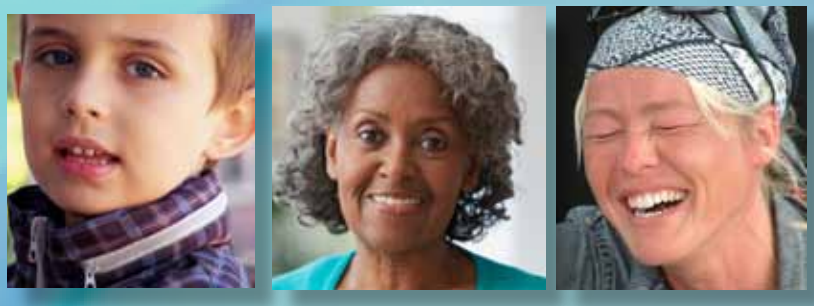
Ohio Department of Health

Oral Health Isn't Optional!

A Report on the Oral Health of Ohioans and Their Access to Dental Care, 2011



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Executive Summary

Executive Summary

Oral health isn't optional. It is critical to our general health and well-being. Oral health enables us to eat properly, work productively, go to school ready to focus on learning, feel good about our appearance and enjoy life. The mouth is the gateway to the rest of the body, providing clues about overall health. It is sometimes the first place where signs and symptoms of other serious diseases are noticed. Unfortunately, oral health care is too often viewed by some as an "extra", sought or provided only after other health care considered more important is secured.

Findings of recent surveys on the oral health of Ohio's children (under 18 years of age) and their access to dental care show:

- Dental disease remains a common problem among Ohio's children; 51 percent of children have experienced tooth decay by third grade.
- Dental care remains the single most common unmet health care need for nearly 157,400 children in Ohio, regardless of family income.
- Almost 486,000 (19 percent) of Ohio's children are without dental insurance; this is four times the number of children without medical insurance.
- Almost 340,000 children in Ohio have never been to the dentist.
- While the percentage of children with tooth decay has declined overall, it continues to vary by geography, family income and insurance coverage:
  - Children in Appalachian counties disproportionately suffer the consequences of untreated cavities and have a greater need for early or urgent dental care than children living in other counties in Ohio.
  - Children from low-income families have more cavities and toothaches and are less likely to have dental insurance than children from middle- or upper-income families.
  - Children covered by Medicaid or those without dental insurance are significantly less likely to have visited the dentist in the past year than children in families with private dental insurance. Black children are significantly less likely to have visited the dentist in the past year than White children.
- The overall percentage of children in Ohio with dental sealants has increased; however, children in rural/non-Appalachian counties are significantly less likely to have dental sealants.

In some ways, adults in Ohio fare worse than children. Recent surveys of Ohio adults show:

- About 45 percent of all Ohio adults have had one or more permanent teeth removed due to tooth decay or gum disease. Black and multi-racial adults and those living in Appalachia are more likely than white adults to have had one or more teeth removed. Nearly 37 percent of Ohio's poorest seniors (65 years of age and older with incomes less than $15,000 per year) have had all their teeth removed.

- Nearly 1.2 million working age adults (18–64 years of age) report that they have dental needs that have not been met.

- More than 3.9 million Ohio adults (45 percent) over 18 years of age have no dental insurance, almost three times more than the number of Ohio adults without medical insurance.

- More than 980,000 seniors (60 percent) have no dental insurance. Most Medicare does not cover routine dental care.

- On average, three Ohioans are diagnosed with oral and pharyngeal cancer and one person dies from the disease every day.

While prevention is the foundation of good oral health, even the best prevention efforts cannot eliminate all disease and the need for accessible dental care. For Ohioans with low incomes and no dental insurance, the current systems for getting dental care are woefully inadequate. For example:

- In 2009, 28 percent of Ohio dentists provided dental care to at least one Medicaid-eligible patient. However only 12 percent of dentists provided care to a significant number of Medicaid-eligible patients (250 or more patients). Some Ohio counties do not have any dentists who provide care to Medicaid-eligible patients. In 2009, only 29 percent of Medicaid-eligible adults (19-64 years of age) and 22 percent of seniors went to the dentist.

- There are currently 68 dental health professional shortage areas in Ohio, designated by the federal government because there are not enough dentists to serve the needs of the people living there.

- Ohio's network of approximately 100 safety net dental clinics in 47 counties is a life-line for people who can not afford to get dental care in private dental offices. However, these programs are stretched to capacity with waiting lists for appointments that can be weeks or months long.

- For many Ohioans, hospital emergency rooms are the only place that they can get relief from their dental pain, a costly and ineffective option.

Proven community-based measures to prevent tooth decay, such as community water fluoridation and school-based sealant programs, are vital to ensuring better oral health for Ohioans and are especially important for our most vulnerable residents. Other strategies, such as school-based/linked dental programs and donated or discounted dental services can help meet the needs of people who can not access regular dental care. However, these programs are currently only meeting a fraction of the unmet dental needs of our residents. The efforts of key stakeholders and oral health advocacy groups have the potential to improve the oral health of Ohioans through their shared vision and committed actions.

Section 1: Introduction

Oral health isn't optional.[1] Despite knowing how to prevent oral diseases, tooth decay and other dental problems remain a significant source of pain and suffering, affecting overall health and quality of life. Since the first oral health survey of Ohio schoolchildren conducted in 1988, the Ohio Department of Health (ODH) has been committed to collecting and analyzing data to measure the prevalence of oral diseases among Ohioans, to understand the barriers that keep Ohioans from getting regular dental care, and to evaluate its efforts to help Ohioans achieve better oral health.

This report summarizes the most recent data about oral diseases suffered by our residents and their access to dental care. Population-based efforts to prevent dental disease are discussed, as well as resources and programs aimed at improving access to dental care for vulnerable populations. Where possible, comparisons are made to data collected in previous surveys. County-level information on the prevalence of various oral health measures for Ohio's children are presented.

Section 2:
The Oral Health of Ohio's Children

Good oral health is crucial to a child's growth and development. Children need a healthy mouth to be able to eat healthy foods, learn to talk, do well in school and have a good self-image. Even though oral diseases can be prevented, many children in Ohio still get cavities, toothaches and other oral health problems. Research shows that children with poorer oral health are more likely to have dental pain and miss school because of it, leading to poor school performance.[2] The good news is that the oral health of Ohio's children appears to be improving; the bad news is that the improvements are not being seen for all children. Where children live, their family's income and whether they have dental insurance all affect the amount of dental disease they have and their ability to get dental care on a regular basis. The following data describe the oral health status of Ohio's children and their access to dental care.

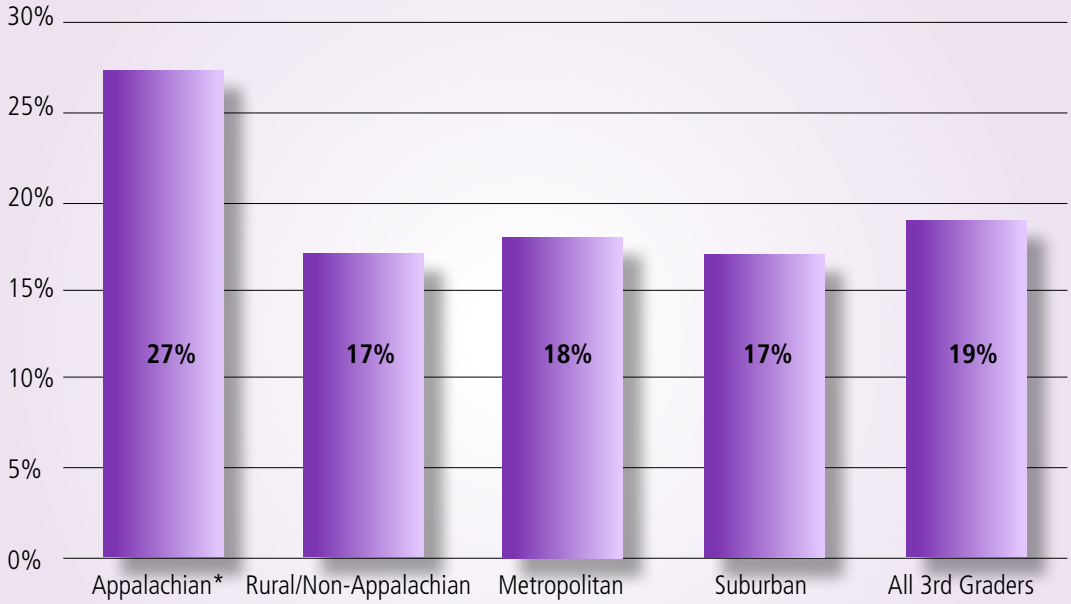
Do Ohio's children have good oral health?

The answer is, "It depends." Many children in Ohio are enjoying improved oral health. Results of the most recent oral health survey of schoolchildren[3] show that, overall, fewer children are experiencing cavities than in the past (referred to as having a "history of tooth decay"). Overall, 19 percent of Ohio's children were found to have untreated cavities, a decrease from 26 percent five years ago. The prevalence of dental sealants, the most effective means of preventing the type of tooth decay seen today among most children, has increased to 50 percent, up from 43 percent five years ago. Overall, about 80 percent of children reportedly had a dental visit during the past year.

However, disparities in the oral health of Ohio's children continue to exist depending on where they live, their families' income and whether they have dental insurance.

As seen in Table 1, children in Appalachian counties continue to suffer from tooth decay at a 50 percent higher rate than children in other areas of Ohio.[3] They have a significantly higher prevalence of untreated cavities (27 percent) than children in rural/non-Appalachian counties (17 percent); children in metropolitan counties (18 percent); and children in suburban counties (17 percent).[3]

Table 1: Percentage of Ohio Third Graders with Untreated Cavities, by County Type,** 2009-2010

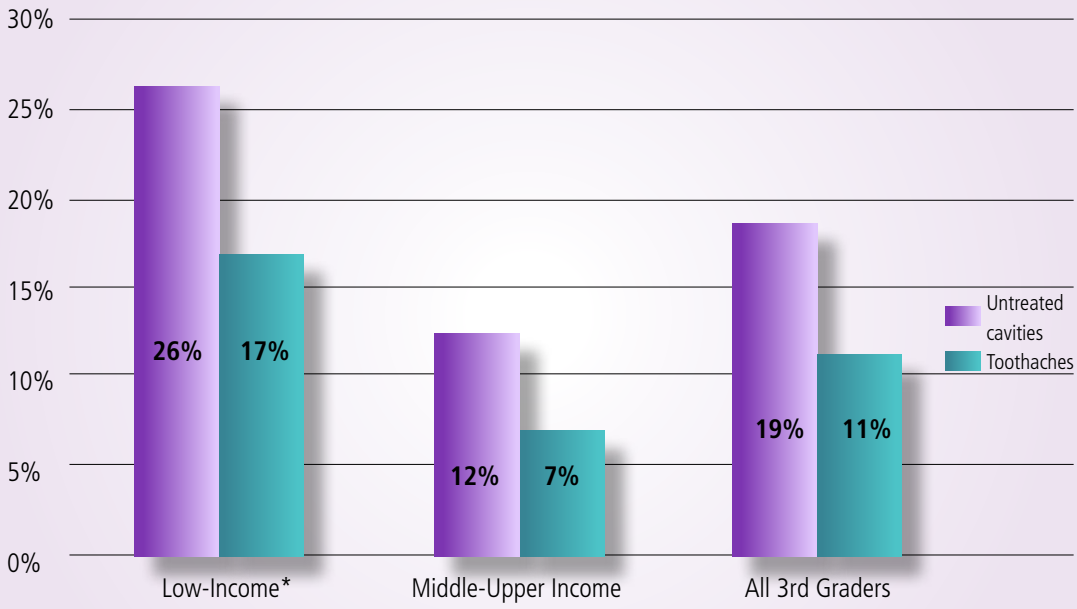


*Statistically significant at $p < .05$

** The list of counties according to county type can be found in Appendix 2.

As seen in Table 2, children from low-income families (family incomes <185 percent of poverty) were more than twice as likely to have untreated cavities as those from middle- or upper-income families (26 percent vs. 12 percent), and more than twice as likely to have toothaches (17 percent vs. 7 percent).[3] They were also less likely to have visited the dentist in the past year (73 percent vs. 89 percent).[3]

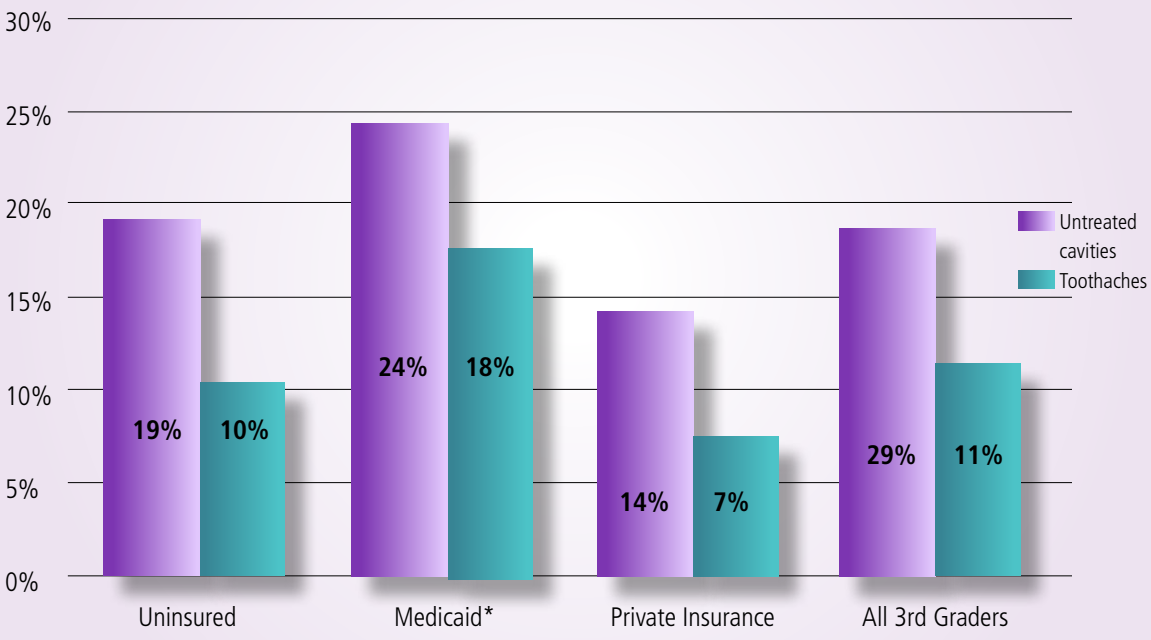
Table 2: Percentage of Ohio Third Graders with Untreated Cavities and Toothaches, by Family Income, 2009-2010



*Statistically significant at $p < .05$ for both untreated cavities and toothaches

While the overall prevalence of tooth decay and toothaches have declined for all Ohio children, children covered by Medicaid and Black children still have a disproportionate share of these problems; this situation has not changed since 2004-05.[3] As seen in Table 3, children covered by Medicaid were significantly more likely to have untreated cavities (24 percent) than children who were uninsured (19 percent) or had private dental insurance (14 percent).[3] Children covered by Medicaid were also significantly more likely to report toothaches (18 percent) than children who were uninsured (10 percent) or those covered by private dental insurance (7 percent).[3] Black children were significantly more likely to report toothaches than White children (16 percent vs. 11 percent). [3]

Table 3: Percentage of Ohio Third Graders with Untreated Cavities and Toothaches, by Dental Insurance Coverage, 2009-2010

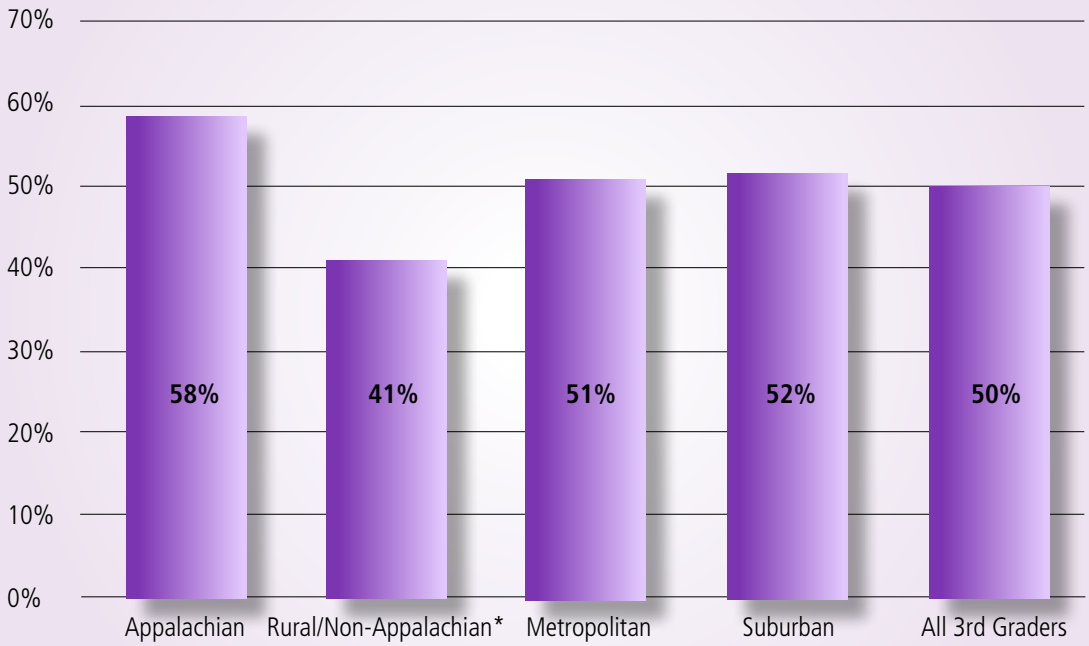


*Statistically significant at $p < .05$ for both untreated cavities and toothaches

Overall, 19 percent of all children in Ohio were found to need early or urgent dental care.[3] Similar to results from the 2004-05 survey, children in Appalachian counties continue to have significantly more dire dental needs than children in other regions of Ohio. Twenty-seven percent of children in Appalachian counties needed early or urgent dental care compared to 16-18 percent of children in other counties.[3]

Dental sealants are the most effective tool to prevent the most common type of tooth decay seen among school-age children today. Table 4 shows that the overall prevalence of dental sealants is 50 percent, an increase from 43 percent in 2004-05.[3] However, children in rural, non-Appalachian counties were significantly less likely to have dental sealants than children in other areas of Ohio (41 percent vs. 58 percent for children in Appalachian counties; 51 percent in metropolitan counties; and 52 percent for suburban counties).[3] Of note is that school-based sealant programs are now operating in 50 of Ohio's 88 counties, mostly in Appalachian counties and the major metropolitan areas.

Table 4: Percentage of Ohio Third Graders with One or More Dental Sealants, by County Type, 2009-2010

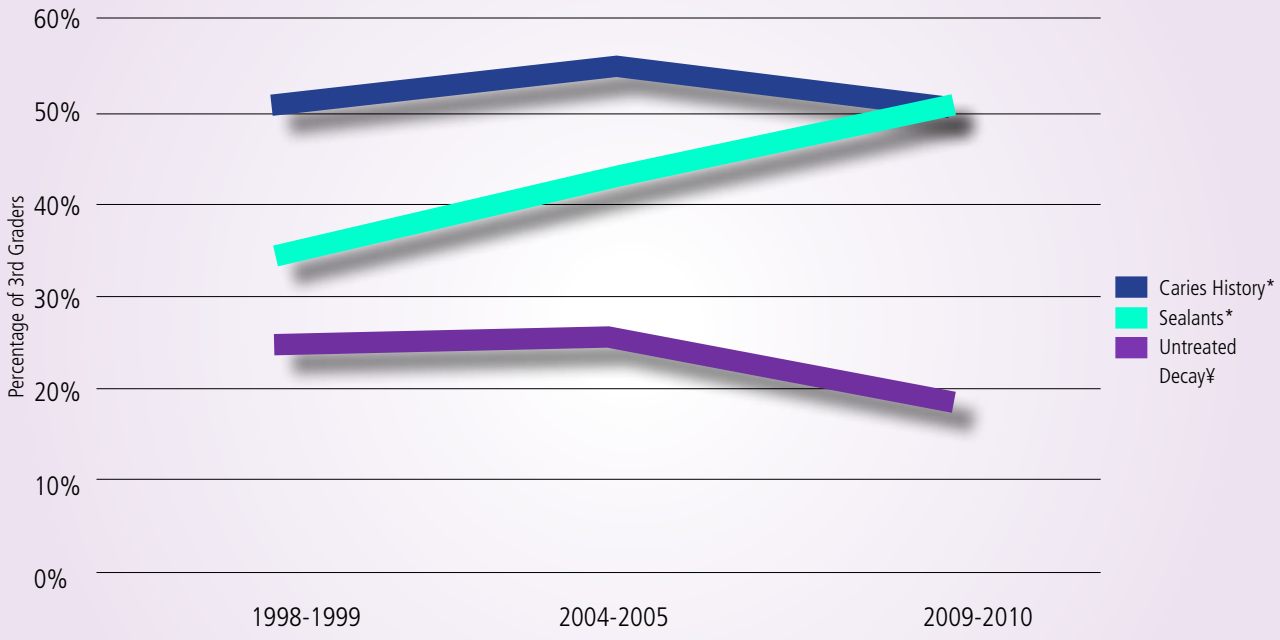


*Statistically significant at $p < .05$

How has the oral health of Ohio's children changed over time?

Findings from the most recent survey of schoolchildren indicate that, overall, the oral health of Ohio's children is improving. The percentage of children who have experienced tooth decay has returned to levels seen in 1998-99 (51 percent) after a small increase in 2004-05 (55 percent).[3] The percentage of children with dental sealants has shown a steady increase over the years to reach 50 percent in 2009-2010.[3] The percentage of children with untreated cavities has significantly declined since 2004-05 after remaining steady between 1998-99 and 2004-05.[3] However, as described earlier, these improvements are not seen across all demographic groups.

Table 5: Oral Health Indicators for Ohio Third Graders, Ohio Department of Health, 1998-2010



* Differences between years is statistically significant (p<.05)
¥ 2009-2010 is statistically significantly lower than 2004-05 and 1998-99 (p<.05)

How do the findings from the 2009-2010 survey of Ohio's schoolchildren compare to national objectives for oral health?

Overall, the findings from the 2009-2010 survey compare favorably to national benchmarks. The percentage of children with untreated cavities has surpassed the national objective, and Ohio has met the 2010 national objective for the percentage of children with dental sealants. Ohio still lags behind in meeting the national objective for the percentage of children with a history of tooth decay, but is improving.

Table 6: Comparison of Findings from Previous Oral Health Surveys of Ohio Third Graders to National Benchmarks

Measure	1998-99 Survey[4]	2004-05 Survey[5]	2009-2010 Survey[3]	National Targets for 2010*[6]
Percentage of children with untreated cavities	26%	26%	19%	21%
Percentage of children with one or more dental sealants	34%	43%	50%	50%
Percentage of children with a history of tooth decay	51%	55%	51%	42%
Percentage of children with an obvious need for dental care	25%	26%	19%	Not addressed

*Data from the 1998-99, 2004-05 and 2009-2010 surveys are based on oral health findings for permanent teeth among 3rd grade schoolchildren. The national Healthy People 2010 Objectives are expressed in terms of age, not grade. The comparable national objectives for children aged 6-9 years are: 1) Reduce the proportion of children with dental caries experience ("history of tooth decay") in their primary and permanent teeth; 2) Reduce the proportion of children with untreated dental decay in primary and permanent teeth; and 3) Increase the proportion of children who have received dental sealants on their molar teeth.

However, the oral health of certain groups of children in Ohio continues to fall short of national objectives. The percentage of children with untreated cavities is higher than the national objective (21 percent) for those residing in Appalachian counties (27 percent), from low-income families (26 percent) or covered by Medicaid (24 percent). Children residing in rural, non-Appalachian counties lag behind children in other areas of Ohio in meeting the national objective for dental sealants (41 percent vs. 50 percent).

Do Ohio's children have access to dental care?

In 2010, access to dental care was the single most common unmet health care need for nearly 157,400 children in Ohio, regardless of family income.[7] Other findings show that:

- Nearly 486,000 or 19 percent of Ohio's children are without dental insurance, up from 479,000 children just two years ago.[7,8] This is four times the number of children without medical insurance.[7]
- Almost 340,000 Ohio children have never been to the dentist, despite the importance of regular dental care in preventing and treating disease.[9] Figure 1 shows the percentage of children in each county who have never visited the dentist:[8]

Figure 1: Percentage of Ohio Children (under age 18) who have Never Visited a Dentist, Ohio Family Health Survey, 2008

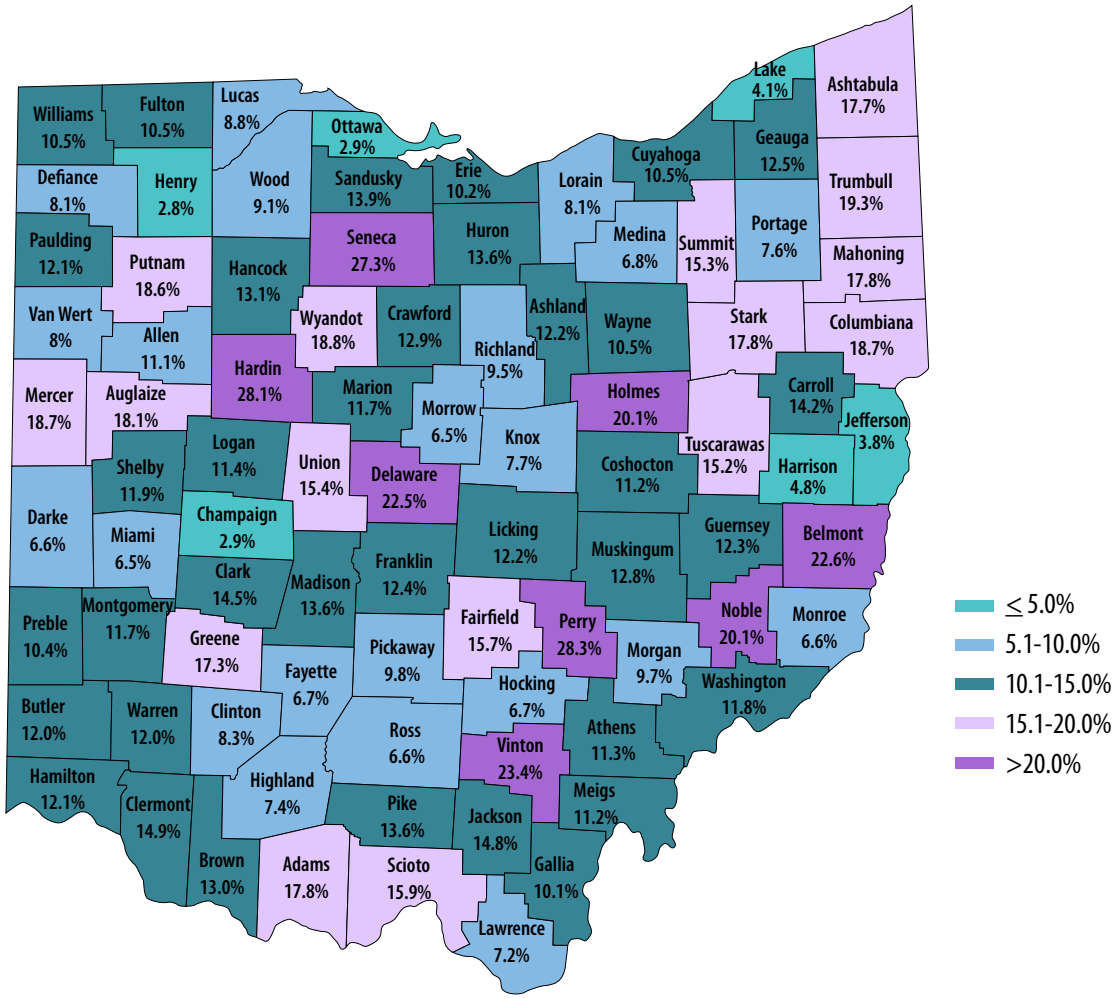
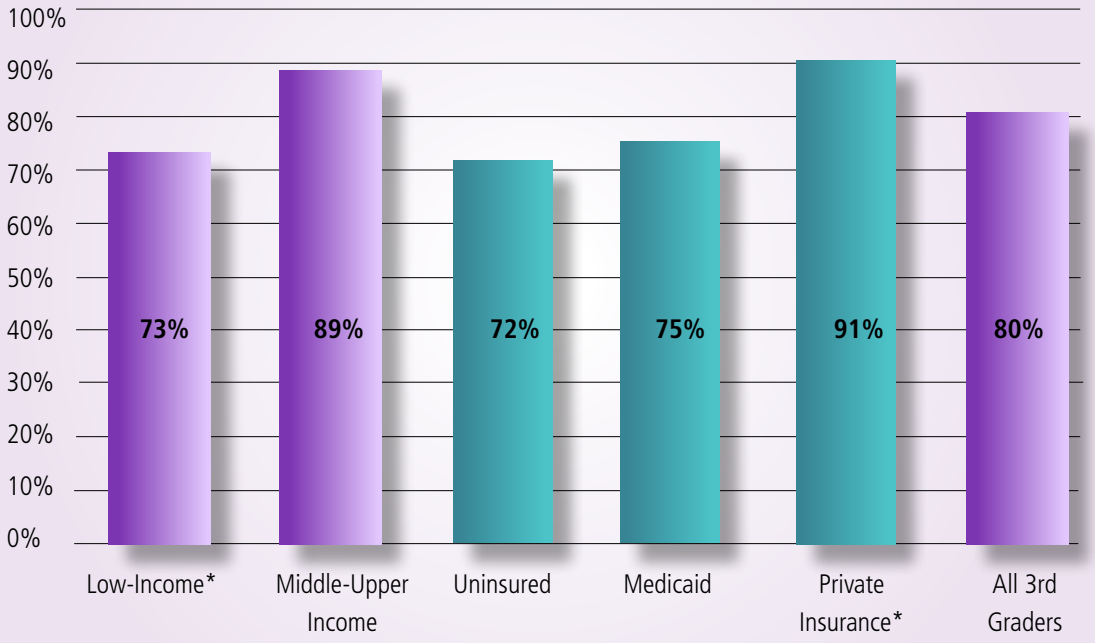


Table 7 indicates that even though most Ohio children had reportedly visited the dentist during the past year, children from low-income families were significantly less likely to have done so than children from middle- and upper-income families (73 percent vs. 89 percent).[3] Children covered by private insurance were significantly more likely to have visited the dentist (91 percent) than children covered by Medicaid (75 percent) or children without dental insurance (72 percent).[3] Black children were significantly less likely than White children to have visited the dentist during the past year (69 percent vs. 83 percent).[3]

Parents reported that the most common reasons that their children were not able to get the dental care they needed were that they could not afford it or did not have dental insurance (42 percent).[3] An additional 19 percent said that either the wait was too long or the appointment hours were inconvenient. [3]

Table 7: Percentage of Ohio Third Graders who had Reportedly Visited a Dentist in the Past Year, by Family Income and Dental Insurance Coverage, 2009-2010

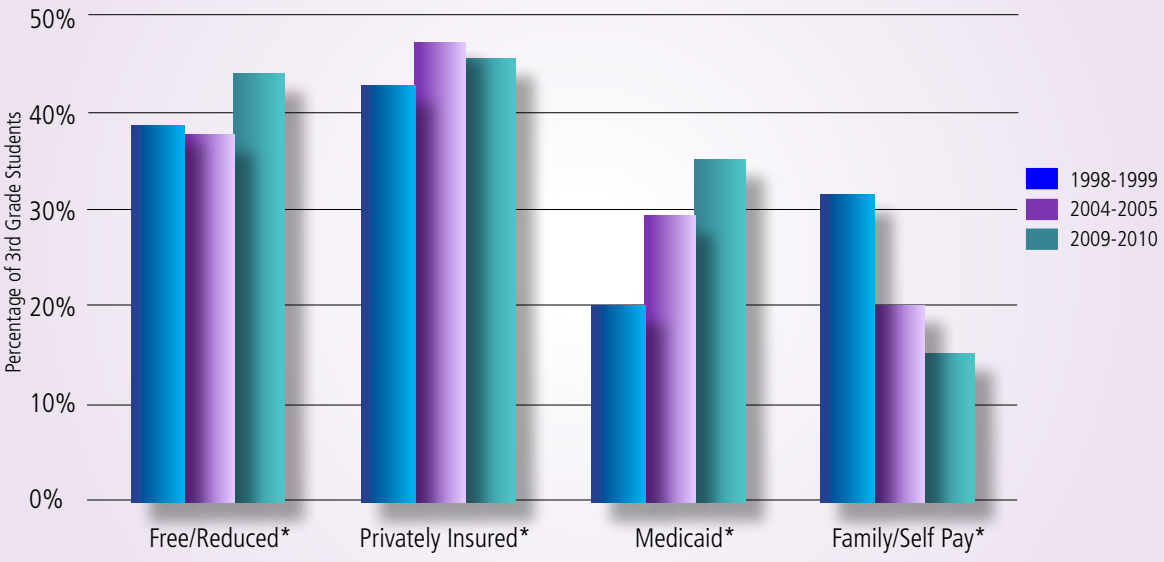


*Statistically significant at $p < .05$

How has coverage for dental care for children changed over time?

Table 8 presents information about how dental coverage has changed since 1998. Overall, the percentage of children without dental insurance continues to decline from 33 percent in 1998[4] to about 16 percent in 2009-2010.[3] However, the type of coverage is shifting; the percentage of children covered by private dental insurance has declined, while the percentage covered by Medicaid has increased. This increase is likely due to the economic downturn in Ohio in recent years (making more children eligible because of the drop in their family's income) and efforts to expand Medicaid eligibility since 2000. Recent data indicate that since 2004 all areas of Ohio have seen an increase in Medicaid enrollment.[10] Eligibility among Ohio schoolchildren for the Free and Reduced Price Meal Program, a proxy for family income, increased from 38 percent in 2004 to almost 44 percent in 2009.[3] As family incomes decline and more children become eligible for Medicaid, an additional strain will be placed on the providers of dental care for this population.

Table 8: Income and Payment Source for Dental Care for Ohio Third Graders, Oral Health Surveys of Ohio Schoolchildren, 1998-2010



*Differences between years is statistically significant ($p<.05$)

Real Oral Health Problems for Real Kids

"About four years ago, I was a school nurse at a vocational high school in a rural community in NW Ohio. One of the students at the school (a senior) started getting into a lot of trouble and his grades were dropping. He was a frequent visitor to the clinic. His parents worked at low-paying jobs and did not have dental insurance. He was not enrolled in Medicaid.

He complained to me of a toothache. When I looked in his mouth, I saw that he had a lower molar that was black and rotted nearly down to the gum. This boy couldn't sleep or eat and the pain was constant! I called the nearest dental clinic and the boy was able to get into the dental clinic the next day. We transported him there and stayed with him during his appointment.

After taking care of the rotted tooth (it needed a root canal), this fellow had a total turn around at school. He no longer got into trouble, his grades went up and his whole demeanor was much happier. He would always go out of his way just to say "Hi" to me; I think because he appreciated the help I found for him.

Certainly this success story involved many people, but being a school nurse gave me the resources to get this student some much needed help."

Sherri Snoad, RN, BSN
School Nurse, Gahanna–Jefferson School District

The use of tobacco among Ohio's youth

Tobacco use among youth can increase their risk for serious diseases and early mortality. The effects of tobacco use on oral health alone include an increased risk for oral and pharyngeal cancer (cancers of the mouth and throat) and advanced periodontal (gum) disease.[11] The following data on the use of tobacco among Ohio's youth are available from the 2008 Ohio Tobacco Youth Survey.[12]

- In 2008, over half of Ohio high school students and about one-third of middle school students had used some form of tobacco products in their lifetime (57 percent and 29 percent, respectively).
- About one-third (30 percent) of high school students report they are current smokers.
- Cigarettes were the most common form of tobacco used by both middle and high school students; cigars were almost as popular.
- The rate of tobacco use among high school students has not significantly changed since 2002; the rate among middle school students has not significantly changed since before 2000.

The Bottom Line

While the oral health of many of Ohio's children is improving, challenges remain. Significant disparities in oral health status and access to dental care exist among Ohio's poorest children, those who reside in rural and Appalachian areas of the state, and in some cases, those from minority groups. Access to dental care remains the single most common unmet health care need among Ohio's children. Four times more children do not have dental insurance than have medical insurance. While more children than ever are eligible for dental care through Medicaid, these children still have more untreated cavities and toothaches than privately-insured children. Efforts to increase the prevalence of dental sealants have resulted in more high-risk children receiving this proven decay-prevention measure and ODH is committed to expanding the availability of sealants to this population. Tobacco use among high school and middle school students continues to be a serious problem.

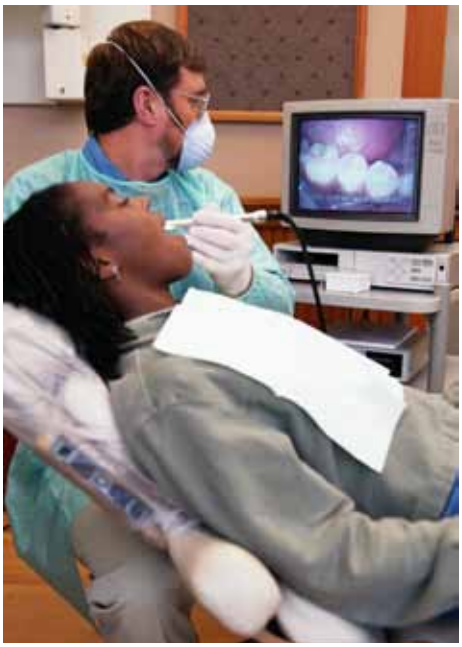
Section 3:
The Oral Health of Ohio's Adults

More adults than ever in Ohio are keeping their teeth for a lifetime, but many continue to face serious oral health problems. Poor oral health can result in periodontal disease, expensive dental work, higher risk for oral cancer, and may be linked to a higher risk for heart disease[13,14], stroke[15] and diabetes.[16] Poor oral health can affect a person's ability to find a job, lead to missed work, and make it difficult to eat, resulting in poor nutritional status. Unfortunately, many adult Ohioans cannot get dental care on a regular basis, particularly those who live in poverty or do not have dental insurance. The following data describe the oral health of adults in Ohio and their ability to get dental care.

Oral health status of Ohio adults and their access to dental care

About 45 percent of all Ohio adults have had one or more permanent teeth removed due to tooth decay or gum disease, and 7 percent have had all their teeth removed.[17] However, significant disparities in tooth loss exist depending on race, income and geography.[17] For example:

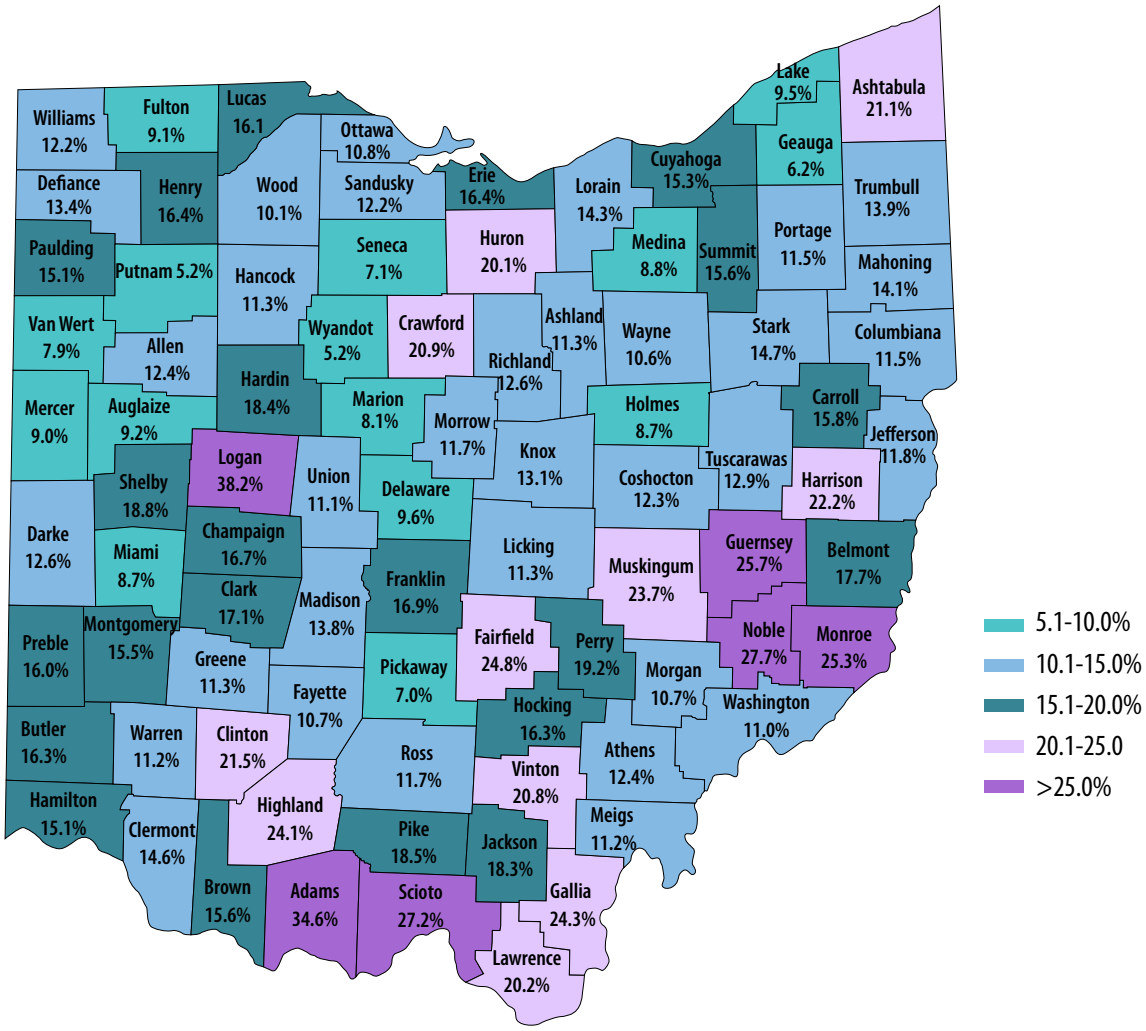
- Tooth loss is more prevalent among Black and multi-racial adults than among White adults.
- 16 percent of Ohio's poorest adults (those with an annual income less than $15,000) have had all their teeth removed, compared to only 2 percent among persons with an annual income of $50,000 or more.
- Ohio's seniors (65 years of age and older) experience the most tooth loss, especially our poorest seniors. Thirty-seven percent of these adults have had all their teeth removed.
- Adults living in Appalachian counties are more likely to have tooth loss than persons living in other areas of the state.



About 60 percent of adults 18-64 years of age had a dental visit within the past year, compared to 56 percent of seniors.[18] The poorest adults in Ohio are far less likely to have had a recent dental visit than people with an income of $50,000 or more (48 percent vs. 83 percent).[17]

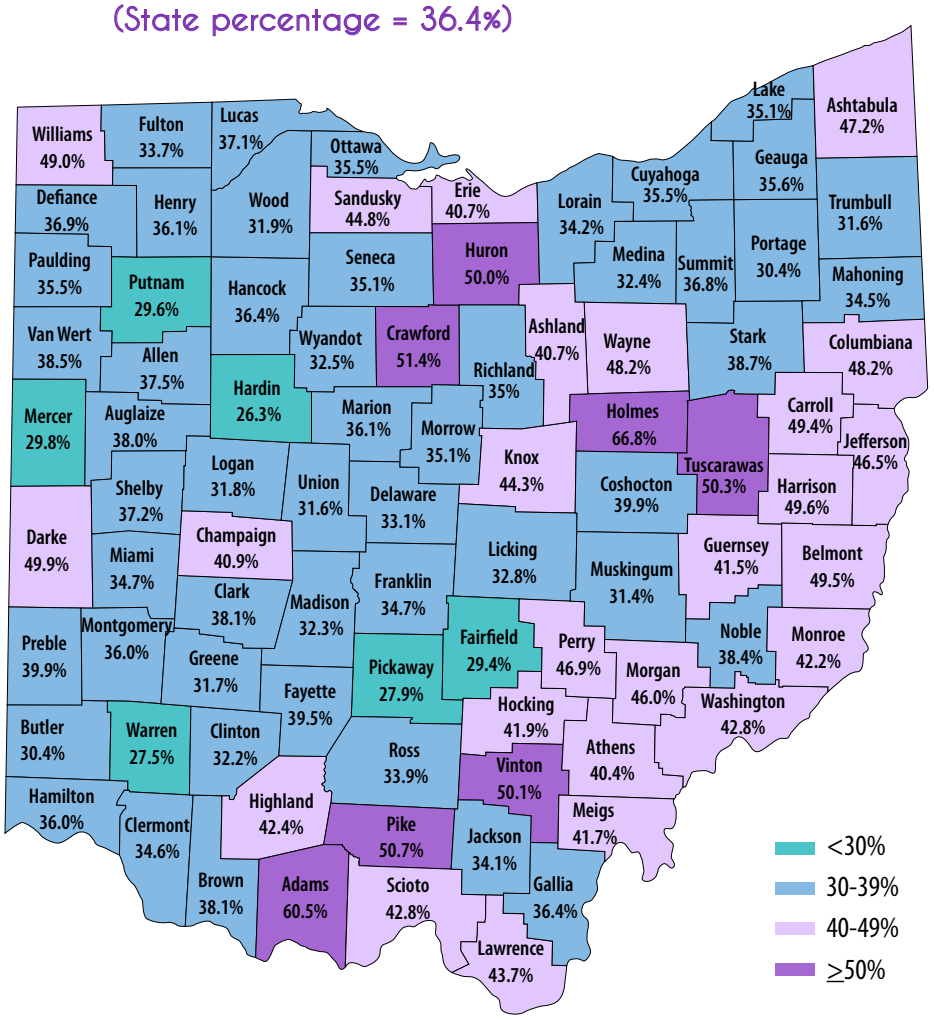
Many Ohio adults continue to experience significant barriers in getting dental care. Overall, 1.28 million adults in Ohio (14.5 percent) say they can't get the dental care they need.[7] Figure 2 shows that in some Ohio counties, the percentage is even higher.[8]

Figure 2: Percentage of Ohio Working-Age Adults (18-64 years of age) with Unmet Dental Care Needs, Ohio Family Health Survey, 2008



Lack of dental insurance is an important factor that prevents adults in Ohio from getting the dental care they need. **More than 3.9 million (45 percent) of Ohio adults don't have dental insurance, almost three times more than the number of Ohio adults without medical insurance.**[7] In just two years, the number of adults without dental insurance has increased by about 534,500.[7,8] The percentage of Ohio adults without dental insurance varies by county, as Figure 3 shows. In some counties, more than half of adults do not have dental insurance.

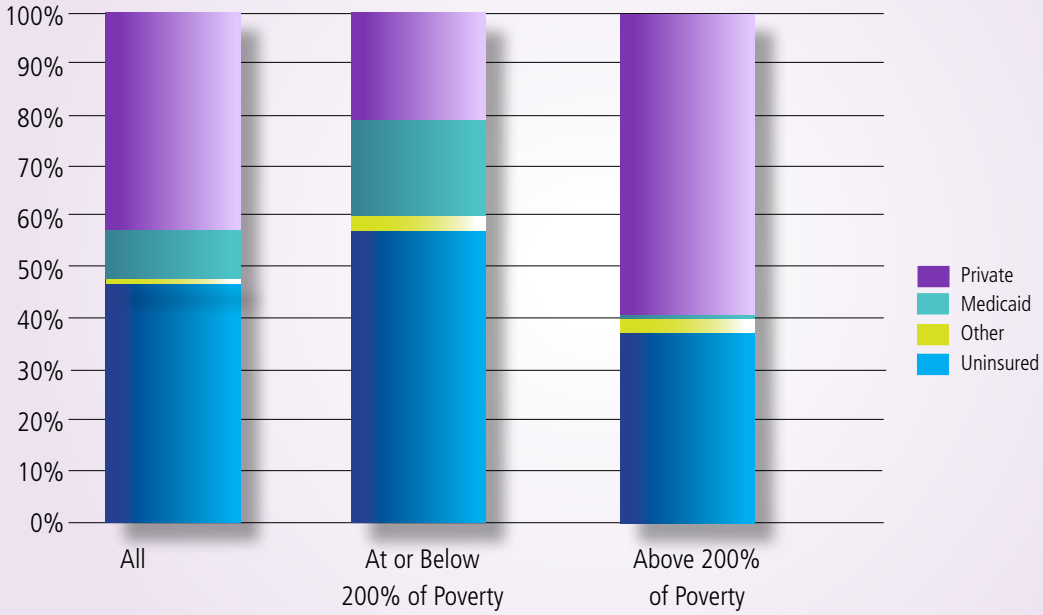
Figure 3: Percentage of Working-Age Adults (18-64 years of age) in Ohio without Dental Insurance, Ohio Family Health Survey, 2008 (State percentage = 36.4%)



Unfortunately, having a job does not guarantee coverage; employers do not always offer dental insurance as a benefit or the cost to the employee may not be affordable. Thirty-seven percent of employed adults in Ohio do not have dental insurance,[7] up from 30 percent just two years ago.[8]

Poverty status is related to insurance coverage. Table 9 shows that the majority (56 percent) of adults in Ohio with incomes less than 200 percent of the Federal Poverty Level (FPL) don't have dental insurance.[7] Only 36 percent of those with incomes 200 percent or above the FPL have no dental coverage.[7]

Table 9: Dental Insurance Coverage for Ohio Adults (18 Years and Older) According to Poverty Status*, 2010 Ohio Family Health Survey[7]



*Based on the 2009 FPL (annual income for a family of four at 200 percent of the FPL was $40,792.)[19]

More than 980,000 (60 percent) of Ohio seniors 65 years of age and older have no dental insurance.[7] Routine dental care is not covered by most Medicare plans. Seniors on low, fixed incomes may find it difficult to pay out-of-pocket costs. The consequences of not getting regular dental care can be significant; poor oral health may worsen other existing medical conditions, further compromising overall health.

About 13 percent of adults 19-64 years of age and 12 percent of adult 65 years of age and older in Ohio are eligible for Medicaid; these include low-income pregnant women; parents of low-income children; people with certain disabilities; and low-income seniors.[18] Those eligible often face a significant challenge in finding a dentist who will accept Medicaid patients. In 2009, 28 percent of Ohio dentists provided dental care to at least one Medicaid-eligible patient.[18] However, only 12 percent of dentists provided care to a large number of Medicaid-eligible patients (250 or more patients).[18] That same year, only 29 percent of adults 19-64 years of age and 22 percent of adults 65 years of age and older who were Medicaid-eligible had a dental visit.[18] Adults eligible for dental care through Medicaid remain at risk for losing this coverage in tough economic times.

The Bottom Line

Adults living in poverty and those without dental insurance face significant challenges in maintaining their oral health. Already unemployed or working in low paying jobs that do not provide dental insurance, the time off to go to the dentist, or the income to pay for it, they are left with few options. They risk losing their job if they take time away from work to get dental care, and work performance can suffer because of the pain and distraction that dental problems can cause.

Dental disease doesn't go away on its own. Without treatment, it just gets worse, jeopardizing overall health. Safety net dental clinics provide dental care to many low-income Ohioans (page 26). Often these clinics have waiting lists that are weeks or months long, are sometimes located in places that are hard to get to without money or a means of transportation, and may not be open at convenient times for people who can not take time off from work. The only choice may be to go to a hospital emergency room, where treatment is most expensive and typically the least effective; little can be done except to get medication for pain and be sent home.

Oral and pharyngeal cancer

Oral and pharyngeal cancer includes cancer in the mouth and cancer that forms in the pharynx (also sometimes called "throat cancer"). Oral and pharyngeal cancer accounts for about two percent of new cancer cases in Ohio, with an age-adjusted incidence rate of 9.8 cases per 100,000 persons.[20] On average, three Ohioans are diagnosed with oral and pharyngeal cancer every day and one person dies from it. Men have higher rates of new oral and pharyngeal cancer than women (14.6 cases/100,000 males vs. 5.7 cases/100,000 females).[20] Blacks have the highest death rate (3.7 deaths/100,000 persons vs. 2.6 deaths/100,000 persons overall).[20]

Most new cases of oral and pharyngeal cancer (68 percent) are advanced and considered life threatening at the time of diagnosis. This is because oral and pharyngeal cancer is usually not painful at its earliest stages and often not found until it has spread beyond the mouth. Tobacco and alcohol use, especially used together, continue to be important risk factors for oral and pharyngeal cancer. However, scientists are finding that the human papilloma virus is also a risk factor. An annual screening by a dentist or dental hygienist is vital to catching this cancer at its earliest stage, offering the best odds for a cure.

Website for this image: www.tobacco-facts.net

HPV and Cancer

For many years, scientists knew that long term tobacco and alcohol use accounted for almost all cases of oral and pharyngeal cancer. Now, scientists know that a third factor, exposure to, or infection with, the human papilloma virus (HPV) is a risk factor for oropharyngeal cancer (cancer in the middle part of the throat).[21] HPVs are actually a group of more than 100 related viruses, 30 of which are transmitted sexually. Most people who get an HPV infection do not notice any symptoms and the disease will go away on its own without treatment. These infections are caused by "low-risk" HPVs, viruses that rarely cause changes in cells that can lead to cancer. But some HPV infections do not go away over time; these are caused by "high-risk" HPVs. These viruses increase the risk for cancer. Cervical cancer is the most frequent cancer caused by a "high-risk" HPV. Almost 25,000 cases of HPV-related cancers occur each year.[22]

Scientists now know that an HPV infection in the mouth increases a person's chance of developing oropharyngeal cancer, whether or not the person uses tobacco or alcohol. HPV is thought to cause about one-third of oropharyngeal cancer.[22] HPV-related oropharyngeal cancer strikes people at a younger age than cancers caused by tobacco or alcohol use. Evidence suggests that HPVs may soon overtake tobacco as the primary risk factor for oral and pharyngeal cancer among persons younger than 50 years of age.[23]

Oral health during pregnancy

"Gain a child, lose a tooth!" This old wives' tale was based on the belief that a woman's oral health was destined to suffer during pregnancy. Bleeding and swollen gums (aka "pregnancy gingivitis") was as expected as swollen ankles. The public and many health professionals thought that dental treatment during pregnancy was too risky for both the pregnant woman and her unborn baby. A survey of Ohio dentists and obstetricians conducted in 2004 found that while these providers agreed that pregnant women could safely have their teeth cleaned and be treated for cavities and infections, they disagreed over the safety of pregnant women receiving dental x-rays, periodontal surgery and the use of dental amalgam for fillings.[24] Obstetricians were less likely than dentists to recommend routine dental care to their pregnant patients.[24]

Today, we know that maintaining a woman's oral health during pregnancy can be done safely and effectively at all stages of pregnancy, and makes good sense for both the woman and her baby. New research shows that if a woman's oral health is not maintained during pregnancy, the health of the baby may suffer. While periodontal disease has not been shown to cause preterm delivery and low birth weight babies, researchers continue to study the association between periodontal disease and these outcomes.[25] Oral infections may worsen a woman's existing medical conditions such as diabetes, which can result in complications of pregnancy such as preeclampsia or a large-for-gestational-age newborn.[26] If a pregnant woman has cavities, she may transmit a high number of decay-causing germs to the baby, putting the baby at risk for cavities in the future.[27]

Unfortunately, many women do not visit the dentist or put off getting needed dental treatment until after they deliver. In 2008, less than half (43 percent) of pregnant women in Ohio visited a dentist or dental clinic while pregnant[28], a finding consistent with data from a sample of nine other states (44 percent).[29] Low-income women are even less likely to have a dental visit; in 2009, only 22 percent of women in Ohio covered by Medicaid received a dental visit while pregnant.[30]

Clearly, work needs to be done to increase the awareness among women and health care providers that dental care during pregnancy can be provided safely and effectively. In recent years, two expert panels were formed to develop guidelines for providing oral health care for pregnant women.[25,26] Both clearly state that oral health care should be an integral part of prenatal care for every woman. Periodic review of a woman's oral health should be done throughout her pregnancy with prompt referral for dental problems.

Section 4: What Are the Resources for Providing Dental Care to Ohioans?

Ohio has a network of dental care providers, including private practice dentists, safety net dental clinics and mobile dental programs. Despite this, many people in Ohio still can't get dental care.

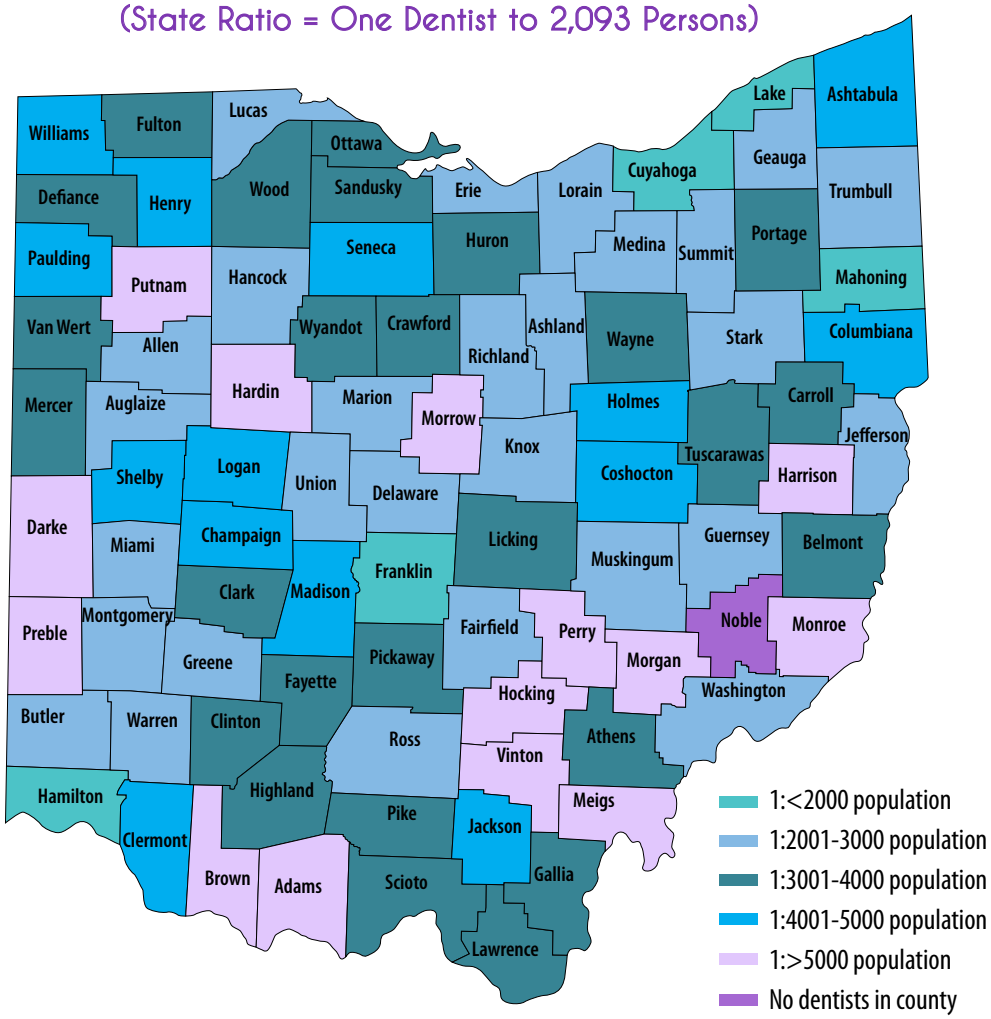
Private Practice Dentists

In 2010, there were approximately 7,000 dentists licensed and residing in Ohio,[31] to serve an estimated population of more than 11.5 million Ohioans.[32] This is the equivalent of about one dentist (including specialists) for every 1,654 Ohioans,[18] a ratio about the same as the overall dentist to population ratio in the U.S.[32,33] The overall number of licensed dentists in Ohio has decreased by about five percent over the past decade.[31, 34]

Having a "dental home" means that a person's "oral health care is delivered in a comprehensive, continuously accessible, coordinated and family-centered way by a licensed dentist."[35] This source of regular care should be provided by a general practice or pediatric dentist (also known as a primary care dentist) rather than by a specialist. Unfortunately, the number of primary care dentists in Ohio is decreasing as the number of specialists is increasing.[9] The overall primary care dentist to population ratio in Ohio currently stands at one for every 2,093 persons.[18]

In Ohio, as in most other states, the problem isn't that there aren't enough dentists; rather, the geographic location of dental offices and the willingness of dentists to treat low-income patients affect access to dental care. Sixty-nine of Ohio's 88 counties (78 percent) have worse than the state primary care dentist to population ratio; ratios range from one dentist for every 1,473 persons in Cuyahoga County to one dentist for every 9,637 persons in Hocking County.[18] Noble County does not currently have a dentist. Sixteen counties have more than twice the state ratio (i.e., one primary care dentist for every 4,186 persons or more).[18] Figure 4 shows that the counties with the worse primary care dentist to population ratios are mostly rural or in the Appalachian region of the state.

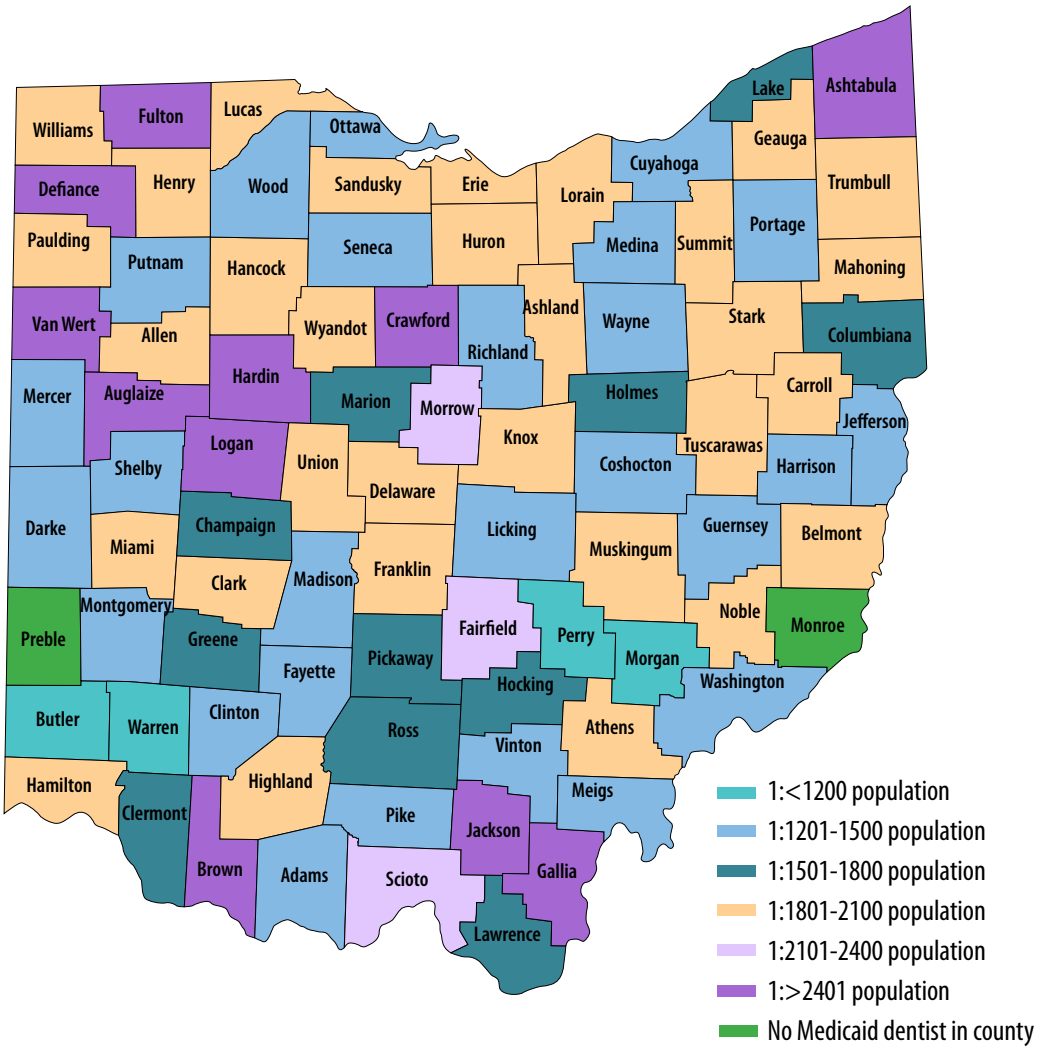
Figure 4: Primary Care Dentist to Population Ratios, by County, 2010[18] (State Ratio = One Dentist to 2,093 Persons)



Four counties with very high primary care dentist to population ratios also do not have any safety net dental clinics (Monroe, Morgan, Hocking and Preble counties). In fact, most safety net dental clinics are in metropolitan counties where dentist to population ratios are the lowest. Only 28 percent of safety net dental clinics are in Appalachian and rural, non-Appalachian counties.

Low reimbursement rates and administrative challenges that dentists face with the Medicaid program result in relatively few dentists willing to participate. In 2009, 28 percent of Ohio dentists provided care to at least one Medicaid-eligible patient.[18] However, many dentists who do enroll in Medicaid limit the number of patients they see. In 2009, only 12 percent of licensed dentists in Ohio provided care to a significant number of Medicaid-eligible patients (250 or more patients).[18] Figure 5 on page 25 illustrates the ratio of Medicaid dentists to the Medicaid-eligible population in each county. Overall, the Medicaid dentist to Medicaid-eligible population ratio for Ohio is one dentist for every 1,169 persons.[18] As can be seen, about half of the counties have a ratio that exceeds the state ratio. Two counties, Monroe and Preble, do not currently have any dentists who serve the Medicaid population.

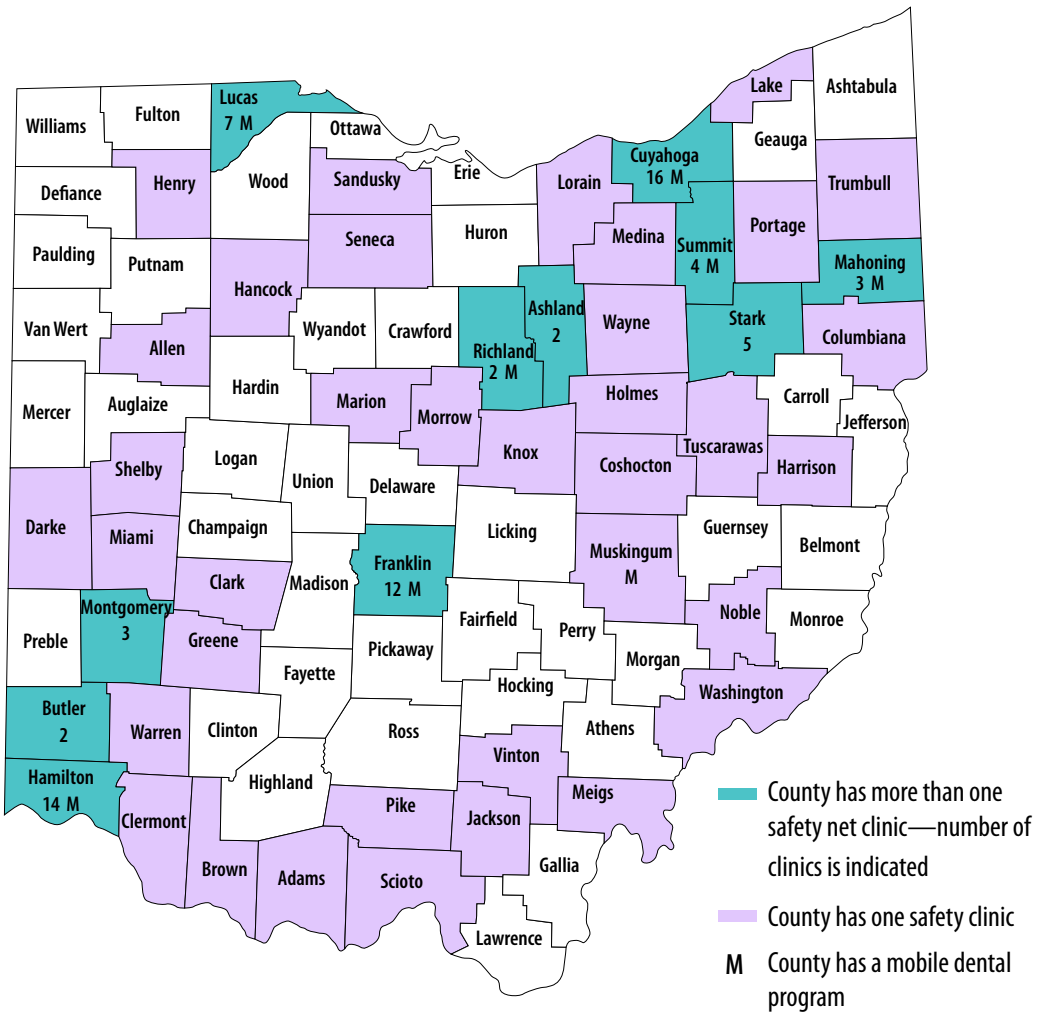
Figure 5: Medicaid Dentist to Medicaid-Eligible Population Ratios, by County, 2010[18]
(State Ratio = One Medicaid dentist to 1,169 Medicaid-Eligible Persons)



Safety Net Dental Clinics

Safety net dental clinics typically provide dental care to patients covered by Medicaid and offer sliding-fee schedules, reduced fees or free care to patients who can not afford to pay a private dentist. They are mostly operated by local health departments, community health centers, hospitals and other non-profit organizations in a community. Ohio has about 100 programs in 47 counties that provide basic dental services such as exams, X-rays, fillings, extractions, root canals and dentures. There are also 12 programs in 11 counties that offer only preventive care services such as cleanings and fluoride treatments. Figure 6 is a map of the safety net dental clinics, including mobile dental programs, currently operating in Ohio. ODH provides grant funding to 20 of these clinics.

Figure 6: Safety Net Dental Clinics, Ohio Department of Health, April 2011



Safety net dental clinics are a critical part of the dental care delivery system in Ohio. ODH-funded clinics alone provided dental care to almost 70,000 Ohioans in 2010.[9] During tough economic times, the demand for services exceeds the capacity of many safety net dental clinics to provide care. Because safety net dental clinics provide care to all patients regardless of their ability to pay, it is a financial challenge to keep these clinics open. Waiting lists may be weeks or months long. Most safety net dental clinics in Ohio are not in rural and Appalachian counties; long travel time and the associated expense make it difficult for people from these areas to get dental care.

Unless dentists in private dental offices increase their willingness to provide dental care to Medicaid-eligible Ohioans, the already overburdened network of safety net dental clinics will continue to be heavily depended upon to serve the needs of low-income persons.

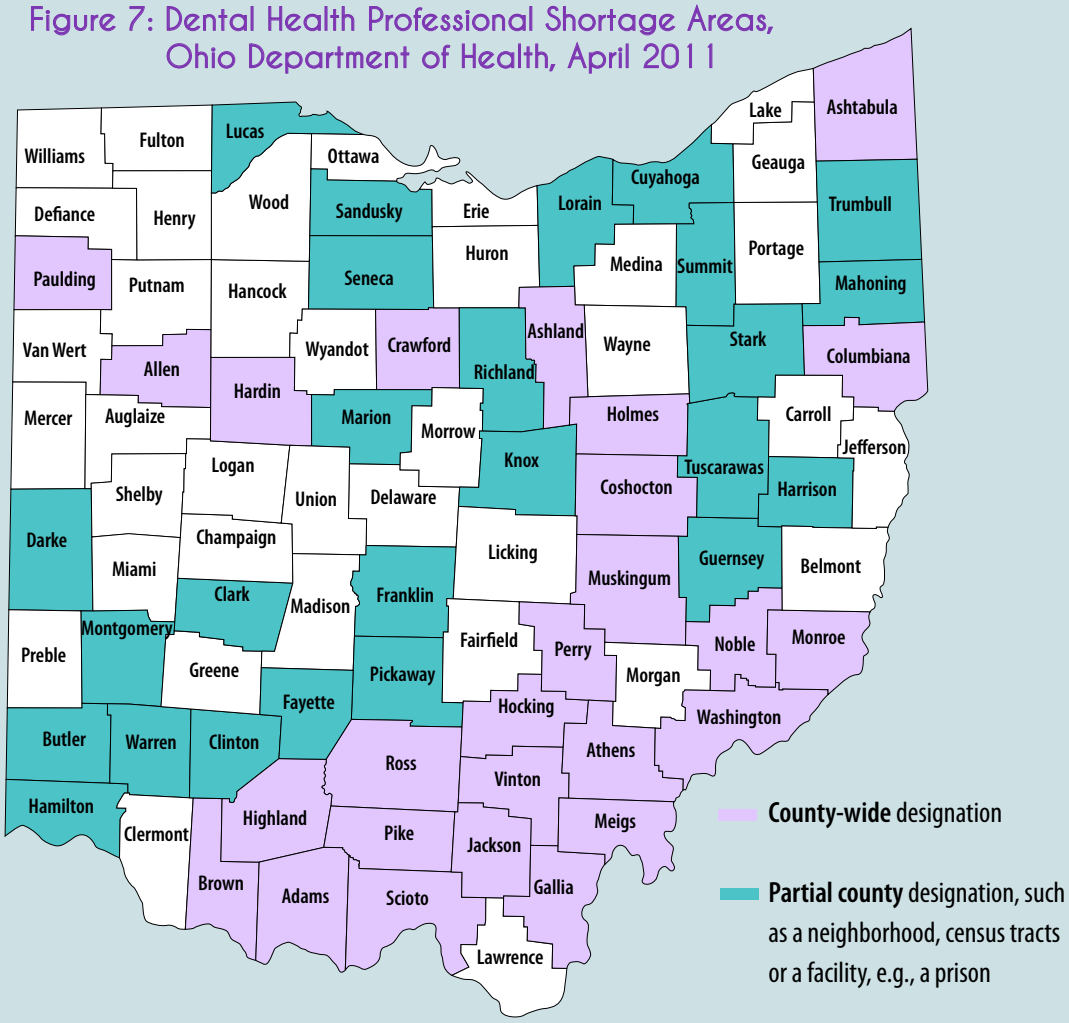
Mobile/Portable Dental Programs

Mobile/portable dental programs offer an effective option for providing dental care for persons who don't have access to dental care through traditional fixed location dental offices or clinics. These persons may have special health care needs and be homebound, live in residential facilities, not have a permanent residence, live in isolated geographic areas or be children who don't have a dental home. As seen in Figure 6 on page 26, eight counties in Ohio have mobile/portable dental programs. Most of these programs provide dental care to schoolchildren by bringing a mobile vehicle or portable dental equipment to schools. Other programs serve people who are homebound and in nursing homes.

Dental Health Professional Shortage Areas

When a geographic area does not have enough dentists to serve the needs of the people living there, it can be designated as a dental health professional shortage area (HPSA) by the federal government. Currently, there are 68 dental HPSAs in Ohio.[9] An entire county may be designated as a HPSA; but in some cases, only certain neighborhoods or census tracts in a city, or a facility (such as a prison), are designated. Figure 7 shows the counties in Ohio that have one or more dental HPSAs. Most dental HPSAs are found in Appalachian counties and inner cities, and are usually designated because there are not enough dentists who serve Medicaid-eligible patients. A dental HPSA designation is important because it then becomes a place where a dentist can receive loan repayment for his/her services (page 32). The application process to become a dental HPSA is complex. There are likely other communities or counties in the state that do not have enough dentists, but have not applied to become a dental HPSA.

Figure 7: Dental Health Professional Shortage Areas, Ohio Department of Health, April 2011



Section 5:
How Do Community-based Prevention Programs Improve the Oral Health of Ohioans?

Prevention of oral diseases is still the most effective and least expensive way to improve oral health.[11] Community-based prevention programs, which are focused on improving the oral health of groups of people, complement personal actions (e.g., tooth brushing) and preventive services provided by dental professionals (e.g., cleanings, fluoride treatments). Community-based prevention programs are especially important when access to professional dental care is limited among groups at higher risk for dental disease.

Community water fluoridation

Community water fluoridation continues to be a cornerstone of public health and is one of the most effective ways to prevent tooth decay for both children and adults. Fluoride is naturally present in all water. Community water fluoridation is the adjustment of the natural fluoride level in public water systems to an optimal level to prevent tooth decay. Fluoridation has been identified as "one of the 10 great public health achievements of the 20th century" by the U.S. Centers for Disease Control and Prevention.[36] More than 92 percent of Ohioans on public water systems drink water that is optimally fluoridated,[9] far exceeding the Healthy People 2010 National Objective for community water fluoridation (75 percent)[6], as well as the national percentage of people on community water systems who drink fluoridated water (72 percent)[37].

Unfortunately, nearly 820,000 Ohioans on public water systems do not receive fluoridated water. The Ohio Revised Code currently requires communities of more than 5,000 residents to adjust the fluoride level to 0.8 - 1.3 parts fluoride per million parts water.[38] In 1970, a one-time referendum process allowed communities to vote to be exempted from this law. At that time, 30 communities voted not to fluoridate their water. Since then, seven of those communities have reversed their decision: Athens, Bellefontaine, Bellevue, Fairborn, Middletown, Delaware and Tipp City.

School-based sealant programs

School-based sealant programs (S-BSPs) have operated in Ohio for more than 25 years. ODH provides grant funds to local agencies to operate S-BSPs. These programs target schools with 40 percent or more of the students eligible for the state's Free and Reduced Price Meals Program.[39] Sealants are provided to children in 2nd and 6th grades because they are most likely to have newly-erupted permanent molars. S-BSPs operate mainly in southeastern Ohio and in major cities where children are at higher risk for tooth decay and do not have access to regular dental care.

Figure 8, page 31, shows the 50 counties in Ohio where children receive sealants through S-BSPs; most operate with funding from ODH. In 2011, a federal grant from the Health Resources and Services Administration (HRSA) enabled ODH to expand existing S-BSPs and start programs in two new counties. In 2011, S-BSPs will operate in 796 schools and approximately 30,000 students will receive sealants.

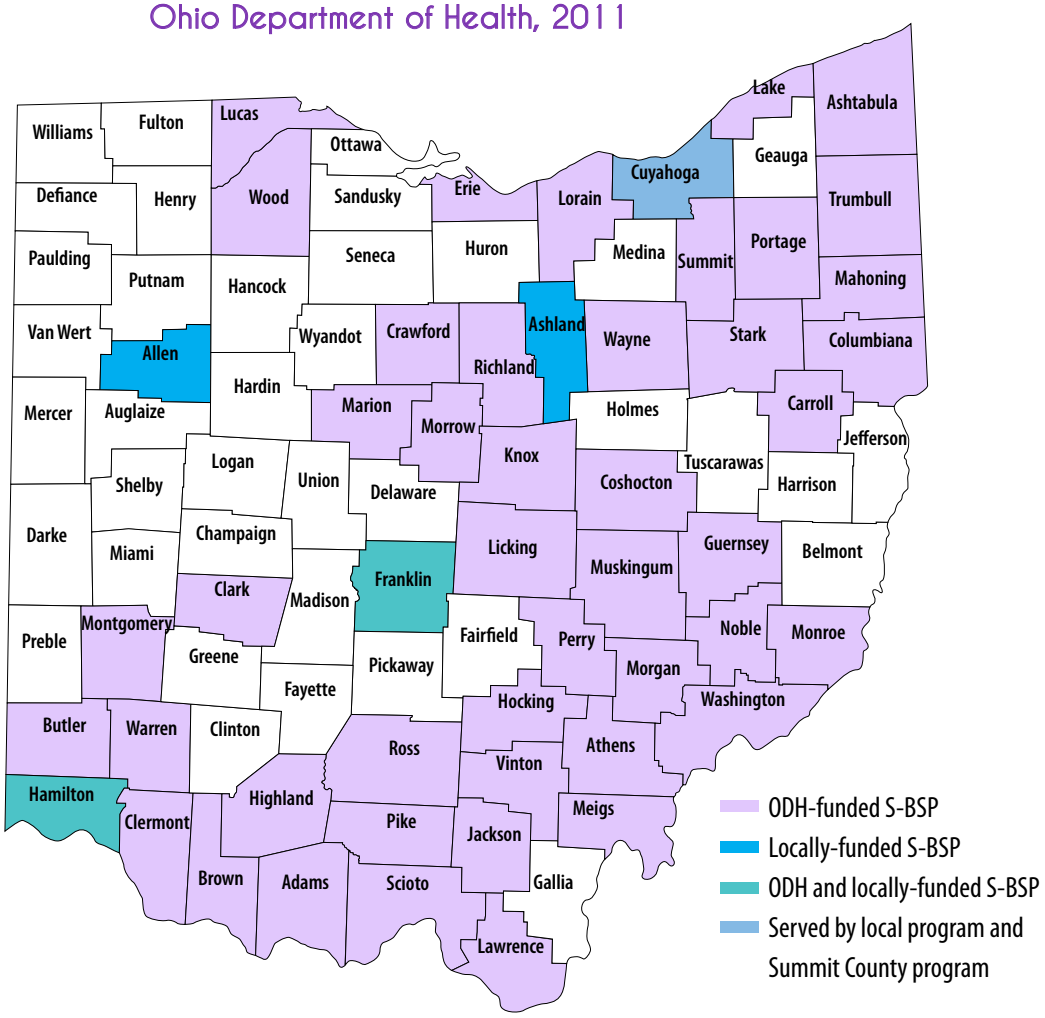
What are dental sealants?

Dental sealants are thin, plastic coatings that are painted on the biting surfaces of the back teeth. Sealants block food and decay-causing bacteria from entering the narrow grooves of the teeth where decay is most likely to occur. These are the areas of the teeth that are the hardest to keep clean.

A. Normal tooth pits and fissures
B. Tooth with dental sealants

A. B.

Figure 8: School-based Dental Sealant Programs, Ohio Department of Health, 2011



As seen in Figure 8, many rural and some Appalachian counties in Ohio still do not have S-BSPs. An analysis conducted by ODH shows that 192 schools without sealant programs are good candidates because they meet eligibility criteria and are near existing programs that have expressed interest in expanding. S-BSPs in these schools would enable an additional 17,000 students in the targeted grades to receive sealants.

Approximately 400 other schools are eligible for S-BSPs based on their percentage of low-income children; however, these schools are not near other schools with existing sealant programs or the nearest program does not have the capacity or interest in expanding to additional schools. Also, some of these schools are not close enough to other eligible schools, and so there is not a "critical mass" of students to make a new program cost-effective. ODH is currently exploring other approaches to getting sealants to students in these areas.

Section 6: Strategies That Can Help Increase Access to Dental Care

Dentist loan repayment programs

In 2003, the Ohio General Assembly enacted a law creating the Ohio Dentist Loan Repayment Program (ODLRP). This program is intended to increase the number of general and pediatric dentists practicing in underserved areas of Ohio. It is funded through a nominal increase in biennial renewal fees for dentists' licensure. The ODLRP pays for all or part of the loans taken out by dentists for their professional training. To qualify for loan repayment, dentists must provide services in underserved areas of the state for a minimum of 40 hours per week. Also, services must be provided for Medicaid-eligible persons and others without regard to a patient's ability to pay. Dentists are paid a salary in addition to the loan repayment they receive. Between 2003 and 2010, 17 participating dentists provided care to nearly 52,000 unduplicated vulnerable Ohioans (e.g., Medicaid-eligible and the uninsured) in underserved areas. In 2010, ODH received a grant from HRSA to create a new loan repayment program, the Ohio Dentist Workforce Loan Repayment Program, which will enable six more dentists to receive loan repayment in exchange for providing dental services in dental HPSAs.

Dental OPTIONS

Dental OPTIONS (the **O**hio **P**artnership **T**o **I**mprove **O**ral health through access to **N**eeded **S**ervices) is a program that was started in 1997 by ODH and the Ohio Dental Association. The program links people, mostly adults, in need of dental care with dentists who have volunteered to provide care at lower fees. The program is for persons with a low household income and no dental insurance. Most of the patients are the "working poor" or the elderly living on a fixed income. Over the years, the OPTIONS program has enabled nearly 14,000 adults to get dental care. However, the OPTIONS program is not designed to provide access to regular dental care, and the need for care remains high. As of May 2011, approximately 870 people who have been approved to receive dental care through OPTIONS remain on a waiting list.[9] Only about 13 percent of licensed dentists residing in Ohio currently participate in the OPTIONS program; many rural and Appalachian counties do not have any participating dentists.[9]

School-based/linked oral health programs

School-based/linked oral health programs provide a cost-effective way for schools and communities to meet the dental care needs of poor children who are not able to get dental care. These programs, located in or very near schools, can provide a comprehensive range of services that include oral health education, screening and referral, and the delivery of preventive and treatment services. The advantages of school-based/linked oral health services are clear:

- Students spend less time away from the classroom than if they have to go elsewhere in the community for care.
- School staff are more willing to participate in oral health screenings when they can refer children for problems that will be addressed in a timely way.
- Parents know that their children will get the dental care they need, and do not have to miss work to take their child to the dentist.
- Children are better able to learn when not distracted by dental problems that have not been fixed.

School-based/linked dental programs that provide preventive and treatment services are relatively rare in Ohio, despite the fact that this approach offers great potential for solving a difficult problem.

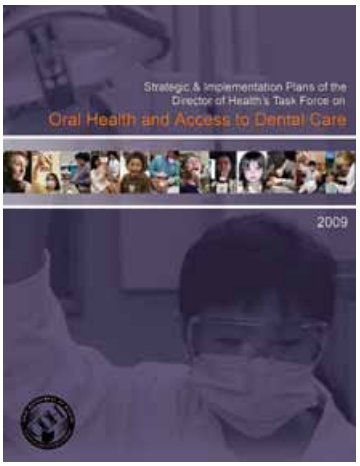
The Dental Road Crew – A Promising Solution for Kids in Need

Oral health professionals in Cincinnati struggled for years with the problem of low-income children not being able to get dental care. The health department's school-based sealant program was providing preventive sealants to thousands of high-risk students every year, but the children found to have cavities were not getting needed treatment. Assigning a case worker to help families get care for their children was not making enough of a difference. Children were still going months without seeing a dentist. A new model for getting dental care for children was needed.

Starting in 2004, a school-based/linked dental health program was started. The program involves two strategies: bringing a "dental office" to children at school through the use of a fully-equipped mobile dental van, and "shuttling" children via a passenger van to local dental clinics for care. Both approaches have resulted in kids getting the care they need. Recent data from the 2009-2010 school year indicate that more than 11,600 children were screened and 2,231 needed referral for dental treatment. Of the children referred, 91 percent completed treatment.

School staff view dental screenings conducted by school nurses as a good use of their time now that resources are available for fixing the dental problems that are found. Children avoid absences from school due to dental pain and infections and can learn better with a healthy mouth. Parents miss less work and can feel relief in knowing that their children have a way to get their dental needs met. School-based/linked dental programs offer a real solution to a problem that is tough to solve any other way.

Director of Health's Task Force on Oral Health and Access to Dental Care



In 2009, ODH convened a task force of key stakeholders to make recommendations and develop a plan to increase "the number of the most vulnerable Ohioans (e.g., people with Medicaid coverage, those who are uninsured and other disadvantaged) who receive appropriate oral health care and have optimal oral health."[40] The process included holding a series of community forums attended by providers, patients, families and advocates of oral health. Based on that input, presentations from national experts and their own deliberations, the task force made the following recommendations:

- Increase the numbers of Ohioans who benefit from effective community-based and community-wide dental disease prevention strategies, especially the most vulnerable Ohioans
- Reduce financial barriers to achieving oral health and accessing dental care
- Increase the number of trained dentists and dental hygienists willing to work with the most vulnerable Ohioans
- Allocate resources to assure support for a meaningful and sustainable dental safety net that can increase the number of the most vulnerable Ohioans receiving dental care
- Increase the number of primary care providers and other nondental health professionals who are actively involved in improving the oral health of their patients
- Build a broad-based oral health movement that is recognized as an important political force that must be accounted for in all public policy deliberations directly or indirectly related to health
- Increase the number of trained providers, including dentists and dental hygienists, treating people with special needs (e.g., developmental disabilities, the very young, the very old and the medically fragile) appropriately throughout their lifetimes, especially those among the most vulnerable Ohioans
- Provide all community-based prevention programs and dental care services in a culturally-competent manner
- Increase optimal oral health by reinforcing old partnerships and building new partnerships that recognize and leverage common ground related to oral health outcomes for the most vulnerable Ohioans, while acknowledging and respecting legitimate differences among partners

Inspired by the recommendations of the task force, the Children's Oral Health Action Team (COHAT)[41] was formed, a broad-based group of about 20 member organizations, each well-versed in child oral health policy and committed to improving the oral health of Ohio's children through advocacy and education. During its first year, COHAT formed its organizational framework and identified goals. These goals include effecting change in the Medicaid system, ensuring the inclusion of oral health in childhood development policies and increasing the capacity of Ohio's primary care providers to improve the oral health of our children.

Section 7: Acknowledgements

Make Your Smile Count! The 2009-2010 Oral Health Survey of Ohio Schoolchildren

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Appendix 1: Terms Used in This Report

Access to Dental Care—a term that means people are able to get dental care when they need it. It is evaluated by measuring the number of people who had a recent dental visit; the number who do not have dental insurance; and the number who say they need dental care, but can't obtain it.

County Type—a term that classifies each Ohio county into one of four categories:

- Appalachian (as designated by the federal Appalachian Regional Commission)
- Metropolitan (a non-Appalachian county that contains at least one city with 50,000 or more inhabitants)
- Suburban (a non-metropolitan, non-Appalachian county that meets the U.S. Census definition of an urbanized area)
- Rural/Non-Appalachian (all other counties not classified as Appalachian, metropolitan or suburban)

A table of Ohio counties by their classification can be found in Appendix 2 of this report.

Dental Screening—a process used to describe, through direct observation of the mouth, the general oral health of the individual. It is not a thorough exam that results in a diagnosis of a dental problem or a plan for its treatment.

Early or Urgent Dental Visit—an "early" visit to the dentist is one that should be scheduled within several weeks; an "urgent" visit is one that should be scheduled within 24 hours.

History of Tooth Decay—an untreated cavity, a filling, or a permanent tooth that is missing because it had been extracted due to tooth decay.

Low-income—a term that refers to an annual family income of <185 percent of the Federal Poverty Level [FPL]). In 2009, 185 percent of the FPL was less than $40,792 for a family of four.

Statistically Significant— a term used to describe data comparing two or more groups. In this report, the term "statistically significant" refers to a very small probability of observing findings if there were actually no true difference between groups. Traditionally, if this probability is less than 5 percent (i.e., $p<.05$), it is called statistically significant, i.e., the differences noted are unlikely to have occurred by chance.

Appendix 2: County Type Designations

Appalachian
Adams
Athens
Belmont
Brown
Carroll
Clermont
Columbiana
Coshocton
Gallia
Guernsey
Harrison
Highland
Hocking
Holmes
Jackson
Jefferson
Lawrence
Meigs
Monroe
Morgan
Muskingum
Noble
Perry
Pike
Ross
Scioto
Tuscarawas
Vinton
Washington
Wyandot

Rural/Non-Appalachian
Ashland
Ashtabula
Champaign
Clinton
Crawford
Darke
Defiance
Erie
Fayette
Hancock
Hardin
Henry
Huron
Knox
Logan
Marion
Mercer
Morrow
Ottawa
Paulding
Preble
Putnam
Sandusky
Seneca
Shelby
Van Wert
Warren
Wayne
Williams

Metropolitan
Allen
Butler
Cuyahoga
Franklin
Hamilton
Lorain
Lucas
Mahoning
Montgomery
Richland
Stark
Summit

Suburban
Auglaize
Clark
Delaware
Fairfield
Fulton
Geauga
Greene
Lake
Licking
Madison
Medina
Miami
Pickaway
Portage
Trumbull
Union
Wood

Appendix 3: Description of Data Sources Cited in This Report

2009-2010 Oral Health Survey of 3rd Grade Schoolchildren

During the 2009-2010 school year, the Ohio Department of Health (ODH), in cooperation with the Ohio Department of Education, conducted an oral health survey and Body Mass Index assessment. A stratified random sample of 377 public elementary schools in all 88 Ohio counties was selected. With written parental permission, 14,959 third grade students received an oral health screening by trained dentists and dental hygienists (46.8 percent response rate). Using standard guidelines[42], each child was screened for the following:

- Whether the child had ever had cavities ("history of tooth decay")
- Whether the child had cavities that hadn't been treated
- Whether the child had any sealants on their permanent teeth
- How soon the child should see a dentist

The consent form asked the parent or guardian for the following information about their child's oral health:

- How long it had been since the child had seen a dentist
- How the family pays for dental care
- Whether the child had ever needed dental care but couldn't get it (and why)
- Whether the child had a toothache during the last six months

2008 and 2010 Ohio Family Health Surveys

The 2008 and 2010 Ohio Family Health Surveys consist of data gathered from stratified random digital-dial telephone surveys of households in Ohio. The surveys were managed by the Ohio Colleges of Medicine, Government Resource Center, under the guidance of a multi-agency research team. Respondents were non-institutionalized adults and children living in residential households. Data were collected on nearly 51,000 adults and 13,000 children in 2008, and about 8,300 adults and 2,000 children in 2010.

The surveys gathered information on the following topics:

- Type of insurance coverage, if any
- General health status
- Health care use and needs
- Perceptions of health care quality
- Access to health care

County-level data are available from the 2008 survey; the 2010 survey generated only state-level estimates. For more information, go to http://grc.osu.edu/ofhs/.

2010 Behavioral Risk Factor Surveillance System (BRFSS)

The BRFSS is a random-digit dial telephone survey that tracks health practices, health conditions and risk behaviors of adults 18 years and older in the United States. Data for specific questions are also collected for children living in the household who are 17 years of age and younger. The BRFSS monitors the behaviors associated with major causes of preventable morbidity and mortality in the adult population of Ohio, e.g., cardiovascular disease, cancer, diabetes and injuries. Oral health data include:

- Length of time since their last dental cleaning
- Percentage of adults who have had any permanent teeth extracted
- Percentage of adults who visited a dentist or dental clinic within the past year for any reason

For more information, go to: http://www.cdc.gov/BRFSS/.

2008 Ohio Youth Tobacco Survey (OYTS)

The OYTS is a self-administered, school-based survey conducted by ODH to gather information about tobacco use prevalence, exposure to secondhand smoke, exposure to pro- and anti-tobacco media messages, knowledge and beliefs about tobacco use and future intent to use tobacco products.
For more information, go to:
http://www.odh.ohio.gov/ASSETS/9FD3BA6D31C14EA4AFD0E0A55E5B0F68/yts08w.pdf.

Ohio Cancer Incidence Surveillance System (OCISS)

The OCISS is the central cancer registry for the State of Ohio and is managed through a partnership between ODH and The Ohio State University Comprehensive Cancer Center—James Cancer Center and Solove Research Institute. The OCISS collects and analyzes cancer incidence data for all Ohio residents. All Ohio providers of medical care are charged, by law, with reporting to the OCISS all cancers diagnosed and/or treated in Ohio.
For more information, go to:
http://www.odh.ohio.gov/ASSETS/79F9E92E210F477D885F8EAC864E2F27/0206Monograph_Final.pdf.

Appendix 4: Prevalence of Various Oral Health Measures Among 3rd Grade Students, by County, 2009-2010 Oral Health Survey of Ohio Schoolchildren

County	History of Tooth Decay			Untreated Cavities			One of More Sealants			Early or Urgent Dental Needs			Toothache in the Last Six Months			Dental Visit During the Past Year		
	Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI	
Adams	60.0	41.13	78.83	33.5	13.84	53.06	57.6	56.68	58.59	33.5	13.84	53.06	11.8	0.00	29.57	74.7	69.44	80.05
Allen	48.8	44.27	53.31	14.6	8.09	21.07	35.1	9.57	60.68	14.9	8.58	22.53	10.8	5.70	15.91	77.5	70.39	84.57
Ashland	58.7	51.92	65.39	18.1	9.62	26.62	43.9	26.27	61.58	16.0	6.61	25.36	3.4	0.00	7.23	82.9	77.52	88.27
Ashtabula	61.9	44.45	79.28	46.2	26.97	65.50	18.3	7.82	28.78	45.6	29.24	61.94	21.5	6.97	36.08	57.3	46.43	68.17
Athens	59.7	57.78	61.69	32.4	31.24	33.52	79.6	59.31	99.98	33.4	27.12	39.75	9.3	4.85	13.70	81.4	74.51	88.29
Auglaize	40.6	27.98	53.26	14.3	0.00	28.64	34.0	22.77	45.21	13.5	0.00	29.14	10.1	7.98	12.15	81.0	72.06	89.87
Belmont	68.7	63.55	73.75	29.8	25.22	34.28	37.3	31.66	43.00	31.0	24.41	37.63	10.4	8.27	12.50	78.3	68.65	87.92
Brown	50.7	47.14	54.26	21.6	15.17	28.00	62.5	57.25	67.83	22.6	13.57	31.57	12.4	10.00	14.76	82.1	78.87	85.24
Butler	40.8	27.81	53.79	11.6	4.38	18.81	33.7	19.12	48.29	11.6	4.38	18.81	12.1	4.78	19.42	79.7	77.56	81.91
Carroll	62.9	47.34	78.47	29.2	19.41	39.04	63.5	47.10	79.98	27.4	12.25	42.54	15.5	7.12	23.88	72.3	64.30	80.34
Champaign	64.4	60.54	68.19	25.0	15.95	34.04	51.0	48.07	54.01	25.7	15.93	35.90	12.5	9.46	15.59	77.0	54.66	99.32
Clark	56.2	50.19	62.23	15.5	12.94	18.05	53.3	19.59	87.05	10.6	7.52	13.63	14.1	3.88	24.41	81.5	69.21	93.88
Clermont	40.7	28.84	52.62	6.1	0.00	12.43	46.3	42.04	50.59	6.1	0.00	12.49	12.5	9.40	15.54	81.0	76.39	85.58
Clinton	54.0	47.64	60.34	2.4	0.00	5.33	45.6	39.16	52.07	2.4	0.19	4.53	12.3	5.27	19.33	73.5	62.38	84.65
Columbiana	61.6	53.68	69.44	28.0	15.69	40.25	43.1	30.19	55.91	28.0	15.71	40.73	9.8	2.74	16.77	80.9	69.95	91.83
Coshocton	65.4	57.65	73.15	19.3	8.81	29.73	78.4	75.86	80.96	19.3	7.54	31.20	8.8	3.65	13.93	85.8	78.05	93.65
Crawford	64.6	57.67	71.51	23.4	17.86	28.96	38.4	16.50	60.28	21.5	17.20	25.90	12.9	7.61	18.16	81.5	77.59	85.42
Cuyahoga	58.2	48.40	68.07	21.4	11.52	31.21	45.2	22.54	67.94	21.4	6.39	36.33	12.5	9.89	15.12	75.7	69.81	81.64
Darke	57.9	45.11	70.63	17.0	10.21	23.71	43.7	32.31	55.16	17.6	10.23	25.50	12.3	7.25	17.37	78.9	70.10	87.61
Defiance	52.8	45.68	59.94	12.2	9.75	14.60	40.1	30.33	49.82	12.2	8.30	17.28	14.2	13.40	14.97	73.0	69.06	76.87
Delaware	32.4	26.85	37.87	8.5	5.84	11.23	71.0	66.35	75.65	8.5	5.81	11.33	6.7	4.37	9.13	92.7	88.79	96.64
Erie	53.5	43.84	63.18	16.0	11.70	20.25	56.2	48.04	64.30	16.0	12.74	20.26	16.7	8.78	24.53	77.3	65.92	88.64
Fairfield	43.1	30.10	56.07	14.9	6.82	22.89	45.8	40.90	50.75	15.4	7.87	22.88	10.0	3.78	16.31	85.5	79.05	91.88
Fayette	60.5	49.73	71.23	36.2	31.56	40.93	31.5	14.66	48.36	36.2	23.91	48.58	19.1	10.07	28.17	72.2	58.57	85.74

Due to the sampling methods used in the survey, relatively small numbers of children were screened in each county. County percentages shaded in teal have a relative standard error of more than 30 percent. They have been deemed unreliable by ODH and should not be cited. Also, ODH does not advise comparing any data across counties because the precision of the rates in each county cannot be reliably determined. The width of each confidence interval (CI) gives us some idea about how certain we are about the true prevalence of each measure in each county. In counties with wide confidence intervals, we are less certain about the true prevalence, while in counties with small intervals, we are more certain. In technical terms, the 95 percent confidence interval means if we were to repeat the survey 100 times, 95 of the confidence intervals we found would contain the true prevalence for that measure in that county.

Appendix 4: Prevalence of Various Oral Health Measures Among 3rd Grade Students, by County, 2009-2010 Oral Health Survey of Ohio Schoolchildren

County	History of Tooth Decay			Untreated Cavities			One or More Sealants			Early or Urgent Dental Needs			Toothache in the Last Six Months			Dental Visit During the Past Year		
	Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI	
Franklin	48.5	39.57	57.47	31.1	25.80	36.49	53.8	41.40	66.11	32.0	25.44	39.01	10.3	7.11	13.44	81.6	75.36	87.93
Fulton	44.6	31.46	57.82	9.4	0.18	18.67	21.2	9.22	33.27	9.4	0.27	19.40	9.2	5.21	13.26	87.2	80.47	93.92
Gallia	55.8	43.36	68.18	35.9	22.42	49.34	57.4	55.31	59.53	35.9	24.23	49.98	12.9	6.74	19.01	71.8	58.12	85.39
Geauga	35.1	26.80	43.38	24.4	11.14	37.69	67.3	62.63	72.04	22.5	11.02	34.58	10.9	4.84	17.05	90.5	85.78	95.20
Greene	58.6	50.01	67.17	7.1	4.43	9.79	39.0	25.55	52.47	7.5	5.42	9.65	15.2	2.08	28.29	88.4	85.81	91.07
Guernsey	58.5	49.46	67.57	17.7	15.89	19.59	75.6	62.36	88.86	15.0	8.62	21.61	9.3	2.60	16.04	79.5	72.24	86.71
Hamilton	39.5	32.15	46.90	7.8	2.89	12.65	60.9	47.90	73.94	7.3	2.93	12.84	10.6	4.66	16.55	77.9	72.01	83.81
Hancock	44.3	34.84	53.67	14.0	8.15	19.94	30.6	23.43	37.76	14.0	8.15	20.39	11.5	6.93	16.02	85.2	78.32	92.06
Hardin	62.7	41.09	84.23	20.7	11.04	30.35	38.3	33.55	43.11	19.6	6.75	33.30	8.1	0.00	16.49	82.0	77.02	86.94
Harrison	59.8	53.87	65.69	29.6	9.70	49.49	32.3	13.57	50.93	29.6	12.24	49.49	14.2	9.73	18.61	72.2	55.95	88.36
Henry	53.7	47.00	60.34	13.3	4.89	21.75	30.9	19.02	42.78	13.3	4.89	21.75	9.6	5.15	13.96	83.0	70.36	95.57
Highland	58.2	43.36	72.97	23.0	9.62	36.42	54.5	52.51	56.58	23.4	10.83	37.13	10.1	0.40	19.71	79.7	74.99	84.41
Hocking	57.3	48.92	65.76	18.7	14.98	22.35	75.9	67.85	84.00	18.7	14.70	24.82	7.4	1.45	13.36	74.7	51.81	97.62
Holmes	75.0	61.02	88.94	48.6	31.86	65.43	27.4	13.77	40.93	48.6	31.48	65.81	16.8	12.47	21.21	49.9	19.44	80.30
Huron	57.0	44.98	69.06	21.9	10.45	33.33	30.9	18.82	43.03	21.9	12.29	31.53	16.8	13.74	19.84	68.2	46.40	90.04
Jackson	57.9	50.20	65.61	39.6	28.32	50.88	82.6	79.83	85.45	40.0	27.69	52.40	20.1	10.43	29.82	69.9	67.67	72.22
Jefferson	74.2	69.55	78.92	44.7	35.61	53.73	39.8	25.63	53.91	43.6	28.10	59.03	14.2	5.71	22.64	70.8	59.53	81.97
Knox	58.4	43.47	73.24	18.4	12.51	24.26	46.8	18.55	75.14	20.1	13.98	26.26	6.9	3.66	10.04	79.5	75.03	83.89
Lake	46.7	32.97	60.35	22.5	15.31	29.74	51.9	41.55	62.31	22.3	14.97	30.41	8.1	3.78	12.46	79.9	72.10	87.77
Lawrence	62.2	47.52	76.81	44.0	24.95	62.98	68.3	58.94	77.75	44.0	24.75	63.19	17.3	7.24	27.43	74.8	61.35	88.23
Licking	40.3	34.56	46.09	9.9	6.22	13.55	68.7	59.60	77.90	9.9	6.22	13.55	6.3	4.88	7.67	85.8	79.10	92.40
Logan	47.9	41.36	54.42	19.5	9.70	29.25	29.8	23.64	35.89	19.9	7.19	32.67	12.9	5.65	20.11	76.8	72.47	81.22
Lorain	49.2	26.69	71.77	13.8	8.86	18.64	47.5	19.24	75.77	15.1	8.07	22.09	14.4	0.00	29.66	81.4	70.67	92.21
Lucas	47.9	40.54	55.21	6.3	2.53	10.10	55.5	48.13	62.96	6.2	2.35	10.45	9.2	6.57	11.83	85.0	81.28	88.75

Due to the sampling methods used in the survey, relatively small numbers of children were screened in each county. County percentages shaded in teal have a relative standard error of more than 30 percent. They have been deemed unreliable by ODH and should not be cited. Also, ODH does not advise comparing any data across counties because the precision of the rates in each county cannot be reliably determined. The width of each confidence interval (CI) gives us some idea about how certain we are about the true prevalence of each measure in each county. In counties with wide confidence intervals, we are less certain about the true prevalence, while in counties with small intervals, we are more certain. In technical terms, the 95 percent confidence interval means if we were to repeat the survey 100 times, 95 of the confidence intervals we found would contain the true prevalence for that measure in that county.

Appendix 4: Prevalence of Various Oral Health Measures Among 3rd Grade Students, by County, 2009-2010 Oral Health Survey of Ohio Schoolchildren

County	History of Tooth Decay			Untreated Cavities			One of More Sealants			Urgent or Early Dental Needs			Toothache in the Last Six Months			Dental Visit During the Past Year		
	Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI	
Madison	32.8	26.23	39.30	19.9	15.91	23.95	59.5	51.64	67.27	18.5	16.41	20.67	11.4	3.00	19.78	84.4	79.63	89.16
Mahoning	59.6	38.17	81.08	22.2	8.66	35.67	55.1	39.35	70.89	22.2	8.05	36.28	12.5	5.88	19.07	78.0	63.96	92.05
Marion	51.7	42.39	61.06	25.8	13.18	38.37	37.3	24.13	50.55	33.8	11.11	60.62	13.5	1.30	25.76	82.9	72.91	92.91
Medina	51.2	51.12	63.34	18.3	6.54	30.12	51.5	35.16	67.89	18.3	5.67	30.99	8.9	3.52	14.22	86.7	79.67	93.79
Meigs	55.3	42.54	68.10	43.3	39.25	47.32	82.9	77.75	88.15	45.0	33.83	57.11	9.8	0.00	20.07	67.7	65.48	69.85
Mercer	53.5	45.20	61.77	13.1	2.37	23.89	35.0	22.07	47.94	13.1	2.37	23.89	3.0	1.63	4.37	84.5	71.78	97.31
Miami	50.9	45.33	56.38	17.9	14.28	21.52	33.7	27.92	39.47	17.9	14.19	22.07	13.9	8.24	19.53	79.8	68.14	91.45
Monroe	65.9	59.42	72.29	32.1	20.82	43.47	78.3	74.60	81.98	33.6	18.22	49.01	20.4	16.09	24.74	80.1	66.70	93.49
Montgomery	47.7	39.79	55.67	12.4	6.98	17.76	48.5	38.81	58.18	12.0	6.23	17.93	11.5	8.63	14.31	83.0	76.26	89.67
Morgan	75.1	56.17	93.96	35.4	33.49	37.32	66.3	65.13	67.45	35.4	32.88	39.39	16.1	12.72	19.52	80.8	76.81	84.74
Morrow	41.9	30.71	53.12	16.3	4.50	28.14	41.9	16.68	67.04	15.7	4.07	27.34	13.2	8.72	17.61	71.7	63.36	79.95
Muskingum	56.3	48.97	63.71	26.5	23.51	29.49	68.0	60.32	75.75	26.5	23.72	29.64	8.8	2.04	15.53	78.8	68.86	88.68
Noble	59.2	44.45	74.01	23.6	9.94	37.27	85.4	72.60	98.27	25.5	12.30	43.46	13.0	0.00	28.91	84.3	80.60	88.05
Ottawa	58.6	55.68	61.58	26.3	17.96	34.70	48.3	27.87	68.63	26.4	21.49	31.67	9.8	3.24	16.39	80.6	70.52	90.67
Paulding	62.1	54.20	69.94	22.4	14.95	29.75	43.0	38.19	47.72	22.4	16.42	30.49	9.4	0.00	21.45	77.3	62.57	92.04
Perry	62.7	52.30	73.13	23.5	15.16	31.81	59.7	38.11	81.25	23.5	14.28	32.69	8.7	5.76	11.68	76.9	68.44	85.37
Pickaway	59.2	52.95	65.45	36.0	21.32	50.69	38.9	34.59	43.28	36.0	21.09	51.17	10.2	3.76	16.71	82.1	70.70	93.41
Pike	62.9	62.15	63.61	29.2	22.23	36.15	71.3	63.11	79.46	29.2	22.23	36.15	17.8	12.49	23.20	67.0	62.12	71.96
Portage	49.6	41.27	57.87	22.7	11.84	33.63	60.0	52.77	67.28	22.4	11.44	33.66	10.2	5.21	15.15	85.3	80.13	90.55
Preble	43.2	29.04	57.41	17.2	17.09	17.22	19.6	0.00	43.11	18.6	8.71	31.80	11.2	3.09	19.35	76.8	72.99	80.70
Putnam	57.3	45.69	68.87	11.4	5.87	16.96	34.7	28.19	41.25	12.2	6.36	18.60	9.2	4.57	13.93	87.7	80.62	94.74
Richland	64.8	54.89	74.70	23.9	14.68	33.21	34.5	27.67	41.37	25.3	14.81	35.87	14.0	3.72	24.21	79.0	71.69	86.23
Ross	60.0	50.59	69.46	33.4	20.98	45.87	38.5	24.42	52.60	33.4	22.67	45.94	12.3	5.76	18.82	73.5	65.63	81.41
Sandusky	52.0	41.70	62.26	12.4	1.42	23.38	46.5	26.44	66.61	12.4	1.42	23.38	6.5	0.00	13.23	74.8	67.72	81.82
Scioto	56.2	41.16	71.24	27.0	21.24	32.69	30.8	16.78	44.76	27.0	9.92	44.00	27.2	12.70	41.61	68.5	58.84	78.06

Due to the sampling methods used in the survey, relatively small numbers of children were screened in each county. County percentages shaded in teal have a relative standard error of more than 30 percent. They have been deemed unreliable by ODH and should not be cited. Also, ODH does not advise comparing any data across counties because the precision of the rates in each county cannot be reliably determined. The width of each confidence interval (CI) gives us some idea about how certain we are about the true prevalence of each measure in each county. In counties with wide confidence intervals, we are less certain about the true prevalence, while in counties with small intervals, we are more certain. In technical terms, the 95 percent confidence interval means if we were to repeat the survey 100 times, 95 of the confidence intervals we found would contain the true prevalence for that measure in that county.

Appendix 4: Prevalence of Various Oral Health Measures Among 3rd Grade Students, by County, 2009-2010 Oral Health Survey of Ohio Schoolchildren

County	History of Tooth Decay			Untreated Cavities			One of More Sealants			Urgent or Early Dental Needs			Toothache in the Last Six Months			Dental Visit During the Past Year		
	Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI		Prev	95 percent CI	
Seneca	55.7	37.01	74.46	12.7	7.43	18.04	35.6	30.37	40.73	13.5	6.73	21.19	5.3	1.52	9.07	91.1	84.31	97.80
Shelby	47.6	41.14	53.98	14.9	7.58	22.21	44.1	39.09	49.19	14.9	7.31	23.64	10.5	8.81	12.17	74.5	68.17	80.79
Stark	59.9	52.94	66.86	21.2	14.11	28.35	50.9	44.74	57.15	21.5	13.94	29.01	8.5	4.35	12.69	80.8	78.23	83.36
Summit	53.4	43.24	63.58	10.0	5.86	14.13	63.7	58.69	68.80	10.0	4.85	17.59	11.3	5.07	17.63	80.0	71.45	88.60
Trumbull	66.9	57.91	75.82	22.0	18.52	25.56	59.4	43.01	75.83	22.0	17.49	29.36	16.7	8.98	24.39	79.4	73.01	85.75
Tuscarawas	62.3	56.35	68.21	24.7	21.87	27.57	49.2	42.58	55.85	24.7	16.12	33.32	13.9	8.26	19.51	84.4	79.03	89.79
Union	43.2	36.08	50.28	16.4	6.98	25.77	54.5	42.49	66.52	14.9	5.57	24.29	5.3	0.73	9.93	89.0	84.24	93.85
Van Wert	40.6	34.12	47.02	7.9	3.14	12.62	25.9	15.57	36.15	7.9	3.14	12.62	4.5	1.08	7.92	64.2	31.35	97.08
Vinton	72.6	65.85	79.31	41.5	40.50	42.45	70.3	67.25	73.39	41.5	40.50	42.45	22.9	18.96	26.75	76.3	60.01	92.69
Warren	27.6	23.61	31.50	1.6	0.00	3.80	61.2	54.02	68.43	1.4	0.00	3.77	6.5	2.96	10.08	86.3	85.14	87.54
Washington	63.2	48.46	77.98	35.6	19.61	51.61	47.9	29.20	66.67	35.6	10.85	62.07	18.4	3.22	33.50	76.6	72.10	81.08
Wayne	58.7	52.90	64.57	20.7	12.05	29.44	45.2	34.22	56.21	21.2	9.27	33.23	10.5	5.05	16.01	75.6	67.05	84.07
Williams	45.8	37.85	53.71	17.0	15.64	18.35	27.4	7.67	47.07	17.0	15.35	18.64	9.7	0.00	21.64	72.4	61.14	83.74
Wood	42.1	32.72	51.57	5.8	3.37	8.23	39.7	31.12	48.29	6.8	3.72	10.57	15.1	9.96	20.19	84.5	78.48	90.62
Wyandot	63.7	61.12	66.32	30.7	20.73	40.76	30.2	12.05	48.43	29.0	22.84	36.13	20.2	12.56	27.78	75.5	71.21	79.81
Statewide	51.2	49.21	53.27	18.7	17.05	20.31	50.4	47.06	53.64	18.8	16.49	21.04	11.4	10.42	12.37	80.1	78.84	81.36

Due to the sampling methods used in the survey, relatively small numbers of children were screened in each county. County percentages shaded in teal have a relative standard error of more than 30 percent. They have been deemed unreliable by ODH and should not be cited. Also, ODH does not advise comparing any data across counties because the precision of the rates in each county cannot be reliably determined. The width of each confidence interval (CI) gives us some idea about how certain we are about the true prevalence of each measure in each county. In counties with wide confidence intervals, we are less certain about the true prevalence, while in counties with small intervals, we are more certain. In technical terms, the 95 percent confidence interval means if we were to repeat the survey 100 times, 95 of the confidence intervals we found would contain the true prevalence for that measure in that county.

Ohio Department of Health

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