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The contribution of different permanent tooth types to untreated caries:

Implications for public health surveillance and prevention

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Abstract

Background.—Untreated caries (UC), although highly prevalent, is largely preventable. Information on the contribution of different teeth to UC prevalence and severity could be helpful in evaluating UC surveillance protocols and the relative benefits of caries prevention interventions.

Methods.—The authors combined data from 3 cycles (2011–2016) of the National Health and Nutrition Examination Survey for participants aged 6 through 11 years, 12 through 19 years, 20 through 34 years, 35 through 49 years, 50 through 64 years, 65 through 74 years, and 75 years and older. For each age group the authors calculated the contribution of successive permanent tooth types (for example, first molars and second molars) to UC prevalence and severity.

Results.—UC prevalence and the percentage of prevalence detected by means of screening molars were, respectively, 5% and 95% among participants aged 6 through 11 years; 16% and 92% among participants aged 12 through 19 years; 29% and 86% among participants aged 20 through 34 years; 26% and 70% among participants aged 35 through 49 years; 21% and 48% among participants aged 50 through 64 years; 16% and 36% among participants aged 65 through

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SUPPLEMENTAL DATA

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74 years; and 17% and 25% among participants 75 years and older. Among adults aged 50 years and older, no teeth appeared to capture a disproportionate share of UC prevalence. Molars accounted for 87%, 79%, and 56% of severity among participants aged 6 through 11 years, 12 through 19 years, and 20 through 34 years, respectively. After age 34 years, molars accounted for less than 50% of severity.

Conclusions.—Molars are the tooth type most susceptible to UC well into adulthood.

Practical Implications.—Molars could be used as sentinel teeth for surveillance of UC and adults could benefit from caries prevention that targets molars.

Keywords

Untreated caries; public health surveillance; pit-and-fissure sealants

Untreated caries (UC) is the most prevalent disease globally.[1] Studies indicate that untreated dental disease in children is associated with lower school attendance and grades.[2,3] In the United States, more than 34 million school hours were lost in 2008 due to acute, unplanned oral health care needs.[4] Among adults, UC is associated with unemployment[5] and lower productivity; the Global Burden of Disease estimated losses of $4.9 billion in the United States and $21 billion globally (2015 US dollars).[6] If left untreated, caries can lead to tooth loss, which can diminish the ability to eat healthy foods.[1]

Caries can be prevented with timely receipt of primary and secondary preventive oral health care. There are 2 clinical preventive interventions with evidence for effectiveness: professionally applied fluoride and dental sealants. Both are recommended for youth at elevated risk of developing caries.[7] Although the caries preventive benefit from topical fluoride application extends to all teeth (twice yearly application prevents 43% of caries in all permanent teeth of youth[8]), the benefit from dental sealants is limited to the pits and fissures of posterior teeth (reducing the odds of caries initiation in sealed versus not sealed permanent molars 88% at 2 years after placement[9]). The effectiveness of sealants in reducing all caries will increase with the likelihood that affected surfaces are posterior pits and fissures.

Because the effectiveness of caries preventive measures and restorative materials can vary according to tooth type,[10] it is important to have information on the caries susceptibility of different tooth types. This information could be used to examine the relative benefits of interventions to prevent caries that target different teeth and to assess potential performance of abbreviated, less resource-intensive caries surveillance protocols. One commonly used protocol is the basic screening survey (BSS), in which examiners only record information about whether the patient has the condition.[11] Since 2010, the BSS has been conducted among third graders in 41 states and among older adults 65 years and older in 23 states. The BSS provides information to estimate the prevalence, but not the severity, of caries and UC.

Researchers examining the relative caries susceptibility of different permanent tooth types in children found that the permanent molars had the highest susceptibility.[12] Macek and colleagues[10] replicated that study using data from the third National Health and Nutrition Examination Survey (NHANES) 1988–1994. They found that although the permanent

molars were still the most susceptible teeth, there had been a decrease in the susceptibility of first molars relative to second molars, which the authors posited might be due to increased sealant use in first molars relative to second molars. Guidelines for the use of sealants in clinical[13] and school settings[14] also included the relative caries susceptibility of permanent molars using national data from NHANES 1999–2004. These guidelines noted that 90% of caries were in posterior teeth.

These studies were conducted more than a decade ago among youth and measured caries susceptibility according to caries experience. There are 2 commonly used indexes for caries —UC and caries experience—which include both treated and untreated disease.[1] To monitor the burden of caries, the Global Burden of Disease selected the index of UC instead of caries experience because the latter reflects lifetime prevalence and provides little information on active disease, which is more likely to be symptomatic.[1]

In our study, we used national data to examine whether molars are the most susceptible teeth to UC throughout life. Because missing teeth can be a sequelae of preventable dental disease and diminish quality of life, we also examined the prevalence and severity of UC combined with teeth missing due to dental disease (UCM) among adults. We estimate the prevalence and severity of UC and UCM for different age groups and the contribution of different teeth (for example, first molars and canines) to these outcomes. Information from our study can be used to evaluate protocols for UC and UCM surveillance and the relative benefit of different interventions to prevent caries over the life span.

METHODS

Data set and study population

We combined data from 3 cycles (2011–2016) of NHANES.[15–17] NHANES is a cross-sectional survey that uses a complex, multistage probability sample of the civilian, noninstitutionalized US population to obtain data on the health and nutrition of children and adults. The survey consists of interviews conducted in study participants' residences and a standardized health examination conducted in mobile examination centers. The National Center for Health Statistics' Research Ethics Review Board approved the NHANES protocol. Informed consent was obtained from all participating adults 18 years and older, and parental consent was obtained for participants younger than 18 years.

All participants 1 year and older were eligible for the oral health examination. The unweighted examination response rate for all NHANES respondents was 69.5% in the 2011–2012 survey,[15] 68.5% in the 2013–2014 survey,[16] and 58.7% in the 2015–2016 survey.[17] For our analysis, we used examination data on caries for participants 6 years and older, and sealants for adolescents aged 12 through 19 years. Licensed dentists were trained and calibrated before initiation of NHANES data collection and monitored during the collection period to ensure consistent assessment standards. We also used data on age obtained from the interview.

Among the 24,133 respondents 6 and older years in NHANES 2011–2016,[15–17] 21,814 (90%) had a completed dental examination: 3,785 were children aged 6 through 11 years;

3,807 were adolescents aged 12 through 19 years; 4,020 were adults aged 20 through 34 years; 3,777 were adults aged 35 through 49 years; 3,645 were adults aged 50 through 64 years; 1,638 were adults aged 65 through 74 years; and 1,132 were adults 75 years and older.

Outcomes

We estimated prevalence (at least 1 affected tooth) and severity (mean number of affected teeth among participants with condition) of UC for all age groups. To examine the combined effect of prevalence and severity across age groups, we estimated the number of teeth with UC per capita (prevalence × severity). This value represents the number of affected teeth per person in the general population. For adults, we also estimated prevalence and severity of UCM. Outcomes were estimated for all dentate people using the 28 permanent teeth. Finally, we estimated outcomes for each tooth type (for example, prevalence of having UC in at least 1 first molar); tooth types were first molars, second molars, second premolars, first premolars, canines, lateral incisors, and central incisors. UC per capita for each tooth type equals UC per capita times contribution of tooth type to severity.

Estimating contribution of different teeth to UC and UCM

To estimate the percentage contribution of each tooth type to UC and UCM, we assumed that teeth were assessed in the following order: first molars, because previous studies indicated molars had the highest caries susceptibility and first molars are the earliest erupting molars; second molars; second premolars; first premolars; canines; lateral incisors; and central incisors. All missing teeth were classified as not having UC. Because a person can have more than 1 tooth type with UC or UCM, summing the prevalence across tooth types could result in a value exceeding 100%. For example, if there were 2 people, 1 with UC in both first molars and second molars and the other with UC in first molars only, prevalence using first molars would equal 100% (2 of 2) and using second molars would equal 50% (1 of 2). To ensure that the sum of the marginal contributions of each tooth type to prevalence equaled 100%, we estimated marginal contribution from cumulative prevalence. The marginal contribution of each successive tooth type would equal the difference between cumulative prevalence for tooth type x + 1 and cumulative prevalence for tooth type x. The cumulative prevalence for first molars would equal the percentage of people with UC in at least 1 first molar, for second molars the percentage with UC in either a first molar or second molar, and so on. From our previous example, the cumulative prevalence if only first molars were examined would be 100% because both people had UC in a first molar and the marginal contribution of first molars would also be 100%. For the first tooth examined, the marginal contribution is equal to cumulative prevalence. If both first molars and second molars were examined, the cumulative prevalence would remain at 100% because both people have UC in a first or second molar. The marginal contribution of second molars to UC prevalence, however, would be 0 because the difference in the cumulative prevalence is 0. The order of examination matters when estimating the percentage contribution of tooth types to prevalence. Again, using the previous example, if we had started the examination with second molars (that is, only second molars were used to estimate prevalence), the cumulative prevalence would be 50% (1 of 2), as would the marginal contribution. The cumulative prevalence from adding first molars to the examination (examining both first molar and second molar) would be 100% (2 of 2), and the

marginal contribution of first molars would be 50% (cumulative prevalence when examining both first molars and second molars minus cumulative prevalence when examining second molars only). Finally, among people with UC in a permanent molar, we estimated the percentage with at least 1 affected molar occlusal surface.

To measure the contribution of each tooth type to UC and UCM severity, we divided the total number of affected teeth for each tooth type by the total number of affected teeth across all tooth types. Using the example in the previous paragraph, the marginal contribution of first molars to severity would be 67% (2 of 3) and the contribution of second molars would be 33% (1 of 3).

Variation according to sealant status

To examine whether the contribution of each tooth type varied according to sealant status, we estimated the prevalence, severity, and per capita UC overall and for each tooth type for adolescents who had at least 1 sealant and those who had none. We limited this analysis to adolescents aged 12 through 19 years because they are more likely to have erupted second molars.

Statistical analyses

All analyses were conducted using SAS, Version 9.4 (SAS Institute) and SAS-callable SUDAAN, Version 11.0.3 (RTI International). SUDAAN accounts for the complex sample design of NHANES when estimating standard errors. All estimates and standard errors were obtained using the examination sample weights. SUDAAN estimated standard errors using a Taylor series linearization method.

RESULTS

Prevalence and severity of outcomes

Among youth, overall prevalence and severity of UC, respectively, were 5.3% and 1.94 teeth among children aged 6 through 11 years and 16.3% and 2.49 teeth among participants aged 12 through 19 years (Table 1). Among adolescents without and with sealants, prevalence was 23.8% and 8.3% and severity was 2.71 and 1.84 teeth, respectively. Per capita UC was 0.10 teeth for children; 0.41 for adolescents overall; and among adolescents without and with sealants, 0.64 and 0.15, respectively.

Prevalence, severity, and per capita UC among working-age adults were, respectively, 29.3%, 3.50 teeth, and 1.02 teeth among those aged 20 through 34 years; 26.3%, 3.20 teeth, and 0.84 teeth among those aged 35 through 49 years; and 21.3%, 2.62 teeth, and 0.56 teeth among those 50 through 64 years. Among older adults, these values were, respectively, 15.5%, 2.22 teeth, and 0.34 teeth for adults aged 65 through 74 years and 16.6%, 1.95 teeth, and 0.33 teeth among adults 75 years and older.

UCM prevalence and severity were similar to UC values for youth, and among adults, UCM was higher. Prevalence and severity of UCM were, respectively, 36.8% and 4.13 teeth among adults aged 20 through 34 years; 52.1% and 4.96 teeth among adults aged 35 through 49

years; 66.4% and 6.72 teeth among adults aged 50 through 64 years; 76.5% and 7.66 teeth among adults aged 65 through 74 years; and 91.3% and 9.08 teeth among adults 75 years and older.

Contribution of tooth types to prevalence

Among children aged 6 through 11 years, molars had the largest contribution (95.4%) to UC prevalence, with first molars accounting for 93.5% (Figure 1, Table 2). Among children with UC in a first molar, 85% had at least 1 molar occlusal surface with UC (data not shown). Prevalence estimated with first molars was at least 14 times higher than any other tooth type, suggesting that examining first molars first did not affect their contribution to UC prevalence (eTable 1, available online at the end of this article).

Among adolescents, 91.8% of UC prevalence would be detected from screening molars. Eighty-five percent of children with an affected molar also had an affected molar occlusal surface (data not shown). UC prevalence calculated from either molar was at least 6 times higher than the remaining tooth types (eTable 1, available online at the end of this article), again suggesting that order of teeth examined would not have affected our findings.

Among adults aged 20 through 34 years, 85.5% of UC prevalence would be detected by means of screening molars. Among these adults, 87% had an affected occlusal molar surface (data not shown). UC prevalence calculated with either first molars or second molars was at least twice as high as that with other tooth types (eTable 1, available online at the end of this article). Among adults aged 35 through 49 years, screening molars would detect 70.0% of UC prevalence. Among people with a molar with UC, 79% had at least 1 molar occlusal surface affected (data not shown). UC prevalence estimated with either molar was at least 50% higher than that with other tooth types (eTable 1, available online at the end of this article). After age 49 years, no tooth type accounted disproportionately for UC. Screening molars would detect 48.3% of UC cases among adults aged 50 through 64 years: 36.1% among adults aged 65 through 74 years; and 25.3% among adults 75 years and older (Table 2). For adults, regardless of age group, using molars as sentinel teeth for UCM surveillance would detect more than 90% of cases (Table 3, eFigure 1, available online at the end of this article).

Contribution of tooth types to severity

Among children aged 6 through 11 years, first molars had the largest contribution to severity (82.7%) (Figure 2). Combined, first molars and second molars accounted for 87.4% of severity (Table 2). Among adolescents aged 12 through 19 years, molars accounted for 79.3% of severity. The contributions of permanent molars to severity declined with age among adults, accounting for 56.4% among adults aged 20 through 34 years; 40% among adults aged 35 through 49 years; 26.3% among adults aged 50 through 64 years; 21.4% among adults aged 65 through 74 years; and 15.3% among adults 75 years and older. A similar pattern was seen for UCM, with molars accounting for less than 50% of UCM beginning at age 50 years (Table 3; eFigure 2, available online at the end of this article).

Number of UC molars per capita according to age

Among all people, adults aged 20 through 34 years had the highest mean number of affected molars (0.58 molars) (Table 2), with adolescents and adults aged 35 through 49 years having the second highest value (about 0.34 molars). The mean number among adolescents without sealants was 0.50 UC molars.

Variation according to sealant status

The number of molars with UC per 100 adolescents without sealants (0.50 molars) was almost 4 times that among adolescents with at least 1 sealant (13 molars) (Figure 3). In both groups, molars accounted for most of the UC per capita. Among adolescents with at least 1 sealant, the percentage contribution of second molars to UC severity was approximately 6 percentage points higher than the contribution of first molars, and in the no sealant group, the percentage contribution of first molars was approximately 4 percentage points higher than that of second molars (eTable 2, available online at the end of this article).

DISCUSSION

We found that molars accounted for most UC prevalence and severity well into adulthood. The contribution, however, decreased with age; the percentage of prevalence captured by molars decreased from 95% for children aged 6 through 11 years to 70% for adults aged 35 through 49 years, and among adults 50 years and older, the contribution of different tooth types did not appear to differ. The percentage of UCM prevalence captured by molars, however, remained more than 90% for all adults.

Although the contribution of molars to UC and UCM severity was lower than that to prevalence, the effect of age on the relative contribution still held. The contribution of molars to severity was less than 50% for UC after age 34 years and for UCM after age 49 years. Including all posterior teeth improved the accuracy in predicting UC and UCM. From ages 20 through 34 years to 75 years and older, the percentage of UC accounted for by all posterior teeth ranged from 72.9% to 41.9%, and for UCM from 77.1% to 66.1%.

Using molars as sentinel teeth for youth and young adults could hold promise for local and state jurisdictions desiring to monitor UC with a protocol that is less resource-intensive than examining all 28 teeth. The BSS, a widely accepted screening tool, has protocols to assess the oral health of various oral conditions among third graders and older adults 65 years and older. BSS protocols typically include data collection to estimate the prevalence of UC, treated caries, and unmet dental treatment needs.[11] Our findings suggest that sentinel teeth could be used if information about severity was also desired. In addition, sentinel teeth could be used to monitor UC prevalence and severity among young adults aged 20 through 34 years who comprise the largest percentage of the US population,[18] have the highest number of molars per capita with UC, and for whom there are limited data at this level of granularity. Molars could also be used to monitor UCM prevalence among all adults.

Our findings also have implications for public health practice. We found that molars remained the teeth at highest risk of developing UC up to 50 years of age. UC molars per capita, the mean number of molars with UC per person in the general population, was higher

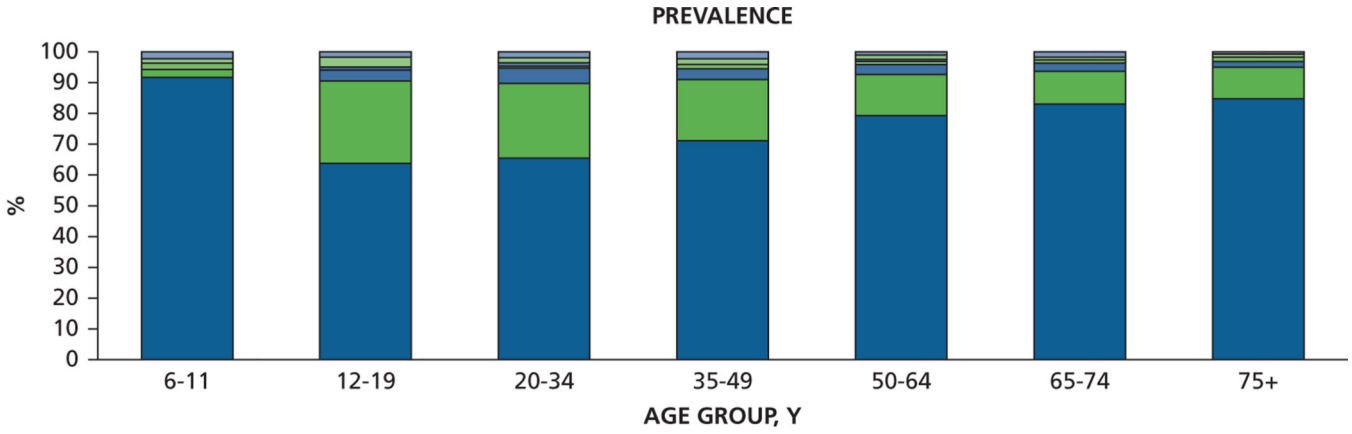
among adults aged 20 through 34 years (0.58) than among all other age groups, including adolescents who did not receive the preventive benefits of sealants (0.50). UC molars per capita among adults aged 35 through 49 years (0.34) was also quite similar to that for all adolescents (0.33) and higher than that for children (0.09).

Another unexpected finding was that although UC per capita was more than 4 times higher among adolescents with no sealants than those with at least 1 sealant (0.64 versus 0.15), molars remain the most susceptible to UC in both groups. Second molars relative to first molars had a higher contribution to UC severity among children with at least 1 sealant, but not among children without sealants. This could be due in part to higher sealant use in first molars relative to second molars.[19]

CONCLUSIONS

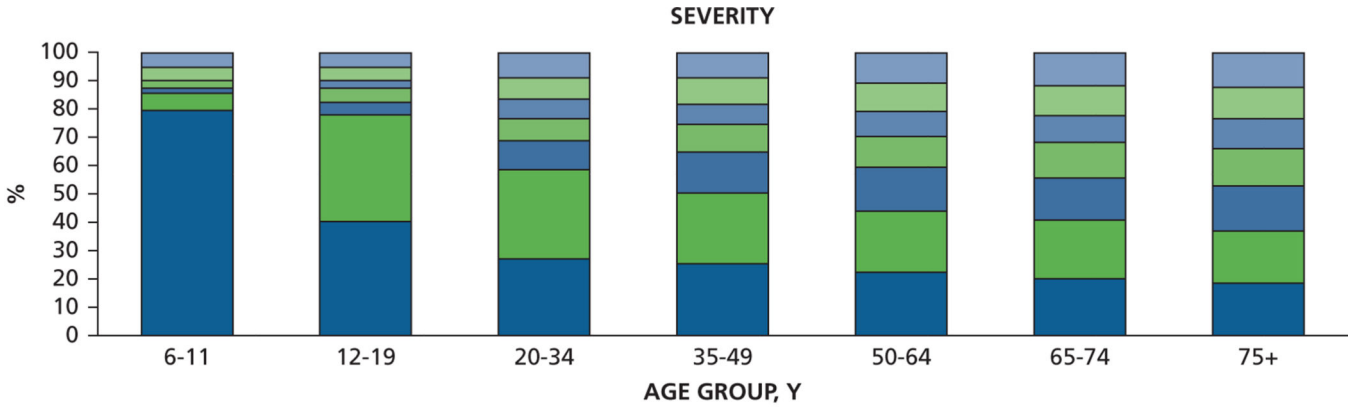
We found that molars contributed most to UC prevalence and severity into adulthood. This suggests that adults could still benefit from effective caries prevention and molars could be used as sentinel teeth in abbreviated caries surveillance protocols for youth and young adults.

Appendix



	6-11	12-19	20-34	35-49	50-64	65-74	75+
+CI	1.8%	1.3%	1.4%	1.8%	0.6%	1.0%	0.3%
+LI	1.4%	3.3%	2.0%	1.8%	1.5%	0.9%	0.5%
+C	0.0%	0.9%	1.4%	0.4%	0.7%	0.6%	0.1%
+1P	1.7%	0.4%	0.5%	1.2%	0.7%	0.4%	1.4%
+2P	0.6%	3.0%	4.2%	3.4%	3.1%	2.7%	2.0%
+2M	2.1%	26.7%	24.8%	19.5%	13.8%	10.8%	10.1%
1M	92.3%	64.4%	65.7%	71.9%	79.5%	83.5%	85.6%

eFigure 1.
Percentage contribution of each tooth type to prevalence of untreated caries or missing teeth due to dental disease according to age—United States. C: Canines. CI: Central incisors. LI: Lateral incisors. 1M: First molars. 2M: Second molars. 1P: First premolars. 2P: Second premolars. Source: NHANES 2011–2016.[15–17]



+CI	4.8%	5.0%	8.7%	9.1%	10.4%	11.3%	11.8%
+LI	4.6%	5.1%	7.9%	8.9%	10.0%	10.8%	11.6%
+C	0.4%	2.5%	6.4%	7.0%	8.6%	9.4%	10.4%
+1P	2.7%	4.5%	8.0%	10.3%	11.3%	12.2%	13.1%
+2P	1.7%	5.0%	10.2%	13.9%	15.2%	15.4%	15.5%
+2M	6.2%	37.3%	31.4%	25.1%	21.9%	20.2%	19.0%
1M	79.7%	40.6%	27.5%	25.6%	22.5%	20.7%	18.5%

eFigure 2.

Percentage contribution of each tooth type to severity of untreated caries or missing teeth due to dental disease according to age—United States. C: Canines. CI: Central incisors. LI: Lateral incisors. 1M: First molars. 2M: Second molars. 1P: First premolars. 2P: Second premolars. Source: National Health and Nutrition Examination Survey 2011–2016.[15–17]

eTable 1.

Prevalence and cumulative prevalence of untreated caries in permanent dentition for successive tooth types by age—United States.*

	UNTREATED CARIES, AGE GROUP, Y													
	6–11		12–19		20–34		35–49		50–64		65–74		75 Or Older	
TOOTH TYPE	Prev, %†	Cumul Prev, %‡	Prev, %	Cumul Prev, %	Prev, %	Cumul Prev, %	Prev, %	Cumul Prev, %	Prev, %	Cumul Prev, %	Prev, %	Cumul Prev, %	Prev, %	Cumul Prev, %
First Molars	93.5	93.5	63.9	63.9	56.0	56.0	43.2	43.2	24.5	24.5	17.6	17.6	13.1	13.1
Second Molars	6.6	95.4	57.3	91.8	63.3	85.4	49.5	70.0	33.0	48.3	23.0	36.1	14.7	25.3
Second Premolars	1.9	95.6	9.4	93.7	22.6	91.0	27.0	80.8	25.8	62.3	22.3	50.5	17.5	38.3
First Premolars	3.9	96.6	8.0	95.8	19.6	93.5	26.4	87.3	26.6	71.8	27.5	65.7	28.2	57.0
Canines	0.3	96.6	4.3	96.2	15.5	96.3	21.3	91.0	33.8	85.8	34.7	82.1	35.8	77.4
Lateral Incisors	6.3	98.1	8.9	98.9	20.2	98.0	28.1	95.4	31.8	95.3	29.0	91.4	33.1	92.7
Central Incisors	5.5	100	8.4	100	22.4	100.0	26.3	100	27.9	100	28.6	100	22.6	100

[*] Sources: National Health and Nutrition Examination Survey 2011–2016.[15–17]

[†] Prev: Prevalence.

[‡] Cumul prev: Cumulative prevalence.

eTable 2.

Percentage contribution of each successive tooth type to untreated caries prevalence and severity in permanent dentition among adolescents aged 12 through 19 years without and with at least 1 dental sealant—United States.[*]

	PREVALENCE[†]			SEVERITY[‡]		
TOOTH TYPE	**All**	**No Sealant**	**At Least 1 Sealant**	**All**	**No Sealant**	**At Least 1 Sealant**
First Molars	63.9	66.0	57.5	40.9	41.2	39.7
Second Molars	27.9	26.4	32.6	38.4	36.8	45.8
Second Premolars	1.9	1.9	2.0	4.5	5.0	2.5
First Premolars	2.0	1.8	2.7	3.7	3.9	3.1
Canines	0.5	0.4	0.6	2.6	2.8	1.7
Lateral Incisors	2.7	2.4	3.6	4.7	4.7	4.4
Central Incisors	1.1	1.2	0.9	5.1	5.6	2.8

[*] Sources: National Health and Nutrition Examination Survey 2011–2015.[15–17]

[†] Prevalence: Number of people with at least 1 tooth with untreated caries.

[‡] Severity: Mean number of teeth with untreated caries per untreated caries case.

ABBREVIATION KEY

BSS	Basic screening survey
C	Canines
CI	Central incisors
LI	Lateral incisors
1M	First molars
2M	Second molars
NHANES	National Health and Nutrition Examination Survey
1P	First premolars
2P	Second premolars
Prev	Prevalence
UC	Untreated caries
UCM	Untreated caries combined with teeth missing due to dental disease

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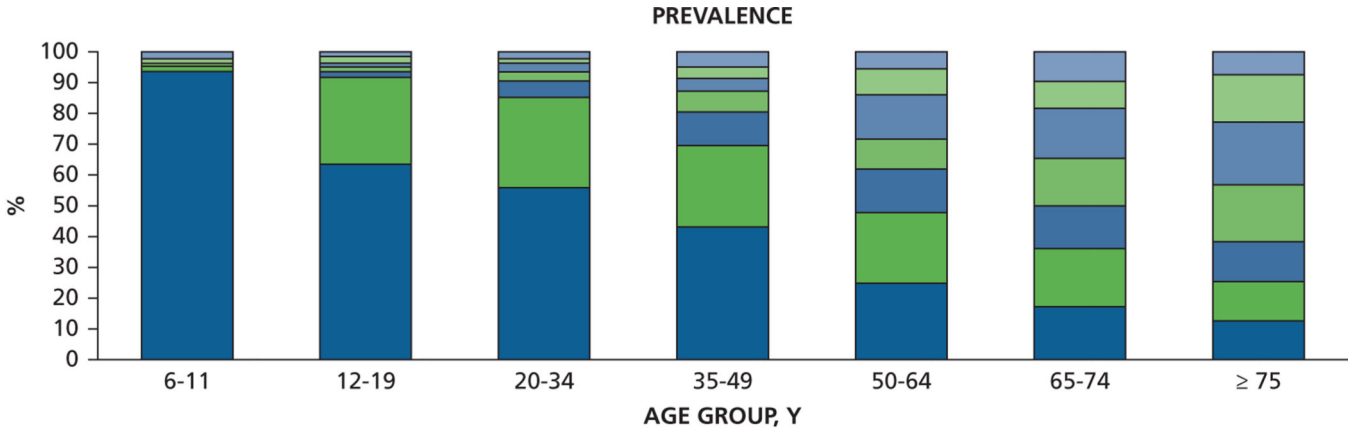
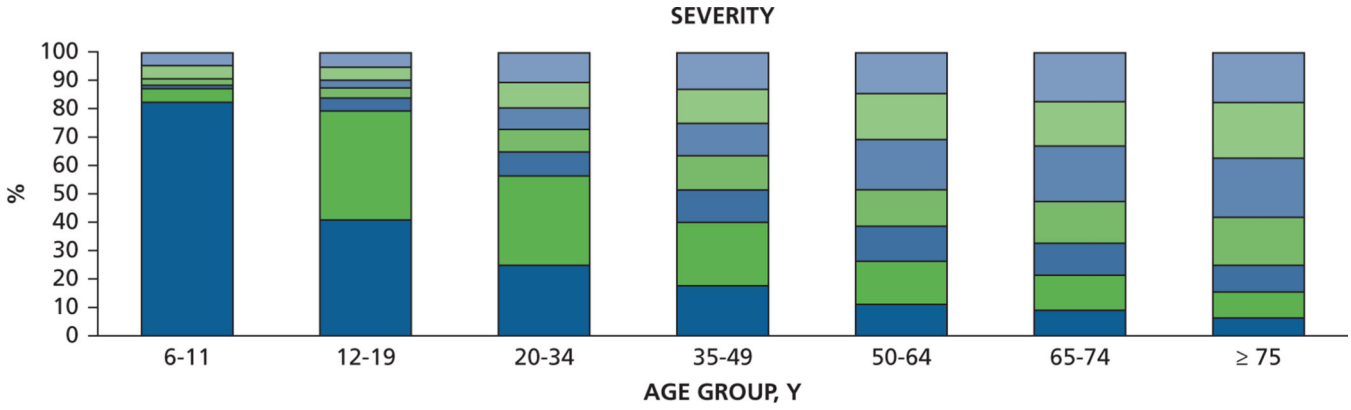


	6-11	12-19	20-34	35-49	50-64	65-74	≥ 75
+CI	1.9%	1.1%	2.0%	4.6%	4.7%	8.6%	7.3%
+LI	1.5%	2.7%	1.7%	4.4%	9.5%	9.2%	15.3%
+C	0.0%	0.5%	2.7%	3.8%	14.0%	16.5%	20.4%
+1P	1.0%	2.0%	2.6%	6.5%	9.5%	15.2%	18.7%
+2P	0.1%	1.9%	5.5%	10.8%	14.0%	14.4%	13.0%
+2M	1.9%	27.9%	29.5%	26.8%	23.7%	18.6%	12.2%
1M	93.5%	63.9%	56.0%	43.2%	24.5%	17.6%	13.1%

Figure 1.

Percentage contribution of each tooth type to untreated caries prevalence in permanent dentition according to age in the United States. C: Canines. CI: Central incisors. LI: Lateral incisors. 1M: First molars. 2M: Second molars. 1P: First premolars. 2P: Second premolars. Source: National Health and Nutrition Examination Survey 2011–2016.[15–17]



	6-11	12-19	20-34	35-49	50-64	65-74	≥ 75
+CI	4.7%	5.1%	10.5%	12.8%	14.8%	17.4%	17.2%
+LI	4.5%	4.7%	8.8%	12.4%	15.8%	15.4%	20.0%
+C	0.1%	2.6%	7.8%	11.1%	17.9%	19.9%	20.9%
+1P	2.2%	3.7%	7.8%	12.0%	12.6%	14.7%	17.0%
+2P	1.1%	4.5%	8.7%	11.7%	12.6%	11.2%	9.6%
+2M	4.7%	38.4%	31.5%	22.1%	15.1%	12.6%	8.4%
1M	82.7%	40.9%	24.9%	17.9%	11.2%	8.8%	6.9%

Figure 2.

Percentage contribution of each tooth type to untreated caries severity in permanent dentition according to age in the United States. C: Canines. CI: Central incisors. LI: Lateral incisors. 1M: First molars. 2M: Second molars. 1P: First premolars. 2P: Second premolars. Source: National Health and Nutrition Examination Survey 2011–2016.[15–17]

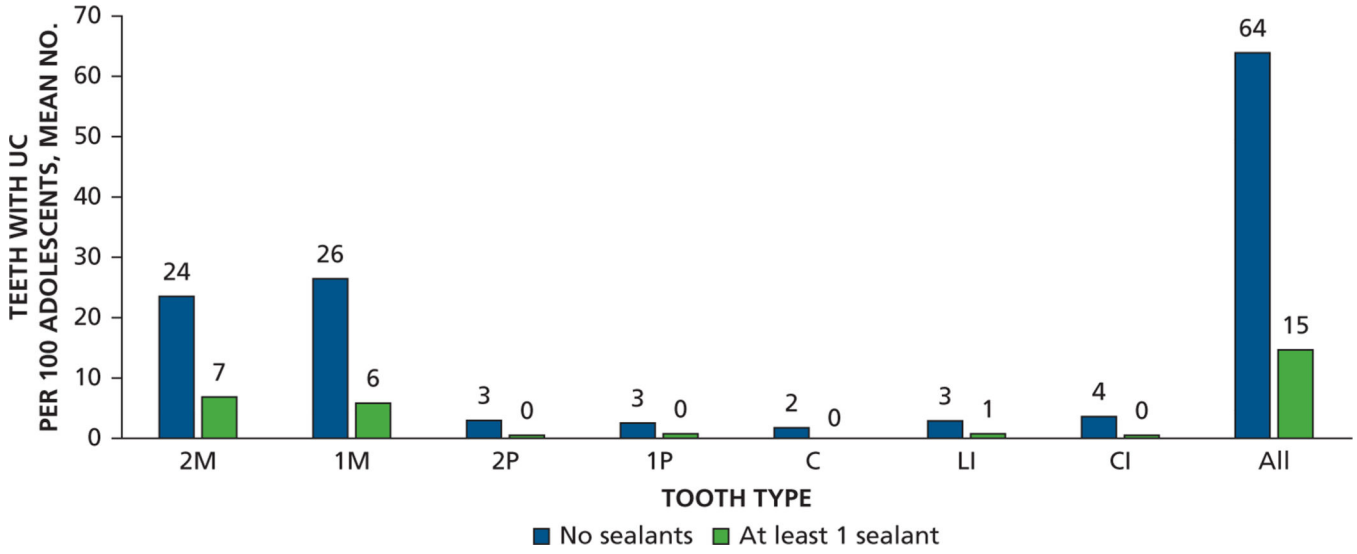


Figure 3.

Mean number of teeth with untreated caries (UC) per 100 adolescents according to age and sealant status. C: Canines. CI: Central incisors. LI: Lateral incisors. 1M: First molars. 2M: Second molars. 1P: First premolars. 2P: Second premolars. Source: National Health and Nutrition Examination Survey 2011–2016.[15–17]

Table 1.

Prevalence and severity of untreated caries and untreated caries or teeth missing due to dental disease[*] by age group—United States.[†]

AGE, Y	UNTREATED CARIES (SE[‡])			UNTREATED CARIES COMBINED WITH TEETH MISSING DUE TO DENTAL DISEASE (SE)	
	Prevalence, %	Severity,[§] Mean	Per Capita, Mean[¶]	Prevalence, %	Severity, Mean
6–11	5.3 (0.45)	1.94 (0.08)	0.10 (0.02)	5.5 (0.44)	2.01 (0.09)
12–19	16.3 (0.99)	2.49 (0.12)	0.41 (0.03)	18.1 (1.04)	2.59 (0.12)
12–19, No Sealants	23.8 (1.52)	2.71 (0.14)	0.64 (0.06)	NR[#]	NR
12–19 At Least 1 Sealant	8.3 (0.88)	1.84 (0.10)	0.15 (0.02)	NR	NR
20–34	29.3 (1.26)	3.50 (0.12)	1.02 (0.06)	36.8 (1.45)	4.13 (0.13)
35–49	26.3 (1.40)	3.20 (0.14)	0.84 (0.06)	52.1 (1.77)	4.96 (0.27)
50–64	21.3 (1.44)	2.62 (0.10)	0.56 (0.06)	66.4 (1.8)	6.72 (0.17)
65–74	15.5 (1.55)	2.22 (0.13)	0.34 (0.04)	76.5 (1.93)	7.66 (0.22)
≥ 75	16.6 (1.35)	1.95 (0.09)	0.33 (0.03)	91.3 (1.00)	9.08 (0.29)

[*] Includes caries or periodontal disease.

[†] Sources: National Health and Nutrition Examination Survey 2011–2016.[15–17]

[‡] SE: Standard error.

[§] Severity: Mean number of affected teeth per case.

[¶] Per capita mean: Mean number of affected teeth among population.

[#] NR: Not reported.

Table 2.

Percentage contribution of molars and posterior teeth to prevalence and severity of untreated caries detected and mean number of teeth with untreated caries.[*]

AGE, Y	PREVALENCE[†] DETECTED FROM, %		SEVERITY[‡] DETECTED FROM, %		UNTREATED CARIES PER CAPITA, MEAN NO.[§]	
	Molars[¶]	Posterior Teeth[#]	Molars	Posterior Teeth	Molars	Posterior Teeth
6–11	95.4	96.6	87.4	90.7	0.09	0.09
12–19	91.8	95.8	79.3	87.6	0.33	0.36
12–19, No Sealants	92.5	96.1	78.0	86.9	0.50	0.56
20–34	85.5	93.5	56.4	72.9	0.58	0.74
35–49	70.0	87.3	40.0	63.7	0.34	0.54
50–64	48.3	71.8	26.3	51.5	0.15	0.29
65–74	36.1	65.7	21.4	47.3	0.07	0.16
≥ 75	25.3	57.0	15.3	41.9	0.05	0.14

[*] Sources: National Health and Nutrition Examination Survey 2011–2016.[15–17]

[†] Prevalence: Number of people with at least 1 tooth with untreated caries.

[‡] Severity: Mean number of teeth with untreated caries per untreated caries case.

[§] Untreated caries per capita equals untreated caries prevalence times untreated caries severity times percentage severity accounted for by tooth type.

[¶] Molars: Permanent first and second molars.

[#] Posterior Teeth: Permanent first and second molars and permanent first and second premolars.

Table 3.

Percentage contribution of molars and posterior teeth to prevalence and severity of untreated caries or missing teeth due to dental disease.[*,†]

AGE, Y	CONTRIBUTION TO PREVALENCE, %		CONTRIBUTION TO SEVERITY, %	
	Molars[‡]	Posterior Teeth[§]	Molars	Posterior Teeth
20–34	90.5	95.2	58.9	77.1
35–49	91.4	96.0	50.7	74.9
50–64	93.3	97.1	44.4	70.9
65–74	94.3	97.4	40.9	68.5
≥ 75	95.7	99.1	37.5	66.1

[*] Includes caries or periodontal disease.

[†] Sources: National Health and Nutrition Examination Survey 2011–2016.[15–17]

[‡] Molars: Permanent first and second molars.

[§] Posterior teeth: Permanent first and second molars and permanent first and second premolars.