

MESSAGE FROM THE MEDICAL OFFICER OF HEALTH



On behalf of Healthy and Safe Communities, I am pleased to endorse and present the City of Hamilton's Oral Health Report, Infographic and Information Report.

Oral health is inextricably linked to overall health; it affects physical, mental health and behavioural health. Ultimately, healthier mouths mean healthier people and healthier people mean stronger communities.

Good oral health and access to care is strongly linked to a person's socio-economic status. This report encourages us to take note of systemic barriers. When it comes to oral health, different people have different needs. A one-size-fits-all approach to oral health may sound like a good way to support equal access to oral health care, but it does not work in practice. We need to make sure all people have the supports they need to access oral health.

We can reduce the cost of oral health by stopping problems before they start. Prevention programs help people avoid serious issues such as cavities, abscesses, and gum disease that can be very expensive to treat. We need to ensure we are using our community resources wisely and work together to ensure comprehensive prevention programs exist in Hamilton.

The Oral Health Reports raise our awareness of the importance of oral health to overall health. Local data reveals what is happening in Hamilton and identifies those at risk of poor health outcomes. The data will help us to develop and improve universal programs to improve the health of the entire community while targeting strategies to priority populations experiencing health disparities.

Information in this report will be used to inform oral health programming for the City of Hamilton. Such local evidence supports decision-making and planning, demonstrates accountability, raises awareness about local issues, and, most importantly, informs strategic spending of limited resources.

A handwritten signature in black ink that reads "Elizabeth Richardson". The signature is fluid and cursive.

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CITY OF HAMILTON ORAL HEALTH REPORT

OCTOBER 2017

EXECUTIVE SUMMARY

This report summarizes the oral health status of Hamiltonians, as well as the oral health inequities that exist within our community. The following is a summary of the key findings:

Oral health issues are prevalent in Hamilton

- The 2016-2017 oral screening program found 19,346 decayed, missing/extracted, and filled teeth among Kindergarten and Grade 2 students; 42% of Grade 2 students had a history of tooth decay.
- 2 in 3 Hamilton youth said they experienced oral or facial pain or discomfort in the past month.
- 312 Hamiltonians had day surgery to correct oral health issues in 2016; nearly half were children.
- On average, 66 Hamiltonians (30+ years-old) will be diagnosed with oral cancer annually.

Oral health care is inaccessible to many Hamiltonians

- 1 in 10 Grade 2 students in Hamilton require urgent dental care.
- Locally, it is estimated that over 185,000 Hamiltonians have no dental insurance.
- Nearly 1,500 Hamiltonians sought dental care through hospital emergency departments (ED) in 2016; this is an increasing trend, especially among children and seniors.
- There are 8,000 eligible children in Hamilton who are not enrolled in Healthy Smiles Ontario.
- 3,227 Hamiltonians received dental care at the PHS Dental Clinic in 2016 and represents a 93% increase when compared to the 1,675 clients served in 2013.
- Hamilton's Dental Health Bus provided care to 1,965 adults and seniors in 2016.

Oral health issues burden Hamiltonians unequally

- Just 11% of the student population accounted for all 3,819 untreated cavities found through the oral screening program (2016-2017) – most of these students have multiple untreated cavities.
- Greater need for urgent dental care among Hamilton children was linked to socio-economic factors such as single parent families, low income households, and recent immigration.
- Hamilton's low income seniors had the poorest access to oral health care compared to any other age and income group; 77% lack dental insurance and 60% avoid regular visits to the dentist.
- Hamilton's rate of oral day surgeries and dental-related ED visits were greatest in lower Hamilton, especially in neighbourhoods with postal codes beginning with L8R, L8N, L8L, and L8M. There is a greater need for access to preventative care among residents from these neighbourhoods.

BACKGROUND

Oral health impacts overall health and well-being. Poor oral health has been linked to other diseases and health conditions, such as heart disease, respiratory disease, stroke, malnutrition, low birth weight, and psycho-social well-being^[1-2]. You cannot be healthy without good oral health.

Poor oral health is preventable. Despite this, oral health issues are common. In particular, tooth decay (cavities) is one issue that significantly burdens local population health. Although it is largely preventable, tooth decay will impact 96-100% of adults, making it one of the most common diseases globally and locally^[3-4]. One common method of preventing tooth decay is through the use of fluorides, which can be used safely and effectively in a number of ways^[2]:

- Routinely brushing with fluoridated toothpaste
- Fluoride mouth rinse programs in schools
- Professionally-applied fluoride varnishes
- Community water fluoridation

Prevention is good economics; it saves money while making communities healthier. Many preventative oral health interventions show a return on investment. For example, the return on investment for community water fluoridation is estimated to be \$38 saved for every \$1 invested^[5].

The cost of care is a barrier to good oral health. When Ontarians need dental care they usually have two options: pay for care out-of-pocket or, if they are fortunate to have coverage, claim it through private or third-party insurance. Only 1.3% of dental care expenditures in Ontario are publicly funded^[6]. Ontario's public sector spending on dental care is \$5.67 per person which is the lowest among all Canadian provinces and territories (nationally, it's \$19.54 per person)^[6]. Hence, it is not surprising that income and dental insurance are the most important determinants of dental care utilization^[7]. These barriers to care are creating a burden on other parts of the health care system: publicly-funded hospital emergency departments and operating rooms (day surgery units) are frequently being used to treat preventable oral disorders^[8]. In fact, the most common reason for day surgeries among Canadian children is treatment of tooth decay (cavities)^[9].

Understanding the oral health of local populations is important. Such local evidence supports decision-making and planning, demonstrates accountability, raises awareness about local issues, and, most importantly, informs strategic spending of limited resources. The oral health of Hamiltonians is summarized in this population health assessment and surveillance report which provides a local overview of oral health status, emerging trends, and local populations with the greatest needs.

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CHILD AND YOUTH ORAL HEALTH

ORAL HEALTH STATUS

Self-Reported Oral Health

According to the 2013-2014 Canadian Community Health Survey (CCHS), 89.3% of Hamilton youth (12-19) report having good, very good, or excellent oral health; this is similar to the equivalent Ontario estimate (89.7%). Additionally, 2 in 3 (66.4%) Hamilton youth said they experienced oral or facial pain or discomfort in the past month, which is greater (but not significantly different) than the equivalent Ontario estimate (55.1%). Lastly, 85.6% of Hamilton youth report brushing their teeth at least twice daily.

Tooth Decay (Cavities)

Public Health Services conducts annual oral screenings of all Kindergarten (JK and SK) and Grade 2 students at all publicly-funded schools in Hamilton. Between 2012 and 2017, over 72,000 oral screenings were completed for this student population and the results are summarized in **Table 1**; these oral screening outcomes did not change significantly during the reported time period.

Among the 14,934 Kindergarten and Grade 2 students screened in the 2016-2017 school year, the following findings were observed:

- 23% of Kindergarten and 42% of Grade 2 students had a history of tooth decay.
- 19,346 decayed, missing/extracted, or filled teeth were observed.
- 3,819 untreated cavities were observed.
- 9 schools with very high rates of untreated cavities; most were located in lower Hamilton.
- 0.1% (n=16) of Kindergarten and Grade 2 students had suspected fluorosis.

It is important to note that all untreated cavities (n=3,819) were found in just 11% of all Kindergarten and Grade 2 students (average of 2.4 untreated cavities per student).

Table 1. Oral screening results from Kindergarten (JK+SK) and Grade 2 students in Hamilton, 2012-2017.

School Year	Total Students Screened (Kindergarten and Gr 2)	% of Kindergarten students with cavity history ^[i]	% of Grade 2 students with cavity history ^[i]	Total number of untreated decayed teeth
2012-2013	14,360	22.1%	36.7%	3,719
2013-2014	14,521	23.0%	35.9%	3,800
2014-2015	14,165	22.8%	37.4%	3,604
2015-2016	14,354	23.8%	41.8%	3,763
2016-2017	14,934	22.8%	41.8%	3,819

Data Source: Oral Health Information Support System^[i] (2012-2017), City of Hamilton Public Health Services.

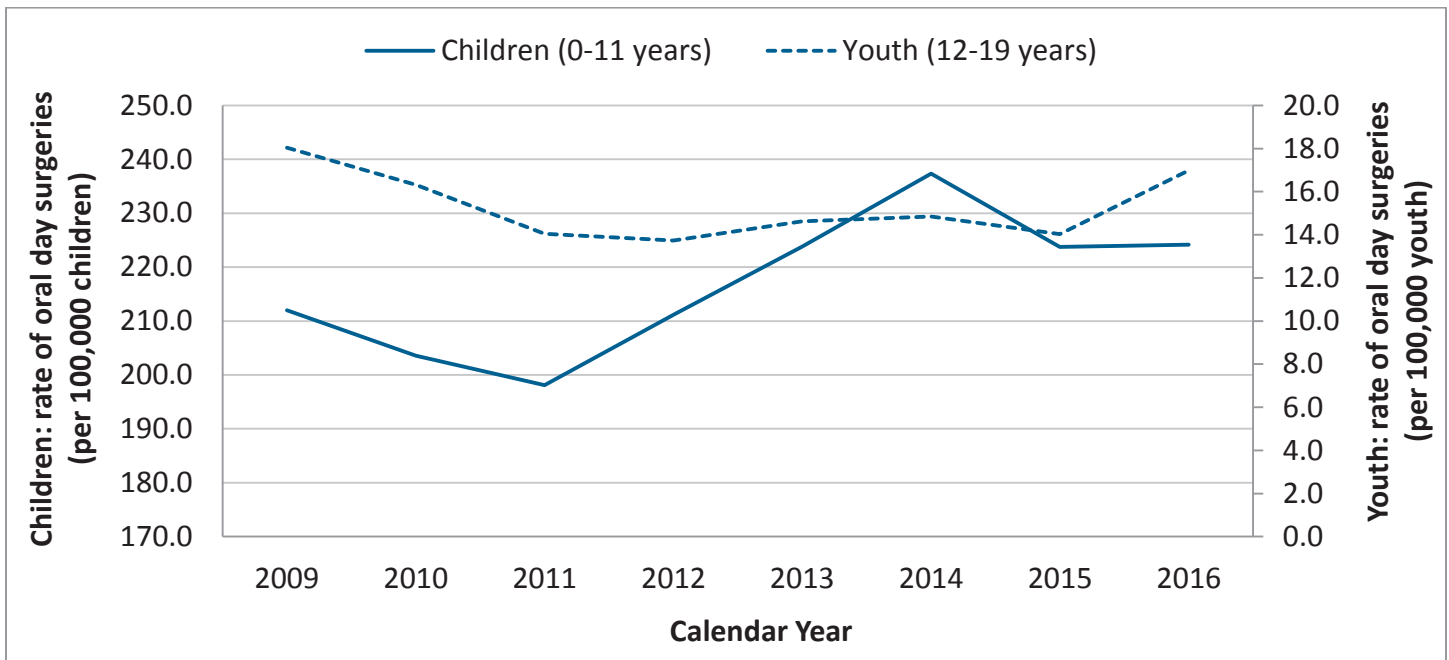
Oral Day Surgeries

Despite being largely preventable, oral day surgeries burden our healthcare system by using hospital resources (\$1,408 per surgery) and contributing to prolonged wait times for other pediatric care^[8]. Canadian children are more likely to have an oral day surgery if they are living in: (i) a rural or remote community, (ii) a neighbourhood with a high proportion of Aboriginal residents, or (iii) a materially-deprived neighbourhood^[9].

In 2016, 148 Hamilton children (0-11 years-old) had day surgery to correct an oral health issue; this translates to a local rate of 213.7 cases per 100,000 children, which is significantly lower than the equivalent Ontario rate. Oral day surgeries are less common among Hamilton youth (12-19 years-old) with 12 cases reported in 2016; the rate for Hamilton youth (23.8 cases per 100,000 youth) is significantly lower than the Ontario rate.

The historical rates for oral day surgeries among children and youth is shown in **Figure 1** for Hamilton (2009-2016). There was an apparent, but not statistically significant, increase in the rate of oral day surgeries among children that warrants continued monitoring. The youth rate did not change significantly during this period.

Figure 1. Rate (3-year moving mean) of oral day surgeries among children and youth in Hamilton (2009-2016).



Data Source: Ambulatory Emergency External Cause^[iii] [2007-2016], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: [11 Oct 2017].

Oral Cancer

Oral cancer is uncommon among children and youth; in Ontario, there are usually fewer than five new cases reported annually among residents under 15 years-old. There were no new cases of oral cancer among children and youth (under 15) in Hamilton between 2004 and 2012.

ORAL HEALTH CARE

Urgent Need for Care

Public Health Services’ annual oral screening program identifies children who require urgent dental care. Urgent dental needs include open obvious decay, infection, trauma, or irreversible periodontal disease. Treatment is provided to children through Public Health Services’ clinics or through a community dentist.

Urgent care needs are summarized in **Table 2** for Hamilton students (2012-2017). In the 2016-2017 school year, 798 (8.5%) Kindergarten and 531 (10.3%) Grade 2 students in Hamilton required urgent dental care. Urgent dental needs did not change significantly from year to year.

**Over
1 in 10
Grade 2 students in
Hamilton require urgent
dental care**

Table 2. Urgent need for dental care for Kindergarten (JK+SK) and Grade 2 students in Hamilton, 2012-2017.

School Year	Total Kindergarten students requiring urgent dental care	% of Kindergarten students requiring urgent dental care	Total Grade 2 students requiring urgent dental care	% of Grade 2 students requiring urgent dental care
2012-2013	829	8.8%	516	10.5%
2013-2014	837	8.9%	488	9.9%
2014-2015	785	8.5%	529	10.6%
2015-2016	813	8.8%	591	11.5%
2016-2017	798	8.5%	531	10.3%

Data Source: Oral Health Information Support System (2012-2017), City of Hamilton Public Health Services.

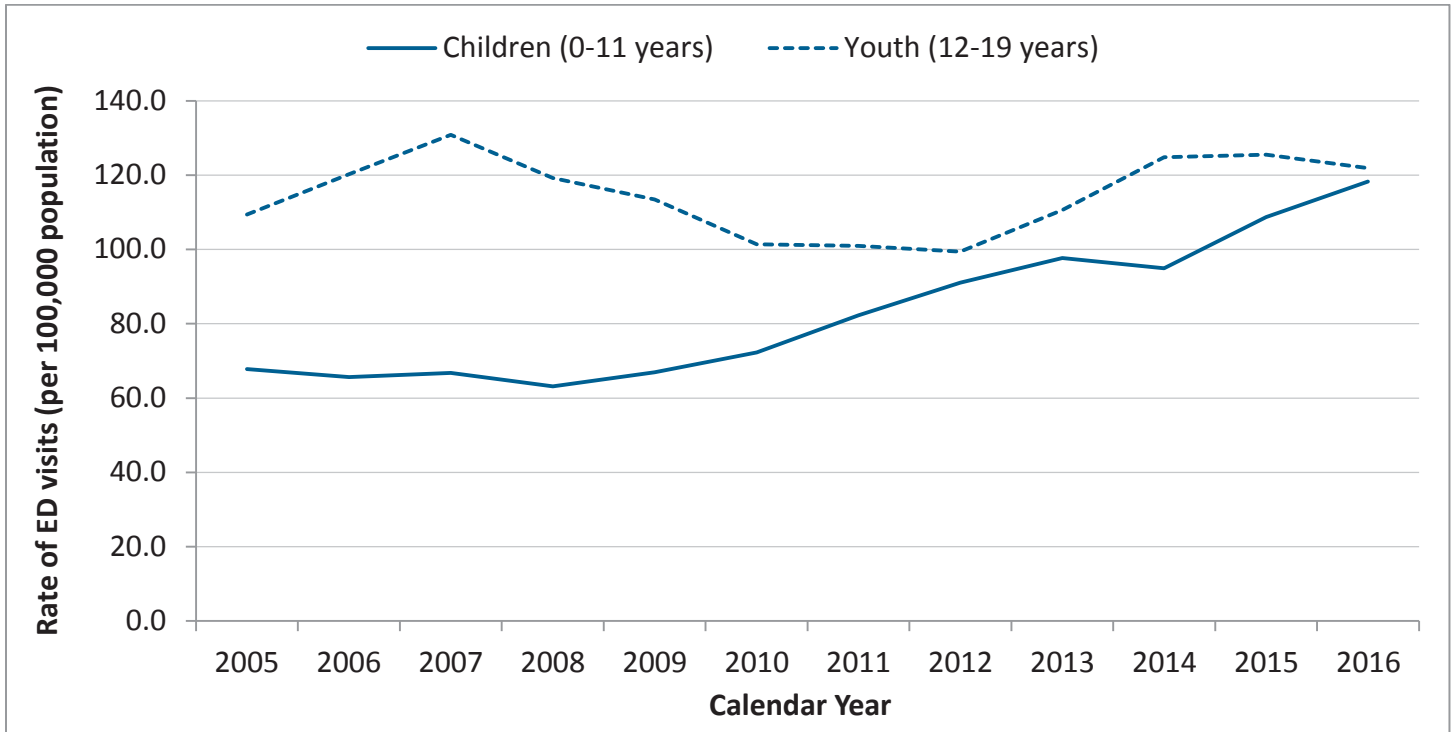
Access to Care

Hamilton children and youth commonly access dental care through a community dentist. According to local survey data, 77.1% of youth (12-19 years-old) said they usually visit the dentist for a check-up at least once per year (CCHS 2013-2014), which is lower but not statistically different than the provincial estimate (84.6%).

Another route of accessing dental services is through publicly-funded programs and clinics. Some children are eligible for the provincially-funded Healthy Smiles Ontario (HSO) program which covers dental services for those with financial hardships. There are an estimated 26,400 children eligible for the HSO program in Hamilton. As of March 2017, it is estimated that 18,390 children were enrolled in the HSO program locally; that is, HSO is not reaching an estimated 8,000 Hamilton children who are eligible and would benefit from this program (Oral Health Reporting Solution MOHLTC, 2017). In addition, dental clinics run by Hamilton Public Health Services provided preventative services to 481 children/youth and restorative services to 40 children/youth during the 2016-2017 school year.

Sometimes Hamilton children and youth will access dental care through hospital emergency departments (ED); this may be the only option for families who cannot afford care and are not covered by insurance or publicly-funded programs. In 2016, there were 143 dental-related ED visits among children and youth in Hamilton. Between 2005 and 2016, the rate of dental-related ED visits increased significantly by 63.9% for Hamilton children (see **Figure 2**). For Hamilton youth, there was no significant change in the trend over time for dental-related ED visits (values fluctuated within a range of 84.3 - 149.2 visits per 100,000 youth).

Figure 2. Rate (3-year moving mean) of dental-related emergency department (ED) visits among children and youth in Hamilton (2005-2016).



Data Source: Ambulatory Emergency External Cause^[ii] [2003-2016], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: [11 Oct 2017].

Barriers to Care

One barrier to dental care is cost. Ontarians not covered by private or third-party insurance must pay for their own dental care (unless they qualify for publicly-funded support). According to the 2013-2014 Canadian Community Health Survey, 73.5% of Hamilton youth (12-19 years-old) report having whole or partial dental insurance, which is similar to the equivalent provincial estimate (70.4%). Locally, this translates to an estimated 31,000 children and youth who lack dental insurance.

Lack of oral health literacy and awareness is another barrier to dental care. Among those who do not visit the dentist regularly, 80.7%^E of Hamilton youth said that regular dental visits are not necessary (CCHS 2013-2014).

Over
80%
of Hamilton Youth who do not visit the dentist regularly say that such visits are unnecessary^E

ADULT AND SENIOR ORAL HEALTH

ORAL HEALTH STATUS

Self-Reported Oral Health

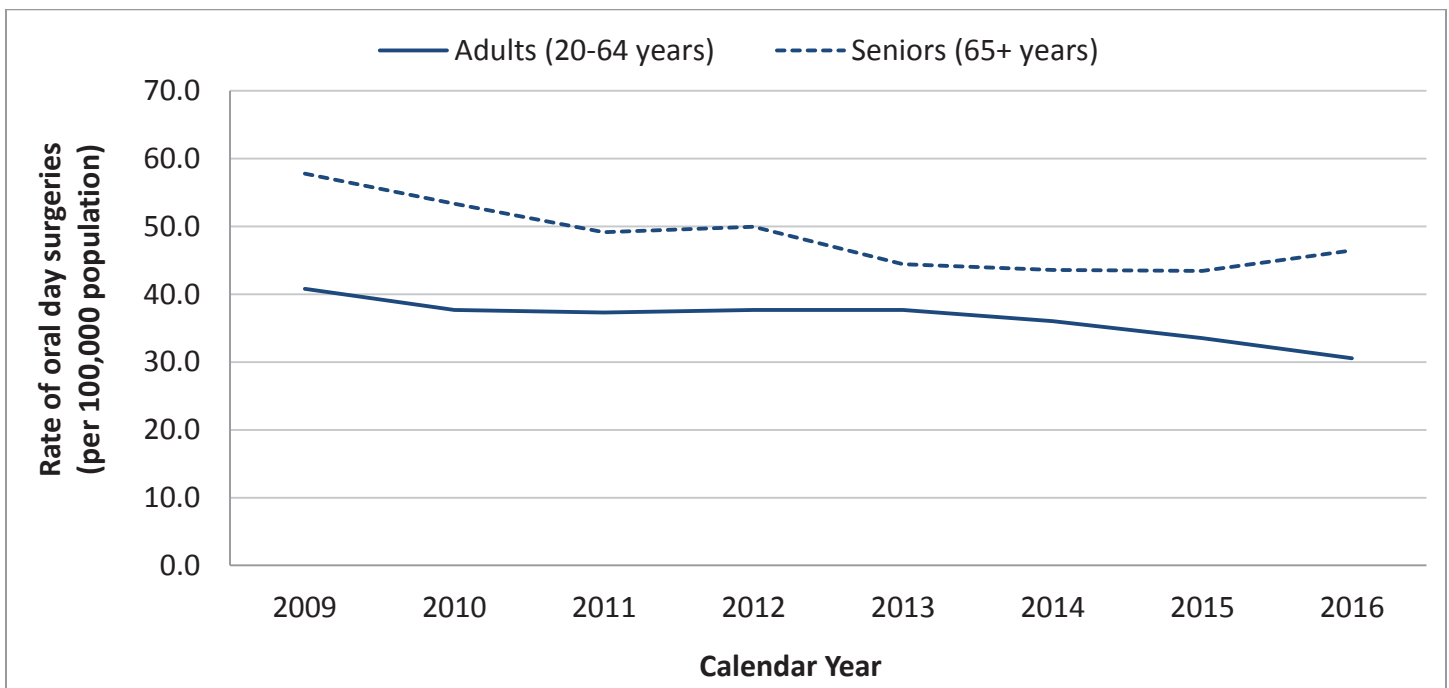
In Hamilton, 83.5% of adults (20-64 years-old) and 81.9% of seniors (65+ years-old) self-report having good, very good, or excellent oral health (CCHS 2013-2014), which were similar to the equivalent Ontario estimates. Additionally, 52.5% of adults and 38.8% of seniors in Hamilton said they experienced oral or facial pain or discomfort in the past month (CCHS 2013-2014); neither value was significantly different from the equivalent provincial estimates.

Oral Day Surgeries

There were 104 Hamilton adults (20-64 years-old) who had oral day surgery in 2016; this translates to a local rate of 30.0 cases per 100,000 adults which is significantly lower than the Ontario rate. Among Hamilton seniors (65+ years-old), 48 had an oral day surgery in 2016 which translates to a rate of 50.2 cases per 100,000 seniors (this is significantly lower than the Ontario rate).

The historical rates for oral day surgeries among adults and seniors is shown in **Figure 3** for Hamilton (2009-2016). Both rates were consistent over the reported timeframe (no statistically significant changes).

Figure 3. Rate (3-year moving mean) of oral day surgeries among adults and seniors in Hamilton (2009-2016).



Data Source: Ambulatory Emergency External Cause⁽ⁱⁱⁱ⁾ [2007-2016], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: [11 Oct 2017].

Oral Cancer

Oral cancer is one of the top 10 most prevalent cancers among Ontario males. The incidence of oral cancer increased significantly in Ontario between 2003 and 2012, especially among males. Provincially, the five-year survival ratio for oral cancer is 82.6% for younger adults (under 45 years-old), but declines to 58.6% or less for seniors (65+ years-old)^[10].

The primary causes of oral cancer are tobacco and alcohol use. Certain oral cancers are also linked to the sexually transmitted human papillomavirus (HPV)^[11]. The HPV vaccine is free, but not mandatory, for all Grade 7 students in Ontario.

On average, 38 Hamilton adults (30-64 years-old) and 34 Hamilton seniors (65+ years-old) will be diagnosed with oral cancer each year (5-year average: 2008-2012). Further, oral cancer causes an average of 7 deaths among adults and 10 deaths among seniors annually in Hamilton (5-year average: 2008-2012).

ORAL HEALTH CARE

Access to Care

Community dentists are the main providers of dental care for adults and seniors. In Hamilton, 70.7% of adults (20-64 years-old) and 57.0% of seniors (65+ years-old) said they usually visit the dentist for an annual check-up (CCHS 2013-2014); both values are similar to the provincial estimates for adults (72.8%) and seniors (58.6%).

Publicly-funded emergency care is also accessible to low income adults and seniors through the City of Hamilton's Dental Clinic and Dental Health Bus. This program provides mobile dental services including x-rays, dental fillings, uncomplicated tooth extractions, and antibiotics for dental infections. The total number of clients serviced by the Dental Clinic and Dental Health Bus increased between 2013 and 2016 (see **Table 3**).

Table 3. Number of clients at the City of Hamilton's Dental Health Bus and Dental Clinic (2013-2016).

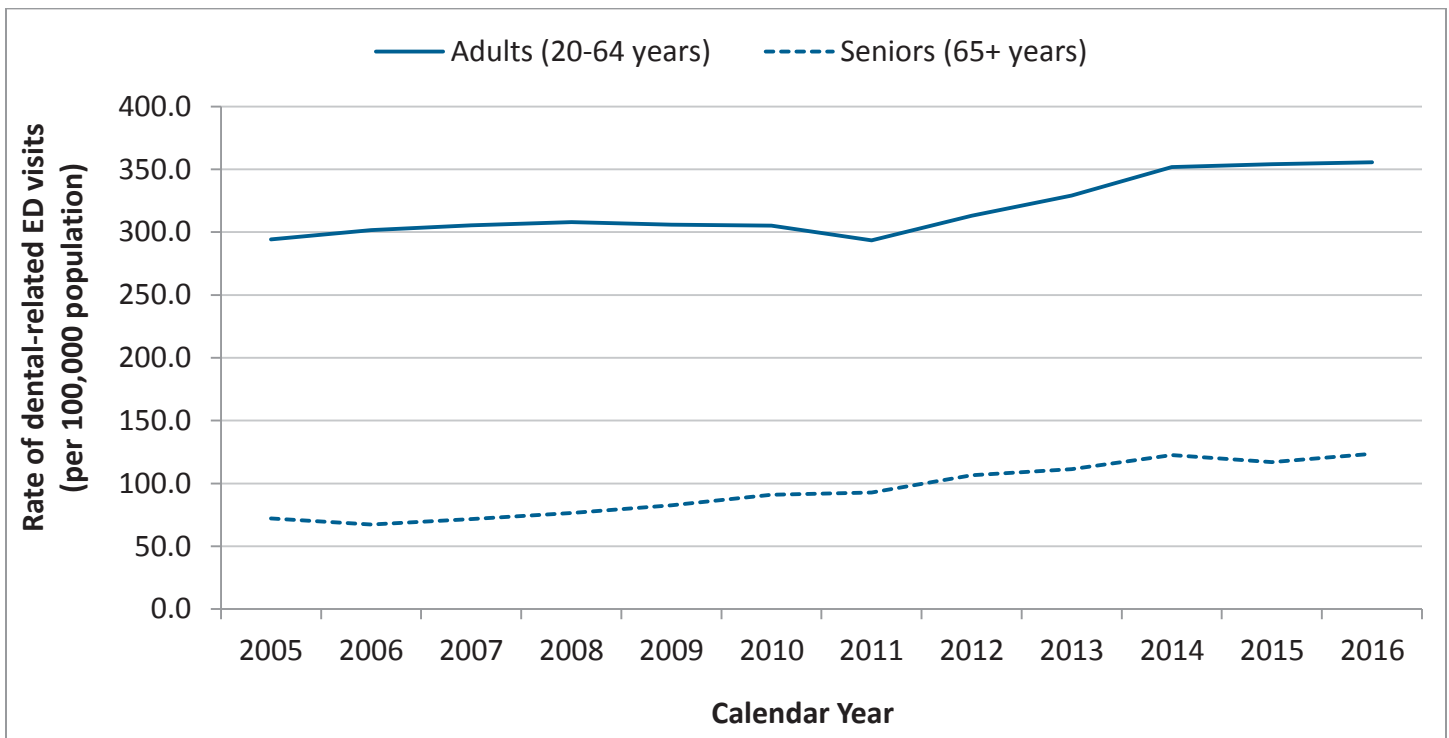
Dental Service	2013	2014	2015	2016
Total clients (received service) at Dental Health Bus	1,710	1,485	1,897	1,965
Individuals turned away from Dental Health Bus†	418	N/A	489	494
Total clients at Dental Clinics	1,675	1,480	2,561	3,227

Data Notes: (†) – Individuals were turned away due to lack of resources (staff, time, capacity).

Data Source: Dental Program (2013-2016), City of Hamilton Public Health Services.

Adults and seniors occasionally access dental care through Hamilton's emergency departments (ED). In Hamilton, there is an average of 1,202 ED visits among adults and 111 ED visits among seniors for oral health issues (5-year average: 2012-2016). The local rate of dental-related ED visits increased marginally (by 11.2%) for adults between 2005 and 2016 (see **Figure 4**). Similarly, between 2005 and 2016, the local rate for seniors doubled, from 68.7 to 139.0 dental-related ED visits per 100,000 seniors (statistically significant difference).

Figure 4. Rate (3-year moving mean) of dental-related emergency department (ED) visits among adults and seniors in Hamilton (2005-2016).



Data Source: Ambulatory Emergency External Cause^[ii] [2003-2016], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: [11 Oct 2017].

Barriers to Care

Cost is a common barrier to dental care, particularly for adults and seniors who lack dental insurance. In Hamilton, 71.5% of adults (20-64 years-old) and 34.1% of seniors (65+ years-old) report having whole or partial dental insurance (CCHS 2013-2014); both values are similar to equivalent provincial estimates for adults (69.8%) and seniors (35.8%). Based on this local data, it is estimated that 93,000 adults and 61,000 seniors living in Hamilton have no dental insurance. Further, among Hamilton adults who do not visit the dentist regularly, 35.7%^E said it is due to cost (CCHS 2013-2014).

**Nearly
2 in 3
Hamilton Seniors have no
dental insurance**

Lack of oral health literacy and awareness is another barrier to dental care. For Hamilton adults who do not visit the dentist regularly, 23.9%^E said it isn't necessary (CCHS 2013-2014). For Hamilton seniors who do not visit the dentist regularly, 65.8% said that regular visits aren't needed because they wear dentures (CCHS 2013-2014), although regular dental visits are still recommended for anyone with dentures.

ORAL HEALTH INEQUITIES

SOCIAL DETERMINANTS OF ORAL HEALTH

Oral health is not an equal experience for everyone. It is well understood that oral health is linked to a person's socio-economic well-being; for example, oral day surgeries are more common among children from marginalized neighbourhoods^[9]. These socially-produced differences in oral health are referred to as health inequities. Understanding health inequities and determining which populations have the greatest need for dental services can assist decision-makers with targeted investments that will have a greater impact.

To identify inequities, oral health survey results (CCHS 2013-2014) were reported for various income and age groups in Hamilton (see **Table 4**). In general, low income Hamiltonians had poorer oral health and less access to care compared to middle and high income Hamiltonians. Access to oral health care was particularly poor among low income seniors.

Table 4. Oral health inequities across income and age groups in Hamilton, 2013-2014.

Indicator	Youth (12-19)	Adults (20-64)	Seniors (65+)	Total
Excellent, very good, good oral health (%)				
Low income	95.6 [†]	69.4	78.2	75.2
Middle income	83.2	86.6	84.7	85.8
High income	88.5	90.3 [*]	83.2	89.6 [*]
Oral or facial pain or discomfort (%)				
Low income	68.4	59.7	41.5	56.5
Middle income	59.2	50.6	40.2	49.5
High income	75.4 [†]	49.5 [†]	25.8 ^E	49.4
Whole or partial dental insurance (%)				
Low income	71.9 [†]	54.5 [†]	23.5	49.4
Middle income	68.9 [†]	72.1 ^{†*}	38.0	64.9 [*]
High income	84.0 [†]	82.1 ^{†*}	52.0 [*]	79.8 [*]
Regularly visits the dentist (%)				
Low income	60.2	52.0	40.0	50.2
Middle income	86.4	73.4 [*]	65.9 [*]	73.3 [*]
High income	92.8 [*]	81.5 [*]	77.5 [*]	81.9 [*]

Data Notes: (*) – indicates a statistically greater value compared to another income group within the same age group; (†) – indicates a statistically greater value compared to one or more age groups within the same income group; (E) – use estimate with caution due to high sampling variability.

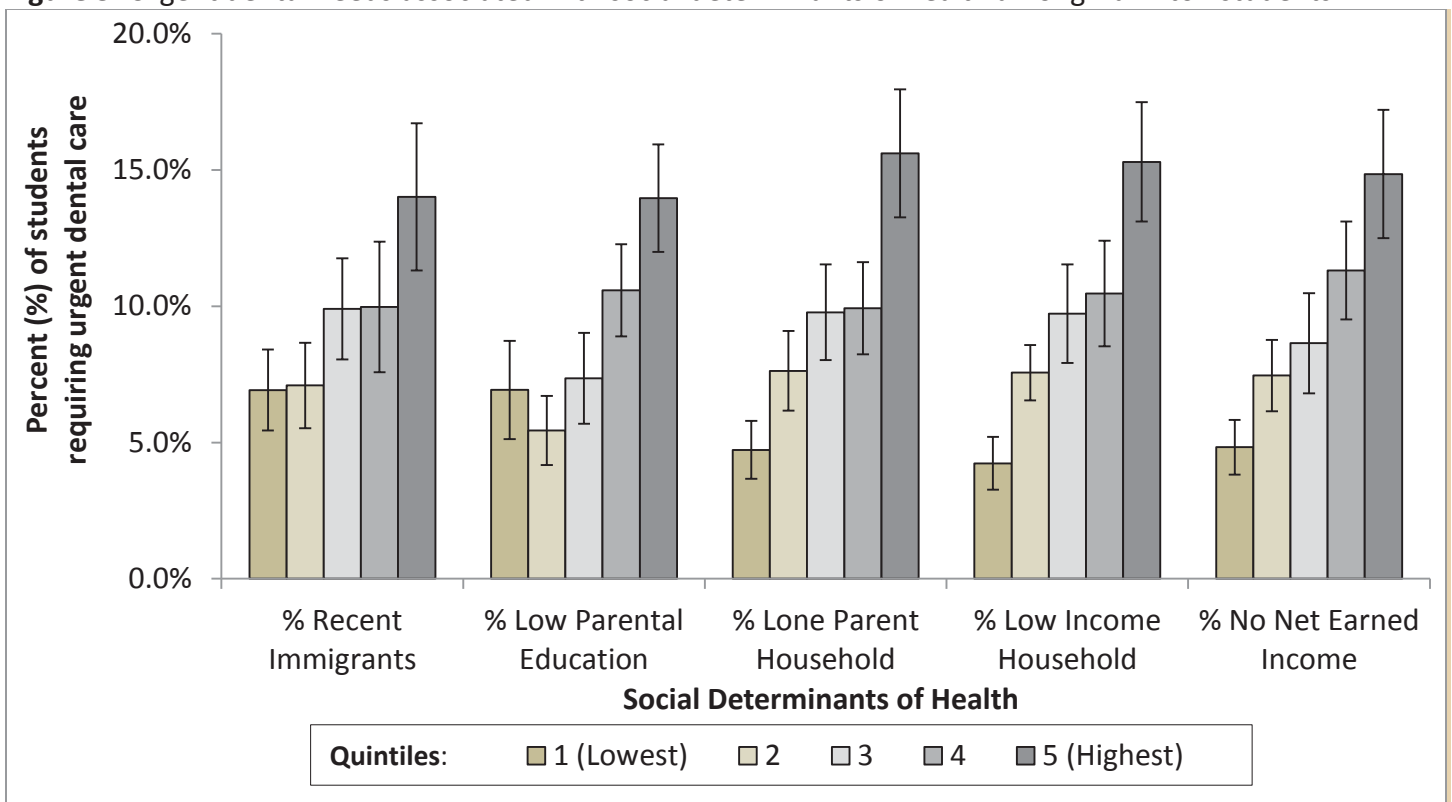
Data Source: Canadian Community Health Survey^[iv] [2013-2014], Statistics Canada.

School-level measures of social determinants of health were divided into quintiles and the percent of students (Kindergarten and Grade 2) requiring urgent dental care were reported for each quintile (see **Figure 5** – the highest quintile represents the student population with the greatest socio-economic marginalization).

Need for urgent dental care was associated with the following social determinants of health: recent immigrants, low parental education, lone parent households, low income households, and households with no net earned income.

The health equity gap was greatest for students from low income households: urgent dental needs were 3.6-times greater for the least affluent compared to the most affluent student populations (note: low income is based on the after-tax low-income measure for families with school-age children in neighbourhoods served by the school).

Figure 5. Urgent dental needs associated with social determinants of health among Hamilton students.

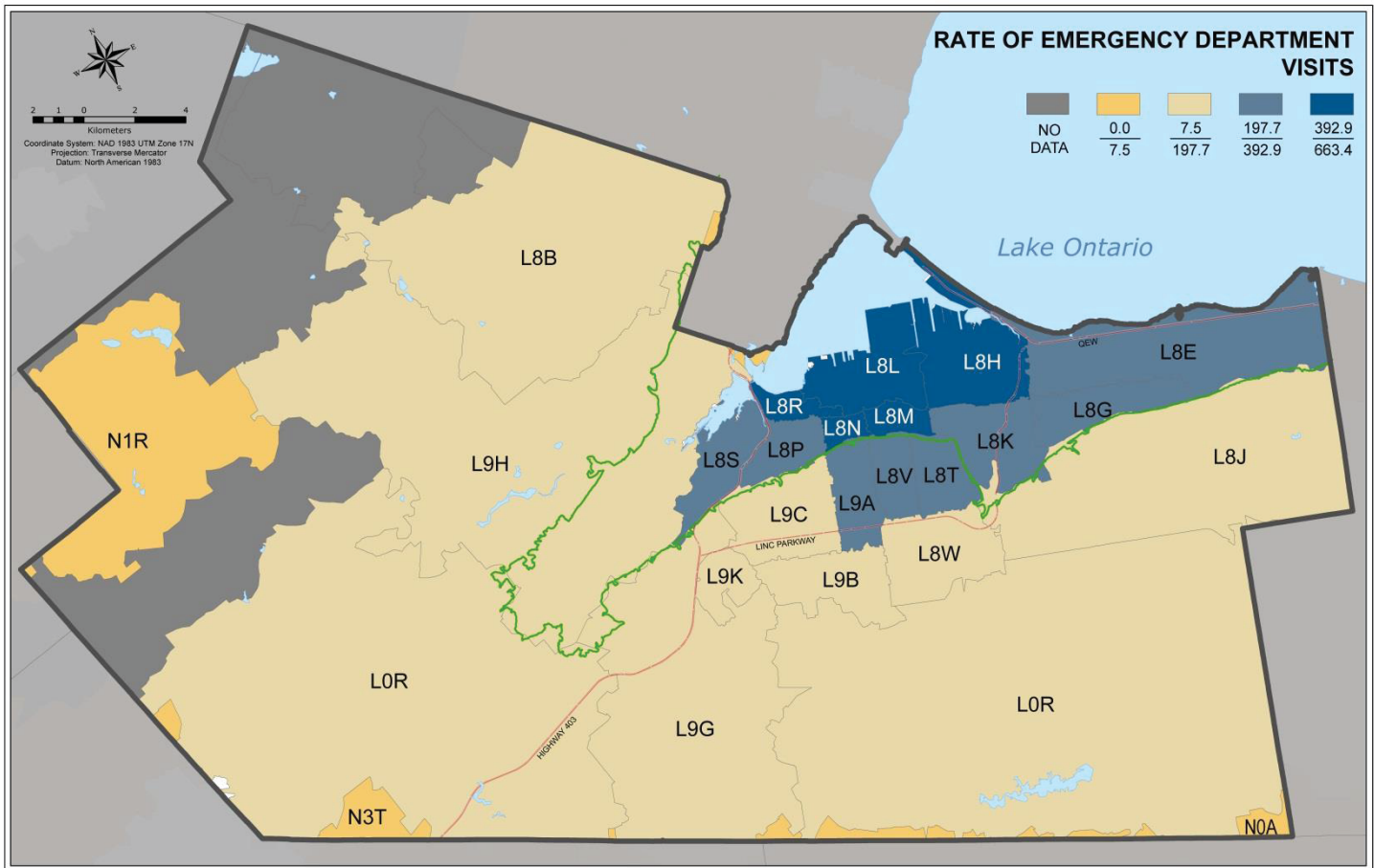


Data Note: Socio-economic data were divided into quintiles: the lowest quintile (1) represents the bottom 20% of values and the highest quintile (5) represents the top 20% of values (e.g., the highest quintile for recent immigrants represents the schools with the greatest percent of recent immigrants).

Data Sources: Oral Health Information Support System^[i] [2016-2017], City of Hamilton Public Health Services; Education Opportunities Index (EOI), Ministry of Education (2014-2015). EOI is derived from three sources: the Ontario School Information System (OnSIS), 2014-2015; and Statistics Canada 2011 National Household Survey data and 2014 Taxfile data.

The rate of dental-related ED visits for all Hamiltonians also was mapped by forward sortation areas (first three digits of the patient’s postal code of their primary residence). Neighbourhoods with the greatest rates (in descending order) include L8M, L8L, L8N, L8H, and L8R (see **Figure 6**). Similar to oral day surgeries, the greatest rates of dental-related ED visits were found in lower Hamilton (below the escarpment between Highway 403 and Red Hill Valley Parkway). Seeking dental care through hospital emergency departments is strongly linked to a lack of access to community dental care, particularly for those who do not qualify for publicly-funded dental care subsidies (most adults and seniors)^[8]. Improving access to dental care, particularly for the adults and seniors in these neighbourhoods, is warranted.

Figure 7. Map of dental-related emergency department visits in Hamilton (cases per 100,000 population) using the patients’ residential postal code (3-year mean; 2014-2016).



Data Source: Ambulatory Emergency External Cause^[iii] [2014-2016], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: [11 Oct 2017].

In conclusion, this report provides a brief overview of oral health in Hamilton. The population health and program data show that poor oral health is common in Hamilton and unequally affects the city’s most vulnerable populations. Many Hamiltonians who need dental care do not have dental insurance and cannot afford to pay out-of-pocket. Increasing awareness of and access to publicly-funded dental services for Hamiltonians with the greatest needs should be a priority.

DATA NOTES

- i. **Oral Health Information Support System:** OHISS contains data collected through Public Health Services' annual oral screening of all Kindergarten and Grade 2 students in publicly-funded schools in Hamilton. Data is reported by school year (e.g., August 1, 2016 to July 31, 2017). Oral health data is not captured for children who opt out of the screening, were absent on the day of screening, or attend a private school. For schools with high rates of tooth decay, students from older grades (Grades 4, 6, and 8) also are screened; this data is not reported as it would not accurately represent oral health status due to the purposeful sampling method.
 - a. **Evidence of tooth decay/cavities:** Students were determined to have a history of tooth decay or cavities (non-caries free) if they had one or more decayed, missing/extracted, or filled primary or permanent tooth (deft/DMFT>0). Screening is based on the professional judgement and training of the registered dental hygienist. Tooth decay is suspected by the registered dental hygienist and may not correspond with a diagnosis by a dentist (the screening data will contain some false positives or false negatives).
- ii. **Emergency Department Visits for Oral Health Issues:** Ambulatory care visits are a source of morbidity information available through IntelliHealth (MOHLTC) originally from the National Ambulatory Care Reporting System (NACRS), Canadian Institute for Health Information (CIHI). Emergency department visits for oral health issues were defined as those with the following International Classification of Disease (ICD-10 CA) codes: impacted teeth (K01.1), dental caries (K02), acute apical periodontitis of pupal origin (K04.4), chronic apical periodontitis (K04.5), periapical abscess with sinus (K04.6), periapical abscess without sinus (K04.7), acute gingivitis (K05.0), chronic gingivitis (K05.1), acute periodontitis (K05.2), temporomandibular joint disorder, unspecified (K07.69), toothache, not otherwise specified (K08.87), disease of salivary gland, unspecified (K11.9), and cellulitis and abscess of mouth (K12.2).
- iii. **Day Surgery for Oral Health Issues:** Day surgery data is available through IntelliHealth (MOHLTC) originally from the National Ambulatory Care Reporting System (NACRS) and the Discharge Abstract Database (DAD), Canadian Institute for Health Information (CIHI). Day surgeries for oral health issues were defined as those with an International Classification of Disease (ICD-10 CA) code of K02 (dental cavities) & K04.7 (periapical abscess without sinus), and with an identified surgical procedure (Canadian Classification of Health Interventions) codes of 1.FE.57.JA (tooth extraction), 1.FF.56 (removal of foreign body, root of tooth), 1.FF.89 (excision total, root of tooth), 1.FE.89 (excision total, tooth), 1.FE.29 (tooth restoration), 1.FE.53.JA-RV (implantation of internal device, tooth), 1.FF.59.JA (destruction, root of tooth), 1.FD.52 (gingival drainage), 1.FE.87.JA-H (excision partial, tooth), 1.FF.53 (implantation of internal device, root of tooth), 1.FF.80 (repair, root of tooth), and 1.FF.87 (excision partial, root of tooth)^[9].
- iv. **Canadian Community Health Survey:** The CCHS collects information on health status and determinants, and health care utilization. It surveys a large sample of respondents 12 years of age and older living in private dwellings. Since the CCHS only collects information from community-dwelling residents, indicators do not represent the health status of all individuals living in the community (e.g. individuals living in institutions or those who are homeless). CCHS data are self-report and, as a result, are subject to bias: individuals may have difficulty with recalling their past behaviours or may 'adjust' their responses to align with what is seen as socially desirable. Unless otherwise stated don't know, refusal and otherwise not stated responses are included in the denominator and represent less than 5% of the response. Unless otherwise stated, bootstrapping techniques provided by Statistics Canada were used to produce the 95% CIs for CCHS data, and used to compare the differences in outcomes for Hamilton residents between population groups and over time. 95% CIs accompany estimates in brackets. Normal distribution was assumed.
 - a. **Income:** Health equity analysis compares income groups using the CCHS. The CCHS asks respondents about all sources of total household income before taxes and deductions in the past 12 months. This information is adjusted using Statistic Canada's low income cut-offs while accounting for household and community size. Household income data are separated into deciles which provide a relative measure of each household income. For this indicator, these deciles were then grouped into 3 categories: the lowest 30% (low income), middle 40% (mid income) and highest 30% (high income) income groups.
 - b. **High sampling variability [E]:** Estimates with a high sampling variability (CV: 16.6-33.3) are denoted ("E") and should be interpreted with caution. Estimates with a very high sampling variability (CV>33.3) are not reportable.

REFERENCES

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