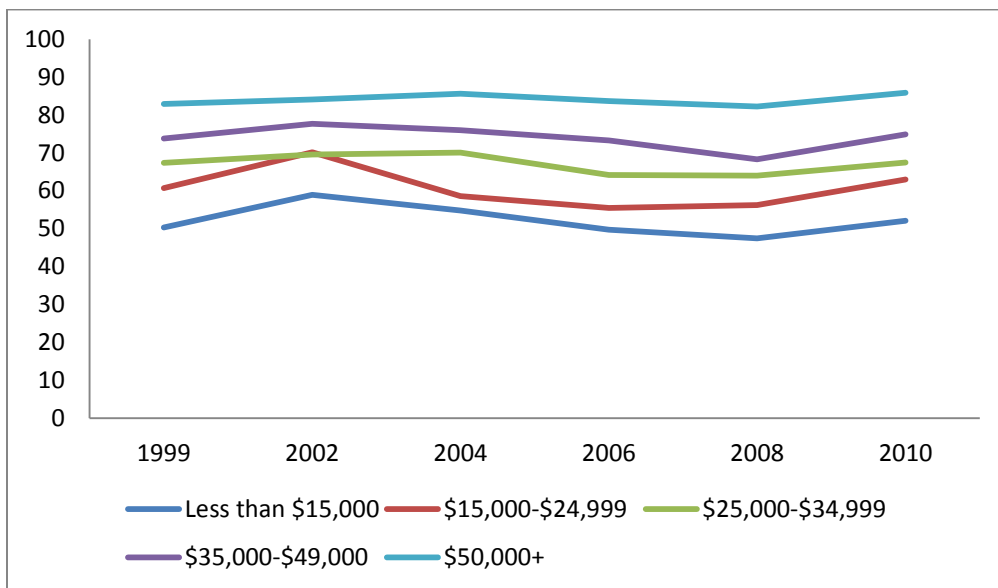


Figure 5. Trend in Adult Dental Visits by Income – Iowa (CDC, 2015d)

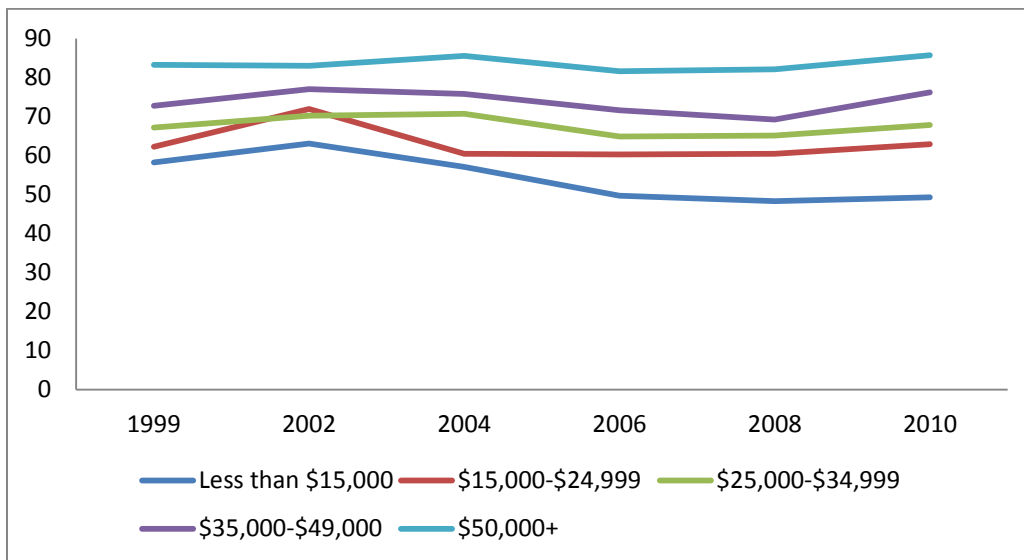


Figure 6. Trend in Adult Dental Cleanings by level of Income - Iowa (CDC, 2015d)

Education. Similar to that of level of income, the highest level of education one achieves is significantly associated with health and an individual’s ability to obtain health services. Approximately 9% of adults 25 years of age and older in Iowa have less than a high school education (U.S. Census Bureau, 2015a; See Table 3), 22.1% of these individuals are at or below poverty level (U.S. Census Bureau, 2015b, c, d; See Table 2). Alternately, 58% of Iowans have attended some college, achieved an Associate’s degree, or completed a Bachelor’s Degree or Higher. The rate of educational achievement in the counties that comprise the East-Central Iowa Service Area differs slightly from that of Iowa as a whole.

In Johnson and Linn Counties, the rate of individuals who have obtained a Bachelor’s degree or higher exceeded the state of Iowa with 60.1% and 43.1% of the county population having achieved a degree in higher education, respectively (U.S. Census Bureau, 2015a). On the other hand compared to the State of Iowa, Benton, Iowa, and Jones counties demonstrated a higher rate of High School graduates, similar level of “Some college, Associates degree”, and a reduced rate of college graduates. Similar to the state of Iowa, the percentage of individuals with a less than high school education who

have been identified as living at or below the poverty level ranges from 17.2% in Jones County to 23% in Benton (See Table 2).

Table 3: Level of Educational Attainment by County and State

Level of Educational Attainment	East-Central IA Service Area by County					State
	Benton	Iowa	Johnson	Jones	Linn	Iowa
(25 years and older)	%	%	%	%	%	%
Less than high school graduate	8.1	6.8	5.2	8.6	6.2	9.1
High school graduate/ GED	38	37.8	17	41	27	32.9
Some college, Associate's degree	22.6	22.7	17.7	21.4	23.8	21.7
Bachelor's degree or higher	31.4	32.6	60.1	28.9	43.1	36.3

(U.S. Census Bureau, 2015a)

Level of education has similar effects on oral health as was noted in level of income. Just over half of Iowans with less than a high school education had a dental visit or a dental cleaning in 2010 (CDC, 2015d; See Figures 7 & 8). Iowans who were college graduates were more than 30% more likely to attend a dental visit or dental cleaning during this time (CDC, 2015d). As was the case with level of income, the trend in percentage of adults who had a dental visit within the year prior to survey by education level was primarily consistent overtime, with the exception of the rate across individuals with less than a high school education. The rate of dental visits among individuals with less than a high school education was significantly lower than the other three levels of educational attainment. Between 1999 and 2010, the percentage of individuals who visited a dentist increased from 45.6% in 1999 to 52.2% in 2010; a fluctuation was noted in 2002 of 55.5%, followed by a steady decline between 2002 and 2008. A similar trend was noted in the percentage of adults who received dental cleanings by level of educational attainment. However, between 1999 and 2010 the percentage of adults with less than a high school education who received dental cleanings demonstrated a decline from 55.2% to 50.9% respectively. The disparities noted in educational attainment as well as level of income, may be attributed to an increased earning potential of college graduates as well as the increased awareness of one's health associated with the increase in level of education.

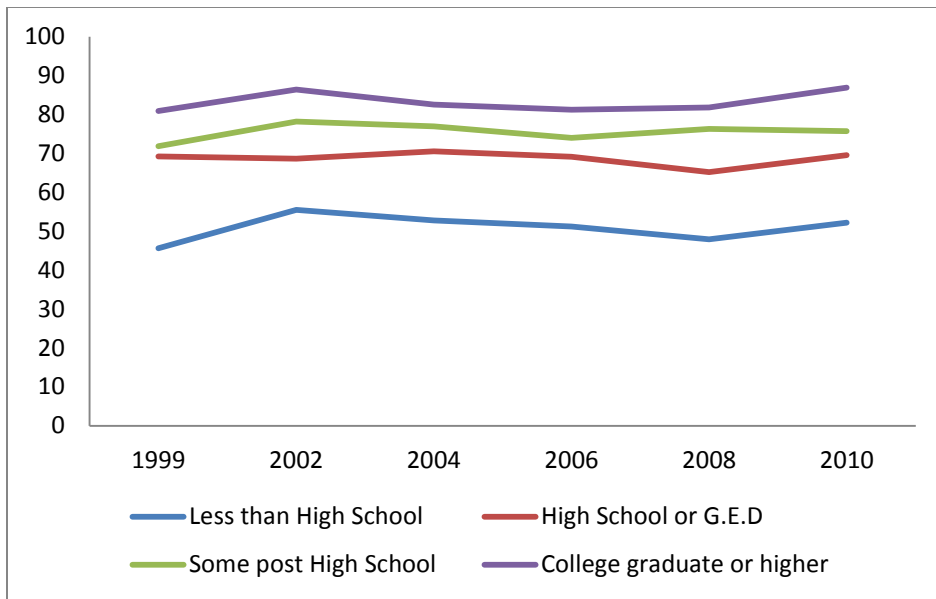


Figure 7. Trend in Percent of Dental Visits by Level of Education – Iowa, 1999-2010 (CDC, 2015d)

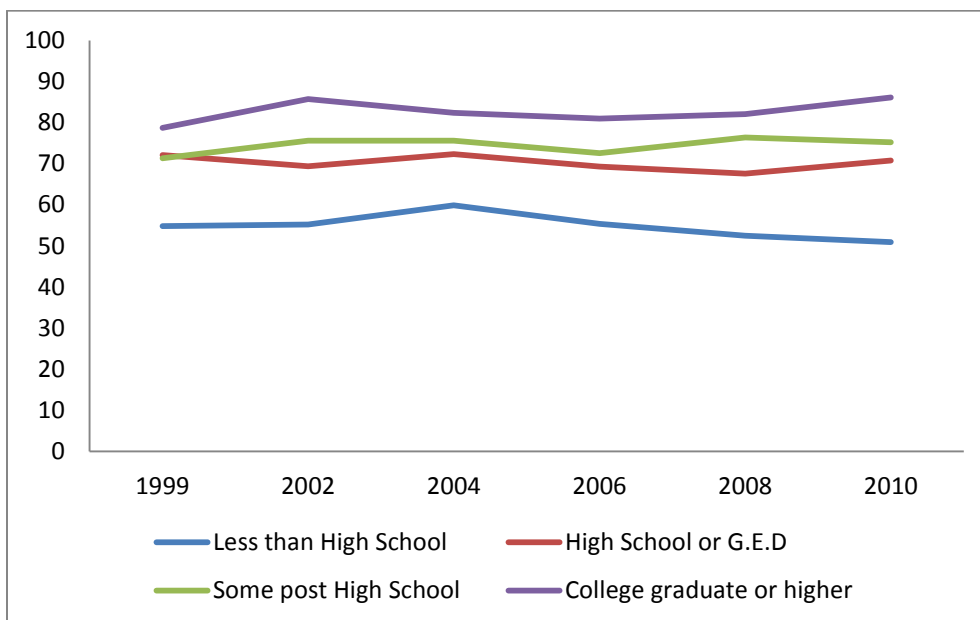


Figure 8. Trend in Adult Dental Cleanings by Level of Education – Iowa, 1999-2010 (CDC, 2015d)

Nutrition

In order to support optimal oral and physical health a person must engage in a balanced, nutritious diet. Proper diet and nutrition includes eating a diet high in fruits and vegetables, which can lower risk of chronic disease and aid in weight management. Conversely, poor dietary habits pose significant repercussions for oral health including an increased risk of dental caries, developmental defects of the enamel, dental erosion, and periodontal disease (WHO, 2015b). Some foods contribute to poor oral health more than others, the most significant of which are foods and beverages containing added sugars and those higher in acidity (ADA, 2014a). The bacteria within the mouth thrive on the presence of carbohydrates to multiply and infect the gums, mouth, and teeth through a release in acid, thus resulting in an increased incidence of cavities and tooth decay.

Consumption of fruits and vegetables is important to help promote a healthy mouth. The natural composition of these items helps stimulate the production of saliva, which washes away harmful acids and food particles from the teeth and neutralizes acid leading to added protection from tooth decay (ADA, 2014a). Unfortunately, a majority of individuals within Iowa fail to eat the recommend five or more fruit and vegetables per day. In 2013, 39% of adults in Iowa reported having consumed less than one serving of fruit a day (IDPH, 2013). Likewise, 26.8% of adults reported having consumed vegetables less than one time per day. Similar to that of adults, in 2011 36.1% and 35.1% of adolescents reported having consumed less than one fruit or vegetable a day, respectively (CDC, 2015b). Both adult and adolescent respondents were more likely to have reported consuming one or more vegetables per day as compared to fruits. A similar pattern was noted in the distribution of fruit and vegetable consumption by sex, race/ethnicity, age, education, and household income, with an increased likelihood of inadequate fruit and vegetable consumption noted among males and individuals of low income and low educational attainment (See Table 4).

Table 4: Adults consuming less than 1 Fruit or Vegetable per day

Demographic	<1 per day Fruit		<1 per day Vegetable	
	%	C.I. (95%)	%	C.I. (95%)
Total	39.3	(37.6-40.8)	26.8	(25.4-28.2)
Sex				
Male	46.5	(44.4-48.9)	31.5	(29.2-33.7)
Female	32.4	(30.4-34.4)	22.4	(20.6-24.2)
Race/Ethnicity				
White/Non-Hispanic	39.3	(37.7-40.9)	26.8	(25.4-28.2)
Non-White or Hispanic	39.1	(32.5-45.7)	27.3	(21.3-33.4)
Age				
18-24	46.7	(40.8-52.6)	37.2	(31.5-42.9)
25-34	39.9	(35.4-44.4)	27.1	(23.0-31.2)
35-44	42.0	(37.9-46.1)	27.5	(23.8-31.2)
45-54	44.8	(41.5-48.1)	26.1	(23.0-29.2)
55-64	39.8	(37.1-42.5)	22.4	(20.0-24.8)
65-74	32.4	(29.3-35.4)	24.6	(21.8-27.5)
75+	20.2	(17.6-22.8)	21.2	(18.4-24.0)
Education				
Less than High School	46.0	(39.5-52.5)	39.3	(32.8-45.8)
High School or G.E.D.	44.3	(41.8-46.8)	31.1	(28.7-33.5)
Some Post High School	39.5	(36.8-42.2)	26.4	(23.9-28.9)
College Graduate	29.3	(26.9-31.7)	17.0	(15.0-19.0)
Household Income				
Less than \$15,000	49.0	(43.3-54.7)	39.3	(33.63-45.0)
\$15,000-24,999	43.4	(39.3-47.5)	31.5	(27.6-35.4)
\$25,000-34,999	42.4	(37.9-46.9)	26.3	(22.0-30.6)
\$35,000-49,999	36.9	(33.0-40.8)	24.9	(21.4-28.4)
\$50,000-74,999	39.4	(35.9-42.9)	22.5	(19.4-25.6)
\$75,000+	34.9	(32.0-37.8)	22.0	(19.3-24.7)

(IDPH, 2013)

Service Utilization

Within the United States, 42.1% of the population used oral health care in 2012 (U.S. Department of Health and Human Services [DHHS], 2012). Across the United States, utilization of oral healthcare differs significantly by poverty level as well as insurance status. As may be ascertained, the lower the poverty level, the less likely an individual is to utilize oral healthcare. Individuals at 199% or below the poverty level were significantly less likely to utilize oral health services as opposed to their

higher income counterparts (See Figure 9). Likewise, those who are uninsured or had public insurance were less likely to utilize the oral healthcare system than individuals with private insurance (See Figure 10), likely due to the inability to afford services. The differences in oral healthcare utilization between levels of poverty as well as insurance status have remained consistent overtime; however, some minor fluctuations can be noted within the categories.

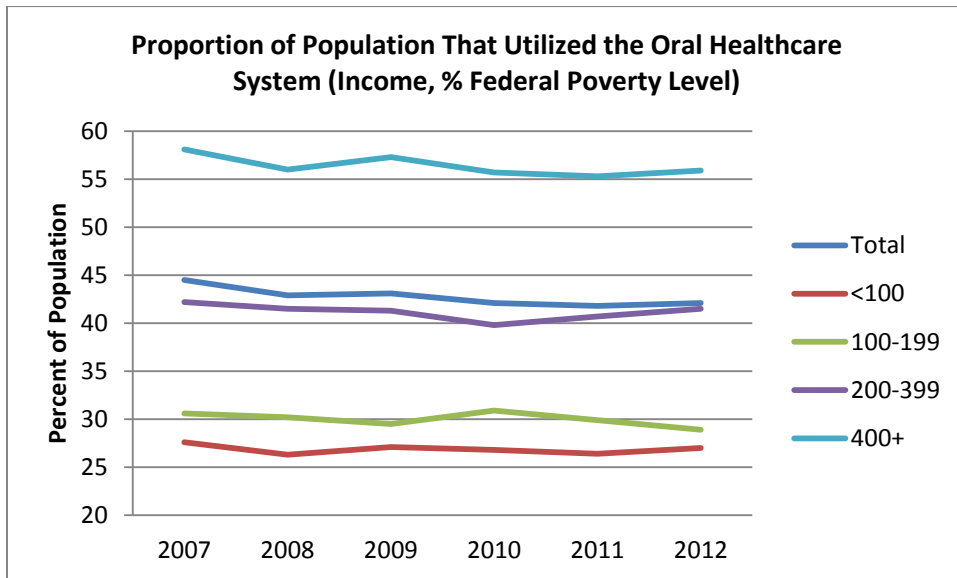


Figure 9. Proportion of population that utilized oral health care by income (DHHS, 2012)

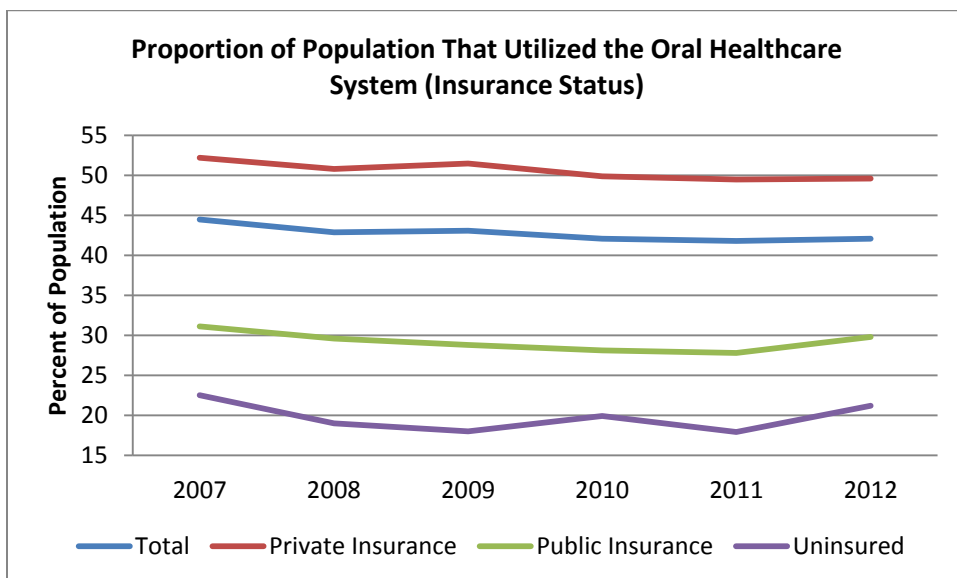


Figure 10. Oral Healthcare Utilization by Insurance Status (DHHS, 2012)

Iowa. As of 2009, there were 515,487 school-aged children in Iowa; of this population 251,283 were enrolled in Medicaid for at least one month, 29% were at or below 200% of the federal poverty line, and 38% were on the free/reduced lunch program (CDC, 2015e). In 2014, less than half of individuals aged 1-20 years who were enrolled in Medicaid received preventative services from dentists statewide (IDPH, 2014b, See Figure 11). During the same time period, only 51% of Iowans aged 0-20 years enrolled in Medicaid received any dental or oral health services from a dental office/clinic, federally qualified health center, screening center, or physician’s office (IDPH, 2014a; See Figure 12). The utilization rates for preventive and overall dental services varied within the counties composing East-Central Iowa as well as compared to the State of Iowa as a whole. Linn and Jones counties demonstrated the highest utilization rates among this population for both preventive and overall dental services still with only 54 and 57% in Jones County and 53 and 57% in Linn County, respectively.

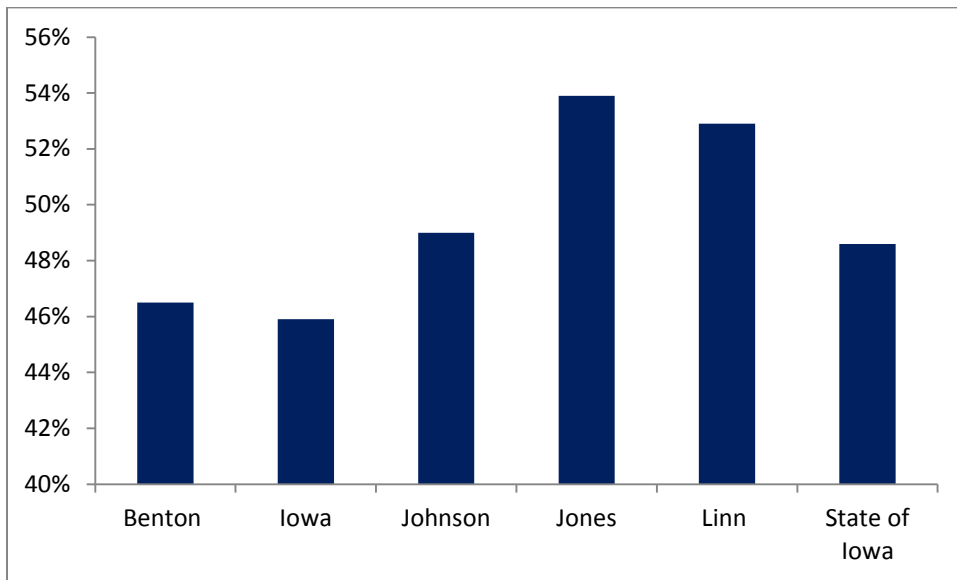


Figure 11. Percentage of Medicaid Enrolled Children (1-20 yrs) Receiving Preventive Services from a Dentist - 2012 (IDPH, 2014b)

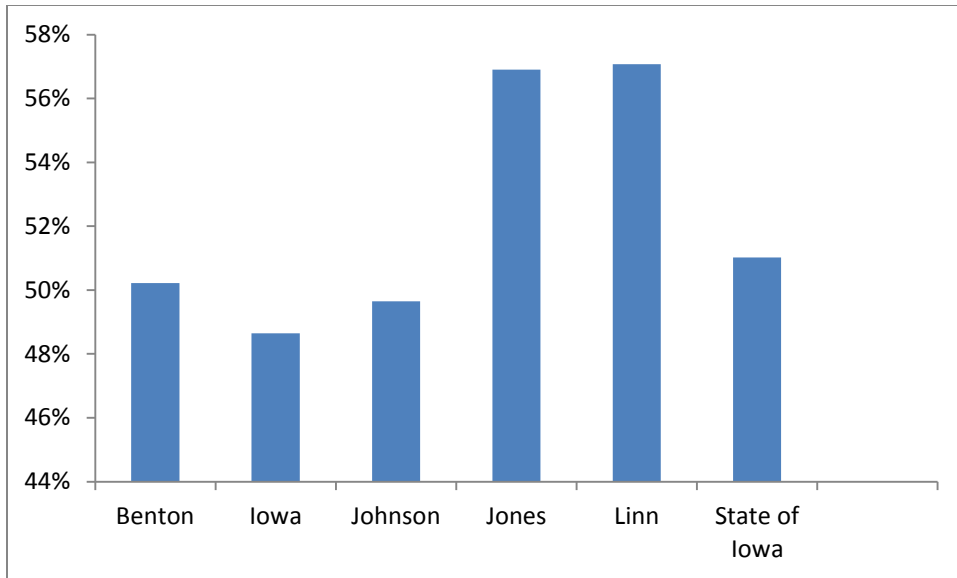


Figure 12. Percent of Medicaid Enrolled Children (0-20) Receiving Any Dental or Oral Health Services – 2014 (IDPH, 2014a).

Factors Related to Utilization. Poor utilization of dental services has been associated with multiple factors, the most common of which is associated with financial restriction. Among low-income families, poor understanding of the benefits associated with good oral health as well as the presence of competing financial obligations have been implicated as significant factors contributing to poor utilization of preventive oral health services among low-income children (Vargas & Ronzio, 2006). According to Vargas and Ronzio, parents with less educational attainment were more likely to postpone dental care for their children compared to their higher educated counterparts. In addition to poor understanding of the benefits of care, anticipation of painful dental treatment, high dental charges, excessive wait times to see a provider, shortage of dental providers, and lack of time are the most commonly cited reasons why individuals fail to access dental care services (Bamise, Bada, Bamise, & Ogunbodede, 2008; Bouchery, 2012; Kaiser Commission on Medicaid and the Uninsured, 2012).

Provider Barriers. Additional barriers associated with dental care utilization among low-income populations are associated with the dental Medicaid program itself (Beazoglou, Bailit, & Maule, 2010). Oral health services provided to Medicaid recipients are administered by a network of publically

supported (Federally Qualified Health Centers [FQHC]) and a voluntary sector of private dental clinics referred to as the oral health safety net. In the state of Iowa, there are only 12 FQHCs and two “look-a-like” (do not receive funding under the Health Center Program) clinics; as such, participation by private dental practitioners within the oral health safety net is essential to assure patients have access to needed dental services.

Despite the availability of dental insurance through Medicaid, many private providers are reluctant to provide services to Medicaid recipients due to reimbursement rates far below the actual cost to the provider, administrative burden of processing Medicaid claims, and the high occurrence of broken appointments among recipients (Mckernan et al., 2013; Synder, 2009). According to McKernan et al. (2013), only 16% of private practice dentist in Iowa accept all new Medicaid patients and 42% report accepting some new Medicaid patients. Among the dentist who reported accepting Medicaid patients, the majority (31%) of providers indicated that they only accept current patients who are newly covered by Medicaid (See Table 5). Among the additional 42% of dentist who do not accept any new Medicaid patients, 80% reported having done so previously, but will no longer provide services to Medicaid patients.

Table 5. Participation in Medicaid by Private Dental Practitioners in Iowa

	Criteria for Accepting New Medicaid Patients	
	n	%
A set number of new Medicaid patients	36	11
Current patients newly enrolled in Medicaid	101	31
Referrals from other dentists/physicians	39	12
Referrals from I-Smile Coordinator	36	11
Child patients	52	16
Adult patients	13	4
Only patients from our county	20	6
Other	42	13

(McKernan et al., 2013)

Community Oral Health Programs

Within the State of Iowa there are various programs that are in place to address the gaps in oral health care particularly among low-income populations. These programs are primarily targeted at addressing oral health among children, pregnant women, and youth specifically with the goal of reducing the burden of oral disease and promoting oral health (IDPH, 2015a). Programs include the school screening, school-based dental sealants, I-Smile, and Maternal and Child Health Dental Programs.

School Screening Program

As a requirement of elementary and high-school entry in the state of Iowa, all students newly enrolled in kindergarten and 9th grades are required to obtain a dental screening (IDPH, 2015e). The intent of the school screening program is to improve the oral health of children in Iowa and promote the importance of oral health as a component of cognitive success and well-being. Dental screenings are captured by the elementary and high schools using a dental certificate. Screenings are provided by an integrated network of health care professionals. At the kindergarten level, providers may include licensed dentists, dental hygienists, nurse, advanced registered nurse practitioners, or by a physician's assistant. However, at the 9th grade level services may only be provided by a licensed dentist or dental hygienist. Schools in need of assistance ensuring all students receive a dental screening or follow-up care rely on a regional I-Smile coordinator to coordinate care for these students.

Significant gaps in screening at the state and county levels were noted during the 2013-2014 school year. During this time there was a 73.7% compliance rate among incoming kindergarteners and 9th graders at the state level, which consisted of submission of a valid Iowa Dental Screening Certificate (IDPH, 2015e). Across the East-Central Iowa Service Area, overall compliance exceeded that of the state with four out the five counties achieving 81% compliance or better (See Appendix 1). However, Benton county fell far below the rate of the surrounding counties with only 69.2% overall compliance, which can be attributed to low compliance among 9th graders with only 46.6% having submitted a valid dental

certificate. Among the children who submitted a valid dental certificate in Iowa, 15.6% required additional treatment, 13.7% required dental care, and 1.9% required urgent dental care. Surprisingly, the highest percentage of children needing urgent dental care in the state of Iowa (2.3%) and Johnson (2.4%), Jones (4.4%), and Linn (3.2%) Counties were among kindergartners, suggesting that earlier intervention is needed.

School-based Sealant Program

In addition to the dental screening program, a school-based sealant program is also in place in Iowa. Dental sealants are thin plastic coatings that are applied to the grooves on the chewing surface of a child's tooth, most commonly the permanent molar teeth (CDC, 2013b). Sealants are an excellent preventive measure that functions to protect against tooth decay. The dental sealant program provides funds for six school-based sealant programs that help improve communication between parents and oral health professionals, and provide access to preventive services for families who lack insurance, transportation, or the funds necessary to receive care (IDPH, 2015d). East-Central Iowa is served by two school-based sealant programs, the Hawkeye Area Community Action Program, Inc. and Johnson County Public Health. These programs are targeted in schools where participation in the free and reduced lunch program is at a minimum of 40 percent. The data from these programs help to further exemplify the need for proper oral health and the impact that income can have on oral hygiene. On average, children on Medicaid have a higher incidence of untreated tooth decay as well as are more likely to have a history of tooth decay as compared to children with insurance or self-pay (Appendix 2 & 3). As children on free and reduced lunches are the target population, children enrolled in Medicaid make up a large proportion of the participants in these programs.

I-Smile Dental Initiative

The I-Smile Dental Initiative was developed through partnerships between the Iowa Department of Public Health, Iowa Department of Human Services, University of Iowa College of Dentistry, and the

Iowa Dental Association to support the school-based dental programs and connect Iowa's children with dental services through a dental home team approach (IDPH, 2015f). Members of the dental team include dentists who provide treatment and evaluation, dental hygienists, physicians, nurse practitioners, registered nurses, physician's assistants, and dietitians, who comprise a larger network of practitioners who are in the position to provide oral screenings, education, and preventive services. Connections between the dental team and recipients are made via I-Smile Coordinators who are licensed dental hygienists. There are currently 24 regional I-Smile coordinators in the state of Iowa.

Maternal and Child Health Dental Program

Finally, in an effort to support the oral health care needs of pregnant moms and families, the Iowa Department of Public Health provides funding to 28 Title V maternal and child health (MCH) agencies across the state of Iowa (IDPH, 2015c). As a component of the comprehensive prenatal visits, the funded Title V maternal health agencies provide women with oral assessments, education, counseling, and dental referrals. Conversely, funds provided to Title V child health agencies may be allocated to strengthen the local oral health infrastructure or to provide basic dental services to uninsured and underinsured children. All child dental services are provided through referral to dentists willing to provide limited restorative and preventive care to child health clients. In addition to dental referrals, the child health agencies also help families break down the barriers they may have in obtaining dental services such as assisting with transportation needs, help schedule dental appointments, and provide oral health education.

Implications

As outlined in this report, there are some significant gaps in coverage for oral healthcare in Iowa. The disparities noted in level of access and utilization of dental services by the low income and undereducated populations in Iowa emphasizes the importance of increasing access to oral health services. The level of oral healthcare for children on Medicaid is truly surprising and further exemplifies

the disparities seen in the low income and undereducated populations of Iowa. Additionally, as highlighted in the school screening program data there is an increased need to establish good oral health practices and services as early as possible in a person's life to ensure present and future oral health, as well as to mitigate the consequences associated with untreated dental caries. Overall, an increase in access to low cost oral healthcare and education can only benefit the population of Iowa particularly among those served in East-Central Iowa.

Recommendations

There are multiple strategies that may be leveraged to address the significant disparities in utilization and access to oral health services noted among the low-income and undereducated populations within East-Central Iowa and the state as a whole. First and foremost, the healthcare and public health fields of Iowa should increase oral health education and expand community-based and outreach programs (CDC, 2003). Oral health education should target the general public, health providers, and public policymakers to help enhance understanding regarding the role oral health plays in overall health and assist community members in making informed health-related decisions. Likewise, the expansion of outreach and targeted community-based programming efforts would assist in both enhancing understanding regarding the importance of oral health as well as addressing the barriers in access to care caused by geographic isolation, poverty, insufficient education, and language barriers.

Finally, it is necessary to expand the existing oral health safety net system to adequately address the dental health needs and lack of access to care among the lower income populations in East-Central Iowa as well across the state. Due to the financial advantage FQHCs have in providing services to low-income populations as compared to non-FQHCs, they are the most important component of the oral health safety net system (Beazoglou et al., 2010). As such, it is of particular importance that investments be made to increase the number of FQHCs in Iowa that are positioned to provide oral health care to this vulnerable population (Synder, 2009).

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Appendix 1: Iowa School Dental Screenings, 2013 – 2014 School Year

State of Iowa

			Treatment Needs			Provider Types				
Grade	Enrollment	Valid Screening Certificates	No Obvious Problems	Requires Dental Care	Requires Urgent Care	DDS/DMD	RDH	MD/DO	PA	RN/ARNP
K	40996	33968 (82.9%)	28112 (82.8%)	5070 (14.9%)	782 (2.3%)	21958 (64.7%)	8332 (24.5%)	465 (1.4%)	107 (0.3%)	3102 (9.1%)
9	38241	24398 (63.8%)	21149 (86.7%)	2922 (12.0%)	317 (1.3%)	15102 (61.9%)	9286 (38.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	79237	58366 (73.7%)	49261 (84.4%)	7992 (13.7%)	1099 (1.9%)	37060 (63.5%)	17618 (30.2%)	465 (0.8%)	107 (0.2%)	3102 (5.3%)

Benton County

			Treatment Needs			Provider Types				
Grade	Enrollment	Valid Screening Certificates	No Obvious Problems	Requires Dental Care	Requires Urgent Care	DDS/DMD	RDH	MD/DO	PA	RN/ARNP
K	258	241 (93.4%)	201 (83.4%)	33 (13.7%)	7 (0.3%)	214 (88.8%)	22 (9.2%)	1 (0.4%)	3 (1.2%)	1 (0.4%)
9	277	129 (46.6%)	117 (90.7%)	11 (8.5%)	1 (0.8%)	120 (93.0%)	9 (7.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	535	370 (69.2%)	318 (85.9%)	44 (11.9%)	8 (2.2%)	334 (90.3%)	31 (8.3%)	1 (0.3%)	3 (0.8%)	1 (0.3%)

Iowa County

			Treatment Needs			Provider Types				
Grade	Enrollment	Valid Screening Certificates	No Obvious Problems	Requires Dental Care	Requires Urgent Care	DDS/DMD	RDH	MD/DO	PA	RN/ARNP
K	297	283 (95.3%)	232 (82.0%)	48 (17.0%)	3 (1.0%)	190 (67.1%)	90 (31.8%)	2 (0.7%)	1 (0.4%)	0 (0.0%)
9	92	75 (81.5%)	58 (77.3%)	14 (18.7%)	3 (4.0%)	36 (48.0%)	39 (52.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	389	358 (92.0%)	290 (81.0%)	62 (17.3%)	6 (1.7%)	226 (63.1%)	129 (36.0%)	2 (0.6%)	1 (0.3%)	0 (0.0%)

Johnson County

			Treatment Needs			Provider Types				
Grade	Enrollment	Valid Screening Certificates	No Obvious Problems	Requires Dental Care	Requires Urgent Care	DDS/DMD	RDH	MD/DO	PA	RN/ARNP
K	1557	1401 (90.0%)	1203 (85.9%)	165 (11.7%)	33 (2.4%)	1173 (83.7%)	154 (11.0%)	61 (4.4%)	2 (0.1%)	11 (0.8%)
9	1280	906 (70.8%)	830 (91.6%)	73 (8.1%)	3 (0.3%)	821 (90.6%)	85 (9.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	2837	2307 (81.3%)	2033 (88.1%)	238 (10.3%)	36 (1.6%)	1994 (86.4%)	239 (10.4%)	61 (2.6%)	2 (0.1%)	11 (0.5%)

Jones County

			Treatment Needs			Provider Types				
Grade	Enrollment	Valid Screening Certificates	No Obvious Problems	Requires Dental Care	Requires Urgent Care	DDS/DMD	RDH	MD/DO	PA	RN/ARNP
K	227	226 (99.6%)	184 (81.4%)	32 (14.2%)	10 (4.4%)	139 (61.5%)	52 (23.0%)	0 (0.0%)	1 (0.4%)	34 (15.0%)
9	204	168 (82.4%)	135 (80.4%)	30 (17.9%)	3 (1.7%)	78 (46.4%)	90 (53.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	431	394 (91.4%)	319 (81.0%)	62 (15.7%)	13 (3.3%)	217 (55.1%)	142 (36.0%)	0 (0.0%)	1 (0.3%)	34 (8.6%)

Linn County

			Treatment Needs			Provider Types				
Grade	Enrollment	Valid Screening Certificates	No Obvious Problems	Requires Dental Care	Requires Urgent Care	DDS/DMD	RDH	MD/DO	PA	RN/ARNP
K	2932	2855 (97.4%)	2422 (84.8%)	342 (12.0%)	91 (3.2%)	1222 (42.8%)	1602 (56.1%)	18 (0.6%)	4 (0.1%)	9 (0.3%)
9	2997	2446 (81.6%)	2287 (93.5%)	131 (5.4%)	28 (1.1%)	183 (7.5%)	2263 (92.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	5929	5301 (89.4%)	4709 (88.8%)	473 (8.9%)	119 (2.2%)	1405 (26.5%)	3865 (72.9%)	18 (0.3%)	4 (0.1%)	9 (0.2%)

Appendix 2: School-Based Sealant Program Report - East-Central Iowa, School Year 2013-2014

Agency	Total # of children screened [1]	Total # of children who received sealants	Total sealants placed	Total sealants on Medicaid children	# of children with history of decay [2]	# of Medicaid children with history of decay	# of children with untreated decay	# of Medicaid children with untreated decay [3]	# of children with private insurance	# of children with no dental insurance	# of children with Medicaid	# of children with hawk-i
Hawkeye Area Community Action Program	647	293	1,313	705	318	153	65	38	231	99	284	28
Johnson County Health Department	193	131	495	117	87	25	24	10	83	36	49	11
State of Iowa	9,413	5,651	32,503	15,682	4,719	2,287	1,719	881	2,634	1,416	4,154	669

(IDPH, 2015)

[1] Children are screened/examined by dental hygienists or dentists

[2] History of decay includes filled teeth and untreated decay

[3] Untreated decay does not include questionable decay

Appendix 3: School-Based Sealant Program – Tooth Decay Status by Payment Source: School Year 2013-2014

Agency	# and % with a History of Decay* relative to Child's Payment Source				# and % with Untreated Decay** relative to Child's Payment Source			
	Insured	Self-Pay	Medicaid	Hawk-i	Insured	Self-Pay	Medicaid	Hawk-i
Hawkeye Area Community Action Program	99	47	153	15	12	13	38	2
	42.90%	47.50%	53.90%	53.60%	5.20%	13.10%	13.40%	7.10%
Johnson County Health Department	35	17	25	5	5	7	10	1
	42.20%	47.20%	51.00%	45.50%	6.00%	19.40%	20.40%	9.10%
State of Iowa	412	213	1,093	139	80	56	287	26
	15.60%	15.00%	26.30%	20.80%	3.00%	4.00%	6.90%	3.90%

(IDPH, 2015)

***Filled teeth and untreated decay**

****Does not include questionable decay**