DQA
DENTAL QUALITY ALLIANCE®
Improving Oral Health Through Measurement

Testing Adult Oral Health Performance Measures:

Emergency Department Visits for Ambulatory Care Sensitive Non-Traumatic Dental Conditions in Adults

Follow-Up After Emergency Department Visits for Ambulatory Care Sensitive Non-Traumatic Dental Conditions in Adults

Adults with Diabetes – Oral Evaluation

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Contents

Purpose

The purpose of this report is to summarize the validation testing for the following adult oral health care performance measures:

1. Emergency Department Visits for Ambulatory Care Sensitive Non-Traumatic Dental Conditions in Adults,
2. Follow-Up after Emergency Department Visits for Ambulatory Care Sensitive Non-Traumatic Dental Conditions in Adults
3. Adults with Diabetes – Oral Evaluation

The DQA contracted with research teams from the University of California San Francisco and the University of Iowa to conduct feasibility, reliability, and validity testing using medical, dental, and pharmacy enrollment and claims data.

Background

In 2016, the Dental Quality Alliance (DQA) approved a starter set of adult dental quality measures that could be calculated using administrative claims data and designed for use at the program and plan levels. These starter-set measures included process and related health care delivery measures to assess the receipt of evidence-based care by adults, which allows for the early detection and prevention of dental diseases, such as periodontitis and dental caries.[1]

In 2018, the DQA Measures Development and Maintenance Committee (MDMC) began the process of testing three additional measures for feasibility, reliability, and validity that assess the performance of the healthcare delivery system as it affects oral-systemic health. Two of these measures address emergency department (ED) visits by adults for ambulatory care sensitive non-traumatic dental conditions (NTDCs) and subsequent follow-up visits to a dental provider within one month. The third measure is a process of care measure of oral evaluation visits among adult patients with diabetes. This report summarizes the testing results.

The DQA entered into service agreements with the University of California San Francisco (UCSF) and the University of Iowa (UI) to test these measures. UCSF secured support from the Oregon Health Authority (OHA), which provided Oregon Medicaid data for measure testing. UCSF partnered with the Oregon Health & Science University (OHSU) to conduct chart validation. The UI secured support from Iowa Medicaid to use program data for measure testing. The DQA provided funding for this project. The data sources and testing methodologies were approved by the University California San Francisco Institutional Review Board, the University of Iowa Institutional Review Board, and the Oregon Health & Science University Institutional Review Board.

Data Sources

Administrative enrollment data and claims data from the following programs were used:

- Oregon Medicaid (OHA)
- Iowa Dental Wellness Plan (DWP)

[1] Program/Plan Level Dental Quality Measures: https://www.ada.org/en/science-research/dental-quality-alliance/dqa-measure-activities/measures-medicaid-and-dental-plan-assessments

- Iowa Medicaid - Family Medical Assistance Program (FMAP)
- Iowa Medicaid - Supplemental Security Income (SSI)

The Oregon population included all Medicaid eligible adults (≥18 years) enrolled in 2014 through 2016.[2] The Oregon Health Authority (OHA) contracts with Coordinated Care Organizations (CCOs) or Dental Care Organizations (DCOs) to deliver dental care to its beneficiaries using a global budgeting capitation model. Dental providers are reimbursed for each service provided to beneficiaries using either a discounted fee-for-service payment structure or salary payments from the DCOs or CCOs.

Iowa data are limited to adults enrolled in 2015 and 2016 in the following three programs: (1) the Dental Wellness Program (DWP) program, which provides dental benefits to the Medicaid expansion population; (2) the traditional Medicaid State Plan via Family Medical Assistance Program (FMAP); and (3) the traditional Medicaid State Plan via Supplemental Security Income (SSI) eligibility. These data were used for previous evaluation of the state's Centers for Medicare & Medicaid Services (CMS) 1115 waiver, which included earlier versions of the DQA diabetes and ED measures. Thus, the Iowa data are limited to members aged 19 to 64 and exclude members with other categorical eligibility (e.g., the foster care transition program, Medicaid/Medicare dual eligible adults, and employed people with disabilities). Excluded members represent approximately 34% of the Iowa Medicaid population. The traditional Medicaid State Plan was administered by the state with fee-for-service (FFS) payments by the Medicaid program to dental providers. In 2015 and 2016, the Iowa Medicaid Enterprise contracted with Delta Dental of Iowa to administer the DWP as a prepaid ambulatory health plan (PAHP). Delta Dental was paid using a capitation model and then reimbursed dentists via a FFS model.

Appendix A summarizes each of the data sources including population characteristics.

Methodology

The research teams engaged in an iterative testing process guided by the DQA MDMC that involved providing regular testing updates during bi-weekly calls. The testing methodology included:

- Establishing feasibility through evaluation of the availability of the critical data elements used to calculate the measures in administrative databases and evaluation of the measure calculation logic for complexity and reporting burden.
- Promoting reliable and valid measurement by refining and clarifying the detailed measure specifications using administrative claims and enrollment data runs to evaluate the numerator and denominator definitions and the measure calculation logic, including extensive sensitivity testing.[3]
- Establishing critical data element reliability and validity by conducting chart reviews to examine the agreement between claims data and dental records by calculating

[2] Data presented in this report are for 2015 and 2016 to allow for comparison to the University of Iowa data. Additional data for 2014 are on file with the DQA.
[3] All sensitivity testing results are on file with the DQA.

sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and the kappa statistic.
- Identifying meaningful performance gaps by evaluating statistically significant and practically meaningful differences in measure scores between programs and by age, race and ethnicity, and geographic location (i.e., urban vs. rural).
- Soliciting stakeholder feedback through the release of Interim Reports for one-month public comment periods.

Critical Data Element Validation

Critical data element validation is a key component of reliability and validity testing in new measure development. Critical data element validation evaluates the correctness of the data elements required to calculate the measure against an authoritative source (i.e., data contained within the patient's health record). The critical data elements for the measures include: (1) member ID, (2) date of birth, (3) monthly enrollment indicator, (4) date of service, (5) place of service (identified through CMS place of service and revenue codes), (6) ICD-9 and ICD-10 diagnosis codes, and (7) dental procedure codes (CDT codes). The first five items are standard data elements used routinely for reporting or billing purposes. Consequently, critical data element validation focused on validating the administrative diagnosis and procedure codes used in the measures against information contained in the patient health records for a random sample of patients drawn using a random uniform distribution. Record reviews were conducted for Oregon Medicaid. The record reviewers followed a detailed review protocol and used a common data abstraction form that was pilot tested. Record review results were provided to the statistical programmer who compared the abstraction results to procedure codes in the claims data for the same patient and date of service. Simple agreement and the kappa statistic were calculated. The kappa statistic takes into account agreement observed by chance and provides a more conservative estimate of agreement. A kappa statistic value of 0 reflects the amount of agreement that would be expected to be observed by chance. A kappa statistic value of 1 indicates perfect agreement. Guidance on interpreting the kappa statistic is: 0.01-0.20 (slight agreement); 0.21-0.40 (fair agreement); 0.41-0.60 (moderate agreement); 0.61-0.80 (substantial agreement); 0.81-0.99 (almost perfect agreement).[4]

Appendix B provides a summary of critical data elements for each program, including the percentage of invalid and/or missing data. There were no concerns with missing and invalid data, supporting the feasibility of measure implementation.

Evaluation of Measure Scores

The measure scores, with 95% confidence intervals, were calculated using the final measure specifications and reported with stratifications by age, sex, race/ethnicity, and geographic location.[5] Face validity was assessed throughout the measure development and testing process. Interim Reports that included the detailed measure specifications and described the

[4] Landis JR, Koch GG. An application of hierarchical kappa-type statistics in the assessment of majority agreement among multiple observers. Biometrics 1977;33(2):363-74.
[5] The Oral Evaluation – Diabetes final measure scores were calculated without the recent changes to the HEDIS® specification that includes new 2019 value sets for telehealth (visit type to identify diabetes) and for advanced illness and frailty (exclusions). These changes were validated through NCQA's measure development processes, and the MDMC reviewed and agreed with these updates conceptually.

measures, testing process, and preliminary results were sent to a broad range of stakeholders, including representatives of federal agencies, dental professionals/professional associations, state Medicaid and CHIP programs, and community health centers.

Measures to Assess Emergency Department Visits by Adults for Ambulatory Care Sensitive Non-Traumatic Dental Conditions

Measure Importance

ED use for NTDCs has been a growing public health concern across the United States[6, 7, 8, 9,10,11, 12] with over 2 million visits occurring in 2015[13.,14] These ED visits are significantly associated with age (21 to 34 years)[7] insurance status (uninsured or Medicaid Insurance)[15], and race (Black or African American)[16]. The majority of these NTDC visits were classified as semi-urgent (53.8%) or non-urgent (23.9%), which presents a public health challenge because they often have great financial implications for the healthcare system (estimated to cost $867 million to $2.1 billion) and divert resources away from urgent cases.[17] Significantly, most NTDCs are better handled in the ambulatory care setting, and the absence of dentists on the staff of most EDs means that these

6 Okunseri C, Okunseri E, Thorpe JM, Xiang Q, Szabo AJC, Cosmetic, Dentistry I. Patient characteristics and trends in nontraumatic dental condition visits to emergency departments in the United States. 2012;4:1.
7 Wall T, Nasseh K. Dental-related emergency department visits on the increase in the United States. *Health Policy Resources Center Research Brief* 2013;
https://www.ada.org/en/~/media/ADA/Science%20and%20Research/Files/HPRCBrief_0513_1. Accessed February 15, 2019.
8 Wall T. Recent trends in dental emergency department visits in the United States:1997/1998 to 2007/2008. Journal of public health dentistry. 2012;72(3):216-220.
9 Lee HH, Lewis CW, Saltzman B, Starks H. Visiting the emergency department for dental problems: trends in utilization, 2001 to 2008. *American journal of public health*. 2012;102(11):e77-83.
10 Zhou W, Kim P, Shen JJ, Greenway J, Ditmyer M. Preventable Emergency Department Visits for Nontraumatic Dental Conditions: Trends and Disparities in Nevada, 2009–2015. 2018;108(3):369-371.
11 Seu K, Hall K, Moy E. Emergency department visits for dental-related conditions, 2009: Statistical Brief# 143. In: *Healthcare Cost and Utilization Project (HCUP) Statistical Briefs [Internet]*. Rockville (MD): Agency for Healthcare Research and Quality (US); 2012.
12 Rampa S, Wilson FA, Allareddy V. Trends in dental-related emergency department visits in the State of California from 2005 to 2011. Oral surgery, oral medicine, oral pathology and oral radiology. 2016;122(4):426-433.
13 American Dental Association. Reduce health care costs and improve patient care by treating dental disease in the dental practice instead of the ER. 2013;
http://www.ada.org/~/media/ADA/Public%20Programs/Files/ER_Utilization_Issues_Flyer.ashx. Accessed February 15, 2019
14 Rui P, Kang K. National Hospital Ambulatory Medical Care Survey: 2015 Emergency Department Summary Tables. 2015; Available from: **https://www.cdc.gov/nchs/data/nhamcs/web_tables/2015_ed_web_tables.pdf**. Accessed February 15, 2019.
15 Sun BC, Chi DL, Schwarz E, et al. Emergency department visits for nontraumatic dental problems: a mixed-methods study. *American journal of public health*. 2015;105(5):947-955.
16 Chalmers NI. Racial Disparities in Emergency Department Utilization for Dental/Oral Health-Related Conditions in Maryland. *Frontiers in public health*. 2017;5:164.
17 Wall T, Nasseh K, Vujicic M. Majority of dental-related emergency department visits lack urgency and can be diverted to dental offices. *Health Policy Institute Research Brief* 2014;
https://www.ada.org/~/media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0814_1.ashx. Accessed February 15, 2019.

patients are unlikely to receive any definitive treatment or care continuity, ultimately leading to poor oral health outcomes.[12,18,19]

Broad Focus on Ambulatory Care Sensitive Conditions (ACSCs)

Billings et al. defined ambulatory care sensitive conditions (ACSCs) as "diagnoses for which the provision of timely and effective outpatient care can help to reduce the risks of hospitalization by either preventing the onset of an illness or condition, controlling an acute episodic illness or condition, or managing a chronic disease or condition."[20] The DQA focused on ACSC visits for these quality measures to capture the effectiveness of programs and plans in ensuring access to timely and effective dental care services for enrollees. NTDC ED visits could be treated more effectively, or prevented altogether, through regular care in a primary dental care setting. Lack of access to routine preventive and restorative dental care is, therefore, a major driver of NTDC ED visits.[21] There was a consensus among the DQA's MDMC to focus broadly on NTDC ED visits to reflect the diverse nature of ambulatory care sensitive (ACS) dental conditions among adults. This differs from the DQA's pediatric ED quality measure that focuses specifically on caries-related ED visits [22] due to the fact that caries and its associated sequelae were identified as the most prevalent reasons for ED visits in the pediatric population.[22, 23]

Identifying Ambulatory Care Sensitive Non-Traumatic Dental Conditions:

The research team used an iterative process to identify all relevant diagnosis codes (ICD-9/10-CM) indicating ambulatory care sensitive non-traumatic dental conditions. First, the research teams conducted a literature review to develop a preliminary list of diagnosis codes that have been applied in published studies.[5-20] Using the diagnosis code set from the Association of State and Territorial Dental Directors (ASTDD) on non-traumatic dental conditions as the starting point,[24] the three research teams (UCSF, UI, OHSU) independently reviewed each code for inclusion or exclusion. A thorough review of the ICD-9 to ICD-10 crosswalk (and reverse), using the general equivalence mapping (GEM)[25] revealed some missing but relevant codes which were later included to ensure completeness.

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18 Hsia RY, Niedzwiecki M. Avoidable emergency department visits: a starting point. *International journal for quality in health care : journal of the International Society for Quality in Health Care*. 2017;29(5):642-645.
19 Allareddy V, Rampa S, Lee MK, Allareddy V, Nalliah RP. Hospital-based emergency department visits involving dental conditions: Profile and predictors of poor outcomes and resource utilization. *The Journal of the American Dental Association*. 2014;145(4):331-337.
20 Billings J, Zeitel L, Lukomnik J, Carey TS, Blank AE, Newman L. Impact of Socioeconomic Status on Hospital Use in New York City. Health Affairs 1993;12(1):162-173.
21 Seu K, Hall KK, Moy E. Emergency department visits for dental-related conditions, 2009: HCUP statistical brief #143. Agency for Healthcare Research and Quality: Rockville (MD); 2012.
22 Herndon J.B., Crall J.J., Carden D.L., Catalanotto F.A., Tomar S.L., Aravamudhan K., Light J.K., Shenkman, E.A. (2017) Measuring Quality: Caries-Related Emergency Department Visits and Follow-Up among Children. *Journal of Public Health Dentistry* ;77(3):252-262. PMID:28252806.
23 Allareddy V, Nalliah RP, Haque M, Johnson H, Rampa SB, Lee MK. Hospital-based emergency department visits with dental conditions among children in the United States: nationwide epidemiological data. *Pediatric dentistry*. 2014;36(5):393-399.
24 Manz MC, Association of State and Territorial Dental Directors (ASTDD). Recommended Guidelines for Surveillance of Non-Traumatic Dental Care in Emergency Departments. 2017; Available from: **https://www.astdd.org/docs/ed-dental-care-protocols-w-appendices-july-6-2017.pdf**. Accessed February 15, 2019.
25 Centers for Medicare and Medicaid Services (CMS). 2018 ICD-10 CM and GEMs. **https://www.cms.gov/Medicare/Coding/ICD10/2018-ICD-10-CM-and-GEMs.html**. Published 2017. Accessed March 21, 2019.

Diagnosis codes were categorized into two groups depending on whether they required an additional-listed diagnosis code to identify a non-traumatic dental condition.[26]

- **Group 1 codes** represent dental conditions that when present as the first-listed diagnosis qualify the visit for inclusion in the measure numerator.
- **Group 2 codes** represent non-specific conditions (e.g., cellulitis and abscess of face) that may also frequently reflect non-dental-related causes for the visit. ED visits with a Group 2 code present as a first-listed diagnosis must include a Group 1 code as an additional-listed diagnosis in order to qualify for inclusion in the measure numerator.

This customized approach allows the inclusion of non-specific diagnoses in Group 2 that may be dental or non-dental related by reducing the number of false positives that would occur if the Group 2 codes were not conditioned on also having a Group 1 code present as an additional-listed diagnosis.

The MDMC reviewed the diagnosis code set recommendations by the research teams and made the final determinations using a consensus process. Codes for which there was not consensus were flagged for chart reviews.

Table 1 shows the frequency distribution of the ten most prevalent first-listed diagnoses across programs, accounting for about 88% of all ACS NTDC ED visits. The diagnoses were similar across all programs. The measure specifications in **Appendix C** provide a complete list of all diagnosis codes included in the final code set.

Table 1: Frequency Distribution of 10 Most Frequently Occurring First-Listed Diagnoses, ALL ACS ED visits for NTDCs

Oregon Medicaid CY 2015				
Description	**ICD-9-CM**	**Frequency**	**Percent**	**Cumulative Percent**
Disorder of teeth and supporting structures, unspecified	K089	4185	27.19	27.19
Periapical abscess without sinus	K047	3824	24.85	52.04
Dental caries, unspecified	K029	2479	16.11	68.15
Other specified disorders of teeth and supporting structures	K088	1279	8.31	76.46
Acute apical periodontitis of pulpal origin	K044	1098	7.13	83.6
Cellulitis and abscess of mouth	K122	194	1.26	84.86
Unspecified lesions of oral mucosa	K1370	183	1.19	86.05
Temporomandibular joint disorder, unspecified	M2660	162	1.05	87.1
Alveolitis of jaw	M273	158	1.03	88.13
Jaw pain	R6884	150	0.97	89.1

[26] The use of this customized approach to classify diagnosis codes into Groups 1 and 2 was tested and validated during the development of the pediatric ED measures. Based on testing data and chart reviews, the MDMC determined that it more reliably identified relevant ED visits [23]. This approach was additionally validated for the adult ED measures through chart reviews.

Oregon Medicaid CY 2016				
Periapical abscess without sinus	K047	4723	32.47	32.47
Other specified disorders of teeth and supporting structures	K088	3813	26.21	58.68
Dental caries, unspecified	K029	2274	15.63	74.32
Other specified disorders of teeth and supporting structures	K0889	1103	7.58	81.9
Disorder of teeth and supporting structures, unspecified	K089	238	1.64	83.53
Cellulitis and abscess of mouth	K122	175	1.2	84.74
Diseases of lips	K130	165	1.13	85.87
Sialoadenitis, unspecified	K1120	127	0.87	86.75
Arthralgia of temporomandibular joint	M2662	122	0.84	87.58
Alveolitis of jaw	M273	119	0.82	88.4
Iowa CY 2016 (DWP, SSI, & FMAP)				
Other specified disorders of teeth and supporting structures	K088	1776	26.92	26.92
Periapical abscess without sinus	K047	1748	26.50	53.42
Dental caries, unspecified	K029	1553	23.54	76.96
Jaw pain	R6884	155	2.35	79.31
Cracked tooth	K0381	124	1.88	81.19
Cellulitis and abscess of mouth	K122	114	1.73	82.92
Other lesions of oral mucosa	K1379	115	1.74	84.66
Chronic gingivitis, plaque induced	K0510	80	1.21	85.87
Sialoadenitis, unspecified	K1120	69	1.05	86.92
Alveolitis of jaw	M273	68	1.03	87.95

Validation of Diagnosis Codes to Identify ACS NTDC ED Visits

Diagnosis codes in OHA Medicaid claims data were compared with data obtained directly from medical (Epic) and dental (AxiUm) electronic health records (EHRs) at the Oregon Health & Science University (OHSU) academic health center to examine the degree of concordance between these two data sources. Automated queries were used to generate background data reports from the EHR of all patients (Medicaid enrollees only) who visited the OHSU ED between January 1st, 2014 and December 31st, 2015. For the two-year study period (2014, 2015), 10,627 patients (20,055 visits) were identified who had any type of ED visit, out of which 452 were NTDC visits made by 390 patients. Given the total ED visits of 20,055, it was determined that a sample size of 377 visits was sufficient for the manual review based on an estimated sample proportion of 0.5 (p=0.5), a standard two-tailed z-score (z=1.96), and a margin of error of 0.05 (d=0.05). The final chart review sample (434 ED visits) included all NTDC ED visits that resulted in inpatient admissions (98 visits), follow-up dental visits (31 visits), a random selection of discharged ED visits (225 visits), and an additional sample of 80 ED visits from the non-NTDC ED visits (stratified sampling) to assess the sensitivity/specificity of the approach for identifying NTDC ED visits. Three trained and calibrated reviewers, independently reviewed and abstracted data from the

medical and dental EHRs for the 434 visits. Twenty (20) of these charts were initially used to pilot test the abstraction process. Inter-rater reliability, based on the pilot-test sample, was 91% among all three reviewers. Discrepancies in the review process were discussed and resolved prior to commencing the full review of the remaining charts. Upon completion of the manual chart reviews, the EHR records were matched with the claims data using patient IDs and dates of service. Nine charts were excluded due to mismatches (>2-day difference) in their dates of service, resulting in a total of 425 visits for the final analysis.

To assess validity, the kappa statistic, sensitivity (accuracy of administrative diagnosis code set to identify an ED visit when it is documented in the patient's medical record), specificity (accuracy of administrative diagnosis code set to accurately exclude an ED visit as not NTDC when an NTDC ED visit is not documented in the patient's medical record), positive predictive value (extent to which an indication of a NTDC ED visit identified by the administrative diagnosis code set is also supported by the patient's medical record), and negative predictive value (extent to which an ED visit is identified as being not NTDC by the administrative diagnosis codes is supported by the patient's medical record) were calculated.

There was one code, Jaw Pain (ICD9 784.92/ICD10 R68.84), for which consensus could not be reached as to whether it was more appropriately placed in Group 1 (include when present as a first-listed diagnosis) or Group 2 (include when present as a first-listed diagnosis and there is also a Group 1 code as an additional-listed diagnosis). The code was included in Group 2 during initial testing pending chart review. Of the 425 visits reviewed, 11 included a first-listed diagnosis of jaw pain in the claims data. Detailed review of the patient records found that all but one represented true dental pain and not TMD-related pain. It was determined that these visits appropriately represented ACS NTDCs consistent with the measure intent. Inclusion in Group 1 also improved measure concordance based on the kappa statistic (from 0.76 to 0.85) as well as improving sensitivity (from 82% to 92%). Consequently, jaw pain was recommended to be included in Group 1 in the final code set. Inclusion of jaw pain in Group 1 instead of Group 2 increased the measure rate by approximately 3%.

First-Listed versus Any-Listed Diagnosis Codes to Identify ED Visits

The reliability and validity of using all-listed diagnoses were lower compared with using first-listed diagnoses (Table 2). Overall agreement using all-listed diagnoses was 90% compared with 93% for first-listed. The kappa statistic value for all-listed diagnoses was 0.78 compared with 0.85 using first-listed diagnoses. Specificity was lower with all-listed diagnoses (80% compared with 94%) and sensitivity was higher (97% compared with 92%).

The lower reliability and validity of all-listed diagnoses was due to the inclusion of visits deemed not to be ACS NTDCs incorrectly classified as an ACS NTDC visit (37 instead of 11). These findings are consistent with those found in the measure testing for the DQA pediatric ED measures.[22] In addition, some state Medicaid programs truncate the number of listed diagnosis codes in their stored claims data used for reporting purposes. Differences in the number of listed diagnoses permitted across databases could potentially threaten the reliability of cross-state comparisons when using all-listed diagnoses.[22]

The diagnosis code set when using first-listed diagnoses demonstrated good overall reliability and validity in identifying NTDC ED visits. Overall agreement was 93%, indicating high overall concordance between the administrative claims and ED records. The kappa statistic was 0.85, which is in the "almost perfect" range.[27] Sensitivity was 92%, and specificity was 94%. The positive predictive value was 95%, and negative predictive value was 90%. Collectively, these findings support the reliability and validity of the diagnosis code set in identifying ACS NTDC visits.

Table 2: Agreement between EHR and Administrative Data Diagnosis Codes to Identify ACS NTDC ED Visits

Agreement between Record Abstraction and Administrative Data				Agree-ment	Kappa Statistic (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)	Positive Predictive Value (95% CI)	Negative Predictive Value (95% CI)
Y/Y	Y/N	N/Y	N/N						
ACS NTDC ED Visit Identified Using First-Listed Diagnoses									
218	20	11	176	93%	85% (80%-90%)	92% (87%-95%)	94% (90%-97%)	95% (92%-98%)	90% (85%-94%)
ACS NTDC ED Visit Identified Using All-Listed Diagnoses									
231	7	37	150	90%	78% (72%-84%)	97% (94%-99%)	80% (74%-86%)	86% (81%-90%)	96% (91%-98%)

Medicaid-Medicare (Dual-Eligible) Population

Due to limited access to complete Medicare claims data within state Medicaid programs, measure scores for the Medicaid-Medicare dual-eligible populations based solely on Medicaid data are likely to significantly under-represent ED visits made by these enrollees. The MDMC made the determination to exclude all member months (denominator) and all associated claims for services (numerator) following the start date of Medicare eligibility for dual-eligible individuals.

Measure 1: Ambulatory Care Sensitive Emergency Department Visits for Non-Traumatic Dental Conditions in Adults

Description: Number of emergency department (ED) visits for ambulatory care sensitive non-traumatic dental conditions per 100,000 member months for adults

Numerator: Number of ED visits with an ambulatory care sensitive non-traumatic dental condition diagnosis code among individuals 18 years and older

Denominator: All member months for individuals 18 years and older during the reporting year

Rate: (NUM/DEN)x100,000

27 Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics. 1977;33(1):159- 74.

Detailed measure specifications for Measure 1 are provided in **Appendix C**.

Measure Intent

The intent of this quality measure is ***to enable plans or programs to assess and/or compare their rates of Ambulatory Care Sensitive ED visits for Non-Traumatic Dental Conditions by adults (18 years and older) at any point in time and/or over time***. Because these visits are potentially avoidable through prevention and outpatient management, lower rates signify better quality of care. This measure can be used to support performance improvement efforts within programs and in accountability applications across programs or plans. It can also be used to inform policy decisions, such as the provision of comprehensive adult dental benefits for Medicaid and currently uninsured populations as well as the availability of non-ED, after-hours dental care for non-urgent cases. It is important that measure implementers recognize that this measure is ***not designed to measure resource use***.

Measure Scores

Using the DQA specifications **(Appendix C)** for ACS ED Visits for NTDCs in adults, both research teams calculated the overall performance scores for this measure. Table 3 indicates that performance scores ranged from 212 to 310 visits per 100,000 member months (MM).

Table 3: Performance Score for ACS NTDC ED Visits by Medicaid Program (2015 and 2016)

Program	Year	Denominator	Numerator	Rate per 100,000 MM
Oregon Medicaid	CY 2015	7,291,092	15,730	215.7
Oregon Medicaid	CY 2016	7,151,183	14,939	208.9
Iowa Dental Wellness Plan	CY 2015	1,724,682	3,808	220.8
Iowa Medicaid-FMAP	CY 2015	595,811	1,545	259.3
Iowa Medicaid-SSI	CY 2015	252,146	580	230.0
Iowa Dental Wellness Plan	CY 2016	1,852,291	5,009	270.4
Iowa Medicaid-FMAP	CY 2016	573,965	1,778	309.8
Iowa Medicaid-SSI	CY 2016	248,459	735	295.8

Measure scores were further stratified by age, sex, geographic location, and race/ethnicity (Appendix F). In both 2015 and 2016, the 25–34-year age category, males, Non-Hispanic Blacks, and rural residents had the highest rate of ACS ED visits for NTDCs among the Oregon Medicaid population. Iowa (2016) showed similar trends: 25-34 year-olds, males, Non-Hispanic Blacks, and rural residents showed the highest rates of ED visits for NTDCs.

ED Visits Resulting in Inpatient Admissions

The MDMC discussed the conceptual basis for including ED visits with NTDC diagnoses that resulted in inpatient admissions. These visits may represent more severe exacerbations of dental-related conditions and contribute disproportionately to costs. However, the decision to admit a patient may be driven by the presence of co-morbid conditions in medically compromised individuals. Thus, inclusion of these visits would require appropriate risk adjustments to adjust for these conditions, thus further complicating the measure. MDMC also discussed that the intent is to measure access by evaluating the proportion of the population that seeks care in the ED for ACS NTDCs and who are subsequently discharged from the ED. Patients seeing care in the ED typically do not receive definitive care and are referred to a dental provider when discharged. Patients who are admitted for hospitalization represent a different category of health care needs and a different episode of care. To avoid confounding by the additional considerations and complexities associated with inpatient admissions, the determination was to focus on those patients who seek care in the ED and are discharged.

Table 4 shows rates of ED visits by disposition status: discharged or inpatient admissions. In general, fewer than 2% of ED visits resulted in an inpatient admission. Rates of ED visits that resulted in an inpatient admission were highest in the Iowa Medicaid-SSI population – a high proportion of whom are disabled.

Table 4: ACS NTDC ED Visits by Disposition (Per 100,000 Member Months)

Program	Year	Total Visits	Discharged	Visits Resulting Inpatient Admission
Oregon Medicaid	CY 2015	218.5	215.7	2.8
Oregon Medicaid	CY 2016	212.1	208.9	3.2
Iowa Dental Wellness Plan	CY 2015	223.3	220.8	2.6
Iowa Medicaid-FMAP	CY 2015	261.8	259.3	2.5
Iowa Medicaid-SSI	CY 2015	233.2	230.0	3.2
Iowa Dental Wellness Plan	CY 2016	273.7	270.4	3.3
Iowa Medicaid-FMAP	CY 2016	311.7	309.8	1.9
Iowa Medicaid-SSI	CY 2016	302.7	295.8	6.8

Although visits resulting in inpatient admissions represent a small percentage of all ACS NTDC visits and the measure intent is not focused on resource use, the DQA recognizes that NTDC ED visits that result in inpatient admissions are significant in terms of both health consequences and system resources. Consequently, the measure specifications require that programs report the number of visits excluded because they resulted in inpatient admissions so that programs and other stakeholders are aware of the magnitude of these visits and can monitor trends over time.

Measure 2: Follow-up after Emergency Department Visits for Ambulatory Care Sensitive Non-Traumatic Dental Conditions in Adults

As an indicator of the continuity of care and receipt of definitive care, it is critical that programs measure follow-up visits to a dental provider following an ACS ED visit for NTDCs. Consistent with the approach used for Measure 1, the measure denominator is based on the number of ED visits instead of the number of unique enrollees.

Description: The percentage of ambulatory care sensitive non-traumatic dental condition emergency department visits among adults aged 18 years and older in the reporting period for which the member visited a dentist within (a) 7 days and (b) 30 days of the ED visit

Numerators: Number of ambulatory care sensitive non-traumatic dental condition ED visits in the reporting period for which the member visited a dentist within (a) 7 days (NUM1) and (b) 30 days (NUM2) of the ED visit

Denominator: Number of ambulatory care sensitive non-traumatic dental condition ED visits in the reporting period

Rates: NUM1/DEN and NUM2/DEN

Detailed measure specifications are available in **Appendix D**.

Follow-Up Period

The two follow-up periods (7 and 30 days) were selected to be in alignment with the DQA's pediatric ED follow-up quality measure.[28] Since services associated with most ACS ED visits for NTDCs tend to be palliative, these time periods measure the receipt of follow-up dental care in a timely manner.

Measure Rates

Approximately one-third (ranging from 29.6% in OHA Medicaid 2015 to 33.6% in Iowa SSI 2016) of all ED visits were associated with a follow-up dental visit within 30 days (Table 5). This decreased to approximately 20% (ranging from 19.6% to 22.1%) when the follow-up period was limited to 7 days after the index ED visit.

Table 5: Performance Scores for Follow-Up after ACS NTDC ED Visit by Medicaid Program

Follow-Up after ACS ED Visits for NTDCs	Denominator	Numerator	Measure Score (%)
Oregon Medicaid CY 2015			
7-day Follow-Up	14,505	2,869	19.8 %

28 Follow-Up after Emergency Department Visits for Dental Caries in Children (NQF #2695)
https://www.ada.org/~/media/ADA/DQA/2019FUafterERVisitsforDentalCariesinChildren.pdf?la=en

30-day Follow-Up	14,505	4,333	29.9 %
Oregon Medicaid CY 2016			
7-day Follow-Up	13,845	2,905	21.0 %
30-day Follow-Up	13,845	4,252	30.7 %
Iowa Dental Wellness Plan CY 2016			
7-day Follow-Up	4,186	912	21.8 %
30-day Follow-Up	4,186	1,367	32.7 %
Iowa Medicaid (FMAP) CY 2016			
7-day Follow-Up	1,546	342	22.1 %
30-day Follow-Up	1,546	487	31.5 %
Iowa Medicaid (SSI) CY 2016			
7-day Follow-Up	566	124	21.9 %
30-day Follow-Up	566	190	33.6 %

Table 6 provides the proportion of follow-up dental visits (within 7 days) after an ACS ED visit for NTDCs stratified by age, sex, geographic location and race/ethnicity. In both 2015 and 2016, the 18 year-old age category had the lowest proportion of follow-up dental visits among working-aged adults (within 7 days), while the 75–84 year-old age category had the highest proportion among the Oregon Medicaid population. Furthermore, females, Hispanics, and urban dwellers had higher proportions of follow-up dental visits among the Oregon Medicaid population. In Iowa, follow-up rates, by age, were highest among 45-54 year-olds. Residents of urban areas also consistently had higher rates of follow-up than rural residents. Rates of follow-up for race/ethnicity categories and by sex were mixed across the programs. Further detailed data on the measure scores are available in Appendix F.

Table 6: Rates of Follow-up Dental Visits After ACS ED Visits for NTDCs (7-days)

	Oregon Medicaid CY 2015	Oregon Medicaid CY 2016	Iowa Dental Wellness Plan CY 2016	Iowa Medicaid (FMAP) CY 2016	Iowa Medicaid (SSI) CY 2016
Overall	**19.8**	**21.0**	**21.8**	**22.1**	**21.9**
Age					
18	16.8	20.7			
19-20	19.9	21.1	11.3	26.1	25.9
21-24	19.2	19.5	18.8	18.1	20.8
25-34	19.6	20.9	20.5	21.7	17.8
35-44	18.8	21.3	21.9	19.5	20.4
45-54	22.1	21.1	23.8	24.6	27.6
55-64	21.6	23.4	21.3	22.2	15.7
65-74	8.1	11.1			0.00
75-84	66.7	66.7			
85+					
Sex					
Female	21.5	22.6	21.3	20.6	21.3
Male	17.8	19.0	20.5	21.6	19.4

Geographic Location					
Urban	20.5	21.5	21.5	22.2	21.8
Rural	17.5	19.8	19.8	18.9	19.4
Unknown/Missing	21.6	15.0	16.7	0	0
Race/Ethnicity*					
Non-Hispanic White	19	20.9	20.89	21.08	20.0
Non-Hispanic Black	21.2	21.8	19.58	20.47	16.2
Hispanic	21.6	24.7	22.78	16.98	14.3
Other	19.4	22.9	21.02	13.85	27.3
Unknown/Missing	20.7	20.4	21.82	25.49	31.3

*Note: A large proportion of the race/ethnicity data were missing in each program, ranging from 12.5% (IA-Medicaid-SSI) to 32.7% (OHA 2015) (Appendix A).

Measure 3: Adults with Diabetes – Oral Evaluation

The measure description is as follows:

Description: Percentage of adults with diabetes who received a comprehensive or periodic oral evaluation or a comprehensive periodontal evaluation within the reporting year

Numerator (NUM): Unduplicated number of adults with diabetes who received a comprehensive or periodic oral evaluation or a comprehensive periodontal evaluation

Denominator (DEN): Unduplicated number of adults with diabetes

Rate: NUM/DEN

Detailed measure specifications are contained in **Appendix E**.

Measure Importance

The 2018 Standards of Medical Care in Diabetes call for initial care management to include a referral to a dentist.[29] This recommendation recognizes the established bi-directional relationship between diabetes mellitus and periodontal disease.[30,31] Specifically, diabetes is associated with increased prevalence and severity of periodontal disease, while severe periodontal disease is associated with poor glycemic control. Oral evaluations represent an important entry point into the dental care system. Diagnosis and treatment planning for the prevention and treatment of periodontal disease at these visits offer patients appropriate dental care with the potential to improve diabetes outcomes.

[29] American Diabetes Association. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Medical Care in Diabetes – 2018. Diabetes Care 2018;41(S1):S28-S37.
[30] Casanova L, Hughes FJ, Preshaw PM. Diabetes and periodontal disease: a two-way relationship. British Dental Journal 2014;217(8):433-7.
[31] Chapple ILC, Genco R, working group 2 of the joint EFP/AAP workshop. Diabetes and periodontal diseases: consensus report of the Joint EFP/APP Workshop on Periodontitis and Systemic Diseases. Journal of Clinical Periodontology 2013;40(14):S106-12.

Medicaid/Medicare Dual Eligible Population

Although it is important to understand the systematic differences that exist in the receipt of services among the dual-eligible population, many Medicaid programs do not have access to Medicare data. The variation in access to the Medicare claims data for a Medicaid program will create a lack of comparability in the reported measures for this population. The MDMC made the determination to exclude individuals dually eligible for Medicaid and Medicare from the denominator.

Identification of Adults with Diabetes

The target population for this measure aligns with the 2018 National Committee for Quality Assurance (NCQA) Healthcare Effectiveness Data and Information Set (HEDIS)® criteria to identify adults with type I and type II diabetes. The HEDIS® criteria are used in several existing NCQA performance measures to assess comprehensive diabetes care in adults. Those measures evaluate rates of hemoglobin A1c (HbA1c) testing and control, blood pressure control, eye exams, and medical attention for neuropathy.[32]

Broadly, adults with diabetes (type I or type II) can be identified by either claims and encounter data that include a diagnosis of diabetes or by pharmacy data (**Appendix 3**). Both claims and encounter data and pharmacy data must be checked, but a patient need only be identified by one method to be eligible for inclusion in the denominator. The HEDIS® criteria identify adults who met at least one of the following criteria in either the measurement year or the preceding year:

Claims/Encounter Data

i. At least one acute inpatient encounter (Acute Inpatient Value Set) with a diagnosis of diabetes (Diabetes Value Set) without telehealth (Telehealth Modifier Value Set; Telehealth POS Value Set)

OR

ii. The subject has at least two outpatient visits (Outpatient Value Set), observation visits (Observation Value Set), ED visits (ED Value Set) or nonacute inpatient encounters (Nonacute Inpatient Value Set) on different dates of service, with a diagnosis of diabetes (Diabetes Value Set). Visit type need not be the same for the two visits.

OR

Pharmacy Claims Data

iii. The subject was dispensed insulin or oral hypoglycemics/antihyperglycemics during the measurement year or year prior to the measurement year on an ambulatory basis. (Diabetes Medications List)

The HEDIS® specifications for measures for comprehensive diabetes care requires exclusion of individuals accessing services in hospices. The specifications also require exclusion of subjects age 66 and older as of December 31 of the measurement year with frailty and advanced illness. The measure *optionally* excludes adults with a diagnosis of secondary diabetes (i.e., due to other medical conditions), such as gestational diabetes or drug-induced diabetes, who do not

[32] NCQA. HEDIS ® Measures. Comprehensive Diabetes Care (CDC). Available at: **https://www.ncqa.org/hedis/measures/comprehensive-diabetes-care/**.

have a diagnosis of diabetes from the **HEDIS® Diabetes Value Set**. These represent a subset of individuals who were originally identified as denominator-eligible through pharmacy claims. The MDMC carefully considered the conceptual basis for exclusions and any potential impact on measure scores.

Considerations for Excluded Adults as Specified in the NCQA HEDIS® Methodology

There were three different kinds of exclusions described in the HEDIS® specifications:

1. Adults seeking care in a hospice setting during the measurement year or the year prior; HEDIS® criteria requires exclusion of these individuals from the measure.
2. Adults age 66 and older as of December 31st of the measurement year with frailty and advanced illness.
3. Adults who do not have a diagnosis of diabetes (Diabetes Value Set) in any setting during the measurement year or year prior, were classified as diabetic based on pharmacy data alone, AND who had a diagnosis of gestational or steroid-induced diabetes (identified through the **HEDIS® Diabetes Exclusion Value Set**) during the measurement year or the year prior; these individuals are "optionally" excluded.

Required Hospice Exclusion

The HEDIS® specifications require exclusion of adults who received hospice services (identified by having any claims/encounter data with a code from the **Hospice Value Set**) during either the measurement year or the year prior. The MDMC also sought to maintain alignment with the HEDIS® specifications as closely as possible to minimize added measurement burden on measure implementers. The research teams examined the effect of maintaining this exclusion; results of the sensitivity testing are shown in Table 7. Overall, applying the hospice exclusion resulted in very small decreases in the denominator (≤1%) and the overall measure score (≤0.2%); consequently, incorporating this exclusion to align with the HEDIS® specifications does not substantially impact the measure scores.

Table 7. Sensitivity Testing: Measure Scores Calculated with and without Adults in Hospice[33]

	Including adults in hospice		Excluding adults in hospice	
	Denominator	Measure Score (%)	Denominator	Measure Score (%)
Oregon, 2015	36,135	22.9	35,903	23.1
Oregon, 2016	35,846	24.6	35,753	24.7

As specified by HEDIS®, the DQA measure specifications require exclusion of adults receiving care in a hospice setting.

Advanced Illness and Frailty Exclusion

The 2019 updates to the HEDIS® specifications include new exclusion criteria that require all adults who are 66 years and older and have associated diagnostic codes included in the advanced illness and frailty value sets be excluded from the denominator. The research teams

[33] This sensitivity test uses the following specifications: 180 days continuous enrollment; optional diagnosis values are included. Note: this sensitivity testing was performed using Oregon data only.

and the MDMC considered the exclusions and have determined the DQA measure specifications will require these adults to be excluded. The DQA specifications additionally exclude all individuals who are Medicare-Medicaid dual eligible. It is anticipated that there is significant overlap between these exclusions. However, this could not be tested because this HEDIS® exclusion was introduced in 2019 with reliance on ICD10 codes, which were largely unavailable within the data used for testing. It is not expected that this exclusion will substantially impact the measure scores.

Optional Diagnosis Exclusions

The MDMC discussed the conceptual significance of including/excluding adults who only have a diagnosis of diabetes other than type I or type II (e.g., gestational diabetes or steroid-induced diabetes that are identified through the **HEDIS® Diabetes exclusion value set**). These represent a subset of individuals originally identified as denominator-eligible through pharmacy claims. The MDMC discussed that these are largely transitional diagnoses (e.g., gestational diabetes is typically not diagnosed until at least the second trimester of pregnancy and often resolves after delivery). As part of its deliberation, the MDMC considered the implications of including the populations within the **HEDIS® exclusion value set** in the measure and its impact on the measure scores. Results from the sensitivity testing (Table 8) did not find a significant impact on the measure scores. Although the denominator was somewhat larger without the exclusions (i.e., excluding individuals with gestational diabetes and steroid-induced diabetes who were not identified in the **HEDIS® Diabetes Value Set**), there was negligible effect on the measure score for each of the programs. Additionally, the MDMC expressed concern that treating the exclusion as "optional" would not ensure appropriate comparisons between plans and programs.

Table 8. Sensitivity Testing: Measure Scores with and without Optional Exclusions for Gestational and Steroid-Induced Diabetes

	Without Exclusions		With Exclusions	
	Denominator	Measure Score (%)	Denominator	Measure Score (%)
Oregon, 2015	37,810	23.1	35,903	23.0
Oregon, 2016	37,479	24.8	35,753	24.7
Iowa DWP, 2016	10,081	34.2	9,950	34.1
Iowa FMAP, 2016	1,994	30.2	1,877	30.3
Iowa SSI, 2016	3,629	24.3	3,619	24.3

Adults identified by the **NCQA HEDIS® Diabetes Exclusion value set** who were not identified as having a diagnosis of diabetes in the **NCQA HEDIS® Diabetes Value Set** will be **required to be excluded from the** denominator.

Pre-Diabetes

The MDMC also discussed the potential for individuals identified based on pharmacy claims only to capture enrollees who have blood glucose levels that are higher than normal (and may be

identified as pre-diabetic), but not high enough to be diagnosed with diabetes. These adults are at risk of developing type 2 diabetes. It is estimated that 1 out of every 3 adults in the U.S. has prediabetes.[34] However, MDMC expressed concerns in trying to exclude these individuals due to lack of a validated accurate identification methodology at the present time. Consequently, the MDMC determined to stay aligned with the NCQA denominator identification and not attempt to exclude individuals with pre-diabetes.

Enrollment Interval Considerations

The DQA explored two enrollment periods for this measure:

1. continuous enrollment throughout the measurement year (i.e., January 1 – December 31), with an allowable gap in enrollment of up to 45 days (referred to in this report as "12 months") and
2. 180 days continuous enrollment during the measurement year.

The 12-month enrollment interval is based on the HEDIS® specifications for required enrollment periods. The 180-day enrollment interval is based on previous testing of DQA pediatric dental measures. For pediatric Medicaid populations, which experienced significant variations in enrollment duration, 180 days was selected to balance sufficient enrollment duration to allow children adequate time to access care with the number of children who drop out of the denominator due to stricter enrollment requirements.

Table 9 shows measure scores for the adult populations using each enrollment interval. Using the NCQA HEDIS® 12-month criteria for continuous enrollment did not substantially reduce the size of the denominator or substantially impact the measure scores across sites and reporting years.

Table 9. Sensitivity testing of enrollment intervals: 12 months versus 180 days

	12 months		180 days	
	Denominator	Measure Score (%)	Denominator	Measure Score (%)
Oregon, 2015	35,903	23.0	39,871	22.1
Oregon, 2016	35,753	24.7	41,466	23.2
Iowa DWP, 2016	9,950	34.1	12,336	31.7
Iowa FMAP, 2016	1,877	30.3	2,133	29.0
Iowa SSI, 2016	3,619	24.3	3,753	23.8

Given the relatively small differences between the denominator definitions, the MDMC determined to align with the HEDIS® specifications and specify an enrollment interval of 12 months with a single allowable gap of up to 45 days.

[34] CDC. *National Diabetes Statistics Report, 2017.* Atlanta, GA: CDC, US DHS; 2017. Available at: **https://www.cdc.gov/diabetes/data/statistics/statistics-report.html**.

Measure Scores

Measure scores based on the above determinations (i.e., 12 months enrollment, adults in hospice excluded, excluding individuals with gestational or steroid-induced diabetes without another diabetes diagnosis, AND who received an oral evaluation) showed significant variation; the percentage of adults with diabetes receiving oral evaluations ranged from 23%–34% (Table 10). Measure scores were further stratified by age, sex, geographic location, and race/ethnicity (Appendix F).

Receipt of Oral Evaluation by Program

In general, rates of oral evaluation among adults with diabetes were higher in Iowa relative to Oregon. The percentage of adults with diabetes who received an oral evaluation in the Oregon population in 2016 was 24.7%. The percentages for the Iowa populations were 34.1% (DWP), 30.3% (FMAP), and 24.3% (SSI).

Comparisons with Any Dental Service Use

Rates of oral evaluation among adults with diabetes were slightly lower than the rate of overall dental utilization in the overall program population (see Table A-5 in Appendix A). For example, 34.1% of adults with diabetes in the Iowa DWP had an oral evaluation in 2016 versus 38.8% of all adults enrolled 11-12 months who received any dental service. Similarly, 24.7% of adults with diabetes in Oregon had an oral evaluation in 2016 compared with 32.6% of all adults enrolled 11-12 months who received any dental service.

Table 10. Overall Measure Scores: Adults with Diabetes – Oral Evaluation[35]

	Denominator	Numerator	Measure Score (%)
Oregon Medicaid CY 2015	35,903	8,262	23.0
Oregon Medicaid CY 2016	35,753	8,823	24.7
Iowa Dental Wellness Plan CY 2016	9,950	3,392	34.1
Iowa Medicaid-FMAP CY 2016	1,877	568	30.3
Iowa Medicaid-SSI CY 2016	3,619	880	24.3
Iowa Dental Wellness Plan CY 2015	8,390	2,777	33.1
Iowa Medicaid-FMAP CY 2015	1,461	431	29.5
Iowa Medicaid-SSI CY 2015	3,138	820	26.1

[35] Measure scores use the DQA proposed measure specifications: 12 months enrollment; adults in hospice are excluded; NCQA's optional exclusion diagnosis value set are excluded. Note: Iowa data are limited to ages 19-64.

Appendix A. Data Sources and Population Characteristics

Appendix A provides an overview of the data sources used for measure testing and overall population characteristics. Table A-1 summarizes the four programs used for testing.

Table A-1. Summary of Data Sources, Delivery System Models, and Provider Reimbursement

Program Name	Oregon Medicaid	IA-DWP	IA Medicaid-FMAP	IA- Medicaid-SSI
Age Range (Years)	18-109	19-66	19-66	19-66
# Unique Enrollees >=18 Years	2015: 769,635 2016: 791,329	2015: 218,808 2016: 230,480	2015: 61,008 2016: 59,804	2015: 37,365 2016: 37,433
Dental Delivery Model(s)	Dental Care Organizations (DCOs)	Fee for service (FFS)	FFS	FFS
Nature of Payments from Program to DCO/CCO (if applicable)	Global Budgeting Capitation Model (per member per month	Prepaid Ambulatory Health Plan (PHP)	N/A	N/A
Nature of Payments from Program or CCO/DCO to Dental Providers	Discounted Fee-for-service (FFS); Salary payments	FFS	FFS	FFS

In both 2015 and 2016, for all four programs, there was a greater percentage of population within the 25–34-year old age category and more women as compared to men (Table A-2). The majority of the population lived in urban locations (using RUCA Code classifications, categorization D) and were non-Hispanic Whites. A large proportion of the race/ethnicity data was missing in each program, ranging from 12.5% (IA-Medicaid-SSI) to 32.7% (OHA 2015).

Table A-2. Population Characteristics - Demographics

	2015		2016		2016					
	OHA		OHA		IA-DWP		IA Medicaid-FMAP		IA- Medicaid-SSI	
	N	Col %	N	Col %	N	Col %	N	Col %	N	Col %
Total Enrollees	769,635	100	791,329	100	230,480	100	59,804	100	37,433	100
Age										
18	21,804	2.8	21,416	2.7	0	0	0	0	0	0
19-20	21,138	2.7	19,964	2.5	17,838	7.7	2,167	3.62	1,263	3.4
21-24	75,601	9.8	76,564	9.7	29,336	12.7	7,837	13.1	2,604	7.0
25-34	207,551	26.9	215,718	27.3	65,392	28.4	26,083	43.6	6,579	17.6
35-44	144,085	18.7	149,972	18.9	45,489	19.7	16,942	28.3	6,102	16.3
45-54	127,758	16.6	128,353	16.2	39,478	17.1	5,685	9.5	8,426	22.5
55-64	115,678	15.1	119,336	15.1	31,378	13.6	1,061	1.8	10,945	29.2
65-74	30,067	3.9	33,350	4.2	1,569	0.68	29	0.1	1,514	4.0
75-84	14,810	1.9	15,450	1.9	0	0	0	0	0	0
85+	11,143	1.4	11,206	1.4	0	0	0	0	0	0
Sex										
Female	423,040	54.9	431,484	54.5	123,055	53.4	46,335	77.5	19,678	52.6
Male	346,595	45.1	359,845	45.5	107,425	46.6	13,469	22.5	17,755	47.4
Geographic Location										
Urban	609,081	79.1	623,484	78.8	152,049	66.0	38,743	64.8	23,921	63.9
Rural	150,233	19.5	155,141	19.6	78,222	33.9	21,011	35.1	13,414	35.8
Missing	10,321	1.3	12,704	1.6	209	0.1	50	0.1	98	0.3
Race and Ethnicity										
Non-Hispanic White	439,985	57.2	438,725	55.4	151,142	65.6	37,059	62.0	24,165	64.6
Non-Hispanic Black	20,470	2.7	20,274	2.6	19,693	8.5	7,130	11.9	4,049	10.8
Hispanic	17,724	2.3	22,728	2.9	13,630	5.9	4,392	7.3	661	1.8
Other	56,610	7.4	51,176	6.5	12,445	5.4	3,725	6.2	720	1.9
Missing/ Unknown	234,846	30.5	258,426	32.7	33,570	14.6	7,498	12.5	7,838	20.9

The majority of the Oregon Medicaid population (84.5%) – in both 2015 and 2016 – was eligible via mechanisms other than SSI or Medicaid/Medicare dual eligibility (Table A-3). Beneficiaries who were dual eligible for Medicare made up 8.9% of the total Oregon Medicaid population. The Iowa populations are eligible for Medicaid benefits via three distinct mechanisms: the DWP (Medicaid expansion), FMAP, or SSI. DWP members represent 70% of the Iowa study population (N=327,717).

Table A-3. Population Characteristics – Enrollees by Eligibility Category

	2015		2016		2016					
	OHA		OHA		Iowa DWP		Iowa FMAP		Iowa SSI	
	N	Col%	N	Col%	N	Col%	N	Col%	N	Col%
Total Enrollees	769,635	100	791,329	100	230,480	100	59,804	100	37,433	100
Enrollees by Program Category										
Medicaid – excluding SSI eligibility	650,004	84.5	668,795	84.5	230,480	100	59,804	100	0	0
Medicaid – SSI eligibility	51,505	6.7	54,681	6.9	0	0	0	0	37,433	100
Medicaid/Medicare (dual eligible)	35,175	4.6	34,238	4.3	0	0	0	0	0	0
Medicaid/Medicare/SSI	32,951	4.3	33,615	4.3	0	0	0	0	0	0

In all programs, the number of enrollees in Medicaid decreased as the length of enrollment increased (Table A-4). Most beneficiaries in the Oregon Medicaid program (60-64%) and the Iowa SSI program (85%) were enrolled for 11-12 months (i.e., 1 year of enrollment with an allowable one-month gap). However, only 42-43% of Iowa DWP and FMAP program enrollees were enrolled for 11-12 months.

Table A-4. Population Characteristics – Enrollees by Length of Enrollment

	2015		2016		2016					
	OHA		OHA		Iowa DWP		Iowa FMAP		Iowa SSI	
	N	%	N	%	N	%	N	%	N	%
Total Enrollees	769,635	100	791,329	100	230,480	100	59,804	100	37,433	100
Continuous Enrollment										
At least one month	765,964	99.5	788,300	99.6	230,480	100	59,804	100	37,433	100
At least 90 days	729,573	94.8	750,107	94.8	198,483	86.1	52,082	87.1	36,359	97.1
At least 180 days	648,613	84.3	654,174	82.7	159,635	69.3	40,540	67.8	34,684	92.7
At least 11 or 12 months	490,342	63.7	472,916	59.8	99,539	43.2	24,924	41.7	31,744	84.8

The proportion of enrollees with at least one month enrollment who received any dental service in a reporting year ranged from 25.9% (OHA, 2016) to 33.0% (Iowa SSI, 2016) (Table A-5). Rates of dental utilization increased consistently as length of enrollment increased, across all programs. Among members with 11-12 months of enrollment, dental utilization ranged from 30.9% (OHA, 2015) to 38.8% (Iowa DWP, 2016).

Table A-5. Population Characteristics – Members with Any Dental Utilization by Length of Enrollment

	2015		2016		2016					
	OHA		OHA		Iowa DWP		Iowa FMAP		Iowa SSI	
Continuous Enrollment	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
At least one month	173,729	27.0	198,606	25.9	65,333	28.3	18,308	30.6	12,352	33.0
At least 90 days	173,006	28.2	197,617	27.1	61,415	30.9	16,914	32.5	12,203	33.6
At least 180 days	169,451	29.6	189,766	29.3	54,369	34.1	14,196	35.0	11,877	34.2
At least 11 or 12 months	157,955	30.9	159,805	32.6	38,610	38.8	9,539	38.3	11,101	35.0

APPENDIX B. Summary of Critical Data Elements by Program

Critical data elements are those required to calculate the measure. Table B-1 summarizes the critical data elements required for the measures. For both the Oregon and Iowa Medicaid populations, all critical data elements were available. Only the revenue/CPT (facility claims) and secondary diagnoses variables had more than 5% missing or invalid information in the Oregon Medicaid data. These codes commonly have higher rates of missing data because they are not applicable to all claims. In the Iowa Medicaid data, the rendering/billing provider NUCC taxonomy codes were missing. However, Iowa administrative data include a state defined provider variable. Provider type is defined by the Iowa Medicaid Enterprise, which links place of service codes and rendering/billing provider taxonomies to their internal provider data.

Table B-1. Critical Data Elements

Variable Name	Source	Claim Category
Member ID	Encounter Database	All
Date of Birth	Enrollment Database	
Monthly enrollment indicator	Enrollment Database	
Dental Procedure Codes - CDT	Encounter Database	Professional - Dental
Date of Service	Encounter Database	All
Medical Procedure Codes - CPT/HCPCs	Encounter Database	Professional - Medical
Revenue codes (facilities)	Encounter Database	Facility
CPT/HCPCs Codes(facilities)	Encounter Database	Facility
Revenue OR CPT	Encounter Database	Facility
CMS Place of Service Codes	Encounter Database	Professional - Medical & Dental
Type of Bill-facility claims	Encounter Database	Facility
ICD Diagnosis Codes - Principal Diagnosis	Encounter Database	Professional & Facility - Medical Only
ICD Diagnosis Codes - Secondary diagnosis code 1	Encounter Database	Professional & Facility - Medical Only
ICD Diagnosis Codes - Secondary diagnosis code 2	Encounter Database	Professional & Facility - Medical Only
ICD Procedure Codes, Facility Claims	Encounter Database	Facility
NDC Number	Encounter Database	Pharmacy
Prescription Fill Date	Encounter Database	Pharmacy
Prescription Days Supply	Encounter Database	Pharmacy
Rendering Provider Taxonomy (NUCC)	Encounter Database	Professional - Dental

Billing Provider Taxonomy (NUCC)	Encounter Database	Professional - Dental

Table B-2 Missing or Invalid Critical Data Elements: Oregon Medicaid, 2015

Critical Data Element	Total Counts	Missing		Invalid		Missing or Invalid	
	N	N	%	N	%	N	%
Member ID	769,635	0	0	0	0		
Member ID	48,387,244	0	0	0	0	0	0
Date of Birth	769,635	0	0	0	0	0	0
Monthly enrollment indicator	1,544,085	0	0	0	0	0	0
Dental Procedure Codes - CDT	1,708,783	2,066	0.1	2,261	0.1	4,327	0.2
Date of Service	48,387,244	0	0	0	0	0	0
Medical Procedure Codes - CPT/HCPCs	21,582,651	1,680	0.01	2,263	0.01	3,943	0.02
Revenue codes (facilities)	11,871,079	0	0	2	0	2	0
CPT/HCPCs Codes(facilities)	11,871,079	2,379,147	20.0	788	0.1	2,379,935	20.1
Revenue OR CPT	11,871,079	2,379,147	20.0	788	0.1	2,379,935	20.1
CMS Place of Service Codes	23,291,434	6,759	0.03	10,725	0.05	17,484	0.08
Type of Bill-facility claims	11,871,079	175	0	0	0	175	0
ICD Diagnosis Code: Line 1	33,453,730	172,693	0.5	49,733	0.1	222,426	0.6
ICD Diagnosis Code: Line 2	33,453,730	14,967,699	44.7	4,169	0.01	14,971,868	44.8
ICD Diagnosis Code: Line 3	33,453,730	20,533,271	61.4	2,708	0.01	20,535,979	61.4
ICD Procedure Codes, Facility Claims	11,871,079	10,899,485	91.8	0	0	10,899,485	91.8
NDC Number	13,224,731	0	0	0	0	0	0
Prescription Fill Date	13,224,731	0	0	0	0	0	0
Prescription Days Supply	13,224,731	0	0	0	0	0	0
Rendering Provider Taxonomy (NUCC)	1,708,783	605	0.04	0	0	605	0.04
Billing Provider Taxonomy (NUCC)	1,708,783	812	0.05	0	0	812	0.05

* 4 diagnostic codes were available

Table B-3 Missing or Invalid Critical Data Elements: Oregon Medicaid, 2016

Critical Data Element	Total Counts	Missing		Invalid		Missing or Invalid	
	N	N	%	N	%	N	%
Member ID	791,329	0	0		0		
Member ID	50,435,093	0	0	0	0	0	0
Date of Birth	791,329	0	0	0	0	0	0
Monthly enrollment indicator	1,688,410	0	0	0	0	0	0
Dental Procedure Codes - CDT	1,824,282	6,263	0.3	6,350	0.3	12,613	0.7
Date of Service	50,435,093	0	0	0	0	0	0
Medical Procedure Codes - CPT/HCPCs	22,709,654	1,574	0.01	2,121	0.01	3,695	0.02
Revenue codes (facilities)	12,389,572	0	0	0	0	0	0
CPT/HCPCs Codes(facilities)	12,389,572	2,440,896	19.7	1,634	0	2,442,530	19.7
Revenue OR CPT	12,389,572	2,440,896	19.7	1,634	0	2,442,530	19.7
CMS Place of Service Codes	24,533,936	10,137	0.1	58,821	0.2	68,958	0.3
Type of Bill-facility claims	12,389,572	154	0	0	0	154	0
ICD Diagnosis Code: Line 1*	35,099,226	193,193	0.6	52,666	0.2	245,859	0.8
ICD Diagnosis Codes: Line 2	35,099,226	15,508,866	44.2	1,566	0	15,510,432	44.2
ICD Diagnosis Code: Line 3	35,099,226	21,126,705	60.2	885	0	21,127,590	60.2
ICD Procedure Codes, Facility Claims	12,389,572	11,431,366	92.3	0	0	11,431,366	92.3
NDC Number	13,511,585	0	0	0	0	0	0
Prescription Fill Date	13,511,585	0	0	0	0	0	0
Prescription Days Supply	13,511,585	0	0	0	0	0	0
Rendering Provider Taxonomy (NUCC)	1,824,282	4580	0.3	0	0	4580	0.3
Billing Provider Taxonomy (NUCC)	1,824,282	2956	0.2	0	0	2956	0.2

* 4 diagnostic codes were available

Table B4 Missing or Invalid Critical Data Elements: Iowa Medicaid, 2016

Critical Data Element	Total Counts	Missing		Invalid		Missing or Invalid	
	N	N	%	N	%	N	%

Critical Data Element	Total Counts	Missing		Invalid		Missing or Invalid	
Member ID	299,135	0	0	0	0	0	0
Member ID	5,075,222	0	0	0	0	0	0
Date of Birth	299,135	0	0	0	0	0	0
Monthly enrollment indicator	299,135	0	0	0	0	0	0
Dental Procedure Codes - CDT	954,718	0	0	32,024	3.4	32,024	3.34
Date of Service	5,075,222	0	0	0	0	0	0
Medical Procedure Codes - CPT/HCPCs	868,722	14	0	0	0	14	0
Revenue codes (facilities)	501,338	0	0	45	0	45	0
CPT/HCPCs Codes(facilities)	501,338	0	0	0	0	0	0
Revenue OR CPT	501,338	0	0	45	0	45	0.01
CMS Place of Service Codes[+]	1,823,440	538,121	29.5	14	0	538,135	29.5
Type of Bill-facility claims	2,429,543	0	0	0	0	0	0
ICD Diagnosis Code: Line 1	3,008,874	0	0	0	0	0	0
ICD Diagnosis Code: Line 2	3,008,874	0	0	0	0	0	0
ICD Diagnosis Code: Line 3	3,008,874	0	0	0	0	0	0
ICD Procedure Codes, Facility Claims	501,338	0	0	0	0	0	0
NDC Number	284,118	0	0	0	0	0	0
Prescription Fill Date	284,118	0	0	0	0	0	0
Prescription Days Supply	284,118	0	0	0	0	0	0
Rendering Provider Taxonomy (NUCC)[+]	5,075,222	5,075,222	100	0	0	5,075,222	100
Billing Provider Taxonomy (NUCC)[+]	5,075,222	5,075,222	100	0	0	5,075,222	100

[+] Iowa administrative data include a state defined provider and place of service variable. Provider type is defined by the Iowa Medicaid Enterprise, which links place of service codes and rendering/billing provider taxonomies to their internal provider data.

Appendix C. Ambulatory Care Sensitive Emergency Department Visits for Non-Traumatic Dental Conditions in Adults

Description: Number of emergency department (ED) visits for ambulatory care sensitive non-traumatic dental conditions per 100,000 member months for adults
Numerator: Number of ED visits with an ambulatory care sensitive non-traumatic dental condition diagnosis code among individuals 18 years and older
Denominator: All member months for individuals 18 years and older during the reporting year
Rate: (NUM/DEN)x100,000

Rationale: The utilization of emergency departments (ED) for non-traumatic dental conditions has been a growing public health concern across the United States (US)[1,2,3,4,5,6,7] with over 2 million visits occurring in 2015.[8,9] These ED visits have been significantly associated with age (21 to 34 years)[2]. The majority of these visits were classified as semi-urgent (53.8%) or non-urgent (23.9%)[10], which can be better managed in an ambulatory care setting. Dental care in an ED setting is not definitive with limited care continuity that ultimately leads to poor oral health outcomes.[8,11,12]

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National Quality Forum Domain: Access[36]

Institute of Medicine Aim: Equity, Safety, Timeliness

National Quality Strategy Priority: Health and Wellbeing

Level of Aggregation: Program *(NOTE: This measure only applies to programs such as Medicaid that provide both medical insurance and dental benefits. Use of this measure as a requirement for stand-alone dental benefit plans will result in feasibility issues due to lack of access to appropriate data. Use by health plans that provide both medical insurance and dental benefits to a population may be considered after assessment of data element feasibility within the plans' databases)*.

Improvement Noted As: A lower rate indicates better quality.

Data Required: Administrative enrollment and claims data (medical); single year. When using claims data to determine service receipt, include only paid claims.

Measure Purpose: Examples of questions that can be answered through this measure at each level of aggregation:

1. What is the rate of emergency department visits for ambulatory care sensitive non-traumatic dental conditions in the enrolled population during the reporting period?
2. Over time, does the rate of emergency department visits by adults for ambulatory care sensitive non-traumatic dental conditions stay stable, increase, or decrease?

This measure is designed to measure access to care by evaluating the proportion of population that seeks dental care in ED. This measure is not to be interpreted as a measure of resource utilization.

Applicable Stratification Variables

1. Age: 18, 19-20, 21-24, 25–34,35–44, 45–54, 55–64, 65–74, 75–84, 85 and above

Ambulatory Care Sensitive Emergency Department Visits for Non-Traumatic Dental Conditions Calculation

1. Calculate total eligible member months as the sum of all member months for enrollees aged **18 years and older** as of the 15th or 30th day of the month as appropriate for when eligibility determinations are made. Either the 15th or the 30th should be selected and used consistently across all member months during the reporting year.

Access measures assess the ability to obtain needed healthcare services in a timely manner, including the perceptions and experiences of people regarding their ease of reaching health services or health facilities in terms of proximity, location, time, and ease of approach. Examples may include, but are not limited to, measures that address the timeliness of response or services, time until next available appointment, and availability of services within a community. National Quality Forum. "NQF Glossary." Available at: **http://www.qualityforum.org/Measuring_Performance/Measuring_Performance.aspx**. Accessed May 23, 2019.

Note: Exclude all member months (and associated claims in those months) in which an individual was eligible for both Medicare and Medicaid (i.e., "dual eligible").

Reporting notes for age stratifications:

- Member months will be attributed to each age stratum based on the member's age as of the 15th or 30th day of the month. Either the 15th or the 30th should be selected and used consistently across all member months during the reporting year.
- One member can contribute member months to more than one age stratum.

YOU NOW HAVE DENOMINATOR (DEN) COUNT: Total member months

2. Identify all emergency department visits for ambulatory care sensitive non-traumatic dental conditions occurring during eligible member months within the reporting year:

   a. Identify a health care encounter as an ED visit if ANY of the following are met:

      - CPT codes 99281-99285 (ED visit for patient evaluation/management); **OR**
      - Revenue codes 0450-0459 (Emergency Room) or 0981 (professional fees for ER services); **OR**
      - CMS place of service code for professional claims - 23 (Emergency Room)

   b. Member must be >=18 years on date of visit

   c. Identify an ED visit as being for an ambulatory care sensitive non-traumatic dental condition if:

      i. any of the ICD-9-CM/ICD-10-CM diagnosis codes in Table 1 is listed as a FIRST-LISTED diagnosis code associated with the visit

      OR

      ii. (a) any of the ICD-9-CM/ ICD-10-CM diagnosis codes in Table 2 is listed as a FIRST-LISTED diagnosis AND (b) any of the ICD-9-CM/ ICD-10-CM diagnosis codes in Table 1 is listed as an ADDITIONAL LISTED diagnosis. (Codes from Table 2 must be accompanied by a code from Table 1 to qualify.)

   d. Count only one visit per member per day.

   e. Sum the number of ED visits for ambulatory care sensitive non-traumatic dental conditions.

   Reporting note for age stratifications: Numerator cases are stratified based on age on date of ED visit.

3. Exclude all visits resulting in an inpatient admission:

    a. Identify an ambulatory care sensitive non-traumatic dental condition ED visit as resulting in an inpatient admission if:

        (i) the patient has an inpatient admission defined by UB Type of Bill = 11x OR 12x OR 41x

    AND

        (ii) that admission occurred within 48 hours:
        [inpatient admit date] – [ED admit date] >= 0 days AND <= 2 days

    b. If an ED visit for ambulatory care sensitive non-traumatic dental condition resulted in an inpatient admission, then EXCLUDE this visit. The visit will not be counted.

    Note: If there are 2 or more dental ED visits that occurred within 2 days of the same inpatient admission, **only one** of those ED visits should be counted has resulting in an inpatient admission. [Example: If there is one dental-related ED visit on Saturday and a second dental-related ED visit on Sunday with an inpatient admission also occurring on Sunday, then this would be counted as 2 ED visits with one being excluded as "resulting in an inpatient admission" and one retained in the denominator as "did not result in an inpatient admission."]

YOU NOW HAVE NUMERATOR (NUM) COUNT: Number of ED visits for ambulatory care sensitive non-traumatic dental conditions that did not result in an inpatient admission

4. Report
    a. Unduplicated number of ED visits in the numerator after exclusions
    b. Unduplicated number of member months in denominator
    c. Rate per 100,000 member months: (NUM/DEN) x 100,000
    d. Number of ED visits excluded because they resulted in an inpatient admission

    Note: Reliability of the measure score depends on quality of the data that are used to calculate the measure. The percentages of missing and invalid data for these data elements must be investigated prior to measurement. Data elements with high rates of missing or invalid data will adversely affect the accuracy and reliability of the measure rate.

Table 1. Ambulatory Care Sensitive Non-Traumatic Dental Condition ICD-9-CM and ICD-10-CM Diagnosis Codes

ICD-9 Code	Description of ICD-9 Code	ICD-10 Code	Description of ICD-10 Code
520.0	Anodontia	K00.0	Anodontia
520.1	Supernumerary teeth	K00.1	Supernumerary teeth

520.2	Abnormalities of size and form of teeth	K00.2	Abnormalities of size and form of teeth
520.3	Mottled teeth	K00.3	Mottled teeth
520.4	Disturbances of tooth formation	K00.4	Disturbances of tooth formation
520.5	Hereditary disturbances in tooth structure, not elsewhere classified	K00.5	Hereditary disturbances in tooth structure, not elsewhere classified
520.6	Disturbances in tooth eruption	K00.6	Disturbances in tooth eruption
520.6	Disturbances in tooth eruption	K01.0	Embedded teeth
520.6	Disturbances in tooth eruption	K01.1	Impacted teeth
520.8	Other specified disorders of tooth development and eruption	K00.8	Other specified disorders of tooth development
520.9	Unspecified disorder of tooth development and eruption	K00.9	Disorder of tooth development, unspecified
521.00	Dental caries, unspecified	K02.9	Dental caries, unspecified
521.01	Dental caries limited to enamel	K02.61	Dental caries on smooth surface limited to enamel
521.02	Dental caries extending into dentine	K02.52	Dental caries on pit and fissure surface penetrating into dentin
521.02	Dental caries extending into dentine	K02.62	Dental caries on smooth surface penetrating into dentine
521.03	Dental caries extending into pulp	K02.53	Dental caries on pit and fissure surface penetrating into pulp
521.03	Dental caries extending into pulp	K02.63	Dental caries on smooth surface penetrating into pulp
521.04	Arrested dental caries	K02.3	Arrested dental caries
521.05	Odontoclasia	K03.89	Other specified diseases of hard tissues of teeth
521.06	Dental caries pit and fissure	K02.51	Dental caries pit and fissure surface limited to enamel
521.06	Dental caries pit and fissure	K02.52	Dental caries on pit and fissure surface penetrating into dentin
521.06	Dental caries pit and fissure	K02.53	Dental caries on pit and fissure surface penetrating into pulp
521.07	Dental caries of smooth surface	K02.61	Dental caries on smooth surface limited to enamel
521.07	Dental caries of smooth surface	K02.62	Dental caries on smooth surface penetrating into dentine
521.07	Dental caries of smooth surface	K02.63	Dental caries on smooth surface penetrating into pulp
521.08	Dental caries of root surface	K02.7	Dental root caries
521.09	Other dental caries	K02.9	Dental caries, unspecified
521.10	Excessive dental attrition, unspecified	K03.0	Excessive attrition of teeth
521.11	Excessive attrition, limited to enamel	K03.0	Excessive attrition of teeth

521.12	Excessive attrition, extending into dentine	K03.0	Excessive attrition of teeth
521.13	Excessive attrition, extending into pulp	K03.0	Excessive attrition of teeth
521.14	Excessive attrition, localized	K03.0	Excessive attrition of teeth
521.15	Excessive attrition, generalized	K03.0	Excessive attrition of teeth
521.20	Abrasion of teeth, unspecified	K03.1	Abrasion of teeth
521.21	Abrasion, limited to enamel	K03.1	Abrasion of teeth
521.22	Abrasion, extending into dentine	K03.1	Abrasion of teeth
521.23	Abrasion, extending into pulp	K03.1	Abrasion of teeth
521.24	Abrasion, localized	K03.1	Abrasion of teeth
521.25	Abrasion, generalized	K03.1	Abrasion of teeth
521.30	Erosion, unspecified	K03.2	Erosion of teeth
521.31	Erosion, limited to enamel	K03.2	Erosion of teeth
521.32	Erosion, extending into dentine	K03.2	Erosion of teeth
521.33	Erosion, extending into pulp	K03.2	Erosion of teeth
521.34	Erosion, localized	K03.2	Erosion of teeth
521.35	Erosion, generalized	K03.2	Erosion of teeth
521.40	Pathological resorption, unspecified	K03.3	Pathological resorption of teeth
521.41	Pathological resorption, internal	K03.3	Pathological resorption of teeth
521.42	Pathological resorption, external	K03.3	Pathological resorption of teeth
521.49	Other pathological resorption	K03.3	Pathological resorption of teeth
521.5	Hypercementosis	K03.4	Hypercementosis
521.6	Ankylosis of teeth	K03.5	Ankylosis of teeth
521.7	Intrinsic posteruptive color changes of teeth	K03.7	Intrinsic posteruptive color changes of hard tissues of teeth
521.81	Cracked tooth	K03.81	Cracked tooth
521.89	Other specific diseases of hard tissues of teeth	K03.89	Other specific diseases of hard tissues of teeth
521.9	Unspecified disease of hard tissues of teeth	K03.9	Disease of hard tissues of teeth, unspecified
522.0	Pulpitis	K04.0	Pulpitis
522.0	Pulpitis	K04.01	Reversible pulpitis
522.0	Pulpitis	K04.02	Irreversible pulpitis
522.1	Necrosis of the pulp	K04.1	Necrosis of the pulp
522.2	Pulp degeneration	K04.2	Pulp degeneration
522.3	Abnormal hard tissue formation in pulp	K04.3	Abnormal hard tissue formation in pulp
522.4	Acute apical periodontitis of pulpal origin	K04.4	Acute apical periodontitis of pulpal origin
522.5	Periapical abscess without sinus	K04.7	Periapical abscess without sinus
522.6	Chronic apical periodontitis	K04.5	Chronic apical periodontitis

522.7	Periapical abscess with sinus	K04.6	Periapical abscess with sinus
522.8	Radicular cyst	K04.8	Radicular cyst
522.9	Other and unspecified diseases of pulp and periapical tissues	K04.90	Unspecified diseases of pulp and periapical tissues
522.9	Other and unspecified diseases of pulp and periapical tissues	K04.99	Other diseases of pulp and periapical tissues
523.00	Acute gingivitis, plaque induced	K05.00	Acute gingivitis, plaque induced
523.01	Acute gingivitis, non-plaque induced	K05.01	Acute gingivitis, non-plaque induced
523.10	Chronic gingivitis, plaque induced	K05.10	Chronic gingivitis, plaque induced
523.11	Chronic gingivitis, non-plaque induced	K05.11	Chronic gingivitis, non-plaque induced
523.20	Gingival recession, unspecified	K06.0	Gingival recession
523.20	Gingival recession, unspecified	K060.10	Localized gingival recession, unspecified
523.20	Gingival recession, unspecified	K060.20	Generalized gingival recession, unspecified
523.21	Gingival recession, minimal	K06.0	Gingival recession
523.21	Gingival recession, minimal	K060.11	Localized gingival recession, minimal
523.21	Gingival recession, minimal	K060.21	Generalized gingival recession, minimal
523.22	Gingival recession, moderate	K06.0	Gingival recession
523.22	Gingival recession, moderate	K060.12	Localized gingival recession, moderate
523.22	Gingival recession, moderate	K060.22	Generalized gingival recession, moderate
523.23	Gingival recession, severe	K06.0	Gingival recession
523.23	Gingival recession, severe	K06013	Localized gingival recession, severe
523.23	Gingival recession, severe	K06023	Generalized gingival recession, severe
523.24	Gingival recession, localized	K06.0	Gingival recession
523.24	Gingival recession, localized	K060.10	Localized gingival recession, unspecified
523.25	Gingival recession, generalized	K06.0	Gingival recession
523.25	Gingival recession, generalized	K060.20	Generalized gingival recession, unspecified
523.30	Aggressive periodontitis, unspecified	K05.20	Aggressive periodontitis, unspecified
523.31	Aggressive periodontitis, localized	K05.21	Aggressive periodontitis, localized
523.31	Aggressive periodontitis, localized	K052.11	Aggressive periodontitis, localized, slight
523.31	Aggressive periodontitis, localized	K052.12	Aggressive periodontitis, localized, moderate
523.31	Aggressive periodontitis, localized	K052.13	Aggressive periodontitis, localized, severe

523.31	Aggressive periodontitis, localized	K052.19	Aggressive periodontitis, localized, unspecified severity
523.32	Aggressive periodontitis, generalized	K05.22	Aggressive periodontitis, generalized
523.32	Aggressive periodontitis, generalized	K052.21	Aggressive periodontitis, generalized, slight
523.32	Aggressive periodontitis, generalized	K052.22	Aggressive periodontitis, generalized, moderate
523.32	Aggressive periodontitis, generalized	K052.23	Aggressive periodontitis, generalized, severe
523.32	Aggressive periodontitis, generalized	K052.29	Aggressive periodontitis, generalized, unspecified severity
523.33	Acute periodontitis	K05.20	Acute periodontitis
523.40	Chronic periodontitis, unspecified	K05.30	Chronic periodontitis, unspecified
523.41	Chronic periodontitis, localized	K05.31	Chronic periodontitis, localized
523.41	Chronic periodontitis, localized	K053.11	Chronic periodontitis, localized, slight
523.41	Chronic periodontitis, localized	K053.12	Chronic periodontitis, localized, moderate
523.41	Chronic periodontitis, localized	K053.13	Chronic periodontitis, localized, severe
523.41	Chronic periodontitis, localized	K053.19	Chronic periodontitis, localized, unspecified severity
523.42	Chronic periodontitis, generalized	K05.32	Chronic periodontitis, generalized
523.42	Chronic periodontitis, generalized	K053.21	Chronic periodontitis, generalized, slight
523.42	Chronic periodontitis, generalized	K053.22	Chronic periodontitis, generalized, moderate
523.42	Chronic periodontitis, generalized	K053.23	Chronic periodontitis, generalized, severe
523.42	Chronic periodontitis, generalized	K053.29	Chronic periodontitis, generalized, unspecified severity
523.5	Periodontosis	K05.4	Periodontosis
523.5	Periodontosis	K05.40	Periodontosis
523.6	Accretions on teeth	K03.6	Deposits (accretions) on teeth
523.8	Other specified periodontal diseases	K05.5	Other periodontal diseases
523.8	Other specified periodontal diseases	K06.1	Gingival enlargement
523.8	Other specified periodontal diseases	K06.3	Horizontal alveolar bone loss
523.8	Other specified periodontal diseases	K06.8	Other specified disorders of gingiva and edentulous alveolar ridge
523.9	Unspecified gingival and periodontal disease	K05.6	Periodontal disease, unspecified
523.9	Unspecified gingival and periodontal disease	K06.9	Disorder of gingiva and edentulous alveolar ridge, unspecified

524.00	Major anomalies of jaw size, unspecified anomaly	M26.00	Unspecified anomaly of jaw size
524.01	Major anomalies of jaw size, maxillary hyperplasia	M26.01	Maxillary hyperplasia
524.02	Major anomalies of jaw size, mandibular hyperplasia	M26.03	Mandibular hyperplasia
524.03	Major anomalies of jaw size, maxillary hypoplasia	M26.02	Maxillary hypoplasia
524.04	Major anomalies of jaw size, mandibular hypoplasia	M26.04	Mandibular hypoplasia
524.05	Major anomalies of jaw size, macrogenia	M26.05	Macrogenia
524.06	Major anomalies of jaw size, microgenia	M26.06	Microgenia
524.07	Excessive tuberosity of jaw	M26.07	Excessive tuberosity of jaw
524.09	Major anomalies of jaw size, other specified anomaly	M26.09	Other specified anomalies of jaw size
524.10	Anomalies of relationship of jaw to cranial base, unspecified anomaly	M26.10	Unspecified anomaly of relationship of jaw-cranial base relationship
524.11	Anomalies of relationship of jaw to cranial base, maxillary asymmetry	M26.11	Maxillary asymmetry
524.12	Anomalies of relationship of jaw to cranial base, other jaw asymmetry	M26.12	Other jaw asymmetry
524.19	Anomalies of relationship of jaw to cranial base, other specified anomaly	M26.19	Other specified anomalies of jaw-cranial base relationship
524.20	Unspecified anomaly of dental arch relationship	M26.20	Unspecified anomaly of dental arch relationship
524.21	Malocclusion, Angle's class I	M26.211	Malocclusion, Angle's class I
524.22	Malocclusion, Angle's class II	M26.212	Malocclusion, Angle's class II
524.23	Malocclusion, Angle's class III	M26.213	Malocclusion, Angle's class III
524.24	Open anterior occlusal relationship	M26.220	Open anterior occlusal relationship
524.25	Open posterior occlusal relationship	M26.221	Open posterior occlusal relationship
524.26	Excessive horizontal overlap	M26.23	Excessive horizontal overlap
524.27	Reverse articulation	M26.24	Reverse articulation
524.28	Anomalies of interarch distance	M26.25	Anomalies of interarch distance
524.29	Other anomalies of dental arch relationship	M26.29	Other anomalies of dental arch relationship
524.30	Unspecified anomaly of tooth position of fully erupted teeth	M26.30	Unspecified anomaly of tooth position of fully erupted tooth or teeth
524.31	Crowding of teeth	M26.31	Crowding of fully erupted teeth
524.32	Excessive spacing of teeth	M26.32	Excessive spacing of fully erupted teeth
524.33	Horizontal displacement of teeth	M26.33	Horizontal displacement of fully erupted tooth or teeth

524.34	Vertical displacement of teeth	M26.34	Vertical displacement of fully erupted tooth or teeth
524.35	Rotation of tooth/teeth	M26.35	Rotation of fully erupted tooth or teeth
524.36	Insufficient interocclusal distance of teeth (ridge)	M26.36	Insufficient interocclusal distance of fully erupted teeth (ridge)
524.37	Excessive interocclusal distance of teeth	M26.37	Excessive interocclusal distance of fully erupted teeth
524.39	Other anomalies of tooth position	M26.39	Other anomalies of tooth position of fully erupted tooth or teeth
524.4	Malocclusion, unspecified	M26.4	Malocclusion, unspecified
524.50	Dentofacial functional abnormality, unspecified	M26.50	Dentofacial functional abnormalities, unspecified
524.51	Abnormal jaw closure	M26.51	Abnormal jaw closure
524.52	Limited mandibular range of motion	M26.52	Limited mandibular range of motion
524.53	Deviation in opening and closing of the mandible	M26.53	Deviation in opening and closing of the mandible
524.54	Insufficient anterior guidance	M26.54	Insufficient anterior guidance
524.55	Centric occlusion maximum intercuspation discrepancy	M26.55	Centric occlusion maximum intercuspation discrepancy
524.56	Non-working side interference	M26.56	Non-working side interference
524.57	Lack of posterior occlusal support	M26.57	Lack of posterior occlusal support
524.59	Other dentofacial functional abnormalities	M26.59	Other dentofacial functional abnormalities
524.60	Temporomandibular joint disorders, unspecified	M26.60	Temporomandibular joint disorder, unspecified
524.60	Temporomandibular joint disorders, unspecified	M26.601	Right temporomandibular joint disorder, unspecified
524.60	Temporomandibular joint disorders, unspecified	M26.602	Left temporomandibular joint disorder, unspecified
524.60	Temporomandibular joint disorders, unspecified	M26.603	Bilateral temporomandibular joint disorder, unspecified
524.60	Temporomandibular joint disorders, unspecified	M26.609	Unspecified temporomandibular joint disorder, unspecified side
524.60	Temporomandibular joint disorders, unspecified	M26.69	Other specified disorders of temporomandibular joint
524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.61	Adhesions and ankylosis of temporomandibular joint
524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.621	Arthralgia of right temporomandibular joint
524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.622	Arthralgia of left temporomandibular joint
524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.623	Arthralgia of bilateral temporomandibular joint

524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.629	Arthralgia of temporomandibular joint, unspecified side
524.62	Temporomandibular joint disorders, arthralgia of temporomandibular joint	M26.62	Arthralgia of temporomandibular joint
524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.63	Articular disc disorder of temporomandibular joint
524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.631	Articular disc disorder of right temporomandibular joint
524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.632	Articular disc disorder of left temporomandibular joint
524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.633	Articular disc disorder of bilateral temporomandibular joint
524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.639	Articular disc disorder of temporomandibular joint, unspecified side
524.64	Temporomandibular joint sounds on opening and/or closing the jaw	M26.69	Other specified disorders of temporomandibular joint
524.69	Other specified temporomandibular joint disorders	M26.69	Other specified disorders of temporomandibular joint
524.70	Dental alveolar anomalies, unspecified alveolar anomaly	M26.70	Unspecified alveolar anomaly
524.71	Alveolar maxillary hyperplasia	M26.71	Alveolar maxillary hyperplasia
524.72	Alveolar mandibular hyperplasia	M26.72	Alveolar mandibular hyperplasia
524.73	Alveolar maxillary hypoplasia	M26.73	Alveolar maxillary hypoplasia
524.74	Alveolar mandibular hypoplasia	M26.74	Alveolar mandibular hypoplasia
524.75	Vertical displacement of alveolus and teeth	M26.79	Other specified alveolar anomaly
524.76	Occlusal plane deviation	M26.79	Other specified alveolar anomaly
524.79	Other specified alveolar anomaly	M26.79	Other specified alveolar anomaly
524.81	Anterior soft tissue impingement	M26.81	Anterior soft tissue impingement
524.82	Posterior soft tissue impingement	M26.82	Posterior soft tissue impingement
524.89	Other specified dentofacial anomalies	M26.4	Malocclusion, unspecified
524.89	Other specified dentofacial anomalies	M26.89	Other dentofacial anomalies
524.9	Unspecified dentofacial anomalies	M26.9	Dentofacial anomaly, unspecified
525.0	Exfoliation of teeth due to systemic causes	K08.0	Exfoliation of teeth due to systemic causes
525.10	Acquired absence of teeth, unspecified	K08.109	Complete loss of teeth, unspecified cause, unspecified class
525.12	Loss of teeth due to periodontal disease	K08.429	Partial loss of teeth due to periodontal diseases, unspecified class
525.13	Loss of teeth due to caries	K08.439	Partial loss of teeth due to caries unspecified class

525.13	Loss of teeth due to caries	K08.139	Complete loss of teeth due to caries, unspecified class
525.13	Loss of teeth due to caries	K08.431	Partial loss of teeth due to caries, class I
525.19	Other loss of teeth	K08.499	Partial loss of teeth due to other unspecified cause, unspecified class
525.19	Other loss of teeth	K08.191	Complete loss of teeth due to other specified cause, class I
525.19	Other loss of teeth	K08.199	Complete loss of teeth due to other specified cause, unspecified class
525.20	Unspecified atrophy of edentulous alveolar ridge	K08.20	Unspecified atrophy of edentulous alveolar ridge
525.21	Minimal atrophy of the mandible	K08.21	Minimal atrophy of the mandible
525.22	Moderate atrophy of the mandible	K08.22	Moderate atrophy of the mandible
525.23	Severe atrophy of the mandible	K08.23	Severe atrophy of the mandible
525.24	Minimal atrophy of the maxilla	K08.24	Minimal atrophy of the maxilla
525.25	Moderate atrophy of the maxilla	K08.25	Moderate atrophy of the maxilla
525.26	Severe atrophy of the maxilla	K08.26	Severe atrophy of the maxilla
525.3	Retained dental root	K08.3	Retained dental root
525.40	Complete edentulism, unspecified	K08.109	Complete loss of teeth, unspecified cause, unspecified class
525.40	Complete edentulism, unspecified	K08.139	Complete loss of teeth due to caries, unspecified class
525.40	Complete edentulism, unspecified	K08.199	Complete loss of teeth due to other specified cause, unspecified class
525.41	Complete edentulism, class I	K08.101	Complete loss of teeth, unspecified cause, class I
525.41	Complete edentulism, class I	K08.191	Complete loss of teeth due to other specified cause, class I
525.42	Complete edentulism, class II	K08.102	Complete loss of teeth, unspecified cause, class II
525.43	Complete edentulism, class III	K08.103	Complete loss of teeth, unspecified cause, class III
525.44	Complete edentulism, class IV	K08.104	Complete loss of teeth, unspecified cause, class IV
525.50	Partial edentulism, unspecified	K08.409	Partial loss of teeth, unspecified cause, unspecified class
525.51	Partial edentulism, class I	K08.401	Partial loss of teeth, unspecified cause, class I
525.51	Partial edentulism, class I	K08.431	Partial loss of teeth due to caries, class I
525.52	Partial edentulism, class II	K08.402	Partial loss of teeth, unspecified cause, class II

525.53	Partial edentulism, class III	K08.403	Partial loss of teeth, unspecified cause, class III
525.54	Partial edentulism, class IV	K08.404	Partial loss of teeth, unspecified cause, class IV
525.60	Unspecified unsatisfactory restoration of tooth	K08.50	Unsatisfactory restoration of tooth, unspecified
525.61	Open restoration margins	K08.51	Open restoration margins of tooth
525.62	Unrepairable overhanging of dental restorative materials	K08.52	Unrepairable overhanging of dental restorative materials
525.63	Fractured dental restorative material without loss of material	K08.530	Fractured dental restorative material without loss of material
525.64	Fractured dental restorative material with loss of material	K08.531	Fractured dental restorative material with loss of material
525.65	Contour of existing restoration of tooth biologically incompatible with oral health	K08.54	Contour of existing restoration of tooth biologically incompatible with oral health
525.66	Allergy to existing dental restorative material	K08.55	Allergy to existing dental restorative material
525.67	Poor aesthetics of existing restoration	K08.56	Poor aesthetic of existing restoration of tooth
525.69	Other unsatisfactory restoration of existing tooth	K08.59	Other unsatisfactory restoration of tooth
525.71	Osseointegration failure of dental implant	M27.61	Osseointegration failure of dental implant
525.72	Post-osseointegration biological failure of dental implant	M27.62	Post-osseointegration biological failure of dental implant
525.73	Post-osseointegration mechanical failure of dental implant	M27.63	Post-osseointegration mechanical failure of dental implant
525.79	Other endosseous dental implant failure	M27.69	Other endosseous dental implant failure
525.8	Other specified disorders of the teeth and supporting structures	K08.8	Other specified disorders of teeth and supporting structures
525.8	Other specified disorders of the teeth and supporting structures	K08.89	Other specified disorders of teeth and supporting structures
525.8	Other specified disorders of the teeth and supporting structures	M26.79	Other specified alveolar anomalies
525.9	Unspecified disorder of the teeth and supporting structures	K08.9	Disorder of teeth and supporting structures, unspecified
526.0	Developmental odontogenic cysts	K09.0	Developmental odontogenic cysts
526.1	Fissural cysts of jaw	K09.1	Developmental (nonodotogenic) cysts of oral region
526.2	Other cysts of jaws	M27.49	Other cysts of jaws
526.2	Other cysts of jaws	M27.40	Unspecified cyst of jaw
526.3	Central giant cell (reparative) granuloma	M27.1	Giant cell granuloma, central

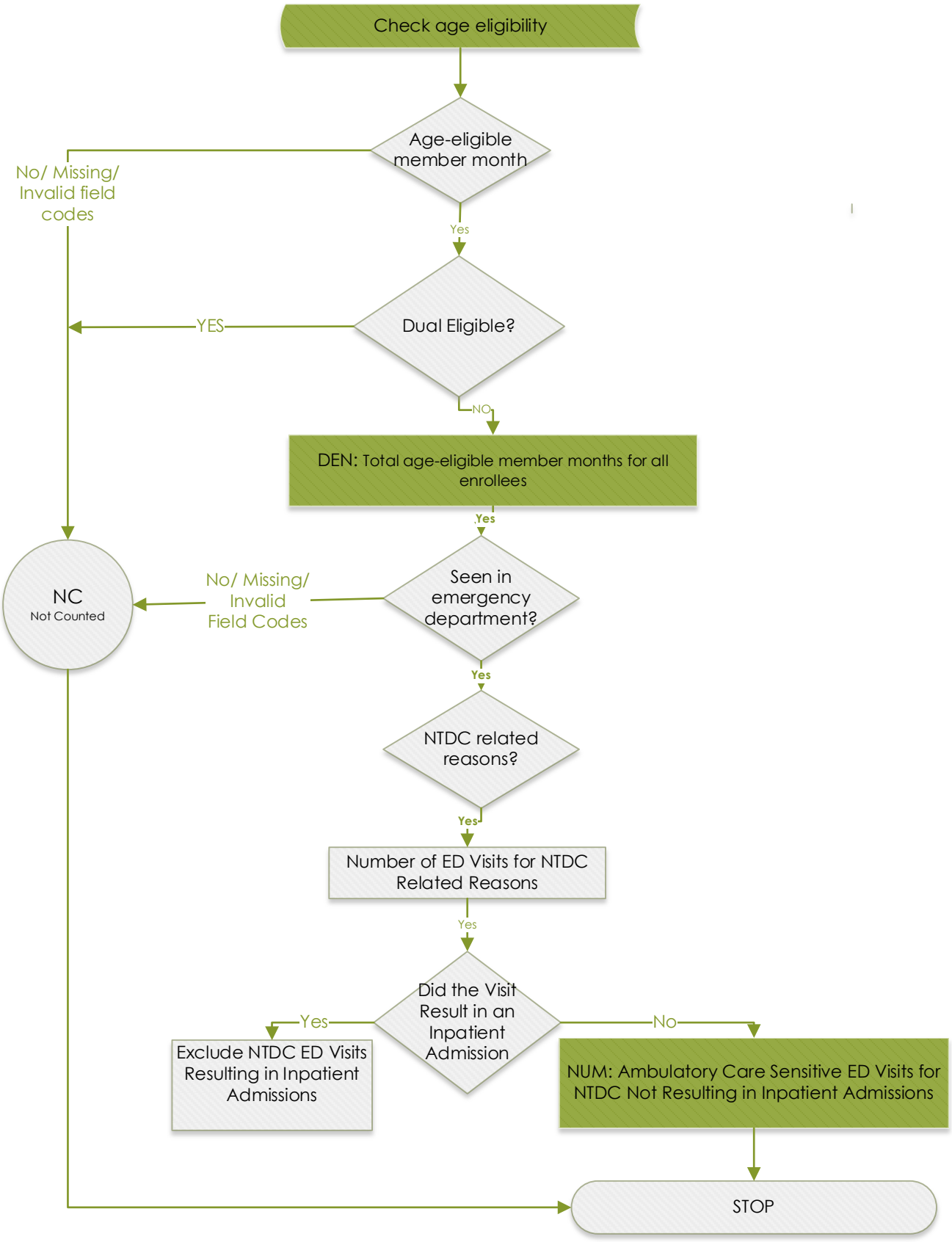
526.4	Inflammatory conditions of jaw	M27.2	Inflammatory conditions of jaw
526.5	Alveolitis of jaw	M27.3	Alveolitis of jaw
526.61	Perforation of root canal space	M27.51	Perforation of root canal space due to endodontic treatment
526.62	Endodontic overfill	M27.52	Endodontic overfill
526.63	Endodontic underfill	M27.53	Endodontic underfill
526.69	Other periradicular pathology associated with previous endodontic treatment	M27.59	Other periradicular pathology associated with previous endodontic treatment
526.81	Exostosis of jaw	M27.8	Other specified diseases of jaws
526.89	Other specified diseases of the jaws	M27.8	Other specified diseases of jaws
526.9	Unspecified disease of the jaws	M27.9	Disease of the jaws, unspecified
526.9	Unspecified disease of the jaws	M27.0	Developmental disorders of jaws
527.0	Atrophy of salivary gland	K11.0	Atrophy of salivary gland
527.1	Hypertrophy of salivary gland	K11.1	Hypertrophy of salivary gland
527.2	Sialoadenitis	K11.20	Sialoadenitis, unspecified
527.2	Sialoadenitis	K11.21	Acute sialoadenitis
527.2	Sialoadenitis	K11.23	Chronic sialoadenitis
527.3	Abscess of salivary gland	K11.3	Abscess of salivary gland
527.4	Fistula of salivary gland	K11.4	Fistula of salivary gland
527.5	Sialolithiasis	K11.5	Sialolithiasis
527.6	Mucocele of salivary gland	K11.6	Mucocele of salivary gland
527.7	Disturbance of salivary secretion	K11.7	Disturbances of salivary secretion
527.7	Disturbance of salivary secretion	R68.2	Dry mouth, unspecified
527.8	Other specified diseases of the salivary glands	K11.8	Other diseases of salivary glands
527.9	Unspecified disease of the salivary glands	K11.9	Disease of the salivary glands, unspecified
528.00	Stomatitis and mucositis, unspecified	K12.2	Cellulitis and abscess of mouth
528.00	Stomatitis and mucositis, unspecified	K12.30	Oral mucositis (ulcerative), unspecified
528.01	Mucositis (ulcerative) due to antineoplastic therapy	K12.31	Oral mucositis (ulcerative) due to antineoplastic therapy
528.01	Mucositis (ulcerative) due to antineoplastic therapy	K12.33	Oral mucositis (ulcerative) due to radiation
528.02	Mucositis (ulcerative) due to other drugs	K12.32	Oral mucositis (ulcerative) due to other drugs
528.09	Other stomatitis and mucositis (ulcerative)	K12.1	Other forms of stomatitis
528.09	Other stomatitis and mucositis (ulcerative)	K12.39	Other oral mucositis (ulcerative)
528.1	Cancrum oris	A69.0	Necrotizing ulcerative stomatitis
101	Vincent's angina	A69.0	Necrotizing ulerative stomatitis

101	Vincent's angina	A69.1	Other Vincent's infections
528.2	Oral aphthae	K12.0	Recurrent oral aphthae
528.3	Cellulitis and abscess of oral soft tissues	K12.2	Cellulitis and abscess of mouth
528.4	Cysts of oral soft tissues	K09.8	Other cysts of oral region, not elsewhere classified
528.4	Cysts of oral soft tissues	K099	Cyst of oral region, unspecified
528.5	Diseases of lips	K13.0	Diseases of lips
528.6	Leukoplakia of oral mucosa, including tongue	K13.21	Leukoplakia of oral mucosa, including tongue
528.71	Minimal keratinized residual ridge mucosa	K13.22	Minimal keratinized residual ridge mucosa
528.72	Excessive keratinized residual ridge mucosa	K13.23	Excessive keratinized residual ridge mucosa
528.79	Other disturbances of oral epithelium, including tongue	K13.29	Other disturbances of oral epithelium, including tongue
528.8	Oral submucosal fibrosis, including of tongue	K13.5	Oral submucosal fibrosis
528.9	Other and unspecified diseases of the oral soft tissues	K13.70	Unspecified lesions of oral mucosa
528.9	Other and unspecified diseases of the oral soft tissues	K13.79	Other lesions of oral mucosa
528.9	Other and unspecified diseases of the oral soft tissues	K13.1	Cheek and lip biting
528.9	Other and unspecified diseases of the oral soft tissues	K13.6	Irritative hyperplasia of oral mucosa
528.9	Other and unspecified diseases of the oral soft tissues	K13.4	Granuloma and granuloma-like lesions of oral mucosa
529.0	Glossitis	K14.0	Glossitis
529.1	Geographic tongue	K14.1	Geographic tongue
529.2	Median rhomboid glossitis	K14.2	Median rhomboid glossitis
529.3	Hypertrophy of tongue papillae	K14.3	Hypertrophy of tongue papillae
529.4	Atrophy of tongue papillae	K14.4	Atrophy of tongue papillae
529.5	Plicated tongue	K14.5	Plicated tongue
529.6	Glossodynia	K14.6	Glossodynia
529.8	Other specified conditions of the tongue	K14.8	Other diseases of the tongue
529.9	Unspecified condition of the tongue	K14.9	Disease of tongue, unspecified
V52.3	Fitting and adjustment of dental prosthetic device	Z46.3	Encounter for fitting and adjustment of dental prosthetic device
V53.4	Fitting and adjustment of orthodontic devices	Z46.4	Encounter for fitting and adjustment of orthodontic device

V58.5	Orthodontics aftercare	Z46.4	Encounter for fitting and adjustment of orthodontic device
V72.2	Dental examination	Z01.20	Encounter for dental examination and cleaning without abnormal findings
V72.3	Dental examination	Z01.21	Encounter for dental examination and cleaning with abnormal findings
784.92	Jaw pain	R68.84	Jaw pain

Table 2. Additional First-Listed ICD-9-CM/ICD-10-CM Diagnosis Codes to Identify Ambulatory Care Sensitive Non-Traumatic Dental Condition Visits when Paired with an Additional Listed Diagnosis Code from the Ambulatory Care Sensitive Non-Traumatic Dental Condition ICD-9-CM/ICD-10-CM Codes in Table 1

ICD9 Codes	Description of Code	ICD10 Codes	Description of Code
682.0	Cellulitis and abscess of face	L03.211	Cellulitis of face
682.0	Cellulitis and abscess of face	L03.212	Acute lymphangitis of face
682.0	Cellulitis and abscess of face	L03.213	Periorbital cellulitis
682.1	Cellulitis and abscess of neck	L03.221	Cellulitis of neck
682.1	Cellulitis and abscess of neck	L03.222	Acute lymphangitis of neck
784.2	Swelling mass or lump in head and neck	R22.0	Localized swelling, mass and lump, head
784.2	Swelling mass or lump in head and neck	R22.1	Localized swelling, mass and lump, neck


Check age eligibility
Age-eligible member month
No/ Missing/ Invalid field codes
Yes
Dual Eligible?
YES
NO
DEN: Total age-eligible member months for all enrollees
Yes
Seen in emergency department?
No/ Missing/ Invalid Field Codes
NC
Not Counted
Yes
NTDC related reasons?
Yes
Number of ED Visits for NTDC Related Reasons
Yes
Did the Visit Result in an Inpatient Admission
Yes
Exclude NTDC ED Visits Resulting in Inpatient Admissions
No
NUM: Ambulatory Care Sensitive ED Visits for NTDC Not Resulting in Inpatient Admissions
STOP

Appendix D: Follow-Up after Emergency Department Visits for Non-Traumatic Dental Conditions in Adults

Description: The percentage of ambulatory care sensitive non-traumatic dental condition emergency department visits among adults aged 18 years and older in the reporting period for which the member visited a dentist within (a) 7 days and (b) 30 days of the ED visit

Numerators: Number of ambulatory care sensitive non-traumatic dental condition ED visits in the reporting period for which the member visited a dentist within (a) 7 days (NUM1) and (b) 30 days (NUM2) of the ED visit

Denominator: Number of ambulatory care sensitive non-traumatic dental condition ED visits in the reporting period

Rates: NUM1/DEN and NUM2/DEN

Rationale: The utilization of emergency departments (ED) for non-traumatic dental conditions has been a growing public health concern across the United States (US)[1,2,3,4,5,6,7] with over 2 million visits occurring in 2015.[8,9] This increase in ED visits has been significantly associated with age (21 to 34 years)[2]. The majority of these visits were classified as semi-urgent (53.8%) or non-urgent (23.9%)[10], which can be better managed in an ambulatory care setting. Dental care in an ED setting is not definitive with limited care continuity that ultimately leads to poor oral health outcomes.[8,11,12.] This process of care measure can be used to assess if the patient had timely follow-up with a dentist for more definitive care.

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National Quality Forum Domain: Process[37]

Institute of Medicine Aims: Equity, Safety, Timeliness

National Quality Strategy Priority: Health and Wellbeing

Level of Aggregation: Program *(NOTE: This measure only applies to programs such as Medicaid that provide both medical insurance and dental benefits. Use of this measure as a requirement for stand-alone dental benefit plans will result in feasibility issues due to lack of access to appropriate data. Use by health plans that provide both medical insurance and dental benefits to a population may be considered after assessment of data element feasibility within the plans databases*).

Improvement Noted As: A higher rate indicates better quality.

Data Required: Administrative enrollment and claims data (medical and dental); single year. When using claims data to determine service receipt, include only paid claims.

Measure Purpose: Examples of questions that can be answered through this measure at each level of aggregation:

1. What is the percentage of ED visits for ambulatory care sensitive non-traumatic dental conditions for which adults see a dentist for follow-up within 7 days and 30 days, respectively?
2. Does the percentage ambulatory care sensitive non-traumatic dental condition ED visits that are followed up by visit with a dentist within 7 days and 30 days, respectively, stay stable, increase or decrease over time?

Applicable Stratification Variables

1. Age: 18, 19-20, 21-24, 25–34,35–44, 45–54, 55–64, 65–74, 75–84, 85 and above

[37] **Process (measure type):** "A healthcare service provided to, or on behalf of, a patient. This may include, but is not limited to, measures that may address adherence to recommendations for clinical practice based on evidence or consensus." National Quality Forum. "NQF Glossary." Available at: **http://www.qualityforum.org/Measuring_Performance/Measuring_Performance.aspx**. Accessed May 23, 2019.

Follow-up after Emergency Department Visit for Ambulatory Care Sensitive Non-Traumatic Dental Conditions Calculation:

1. Identify all emergency department visits for ambulatory care sensitive non-traumatic dental conditions occurring during eligible member months **between January 1 and December 1** of the reporting year:

   Note: Exclude all member months (and associated claims in those months) in which an individual was eligible for both Medicare and Medicaid (i.e., "dual eligible").

   a. Identify a health care encounter as an ED visit if ANY of the following are met:
      - CPT codes 99281-99285 (ED visit for patient evaluation/management); **OR**
      - Revenue code 0450-0459 (Emergency Room) or 0981 (professional fees for ER services); **OR**
      - CMS place of service code for professional claims - 23 (Emergency Room)

   b. Exclude visits that result in inpatient admissions where inpatient admissions are identified as:
      (i) the patient has an inpatient admission defined by UB Type of Bill = 11x OR 12x OR 41x
      AND

      (ii) that admission occurred within 48 hours:

      [inpatient admit date] – [ED admit date] >= 0 days AND <= 2 days.

   c. Member must be >=18 years on date of visit

      Reporting note: Age stratifications will be based on subject's age on date of ED visit.

   d. Identify an ED visit as being for an ambulatory care sensitive non-traumatic dental condition if:

      i. any of the **ICD-9-CM/ICD-10-CM diagnosis codes in Table 1** is listed as a **FIRST-LISTED** diagnosis code associated with the visit

      OR

      ii. (a) any of the **ICD-9-CM/ ICD-10-CM diagnosis codes in Table 2** is listed as a FIRST-LISTED diagnosis **AND** (b) any of the ICD-9-CM/ ICD-10-CM diagnosis codes in Table 1 is listed as an ADDITIONAL LISTED diagnosis. (Codes from Table 2 must be accompanied by a code from Table 1 to qualify.)

   e. Member must be enrolled on date of ED visit and through 30 days following the visit.
   f. Count only one visit per member per day.
   g. Sum the number of ED visits for ambulatory care sensitive dental conditions.

YOU NOW HAVE THE DENOMINATOR: Number of ED visits for ambulatory care sensitive non-traumatic dental conditions related reasons

2. Check if subject had a visit with a dentist (dental service) within 30 days of the ED visit:

   a. If [CDT CODE] = D0100 – D9999 (any dental service), AND;

   b. [DATE OF ED VISIT]-[DATE OF DENTAL VISIT] <=30 days, AND;

   Note: If two or more ambulatory care sensitive non-traumatic dental condition ED visits occur for the same member within 30 days of one another, then use the first ED visit as the index date for follow-up. Both ED visits will count in the denominator. A follow-up dental visit within 30 days of the first ED visit will be counted once in the numerator.

   c. If [RENDERING PROVIDER TAXONOMY] code = any of the NUCC maintained Provider Taxonomy Codes in Table 3 below,[38] then proceed to next step (#3).

   d. If a **AND** b **AND** c are not met, then the service was not a "follow-up dental service"; STOP processing. This ED visit is already included in the denominator but will not be included in the subsequent counts.

   Note: In this step, all **claims** with missing or invalid CDT CODE, missing or invalid NUCC maintained Provider Taxonomy Codes, or NUCC maintained Provider Taxonomy Codes that do not appear in Table 3 should be excluded.

YOU NOW HAVE NUMERATOR 2 (NUM2): ED visits for ambulatory care sensitive non-traumatic dental conditions for which the member had a visit with a dentist within 30 days

3. Among the ED visits identified in Step 3, check if the subject had a visit with a dentist (dental service) within 7 days of the ED visit: [DATE OF ED VISIT]-[DATE OF DENTAL VISIT] <=7 days

YOU NOW HAVE NUMERATOR 1 (NUM1): ED visits for ambulatory care sensitive non-traumatic dental conditions for which the member had a visit with a dentist within 7 days

4. Report
   a. Unduplicated count of ambulatory care sensitive non-traumatic dental condition ED visits with 30-day dentist visit follow-up in numerator
   b. Unduplicated count of ambulatory care sensitive non-traumatic dental condition ED visits with 7-day dentist visit follow-up in numerator

[38] **Identifying "dental" services**: Programs and plans that do not use standard NUCC maintained provider taxonomy codes should use a valid mapping to identify providers whose services would be categorized as "dental" services. Stand-alone dental plans that reimburse ONLY for services rendered by or under the supervision of the dentist can consider all claims as "dental" services.

c. Unduplicated count of ambulatory care sensitive non-traumatic dental condition ED visits in denominator
d. Rates: (NUM1/DEN), (NUM2/DEN)

Table 1. Ambulatory Care Sensitive Non-Traumatic Dental Condition ICD-9-CM and ICD-10-CM Diagnosis Codes

ICD-9 Code	Description of ICD-9 Code	ICD-10 Code	Description of ICD-10 Code
520.0	Anodontia	K00.0	Anodontia
520.1	Supernumerary teeth	K00.1	Supernumerary teeth
520.2	Abnormalities of size and form of teeth	K00.2	Abnormalities of size and form of teeth
520.3	Mottled teeth	K00.3	Mottled teeth
520.4	Disturbances of tooth formation	K00.4	Disturbances of tooth formation
520.5	Hereditary disturbances in tooth structure, not elsewhere classified	K00.5	Hereditary disturbances in tooth structure, not elsewhere classified
520.6	Disturbances in tooth eruption	K00.6	Disturbances in tooth eruption
520.6	Disturbances in tooth eruption	K01.0	Embedded teeth
520.6	Disturbances in tooth eruption	K01.1	Impacted teeth
520.8	Other specified disorders of tooth development and eruption	K00.8	Other specified disorders of tooth development
520.9	Unspecified disorder of tooth development and eruption	K00.9	Disorder of tooth development, unspecified
521.00	Dental caries, unspecified	K02.9	Dental caries, unspecified
521.01	Dental caries limited to enamel	K02.61	Dental caries on smooth surface limited to enamel
521.02	Dental caries extending into dentine	K02.52	Dental caries on pit and fissure surface penetrating into dentin
521.02	Dental caries extending into dentine	K02.62	Dental caries on smooth surface penetrating into dentine
521.03	Dental caries extending into pulp	K02.53	Dental caries on pit and fissure surface penetrating into pulp
521.03	Dental caries extending into pulp	K02.63	Dental caries on smooth surface penetrating into pulp
521.04	Arrested dental caries	K02.3	Arrested dental caries
521.05	Odontoclasia	K03.89	Other specified diseases of hard tissues of teeth
521.06	Dental caries pit and fissure	K02.51	Dental caries pit and fissure surface limited to enamel
521.06	Dental caries pit and fissure	K02.52	Dental caries on pit and fissure surface penetrating into dentin

521.06	Dental caries pit and fissure	K02.53	Dental caries on pit and fissure surface penetrating into pulp
521.07	Dental caries of smooth surface	K02.61	Dental caries on smooth surface limited to enamel
521.07	Dental caries of smooth surface	K02.62	Dental caries on smooth surface penetrating into dentine
521.07	Dental caries of smooth surface	K02.63	Dental caries on smooth surface penetrating into pulp
521.08	Dental caries of root surface	K02.7	Dental root caries
521.09	Other dental caries	K02.9	Dental caries, unspecified
521.10	Excessive dental attrition, unspecified	K03.0	Excessive attrition of teeth
521.11	Excessive attrition, limited to enamel	K03.0	Excessive attrition of teeth
521.12	Excessive attrition, extending into dentine	K03.0	Excessive attrition of teeth
521.13	Excessive attrition, extending into pulp	K03.0	Excessive attrition of teeth
521.14	Excessive attrition, localized	K03.0	Excessive attrition of teeth
521.15	Excessive attrition, generalized	K03.0	Excessive attrition of teeth
521.20	Abrasion of teeth, unspecified	K03.1	Abrasion of teeth
521.21	Abrasion, limited to enamel	K03.1	Abrasion of teeth
521.22	Abrasion, extending into dentine	K03.1	Abrasion of teeth
521.23	Abrasion, extending into pulp	K03.1	Abrasion of teeth
521.24	Abrasion, localized	K03.1	Abrasion of teeth
521.25	Abrasion, generalized	K03.1	Abrasion of teeth
521.30	Erosion, unspecified	K03.2	Erosion of teeth
521.31	Erosion, limited to enamel	K03.2	Erosion of teeth
521.32	Erosion, extending into dentine	K03.2	Erosion of teeth
521.33	Erosion, extending into pulp	K03.2	Erosion of teeth
521.34	Erosion, localized	K03.2	Erosion of teeth
521.35	Erosion, generalized	K03.2	Erosion of teeth
521.40	Pathological resorption, unspecified	K03.3	Pathological resorption of teeth
521.41	Pathological resorption, internal	K03.3	Pathological resorption of teeth
521.42	Pathological resorption, external	K03.3	Pathological resorption of teeth
521.49	Other pathological resorption	K03.3	Pathological resorption of teeth
521.5	Hypercementosis	K03.4	Hypercementosis
521.6	Ankylosis of teeth	K03.5	Ankylosis of teeth
521.7	Intrinsic posteruptive color changes of teeth	K03.7	Intrinsic posteruptive color changes of hard tissues of teeth
521.81	Cracked tooth	K03.81	Cracked tooth
521.89	Other specific diseases of hard tissues of teeth	K03.89	Other specific diseases of hard tissues of teeth
521.9	Unspecified disease of hard tissues of teeth	K03.9	Disease of hard tissues of teeth, unspecified

522.0	Pulpitis	K04.0	Pulpitis
522.0	Pulpitis	K04.01	Reversible pulpitis
522.0	Pulpitis	K04.02	Irreversible pulpitis
522.1	Necrosis of the pulp	K04.1	Necrosis of the pulp
522.2	Pulp degeneration	K04.2	Pulp degeneration
522.3	Abnormal hard tissue formation in pulp	K04.3	Abnormal hard tissue formation in pulp
522.4	Acute apical periodontitis of pulpal origin	K04.4	Acute apical periodontitis of pulpal origin
522.5	Periapical abscess without sinus	K04.7	Periapical abscess without sinus
522.6	Chronic apical periodontitis	K04.5	Chronic apical periodontitis
522.7	Periapical abscess with sinus	K04.6	Periapical abscess with sinus
522.8	Radicular cyst	K04.8	Radicular cyst
522.9	Other and unspecified diseases of pulp and periapical tissues	K04.90	Unspecified diseases of pulp and periapical tissues
522.9	Other and unspecified diseases of pulp and periapical tissues	K04.99	Other diseases of pulp and periapical tissues
523.00	Acute gingivitis, plaque induced	K05.00	Acute gingivitis, plaque induced
523.01	Acute gingivitis, non-plaque induced	K05.01	Acute gingivitis, non-plaque induced
523.10	Chronic gingivitis, plaque induced	K05.10	Chronic gingivitis, plaque induced
523.11	Chronic gingivitis, non-plaque induced	K05.11	Chronic gingivitis, non-plaque induced
523.20	Gingival recession, unspecified	K06.0	Gingival recession
523.20	Gingival recession, unspecified	K060.10	Localized gingival recession, unspecified
523.20	Gingival recession, unspecified	K060.20	Generalized gingival recession, unspecified
523.21	Gingival recession, minimal	K06.0	Gingival recession
523.21	Gingival recession, minimal	K060.11	Localized gingival recession, minimal
523.21	Gingival recession, minimal	K060.21	Generalized gingival recession, minimal
523.22	Gingival recession, moderate	K06.0	Gingival recession
523.22	Gingival recession, moderate	K060.12	Localized gingival recession, moderate
523.22	Gingival recession, moderate	K060.22	Generalized gingival recession, moderate
523.23	Gingival recession, severe	K06.0	Gingival recession
523.23	Gingival recession, severe	K06013	Localized gingival recession, severe
523.23	Gingival recession, severe	K06023	Generalized gingival recession, severe
523.24	Gingival recession, localized	K06.0	Gingival recession
523.24	Gingival recession, localized	K060.10	Localized gingival recession, unspecified
523.25	Gingival recession, generalized	K06.0	Gingival recession
523.25	Gingival recession, generalized	K060.20	Generalized gingival recession, unspecified
523.30	Aggressive periodontitis, unspecified	K05.20	Aggressive periodontitis, unspecified
523.31	Aggressive periodontitis, localized	K05.21	Aggressive periodontitis, localized
523.31	Aggressive periodontitis, localized	K052.11	Aggressive periodontitis, localized, slight

523.31	Aggressive periodontitis, localized	K052.12	Aggressive periodontitis, localized, moderate
523.31	Aggressive periodontitis, localized	K052.13	Aggressive periodontitis, localized, severe
523.31	Aggressive periodontitis, localized	K052.19	Aggressive periodontitis, localized, unspecified severity
523.32	Aggressive periodontitis, generalized	K05.22	Aggressive periodontitis, generalized
523.32	Aggressive periodontitis, generalized	K052.21	Aggressive periodontitis, generalized, slight
523.32	Aggressive periodontitis, generalized	K052.22	Aggressive periodontitis, generalized, moderate
523.32	Aggressive periodontitis, generalized	K052.23	Aggressive periodontitis, generalized, severe
523.32	Aggressive periodontitis, generalized	K052.29	Aggressive periodontitis, generalized, unspecified severity
523.33	Acute periodontitis	K05.20	Acute periodontitis
523.40	Chronic periodontitis, unspecified	K05.30	Chronic periodontitis, unspecified
523.41	Chronic periodontitis, localized	K05.31	Chronic periodontitis, localized
523.41	Chronic periodontitis, localized	K053.11	Chronic periodontitis, localized, slight
523.41	Chronic periodontitis, localized	K053.12	Chronic periodontitis, localized, moderate
523.41	Chronic periodontitis, localized	K053.13	Chronic periodontitis, localized, severe
523.41	Chronic periodontitis, localized	K053.19	Chronic periodontitis, localized, unspecified severity
523.42	Chronic periodontitis, generalized	K05.32	Chronic periodontitis, generalized
523.42	Chronic periodontitis, generalized	K053.21	Chronic periodontitis, generalized, slight
523.42	Chronic periodontitis, generalized	K053.22	Chronic periodontitis, generalized, moderate
523.42	Chronic periodontitis, generalized	K053.23	Chronic periodontitis, generalized, severe
523.42	Chronic periodontitis, generalized	K053.29	Chronic periodontitis, generalized, unspecified severity
523.5	Periodontosis	K05.4	Periodontosis
523.5	Periodontosis	K05.40	Periodontosis
523.6	Accretions on teeth	K03.6	Deposits (accretions) on teeth
523.8	Other specified periodontal diseases	K05.5	Other periodontal diseases
523.8	Other specified periodontal diseases	K06.1	Gingival enlargement
523.8	Other specified periodontal diseases	K06.3	Horizontal alveolar bone loss
523.8	Other specified periodontal diseases	K06.8	Other specified disorders of gingiva and edentulous alveolar ridge
523.9	Unspecified gingival and periodontal disease	K05.6	Periodontal disease, unspecified
523.9	Unspecified gingival and periodontal disease	K06.9	Disorder of gingiva and edentulous alveolar ridge, unspecified
524.00	Major anomalies of jaw size, unspecified anomaly	M26.00	Unspecified anomaly of jaw size

524.01	Major anomalies of jaw size, maxillary hyperplasia	M26.01	Maxillary hyperplasia
524.02	Major anomalies of jaw size, mandibular hyperplasia	M26.03	Mandibular hyperplasia
524.03	Major anomalies of jaw size, maxillary hypoplasia	M26.02	Maxillary hypoplasia
524.04	Major anomalies of jaw size, mandibular hypoplasia	M26.04	Mandibular hypoplasia
524.05	Major anomalies of jaw size, macrogenia	M26.05	Macrogenia
524.06	Major anomalies of jaw size, microgenia	M26.06	Microgenia
524.07	Excessive tuberosity of jaw	M26.07	Excessive tuberosity of jaw
524.09	Major anomalies of jaw size, other specified anomaly	M26.09	Other specified anomalies of jaw size
524.10	Anomalies of relationship of jaw to cranial base, unspecified anomaly	M26.10	Unspecified anomaly of relationship of jaw-cranial base relationship
524.11	Anomalies of relationship of jaw to cranial base, maxillary asymmetry	M26.11	Maxillary asymmetry
524.12	Anomalies of relationship of jaw to cranial base, other jaw asymmetry	M26.12	Other jaw asymmetry
524.19	Anomalies of relationship of jaw to cranial base, other specified anomaly	M26.19	Other specified anomalies of jaw-cranial base relationship
524.20	Unspecified anomaly of dental arch relationship	M26.20	Unspecified anomaly of dental arch relationship
524.21	Malocclusion, Angle's class I	M26.211	Malocclusion, Angle's class I
524.22	Malocclusion, Angle's class II	M26.212	Malocclusion, Angle's class II
524.23	Malocclusion, Angle's class III	M26.213	Malocclusion, Angle's class III
524.24	Open anterior occlusal relationship	M26.220	Open anterior occlusal relationship
524.25	Open posterior occlusal relationship	M26.221	Open posterior occlusal relationship
524.26	Excessive horizontal overlap	M26.23	Excessive horizontal overlap
524.27	Reverse articulation	M26.24	Reverse articulation
524.28	Anomalies of interarch distance	M26.25	Anomalies of interarch distance
524.29	Other anomalies of dental arch relationship	M26.29	Other anomalies of dental arch relationship
524.30	Unspecified anomaly of tooth position of fully erupted teeth	M26.30	Unspecified anomaly of tooth position of fully erupted tooth or teeth
524.31	Crowding of teeth	M26.31	Crowding of fully erupted teeth
524.32	Excessive spacing of teeth	M26.32	Excessive spacing of fully erupted teeth
524.33	Horizontal displacement of teeth	M26.33	Horizontal displacement of fully erupted tooth or teeth
524.34	Vertical displacement of teeth	M26.34	Vertical displacement of fully erupted tooth or teeth
524.35	Rotation of tooth/teeth	M26.35	Rotation of fully erupted tooth or teeth
524.36	Insufficient interocclusal distance of teeth (ridge)	M26.36	Insufficient interocclusal distance of fully erupted teeth (ridge)

524.37	Excessive interocclusal distance of teeth	M26.37	Excessive interocclusal distance of fully erupted teeth
524.39	Other anomalies of tooth position	M26.39	Other anomalies of tooth position of fully erupted tooth or teeth
524.4	Malocclusion, unspecified	M26.4	Malocclusion, unspecified
524.50	Dentofacial functional abnormality, unspecified	M26.50	Dentofacial functional abnormalities, unspecified
524.51	Abnormal jaw closure	M26.51	Abnormal jaw closure
524.52	Limited mandibular range of motion	M26.52	Limited mandibular range of motion
524.53	Deviation in opening and closing of the mandible	M26.53	Deviation in opening and closing of the mandible
524.54	Insufficient anterior guidance	M26.54	Insufficient anterior guidance
524.55	Centric occlusion maximum intercuspation discrepancy	M26.55	Centric occlusion maximum intercuspation discrepancy
524.56	Non-working side interference	M26.56	Non-working side interference
524.57	Lack of posterior occlusal support	M26.57	Lack of posterior occlusal support
524.59	Other dentofacial functional abnormalities	M26.59	Other dentofacial functional abnormalities
524.60	Temporomandibular joint disorders, unspecified	M26.60	Temporomandibular joint disorder, unspecified
524.60	Temporomandibular joint disorders, unspecified	M26.601	Right temporomandibular joint disorder, unspecified
524.60	Temporomandibular joint disorders, unspecified	M26.602	Left temporomandibular joint disorder, unspecified
524.60	Temporomandibular joint disorders, unspecified	M26.603	Bilateral temporomandibular joint disorder, unspecified
524.60	Temporomandibular joint disorders, unspecified	M26.609	Unspecified temporomandibular joint disorder, unspecified side
524.60	Temporomandibular joint disorders, unspecified	M26.69	Other specified disorders of temporomandibular joint
524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.61	Adhesions and ankylosis of temporomandibular joint
524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.621	Arthralgia of right temporomandibular joint
524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.622	Arthralgia of left temporomandibular joint
524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.623	Arthralgia of bilateral temporomandibular joint
524.61	Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous)	M26.629	Arthralgia of temporomandibular joint, unspecified side
524.62	Temporomandibular joint disorders, arthralgia of temporomandibular joint	M26.62	Arthralgia of temporomandibular joint
524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.63	Articular disc disorder of temporomandibular joint

524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.631	Articular disc disorder of right temporomandibular joint
524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.632	Articular disc disorder of left temporomandibular joint
524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.633	Articular disc disorder of bilateral temporomandibular joint
524.63	Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing)	M26.639	Articular disc disorder of temporomandibular joint, unspecified side
524.64	Temporomandibular joint sounds on opening and/or closing the jaw	M26.69	Other specified disorders of temporomandibular joint
524.69	Other specified temporomandibular joint disorders	M26.69	Other specified disorders of temporomandibular joint
524.70	Dental alveolar anomalies, unspecified alveolar anomaly	M26.70	Unspecified alveolar anomaly
524.71	Alveolar maxillary hyperplasia	M26.71	Alveolar maxillary hyperplasia
524.72	Alveolar mandibular hyperplasia	M26.72	Alveolar mandibular hyperplasia
524.73	Alveolar maxillary hypoplasia	M26.73	Alveolar maxillary hypoplasia
524.74	Alveolar mandibular hypoplasia	M26.74	Alveolar mandibular hypoplasia
524.75	Vertical displacement of alveolus and teeth	M26.79	Other specified alveolar anomaly
524.76	Occlusal plane deviation	M26.79	Other specified alveolar anomaly
524.79	Other specified alveolar anomaly	M26.79	Other specified alveolar anomaly
524.81	Anterior soft tissue impingement	M26.81	Anterior soft tissue impingement
524.82	Posterior soft tissue impingement	M26.82	Posterior soft tissue impingement
524.89	Other specified dentofacial anomalies	M26.4	Malocclusion, unspecified
524.89	Other specified dentofacial anomalies	M26.89	Other dentofacial anomalies
524.9	Unspecified dentofacial anomalies	M26.9	Dentofacial anomaly, unspecified
525.0	Exfoliation of teeth due to systemic causes	K08.0	Exfoliation of teeth due to systemic causes
525.10	Acquired absence of teeth, unspecified	K08.109	Complete loss of teeth, unspecified cause, unspecified class
525.12	Loss of teeth due to periodontal disease	K08.429	Partial loss of teeth due to periodontal diseases, unspecified class
525.13	Loss of teeth due to caries	K08.439	Partial loss of teeth due to caries unspecified class
525.13	Loss of teeth due to caries	K08.139	Complete loss of teeth due to caries, unspecified class
525.13	Loss of teeth due to caries	K08.431	Partial loss of teeth due to caries, class I
525.19	Other loss of teeth	K08.499	Partial loss of teeth due to other unspecified cause, unspecified class
525.19	Other loss of teeth	K08.191	Complete loss of teeth due to other specified cause, class I
525.19	Other loss of teeth	K08.199	Complete loss of teeth due to other specified cause, unspecified class

525.20	Unspecified atrophy of edentulous alveolar ridge	K08.20	Unspecified atrophy of edentulous alveolar ridge
525.21	Minimal atrophy of the mandible	K08.21	Minimal atrophy of the mandible
525.22	Moderate atrophy of the mandible	K08.22	Moderate atrophy of the mandible
525.23	Severe atrophy of the mandible	K08.23	Severe atrophy of the mandible
525.24	Minimal atrophy of the maxilla	K08.24	Minimal atrophy of the maxilla
525.25	Moderate atrophy of the maxilla	K08.25	Moderate atrophy of the maxilla
525.26	Severe atrophy of the maxilla	K08.26	Severe atrophy of the maxilla
525.3	Retained dental root	K08.3	Retained dental root
525.40	Complete edentulism, unspecified	K08.109	Complete loss of teeth, unspecified cause, unspecified class
525.40	Complete edentulism, unspecified	K08.139	Complete loss of teeth due to caries, unspecified class
525.40	Complete edentulism, unspecified	K08.199	Complete loss of teeth due to other specified cause, unspecified class
525.41	Complete edentulism, class I	K08.101	Complete loss of teeth, unspecified cause, class I
525.41	Complete edentulism, class I	K08.191	Complete loss of teeth due to other specified cause, class I
525.42	Complete edentulism, class II	K08.102	Complete loss of teeth, unspecified cause, class II
525.43	Complete edentulism, class III	K08.103	Complete loss of teeth, unspecified cause, class III
525.44	Complete edentulism, class IV	K08.104	Complete loss of teeth, unspecified cause, class IV
525.50	Partial edentulism, unspecified	K08.409	Partial loss of teeth, unspecified cause, unspecified class
525.51	Partial edentulism, class I	K08.401	Partial loss of teeth, unspecified cause, class I
525.51	Partial edentulism, class I	K08.431	Partial loss of teeth due to caries, class I
525.52	Partial edentulism, class II	K08.402	Partial loss of teeth, unspecified cause, class II
525.53	Partial edentulism, class III	K08.403	Partial loss of teeth, unspecified cause, class III
525.54	Partial edentulism, class IV	K08.404	Partial loss of teeth, unspecified cause, class IV
525.60	Unspecified unsatisfactory restoration of tooth	K08.50	Unsatisfactory restoration of tooth, unspecified
525.61	Open restoration margins	K08.51	Open restoration margins of tooth
525.62	Unrepairable overhanging of dental restorative materials	K08.52	Unrepairable overhanging of dental restorative materials
525.63	Fractured dental restorative material without loss of material	K08.530	Fractured dental restorative material without loss of material

525.64	Fractured dental restorative material with loss of material	K08.531	Fractured dental restorative material with loss of material
525.65	Contour of existing restoration of tooth biologically incompatible with oral health	K08.54	Contour of existing restoration of tooth biologically incompatible with oral health
525.66	Allergy to existing dental restorative material	K08.55	Allergy to existing dental restorative material
525.67	Poor aesthetics of existing restoration	K08.56	Poor aesthetic of existing restoration of tooth
525.69	Other unsatisfactory restoration of existing tooth	K08.59	Other unsatisfactory restoration of tooth
525.71	Osseointegration failure of dental implant	M27.61	Osseointegration failure of dental implant
525.72	Post-osseointegration biological failure of dental implant	M27.62	Post-osseointegration biological failure of dental implant
525.73	Post-osseointegration mechanical failure of dental implant	M27.63	Post-osseointegration mechanical failure of dental implant
525.79	Other endosseous dental implant failure	M27.69	Other endosseous dental implant failure
525.8	Other specified disorders of the teeth and supporting structures	K08.8	Other specified disorders of teeth and supporting structures
525.8	Other specified disorders of the teeth and supporting structures	K08.89	Other specified disorders of teeth and supporting structures
525.8	Other specified disorders of the teeth and supporting structures	M26.79	Other specified alveolar anomalies
525.9	Unspecified disorder of the teeth and supporting structures	K08.9	Disorder of teeth and supporting structures, unspecified
526.0	Developmental odontogenic cysts	K09.0	Developmental odontogenic cysts
526.1	Fissural cysts of jaw	K09.1	Developmental (nonodotogenic) cysts of oral region
526.2	Other cysts of jaws	M27.49	Other cysts of jaws
526.2	Other cysts of jaws	M27.40	Unspecified cyst of jaw
526.3	Central giant cell (reparative) granuloma	M27.1	Giant cell granuloma, central
526.4	Inflammatory conditions of jaw	M27.2	Inflammatory conditions of jaw
526.5	Alveolitis of jaw	M27.3	Alveolitis of jaw
526.61	Perforation of root canal space	M27.51	Perforation of root canal space due to endodontic treatment
526.62	Endodontic overfill	M27.52	Endodontic overfill
526.63	Endodontic underfill	M27.53	Endodontic underfill
526.69	Other periradicular pathology associated with previous endodontic treatment	M27.59	Other periradicular pathology associated with previous endodontic treatment
526.81	Exostosis of jaw	M27.8	Other specified diseases of jaws
526.89	Other specified diseases of the jaws	M27.8	Other specified diseases of jaws
526.9	Unspecified disease of the jaws	M27.9	Disease of the jaws, unspecified

526.9	Unspecified disease of the jaws	M27.0	Developmental disorders of jaws
527.0	Atrophy of salivary gland	K11.0	Atrophy of salivary gland
527.1	Hypertrophy of salivary gland	K11.1	Hypertrophy of salivary gland
527.2	Sialoadenitis	K11.20	Sialoadenitis, unspecified
527.2	Sialoadenitis	K11.21	Acute sialoadenitis
527.2	Sialoadenitis	K11.23	Chronic sialoadenitis
527.3	Abscess of salivary gland	K11.3	Abscess of salivary gland
527.4	Fistula of salivary gland	K11.4	Fistula of salivary gland
527.5	Sialolithiasis	K11.5	Sialolithiasis
527.6	Mucocele of salivary gland	K11.6	Mucocele of salivary gland
527.7	Disturbance of salivary secretion	K11.7	Disturbances of salivary secretion
527.7	Disturbance of salivary secretion	R68.2	Dry mouth, unspecified
527.8	Other specified diseases of the salivary glands	K11.8	Other diseases of salivary glands
527.9	Unspecified disease of the salivary glands	K11.9	Disease of the salivary glands, unspecified
528.00	Stomatitis and mucositis, unspecified	K12.2	Cellulitis and abscess of mouth
528.00	Stomatitis and mucositis, unspecified	K12.30	Oral mucositis (ulcerative), unspecified
528.01	Mucositis (ulcerative) due to antineoplastic therapy	K12.31	Oral mucositis (ulcerative) due to antineoplastic therapy
528.01	Mucositis (ulcerative) due to antineoplastic therapy	K12.33	Oral mucositis (ulcerative) due to radiation
528.02	Mucositis (ulcerative) due to other drugs	K12.32	Oral mucositis (ulcerative) due to other drugs
528.09	Other stomatitis and mucositis (ulcerative)	K12.1	Other forms of stomatitis
528.09	Other stomatitis and mucositis (ulcerative)	K12.39	Other oral mucositis (ulcerative)
528.1	Cancrum oris	A69.0	Necrotizing ulcerative stomatitis
101	Vincent's angina	A69.0	Necrotizing ulerative stomatitis
101	Vincent's angina	A69.1	Other Vincent's infections
528.2	Oral aphthae	K12.0	Recurrent oral aphthae
528.3	Cellulitis and abscess of oral soft tissues	K12.2	Cellulitis and abscess of mouth
528.4	Cysts of oral soft tissues	K09.8	Other cysts of oral region, not elsewhere classified
528.4	Cysts of oral soft tissues	K099	Cyst of oral region, unspecified
528.5	Diseases of lips	K13.0	Diseases of lips
528.6	Leukoplakia of oral mucosa, including tongue	K13.21	Leukoplakia of oral mucosa, including tongue
528.71	Minimal keratinized residual ridge mucosa	K13.22	Minimal keratinized residual ridge mucosa
528.72	Excessive keratinized residual ridge mucosa	K13.23	Excessive keratinized residual ridge mucosa

528.79	Other disturbances of oral epithelium, including tongue	K13.29	Other disturbances of oral epithelium, including tongue
528.8	Oral submucosal fibrosis, including of tongue	K13.5	Oral submucosal fibrosis
528.9	Other and unspecified diseases of the oral soft tissues	K13.70	Unspecified lesions of oral mucosa
528.9	Other and unspecified diseases of the oral soft tissues	K13.79	Other lesions of oral mucosa
528.9	Other and unspecified diseases of the oral soft tissues	K13.1	Cheek and lip biting
528.9	Other and unspecified diseases of the oral soft tissues	K13.6	Irritative hyperplasia of oral mucosa
528.9	Other and unspecified diseases of the oral soft tissues	K13.4	Granuloma and granuloma-like lesions of oral mucosa
529.0	Glossitis	K14.0	Glossitis
529.1	Geographic tongue	K14.1	Geographic tongue
529.2	Median rhomboid glossitis	K14.2	Median rhomboid glossitis
529.3	Hypertrophy of tongue papillae	K14.3	Hypertrophy of tongue papillae
529.4	Atrophy of tongue papillae	K14.4	Atrophy of tongue papillae
529.5	Plicated tongue	K14.5	Plicated tongue
529.6	Glossodynia	K14.6	Glossodynia
529.8	Other specified conditions of the tongue	K14.8	Other diseases of the tongue
529.9	Unspecified condition of the tongue	K14.9	Disease of tongue, unspecified
V52.3	Fitting and adjustment of dental prosthetic device	Z46.3	Encounter for fitting and adjustment of dental prosthetic device
V53.4	Fitting and adjustment of orthodontic devices	Z46.4	Encounter for fitting and adjustment of orthodontic device
V58.5	Orthodontics aftercare	Z46.4	Encounter for fitting and adjustment of orthodontic device
V72.2	Dental examination	Z01.20	Encounter for dental examination and cleaning without abnormal findings
V72.3	Dental examination	Z01.21	Encounter for dental examination and cleaning with abnormal findings
784.92	Jaw pain	R68.84	Jaw pain

Table 2. Additional First-Listed ICD-9-CM/ICD-10-CM Diagnosis Codes to Identify Ambulatory Care Sensitive Non-Traumatic Dental Condition Visits when Paired with an Additional Listed Diagnosis Code from the Ambulatory Care Sensitive Non-Traumatic Dental Condition ICD-9-CM/ICD-10-CM Codes in Table 1

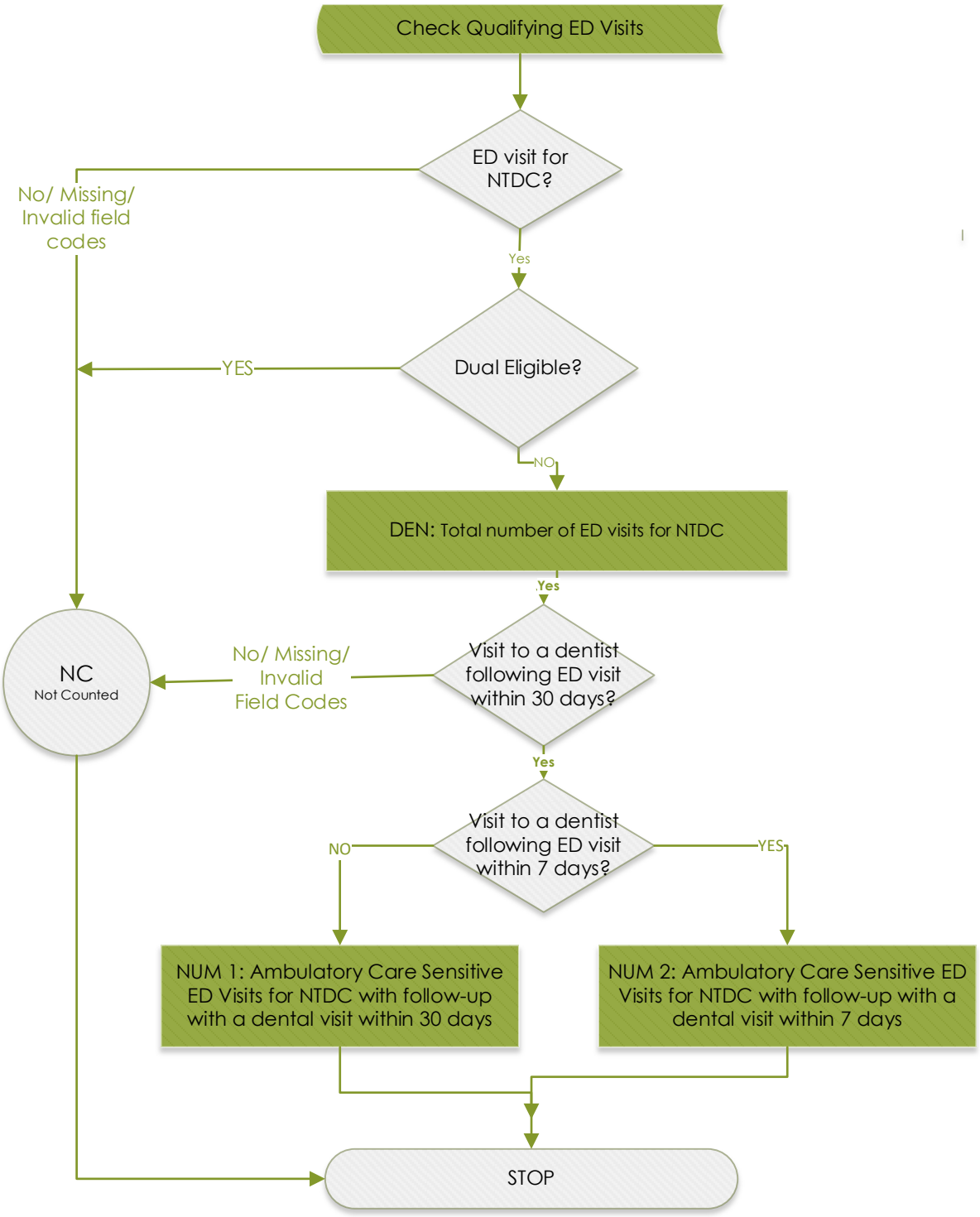
ICD9 Codes	Description of Code	ICD10 Codes	Description of Code
682.0	Cellulitis and abscess of face	L03.211	Cellulitis of face
682.0	Cellulitis and abscess of face	L03.212	Acute lymphangitis of face
682.0	Cellulitis and abscess of face	L03.213	Periorbital cellulitis
682.1	Cellulitis and abscess of neck	L03.221	Cellulitis of neck
682.1	Cellulitis and abscess of neck	L03.222	Acute lymphangitis of neck
784.2	Swelling mass or lump in head and neck	R22.0	Localized swelling, mass and lump, head
784.2	Swelling mass or lump in head and neck	R22.1	Localized swelling, mass and lump, neck

Table 3: NUCC maintained Provider Taxonomy Codes classified as "Dental Service"*

122300000X	1223P0106X	1223X0008X	125Q00000X
1223D0001X	1223P0221X	1223X0400X	261QF0400X
1223D0004X	1223P0300X	124Q00000X+	261QR1300X
1223E0200X	1223P0700X	125J00000X	
1223G0001X	1223S0112X	125K00000X	

*Services provided by County Health Department dental clinics may also be included as "dental" services.
+Only dental hygienists who provide services under the supervision of a dentist should be classified as "dental" services.

*** Note: Reliability of the measure score depends on quality of the data that are used to calculate the measure. The percentages of missing and invalid data for these data elements must be investigated prior to measurement. Data elements with high rates of missing or invalid data will adversely affect the accuracy and reliability of the measure score. ***


Check Qualifying ED Visits
ED visit for NTDC?
No/ Missing/ Invalid field codes
Yes
Dual Eligible?
YES
NO
DEN: Total number of ED visits for NTDC
Yes
Visit to a dentist following ED visit within 30 days?
No/ Missing/ Invalid Field Codes
NC
Not Counted
Yes
Visit to a dentist following ED visit within 7 days?
NO
YES
NUM 1: Ambulatory Care Sensitive ED Visits for NTDC with follow-up with a dental visit within 30 days
NUM 2: Ambulatory Care Sensitive ED Visits for NTDC with follow-up with a dental visit within 7 days
STOP

Appendix E: Adults with Diabetes – Oral Evaluation

Description: Percentage of adults with diabetes who received a comprehensive or periodic oral evaluation or a comprehensive periodontal evaluation within the reporting year

Numerator: Unduplicated number of adults with diabetes who received a comprehensive or periodic oral evaluation or a comprehensive periodontal evaluation

Denominator: Unduplicated number of adults with diabetes

Rate: NUM/DEN

Rationale: The 2018 Standards of Medical Care in Diabetes call for initial care management to include a referral to a dentist.[1] This recommendation recognizes the established bi-directional relationship between diabetes mellitus and periodontal disease.[2,3] Specifically, diabetes is associated with increased prevalence and severity of periodontal disease, while severe periodontal disease is associated with poor glycemic control. Oral evaluations represent an important entry point into the dental care system. Diagnosis and treatment planning for the prevention and treatment of periodontal disease at these visits offer patients appropriate dental care with the potential to improve diabetes outcomes.

References:

1. American Diabetes Association. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Medical Care in Diabetes – 2018. Diabetes Care 2018;41(S1):S28-S37.
2. Casanova L, Hughes FJ, Preshaw PM. Diabetes and periodontal disease: a two-way relationship. British Dental Journal 2014;217(8):433-7.
3. Chapple ILC, Genco R, working group 2 of the joint EFP/AAP workshop. Diabetes and periodontal diseases: consensus report of the Joint EFP/APP Workshop on Periodontitis and Systemic Diseases. Journal of Clinical Periodontology 2013;40(14):S106-12.

AHRQ Domain: Process[39]

IOM Aim: Equity, Effectiveness

Level of Aggregation: Program *(NOTE: This measure only applies to programs such as Medicaid that provide both medical insurance and dental benefits to identify people with diabetes. Use of this measure as a requirement for stand-alone dental benefit plans will result in feasibility issues due to lack of access to appropriate data. Use by health plans that provide both medical insurance and dental benefits to a population may be considered after assessment of data element feasibility within the plans databases).*

Improvement Noted As: A higher score indicates better quality

[39] **Process (Clinical Quality Measure):** A process of care is a health care-related activity performed for, on behalf of, or by a patient. Process measures are supported by evidence that the clinical process—that is the focus of the measure—has led to improved outcomes. National Quality Measures Clearinghouse: **https://www.ahrq.gov/gam/summaries/domain-definitions/index.html**. Accessed April 17, 2019.

Data Required: Dental administrative enrollment and claims data; single year (prior year needed for diabetes identification)

Claims Data: When using claims data to determine service receipt, include both paid and unpaid claims (including pending, suspended, and denied claims).

Measure Purpose: Examples of questions that can be answered through this measure at each level of aggregation:

1. What is the percentage of adults with diabetes who received a comprehensive, periodic, or periodontal oral evaluation during the reporting period?
2. Does the percentage of adults with diabetes who received a comprehensive, periodic, or periodontal oral evaluation vary by any of the stratification variables?
3. Are there disparities in receipt of comprehensive, periodic, or periodontal oral evaluations based on stratification variables?
4. Over time, does the percentage of adults with diabetes receiving a comprehensive, periodic, or periodontal oral evaluation stay stable, increase or decrease?

Applicable Stratification Variables

1. Age: (e.g. 18, 19-20, 21-24, 25-34, 35-44, 45-54, 55-64, 65-75, 75-84, 85+)
2. Geographic Location (e.g., rural; suburban; urban)
3. Race/Ethnicity
4. Socioeconomic Status (e.g., premium or income category)

GUIDANCE FOR IMPLEMENTERS: Diabetes identification for inclusion in the denominator follows the approach used for the NCQA/HEDIS® measure Comprehensive Diabetes Care **to achieve alignment with existing diabetes measures as part of the CMS Core Set of Adult Quality Measures for Medicaid (Adult Core Set).**[1] **Measure implementers should obtain all necessary licenses from** NCQA **to access the complete value set for the measure for any reporting purpose. NCQA's Medication List Directory (MLD) of NDC codes for Dementia Medications and Diabetes Medications can be found at** https://www.ncqa.org/hedis/measures/hedis2019-ndc-license/hedis-2019-final-ndc-lists/**. For more information on the 2019 Adult Core Set, please access the link:** https://www.medicaid.gov/medicaid/quality-of-care/downloads/medicaid-adult-core-set-manual.pdf ***

Adults with Diabetes: Oral Evaluation Calculation

1. Check if the subject meets age criterion at the last day of the reporting year:[40]

[40] Medicaid programs exclude those enrollees who do not qualify for dental benefits. The exclusions criterion should be reported along with the number and percentage of members excluded.

a. If subject is >=18 years, then proceed to next step.
b. If age criterion is not met or there are missing or invalid field codes (e.g., date of birth), then STOP processing. This subject does not get counted in the denominator.

2. Check if subject is continuously enrolled for the reporting year (12 months) with a single gap of no more than 45 days (one month gap for programs that determine eligibility on a monthly basis):[41]
    a. If subject meets continuous enrollment criterion, then proceed to next step.
    b. If subject does not meet enrollment criterion, then STOP processing. This subject does not get counted.

3. Check if subject was dually eligible for Medicaid and Medicare during the reporting year:
    a. If subject is a dual eligible; STOP processing. This subject is excluded from the denominator.
    b. If subject is NOT a dual eligible, then proceed to next step.

4. Exclude subject if care received at a Hospice facility:
    a. If subject had any Hospice encounter claims (NCQA Hospice value set) in the reporting year or the year prior, then STOP processing. This subject does not get counted.
    b. If subject does not have any Hospice encounter claims (NCQA Hospice value set) in the reporting year or the year prior, then proceed to next step.

5. Exclude subjects age 66 and older as of December 31 of the measurement year with frailty and advanced illness:
    a. If subject meets <u>both</u> of the following frailty and advanced illness criteria to be excluded:
        (1) At least one claim/encounter for frailty (Frailty Value Set) during the measurement year.

        AND

        (2) Any of the following during the measurement year or the year prior to the measurement year (count services that occur over both years):
            - At least two outpatient visits (Outpatient Value Set), observation visits (Observation Value Set), ED visits (ED Value Set) or nonacute inpatient encounters (Nonacute Inpatient Value Set) on different dates of

[41] **Enrollment in "same" plan vs. "any" plan**: At the state program level (e.g., Medicaid) a criterion of "any" plan applies versus at the health plan (e.g., MCO) level a criterion of "same" plan applies. The criterion used should be reported with the measure score. While this prevents direct aggregation of results from plan to program, each entity is given due credit for the population it serves. Thus, states with multiple MCOs should not merely "add up" the plan level scores but should calculate the state score from their database to allow inclusion of individuals who may be continuously enrolled but might have switched plans in the interim.

service, with an advanced illness diagnosis (Advanced Illness Value Set). Visit type need not be the same for the two encounters.
- At least one acute inpatient encounter (Acute Inpatient Value Set) with an advanced illness diagnosis (Advanced Illness Value Set)
- A dispensed dementia medication (Dementia Medications List, see link to Medication List Directory in Guidance for Reporting above)

b. If subject does not meet the frailty and advanced illness criteria, then proceed to next step.

YOU NOW HAVE A COUNT OF SUBJECTS WHO MEET THE AGE AND ENROLLMENT REQUIREMENT (AFTER EXCLUSIONS)

6. Check if subject has diabetes:

a. Adults with diabetes (type I or type II) can be identified by either claims/encounter data that include a diagnosis of diabetes or by pharmacy data. Both claims/encounter data and pharmacy data must be checked, but a patient needs to be identified by only one method for inclusion in the denominator.

If subject meets at least one of the following criteria (among i, ii, and iii) in either the measurement year or the preceding year, then include in denominator:

Claims/Encounter Data

i. At least one acute inpatient encounter (Acute Inpatient Value Set) with a diagnosis of diabetes (Diabetes Value Set) without telehealth (Telehealth Modifier Value Set; Telehealth POS Value Set)

OR

ii. The subject has at least two outpatient visits (Outpatient Value Set), observation visits (Observation Value Set), ED visits (ED Value Set) or nonacute inpatient encounters (Nonacute Inpatient Value Set) on different dates of service, with a diagnosis of diabetes (Diabetes Value Set). Visit type need not be the same for the two visits.

Note 1: Only include nonacute inpatient encounters (Nonacute Inpatient Value Set) without telehealth (Telehealth Modifier Value Set; Telehealth POS Value Set).
Note 2: Only one of the two visits may be a telehealth visit, a telephone visit or an online assessment. Identify telehealth visits by the presence of a telehealth modifier (Telehealth Modifier Value Set) or the presence of a telehealth POS code (Telehealth POS Value Set) associated with the outpatient visit. Use the code combinations below to identify telephone visits and online assessments:

- A telephone visit (Telephone Visits Value Set) with any diagnosis of diabetes (Diabetes Value Set)
- An online assessment (Online Assessments Value Set) with any diagnosis of diabetes (Diabetes Value Set)

OR

Pharmacy Claims Data

iii. The subject was dispensed insulin or oral hypoglycemics/antihyperglycemics during the measurement year or year prior to the measurement year on an ambulatory basis. (Diabetes Medications List, see link to Medication List Directory in Guidance for Reporting above)

b. Exclude subjects who do not have a diagnosis from the NCQA Diabetes Value Set (type I or type II Diabetes) and are in the NCQA Diabetes Exclusion Value Set (e.g., have gestational diabetes, steroid/ drug induced diabetes)
   i. If subject has any encounter claims within the Diabetes Exclusion Value Set in the reporting year or the year prior and was not identified in 6a(i) or 6a(ii) above, then STOP processing. This subject does not get counted. (NOTE: If subject was identified in step 6a(i) or 6a(ii) as having diabetes, this subject should remain in the denominator and not be excluded.)
   ii. If subject does not have any encounter claims from the Diabetes Exclusion Value Set in the reporting year or the year prior, then proceed to next step.

YOU NOW HAVE DENOMINATOR (DEN) COUNT: Subjects with diabetes who meet the age and enrollment criteria

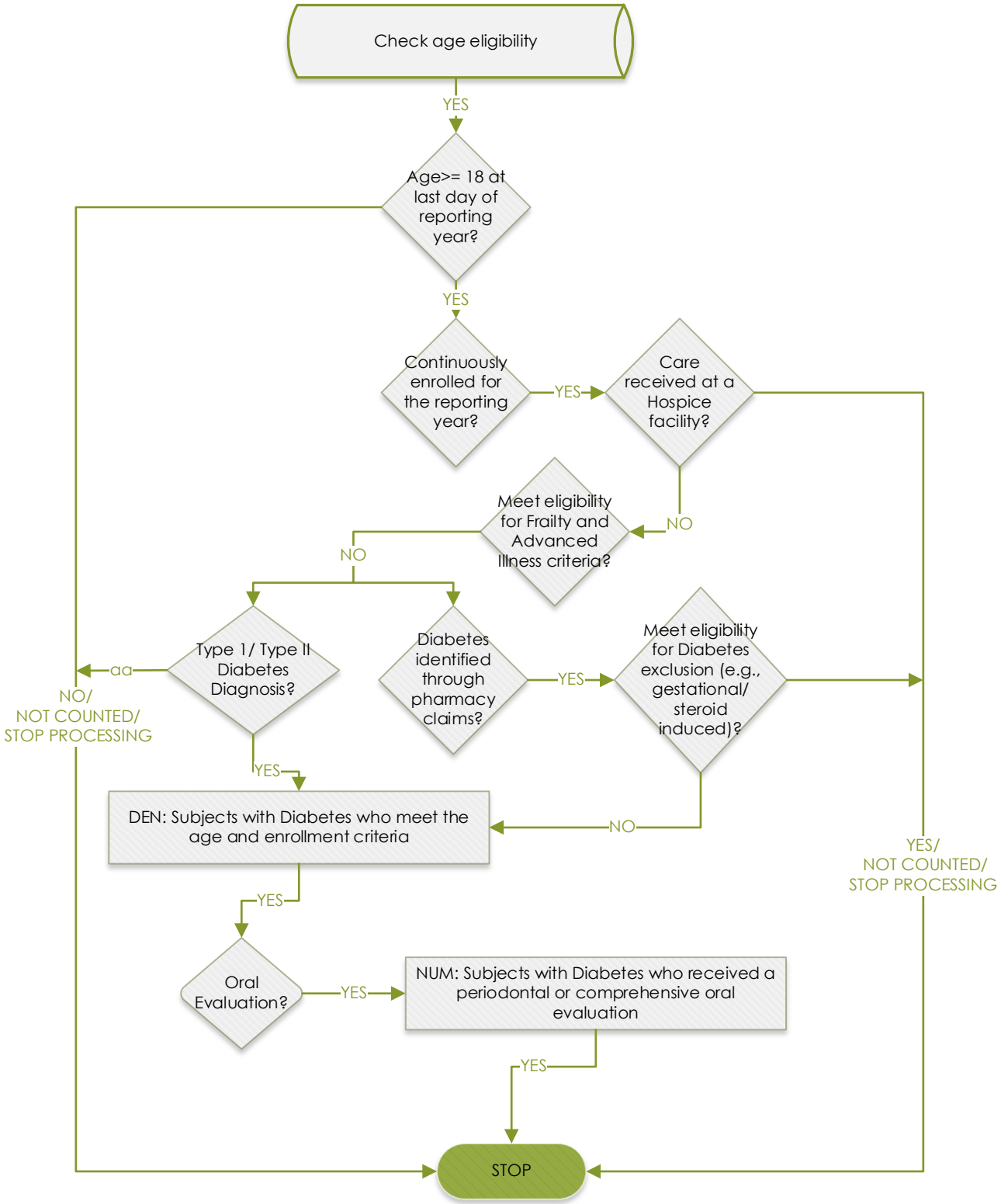
7. Check if subject received a comprehensive, periodic, or periodontal oral evaluation:
   a. If [CDT CODE] = D0120 or D0150 or D0180, then include in **numerator**, STOP processing.
   b. If not, then service was not provided, STOP processing. This subject is already included in the denominator but will not be included in the numerator.

YOU NOW HAVE NUMERATOR (NUM) COUNT: Subjects with diabetes who received a periodontal or comprehensive or periodic oral evaluation

8. Report:
   a. Unduplicated count of subjects in numerator
   b. Unduplicated count of subjects in denominator before exclusions
   c. Unduplicated count of subjects in denominator after exclusions
   d. Measure rate (NUM/DEN after exclusions)

*** Note: Reliability of the measure score depends on the quality of the data that are used to calculate the measures. The percentages of missing and invalid data for these data

elements must be investigated prior to measurement. Data elements with high rates of missing or invalid data will adversely affect the subsequent counts that are recorded. For example, records with missing or invalid CDT CODE may be excluded from measurement. These records are assumed to not have had a qualifying service. In this case, a low quality data set will result in a measure score that will not be reliable.***


Check age eligibility
YES
Age>= 18 at last day of reporting year?
YES
Continuously enrolled for the reporting year?
YES
Care received at a Hospice facility?
NO
Meet eligibility for Frailty and Advanced Illness criteria?
NO
Type 1/ Type II Diabetes Diagnosis?
aa
NO/ NOT COUNTED/ STOP PROCESSING
Diabetes identified through pharmacy claims?
YES
Meet eligibility for Diabetes exclusion (e.g., gestational/ steroid induced)?
YES/ NOT COUNTED/ STOP PROCESSING
YES
DEN: Subjects with Diabetes who meet the age and enrollment criteria
NO
YES
Oral Evaluation?
YES
NUM: Subjects with Diabetes who received a periodontal or comprehensive oral evaluation
YES
STOP

Appendix F: Detailed Performance Measure Scores

The subsequent tables provide detailed performance scores for all 3 measures by program stratified by age, sex, geographic location and race/ethnicity. The tables also include confidence intervals, and standard deviations or standard errors for each measure score.

Table F1: Ambulatory Care Sensitive Emergency Department Visits for Non-Traumatic Dental Conditions in Adults Measure Scores- OREGON

OREGON MEDICAID

	2014										2015										2016									
	Den	Total NTDC Related ED Visits	Total Inpatient Admissions	Total Discharged	Rate 1 (Total NTDC / Den)	SE	95% Confidence Interval	Rate 2 (Total Discharged/ Den- Excludes Inpatient Admissions)	SE	95% Confidence Interval	Den	Total NTDC Related ED Visits	Total Inpatient Admissions	Total Discharged	Rate 1 (Total NTDC / Den)	SE	95% Confidence Interval	Rate 2 (Total Discharged/ Den- Excludes Inpatient Admissions)	SE	95% Confidence Interval	Den	Total NTDC Related ED Visits	Total Inpatient Admissions	Total Discharged	Rate 1 (Total NTDC / Den)	SE	95% Confidence Interval	Rate 2 (Total Discharged/ Den- Excludes Inpatient Admissions)	SE	95% Confidence Interval
TOTAL	**6556840**	**16451**	**220**	**16231**	**250.9**	**2.7**	**245.6 - 256.2**	**247.5**	**2.7**	**242.3 - 252.8**	**7291092**	**15933**	**203**	**15730**	**218.5**	**2.3**	**214 - 223.1**	**215.7**	**2.3**	**211.2 - 220.2**	**7151183**	**15169**	**230**	**14939**	**212.1**	**2.2**	**207.7 - 216.5**	**208.9**	**2.2**	**204.5 - 213.3**
Age																														
18	154002	240	3	237	155.8	12.2	132 - 179.7	153.9	12.1	130.2 - 177.6	154032	254	3	251	164.9	13	139.4 - 190.4	163	12.9	137.6 - 188.3	163207	233	2	231	142.8	10.4	122.3 - 163.2	141.5	10.4	121.2 - 161.9
19-20	207613	319	3	316	153.7	10.9	132.4 - 175	152.2	10.8	131.1 - 173.4	222592	297	1	296	133.4	9.5	114.9 - 152	133	9.4	114.5 - 151.4	204417	277	2	275	135.5	10	116 - 155	134.5	9.9	115.1 - 154
21-24	698570	2012	19	1993	288	8.8	270.8 - 305.2	285.3	8.7	268.2 - 302.4	777352	2029	15	2014	261	7.5	246.4 - 275.7	259.1	7.4	244.5 - 273.7	749090	1684	20	1664	224.8	6.9	211.4 - 238.3	222.1	6.8	208.9 - 235.4
25-34	1854031	7088	87	7001	382.3	6.5	369.6 - 395	377.6	6.4	365 - 390.2	2118757	6670	67	6603	314.8	5.3	304.5 - 325.1	311.6	5.2	301.4 - 321.9	2092470	6481	65	6416	309.7	5.3	299.4 - 320.1	306.6	5.2	296.4 - 316.9
35-44	1334720	3722	45	3677	278.9	6.4	266.4 - 291.3	275.5	6.3	263.1 - 287.9	1488822	3615	60	3555	242.8	5.3	232.4 - 253.3	238.8	5.3	228.5 - 249.1	1480370	3505	73	3432	236.8	5.1	226.9 - 246.7	231.8	5	222.1 - 241.6
45-54	1179236	2197	37	2160	186.3	5.1	176.3 - 196.3	183.2	5.1	173.3 - 193.1	1269579	2140	34	2106	168.6	4.7	159.4 - 177.7	165.9	4.6	156.8 - 175	1210927	2016	40	1976	166.5	4.5	157.6 - 175.4	163.2	4.5	154.4 - 172
55-64	1027824	822	22	800	80	3.5	73.2 - 86.8	77.8	3.4	71.1 - 84.5	1135301	882	21	861	77.7	3.5	70.9 - 84.5	75.8	3.4	69.1 - 82.5	1122029	909	26	883	81	3.1	74.8 - 87.2	78.7	3.1	72.6 - 84.8
65-74	95164	50	4	46	52.5	8.9	35.1 - 70	48.3	8.5	31.6 - 65	117928	41	1	40	34.8	6.4	22.2 - 47.3	33.9	6.3	21.5 - 46.3	121059	61	2	59	50.4	7.2	36.2 - 64.6	48.7	7	34.9 - 62.5
75-84	4459	0	0	0	0	0	0 - 0	0	0	0 - 0	5112	4	1	3	78.2	47.8	0 - 171.9	58.7	43.7	0 - 144.3	5805	3	0	3	51.7	29.8	0 - 110	51.7	29.8	0 - 110
85+	1221	1	0	1	81.9	81.7	0 - 242.1	81.9	81.7	0 - 242.1	1617	1	0	1	61.8	61.7	0 - 182.9	61.8	61.7	0 - 182.9	1809	0	0	0	0	0	0 - 0	0	0	0 - 0
Sex																														
Female	3658834	8994	109	8885	245.8	3.6	238.9 - 252.8	242.8	3.5	235.9 - 249.8	4025578	8542	100	8442	212.2	3.1	206.2 - 218.2	209.7	3	203.8 - 215.7	3936307	8129	109	8020	206.5	3	200.6 - 212.4	203.7	3	197.9 - 209.6
Male	2898006	7457	111	7346	257.3	4.2	249.1 - 265.5	253.5	4.2	245.4 - 261.6	3265514	7391	103	7288	226.3	3.5	219.4 - 233.3	223.2	3.5	216.3 - 230	3214876	7040	121	6919	219	3.4	212.3 - 225.6	215.2	3.3	208.7 - 221.8
Geographic Location																														
Urban	5188339	12335	181	12154	237.7	3	231.9 - 243.6	234.3	3	228.5 - 240	5778245	11999	152	11847	207.7	2.5	202.7 - 212.7	205	2.5	200.1 - 210	5628796	11096	177	10919	197.1	2.5	192.3 - 201.9	194	2.4	189.2 - 198.7
Rural	1287232	3945	38	3907	306.5	6.7	293.3 - 319.6	303.5	6.7	290.4 - 316.6	1411142	3750	49	3701	265.7	5.7	254.6 - 276.9	262.3	5.6	251.2 - 273.3	1403277	3878	50	3828	276.4	5.7	265.1 - 287.6	272.8	5.7	261.7 - 283.9
Unknown/Missing	81269	171	1	170	210.4	20.8	169.6 - 251.3	209.2	20.8	168.4 - 250	101705	184	2	182	180.9	18.2	145.3 - 216.6	178.9	18.1	143.4 - 214.5	119110	195	3	192	163.7	14.1	136.1 - 191.3	161.2	13.9	133.9 - 188.5
Race/Ethnicity																														
Non-Hispanic White	3506199	9278	120	9158	264.6	3.8	257.2 - 272.1	261.2	3.8	253.8 - 268.6	3820071	8685	117	8568	227.4	3.2	221 - 233.7	224.3	3.2	218 - 230.6	3614115	7981	139	7842	220.8	3.2	214.6 - 227	217	3.1	210.8 - 223.1
Non-Hispanic Black	173897	544	11	533	312.8	18.1	277.4 - 348.3	306.5	17.9	271.4 - 341.6	184933	531	7	524	287.1	16.5	254.8 - 319.5	283.3	16.3	251.3 - 315.4	172249	466	6	460	270.5	16.8	237.5 - 303.6	267.1	16.7	234.4 - 299.8
Hispanic	562388	668	16	652	118.8	5.7	107.6 - 130	115.9	5.6	104.9 - 126.9	584786	652	18	634	111.5	5.9	99.9 - 123.1	108.4	5.9	96.9 - 119.9	538902	629	6	623	116.7	5.6	105.7 - 127.7	115.6	5.6	104.7 - 126.5
Other	406539	583	8	575	143.4	8	127.7 - 159.1	141.4	8	125.8 - 157	405869	499	3	496	122.9	6.8	109.6 - 136.3	122.2	6.8	108.9 - 135.5	336484	497	10	487	147.7	9	130.1 - 165.3	144.7	9	127.2 - 162.3
Unknown/Missing	1907817	5378	65	5313	281.9	5.4	271.3 - 292.5	278.5	5.4	267.9 - 289.1	2295433	5566	58	5508	242.5	4.4	233.8 - 251.1	240	4.4	231.4 - 248.5	2489433	5596	69	5527	224.8	4	216.9 - 232.7	222	4	214.2 - 229.8

Table F2: Ambulatory Care Sensitive Emergency Department Visits for Non-Traumatic Dental Conditions in Adults Measure Scores- IA DENTAL WELLNESS PLAN

DWP	2015										2016									
	Den	Total NTDC Related ED Visits	Total Inpatient Admissions	Total Discharged	Rate 1 (Total NTDC/ Den)	Stadard Deviation	95% Confidence Interval	Rate 2 (Total Discharged/ Den- Excludes Inpatient Admissions)	Stadard Deviation	95% Confidence Interval	Den	Total NTDC Related ED Visits	Total Inpatient Admissions	Total Discharged	Rate 1 (Total NTDC/ Den)	Stadard Deviation	95% Confidence Interval	Rate 2 (Total Discharged/ Den- Excludes Inpatient Admissions)	Stadard Deviation	95% Confidence Interval
TOTAL	**1724682**	**3852**	**44**	**3808**	**223**			**221**			**1852291**	**5070**	**61**	**5009**	**274**			**270**		
Age																				
18	61	0	0	0	0	0	[0, 0]	0	0	[0, 0]	34	4	0	4	11765	7454	[-3144, 26673]	11765	7454	[-3144, 26673]
19-20	138796	200	1	199	144	12	[120, 168]	143	12	[119, 168]	156707	269	2	267	172	18	[136, 207]	170	18	[135, 206]
21-24	208882	565	3	562	270	15	[241, 300]	269	15	[239, 299]	220504	710	6	704	322	16	[290, 354]	319	16	[288, 351]
25-34	464818	1600	17	1583	344	11	[321, 367]	341	11	[318, 363]	503366	2125	21	2104	422	13	[395, 449]	418	14	[391, 445]
35-44	341100	889	11	878	261	12	[236, 285]	257	12	[233, 282]	367643	1128	19	1109	307	13	[281, 333]	302	13	[276, 327]
45-54	334376	452	9	443	135	8	[120, 150]	132	8	[117, 148]	346629	611	10	601	176	9	[159, 193]	173	9	[156, 190]
55-64	236616	146	3	143	62	6	[50, 74]	60	6	[49, 72]	257392	223	3	220	87	7	[72, 101]	85	7	[71, 100]
65-74	33	0	0	0	0	0	[0, 0]	0	0	[0, 0]	16	0	0	0	0	0	[0, 0]	0	0	[0, 0]
75-84																				
85+																				
Unknown/Missing																				
Sex																				
Female	926279	2005	18	1987	216	6	[204, 229]	215	6	[202, 227]	989567	2541	31	2510	257	7	[243, 271]	254	7	[240, 268]
Male	798403	1847	26	1821	231	7	[217, 246]	228	7	[214, 242]	862724	2529	30	2499	293	8	[276, 310]	290	8	[273, 306]
Unknown/Missing																				
Geographic Location																				
Urban	1133392	2517	34	2483	222	6	[210, 234]	219	6	[207, 231]	1219016	3352	40	3312	275	7	[261, 289]	272	7	[258, 285]
Rural	589594	1332	10	1322	226	8	[210, 242]	224	8	[208, 240]	631706	1712	19	1693	271	9	[254, 288]	268	9	[251, 285]
Unknown/Missing	1696	3	0	3	177	129	[-80, 434]	177	129	[-80, 434]	1569	6	2	4	382	233	[-83, 848]	255	176	[-97, 607]
Race/Ethnicity																				
Non-Hispanic White	1166521	2863	33	2830	245	6	[233, 258]	243	6	[231, 255]	1237621	3573	46	3527	289	7	[275, 303]	285	7	[271, 299]
Non-Hispanic Black	139721	378	4	374	271	17	[237, 304]	268	17	[234, 301]	152162	558	4	554	367	20	[327, 406]	364	20	[325, 403]
Hispanic	87724	116	2	114	132	16	[101, 164]	130	16	[99, 161]	100139	197	4	193	197	19	[159, 235]	193	19	[155, 230]
Other	90003	157	1	156	174	18	[139, 209]	173	17	[139, 208]	100833	200	0	200	198	23	[152, 245]	198	23	[152, 245]
Unknown/Missing	240713	338	4	334	140	10	[119, 161]	139	11	[118, 160]	261536	542	7	535	207	11	[185, 229]	205	11	[183, 226]

Table F3: Ambulatory Care Sensitive Emergency Department Visits for Non-Traumatic Dental Conditions in Adults Measure Scores- IOWA MEDICAID - FAMILY MEDICAL ASSISTANCE PROGRAM (FMAP)

FMAP	2015										2016									
	Den	Total NTDC Related ED Visits	Total Inpatient Admissions	Total Discharged	Rate 1 (Total NTDC/ Den)	Stadard Deviation	95% Confidence Interval	Rate 2 (Total Discharged/ Den- Excludes Inpatient Admissions)	Stadard Deviation	95% Confidence Interval	Den	Total NTDC Related ED Visits	Total Inpatient Admissions	Total Discharged	Rate 1 (Total NTDC/ Den)	Stadard Deviation	95% Confidence Interval	Rate 2 (Total Discharged/ Den- Excludes Inpatient Admissions)	Stadard Deviation	95% Confidence Interval
TOTAL	**595811**	**1560**	**15**	**1545**	**262**			**259**			**573965**	**1789**	**11**	**1778**	**312**			**310**		
Age																				
18	12394	8	0	8	65	25	[15, 115]	65	25	[15, 115]	3894	0	0	0	0	0	[0, 0]	0	0	[0, 0]
19-20	21982	47	0	47	214	35	[145, 283]	214	35	[145, 283]	19198	41	0	41	214	35	[144, 283]	214	35	[144, 283]
21-24	84100	302	4	298	359	27	[305, 413]	354	27	[300, 408]	78051	289	0	289	370	28	[314, 427]	370	28	[314, 427]
25-34	255109	848	7	841	332	15	[302, 363]	330	15	[299, 360]	248403	958	8	950	386	17	[352, 420]	382	17	[349, 416]
35-44	160612	291	2	289	181	14	[153, 210]	180	14	[152, 208]	160295	414	3	411	258	17	[225, 292]	256	17	[223, 290]
45-54	52295	59	2	57	113	16	[81, 145]	109	16	[78, 140]	53877	76	0	76	141	19	[102, 180]	141	20	[102, 180]
55-64	9312	5	0	5	54	23	[7, 101]	54	24	[7, 101]	10229	11	0	11	108	39	[29, 186]	108	39	[29, 186]
65-74	7	0	0	0	0	0	[0, 0]	0	0	[0, 0]	18	0	0	0	0	0	[0, 0]	0	0	[0, 0]
75-84																				
85+																				
Unknown/Missing																				
Sex																				
Female	468357	1273	11	1262	272	10	[252, 292]	269	10	[250, 289]	444587	1426	11	1415	321	11	[298, 343]	318	11	[296, 341]
Male	144384	298	4	294	206	16	[174, 239]	204	16	[172, 235]	129378	363	0	363	281	19	[242, 319]	281	19	[242, 319]
Unknown/Missing																				
Geographic Location																				
Urban	398478	1029	12	1017	258	11	[237, 280]	255	11	[234, 276]	369603	1167	6	1161	316	13	[290, 341]	314	13	[289, 340]
Rural	213625	541	3	538	253	14	[225, 281]	252	14	[224, 280]	203932	620	5	615	304	15	[274, 334]	302	15	[272, 331]
Unknown/Missing	638	1	0	1	157	153	[-148, 462]	157	153	[-148, 462]	430	2	0	2	465	451	[-437, 1368]	465	451	[-437, 1368]
Race/Ethnicity																				
Non-Hispanic White	402419	1155	9	1146	287	11	[264, 310]	285	11	[262, 307]	372628	1279	9	1270	343	13	[317, 370]	341	13	[314, 367]
Non-Hispanic Black	67979	217	0	217	319	27	[264, 374]	319	28	[264, 374]	64750	231	0	231	357	27	[303, 410]	357	27	[303, 410]
Hispanic	36876	39	1	38	106	20	[67, 145]	103	20	[64, 142]	36093	63	1	62	175	25	[125, 224]	172	24	[124, 219]
Other	35562	60	1	59	169	26	[116, 221]	166	26	[114, 218]	33304	77	0	77	231	33	[164, 298]	231	34	[164, 298]
Unknown/Missing	69905	100	4	96	143	16	[111, 175]	137	16	[106, 169]	67190	139	1	138	207	21	[165, 248]	205	21	[164, 247]

Table F4: Ambulatory Care Sensitive Emergency Department Visits for Non-Traumatic Dental Conditions in Adults Measure Scores- IOWA MEDICAID - SUPPLEMENTAL SECURITY INCOME (SSI)

SSI	2015										2016									
	Den	Total NTDC Related ED Visits	Total Inpatient Admissions	Total Discharged	Rate 1 (Total NTDC/ Den)	Stadard Deviation	95% Confidence Interval	Rate 2 (Total Discharged/ Den- Excludes Inpatient Admissions)	Stadard Deviation	95% Confidence Interval	Den	Total NTDC Related ED Visits	Total Inpatient Admissions	Total Discharged	Rate 1 (Total NTDC/ Den)	Stadard Deviation	95% Confidence Interval	Rate 2 (Total Discharged/ Den- Excludes Inpatient Admissions)	Stadard Deviation	95% Confidence Interval
TOTAL	**252143**	**588**	**8**	**580**	**233**			**230**			**248459**	**752**	**17**	**735**	**303**			**296**		
Age																				
18	7025	6	0	6	85	39	[7, 164]	85	39	[7, 164]	3509	8	0	8	228	97	[35, 421]	228	97	[35, 421]
19-20	12653	20	0	20	158	42	[74, 242]	158	42	[74, 242]	12634	28	0	28	222	47	[127, 316]	222	47	[127, 316]
21-24	22618	65	2	63	287	43	[201, 374]	279	43	[193, 364]	22351	80	0	80	358	50	[258, 458]	358	50	[258, 458]
25-34	42764	180	2	178	421	38	[345, 497]	416	37	[342, 491]	43459	228	4	224	525	46	[433, 616]	515	45	[425, 606]
35-44	37189	129	1	128	347	37	[272, 421]	344	37	[270, 418]	36758	147	4	143	400	43	[314, 486]	389	41	[307, 471]
45-54	59321	134	2	132	226	26	[173, 279]	223	26	[170, 275]	56310	163	6	157	289	30	[229, 350]	279	29	[220, 337]
55-64	70365	54	1	53	77	11	[55, 98]	75	11	[54, 97]	73172	97	3	94	133	21	[91, 174]	128	20	[88, 169]
65-74	208	0	0	0	0	0	[0, 0]	0	0	[0, 0]	266	1	0	1	376	363	[-351, 1103]	376	364	[-351, 1103]
75-84																				
85+																				
Unknown/Missing																				
Sex																				
Female	130406	315	5	310	242	17	[208, 275]	238	17	[205, 271]	127988	375	6	369	293	19	[255, 331]	288	19	[250, 326]
Male	124721	274	3	271	220	16	[187, 253]	217	16	[185, 250]	120471	377	11	366	313	23	[268, 358]	304	22	[260, 348]
Unknown/Missing																				
Geographic Location																				
Urban	165253	402	7	395	243	15	[213, 274]	239	15	[209, 269]	161117	490	9	481	304	18	[268, 340]	299	18	[263, 334]
Rural	89166	182	1	181	204	18	[168, 240]	203	18	[167, 239]	86650	252	8	244	291	25	[241, 341]	282	24	[233, 330]
Unknown/Missing	708	5	0	5	706	356	[-6, 1419]	706	356	[-6, 1419]	692	10	0	10	1445	674	[97, 2793]	1445	674	[97, 2793]
Race/Ethnicity																				
Non-Hispanic White	161261	355	6	349	220	14	[192, 248]	216	14	[189, 244]	157881	479	9	470	303	19	[266, 341]	298	18	[261, 334]
Non-Hispanic Black	30720	120	0	120	391	52	[287, 494]	391	52	[287, 494]	30036	129	2	127	429	49	[332, 527]	423	48	[327, 519]
Hispanic	4795	5	0	5	104	45	[13, 195]	104	46	[13, 195]	4842	16	0	16	330	130	[70, 591]	330	130	[70, 591]
Other	5542	14	0	14	253	86	[81, 425]	253	86	[81, 425]	5657	21	0	21	371	112	[146, 596]	371	113	[146, 596]
Unknown/Missing	52809	95	2	93	180	20	[140, 220]	176	20	[137, 216]	50043	107	6	101	214	28	[159, 269]	202	26	[150, 254]

Table F5: Follow-up after Emergency Department Visits for Non-Traumatic Dental Conditions in Adults- OREGON MEDICAID

	2014									2015									2016								
	Den	7 days followup	30 days followup	Rate 7 days followup	SE	95%CI	Rate 30 days followup	SE	95%CI	Den	7 days followup	30 days followup	Rate 7 days followup	SE	95%CI	Rate 30 days followup	SE	95%CI	Den	7 days followup	30 days followup	Rate 7 days followup	SE	95%CI	Rate 30 days followup	SE	95%CI
TOTAL	**14938**	**2953**	**4483**	**19.8**	**0.33**	**19.1 - 20.4**	**30.0**	**0.37**	**29.3 - 30.7**	**14505**	**2869**	**4333**	**19.8**	**0.33**	**19.1 - 20.4**	**29.9**	**0.38**	**29.1 - 30.6**	**13845**	**2905**	**4252**	**21.0**	**0.35**	**20.3 - 21.7**	**30.7**	**0.39**	**29.9 - 31.5**
Age																											
18	222	50	75	22.5	2.8	17 - 28	33.8	3.17	27.6 - 40	232	39	68	16.8	2.46	12 - 21.6	29.3	2.99	23.5 - 35.2	217	45	65	20.7	2.75	15.3 - 26.1	30.0	3.11	23.9 - 36
19-20	287	57	78	19.9	2.35	15.2 - 24.5	27.2	2.63	22 - 32.3	272	54	85	19.9	2.42	15.1 - 24.6	31.3	2.81	25.7 - 36.8	251	53	69	21.1	2.58	16.1 - 26.2	27.5	2.82	22 - 33
21-24	1821	352	520	19.3	0.93	17.5 - 21.1	28.6	1.06	26.5 - 30.6	1873	360	533	19.2	0.91	17.4 - 21	28.5	1.04	26.4 - 30.5	1535	299	432	19.5	1.01	17.5 - 21.5	28.1	1.15	25.9 - 30.4
25-34	6470	1260	1910	19.5	0.49	18.5 - 20.4	29.5	0.57	28.4 - 30.6	6100	1198	1793	19.6	0.51	18.6 - 20.6	29.4	0.58	28.3 - 30.5	5992	1251	1813	20.9	0.53	19.8 - 21.9	30.3	0.59	29.1 - 31.4
35-44	3369	655	994	19.4	0.68	18.1 - 20.8	29.5	0.79	28 - 31	3252	612	956	18.8	0.69	17.5 - 20.2	29.4	0.8	27.8 - 31	3144	671	982	21.3	0.73	19.9 - 22.8	31.2	0.83	29.6 - 32.9
45-54	1994	406	638	20.4	0.9	18.6 - 22.1	32.0	1.04	29.9 - 34	1930	427	633	22.1	0.94	20.3 - 24	32.8	1.07	30.7 - 34.9	1827	386	578	21.1	0.96	19.3 - 23	31.6	1.09	29.5 - 33.8
55-64	734	168	258	22.9	1.55	19.8 - 25.9	35.1	1.76	31.7 - 38.6	805	174	251	21.6	1.45	18.8 - 24.5	31.2	1.63	28 - 34.4	822	192	295	23.4	1.48	20.5 - 26.3	35.9	1.67	32.6 - 39.2
65-74	40	5	10	12.5	5.23	2.3 - 22.7	25.0	6.85	11.6 - 38.4	37	3	12	8.1	4.49	-0.7 - 16.9	32.4	7.7	17.3 - 47.5	54	6	16	11.1	4.28	2.7 - 19.5	29.6	6.21	17.5 - 41.8
75-84										3	2	2	66.7	27.22	13.3 - 120	66.7	27.22	13.3 - 120	3	2	2	66.7	27.22	13.3 - 120	66.7	27.22	13.3 - 120
85+	1									1																	
Sex																											
Female	8151	1688	2576	20.7	0.45	19.8 - 21.6	31.6	0.51	30.6 - 32.6	7799	1674	2533	21.5	0.46	20.6 - 22.4	32.5	0.53	31.4 - 33.5	7455	1688	2479	22.6	0.48	21.7 - 23.6	33.3	0.55	32.2 - 34.3
Male	6787	1265	1907	18.6	0.47	17.7 - 19.6	28.1	0.55	27 - 29.2	6706	1195	1800	17.8	0.47	16.9 - 18.7	26.8	0.54	25.8 - 27.9	6390	1217	1773	19.0	0.49	18.1 - 20	27.7	0.56	26.6 - 28.8
Geographic Location																											
Urban	11193	2226	3370	19.9	0.38	19.1 - 20.6	30.1	0.43	29.3 - 31	10939	2239	3320	20.5	0.39	19.7 - 21.2	30.4	0.44	29.5 - 31.2	10127	2178	3129	21.5	0.41	20.7 - 22.3	30.9	0.46	30 - 31.8
Rural	3589	694	1062	19.3	0.66	18 - 20.6	29.6	0.76	28.1 - 31.1	3404	595	962	17.5	0.65	16.2 - 18.8	28.3	0.77	26.7 - 29.8	3545	701	1078	19.8	0.67	18.5 - 21.1	30.4	0.77	28.9 - 31.9
Unknown/Missing	156	33	51	21.2	3.27	14.7 - 27.6	32.7	3.76	25.3 - 40.1	162	35	51	21.6	3.23	15.3 - 27.9	31.5	3.65	24.3 - 38.6	173	26	45	15.0	2.72	9.7 - 20.4	26.0	3.34	19.5 - 32.5
Race/Ethnicity																											
Non-Hispanic White	8434	1631	2496	19.3	0.43	18.5 - 20.2	29.6	0.5	28.6 - 30.6	7917	1504	2310	19.0	0.44	18.1 - 19.9	29.2	0.51	28.2 - 30.2	7272	1520	2217	20.9	0.48	20 - 21.8	30.5	0.54	29.4 - 31.5
Non-Hispanic Black	497	100	144	20.1	1.8	16.6 - 23.6	29.0	2.03	25 - 33	481	102	142	21.2	1.86	17.6 - 24.9	29.5	2.08	25.4 - 33.6	418	91	128	21.8	2.02	17.8 - 25.7	30.6	2.25	26.2 - 35
Hispanic	594	136	204	22.9	1.72	19.5 - 26.3	34.3	1.95	30.5 - 38.2	588	127	188	21.6	1.7	18.3 - 24.9	32.0	1.92	28.2 - 35.7	575	142	192	24.7	1.8	21.2 - 28.2	33.4	1.97	29.5 - 37.2
Other	536	120	164	22.4	1.8	18.9 - 25.9	30.6	1.99	26.7 - 34.5	444	86	135	19.4	1.88	15.7 - 23	30.4	2.18	26.1 - 34.7	454	104	147	22.9	1.97	19 - 26.8	32.4	2.2	28.1 - 36.7
Unknown/Missing	4877	966	1475	19.8	0.57	18.7 - 20.9	30.2	0.66	29 - 31.5	5075	1050	1558	20.7	0.57	19.6 - 21.8	30.7	0.65	29.4 - 32	5126	1048	1568	20.4	0.56	19.3 - 21.5	30.6	0.64	29.3 - 31.9

Table F6. Measure Scores: Adults with Diabetes – Oral Evaluation

	OREGON MEDICAID									
	2015					2016				
	Den	Num	Rate	SD	95% Confidence Interval	Den	Num	Rate	SD	95% Confidence Interval
TOTAL	**35903**	**8262**	**23.01**	**42.09**	**22.58-23.45**	**35753**	**8823**	**24.68**	**43.11**	**24.23-25.12**
Age										
18	142	37	26.06	43.89	18.84-33.28	172	46	26.74	44.26	20.13-33.36
19-20	139	26	18.71	39	12.22-25.19	150	37	24.67	43.11	17.77-31.57
21-24	729	173	23.73	42.54	20.64-26.82	719	152	21.14	40.83	18.16-24.12
25-34	3424	810	23.66	42.5	22.23-25.08	3384	843	24.91	43.25	23.45-26.37
35-44	6282	1531	24.37	42.93	23.31-25.43	6214	1546	24.88	43.23	23.8-25.95
45-54	10769	2456	22.81	41.96	22.01-23.6	10562	2572	24.35	42.92	23.53-25.17
55-64	13424	3034	22.6	41.82	21.89-23.31	13562	3398	25.06	43.33	24.33-25.78
65-74	885	174	19.66	39.74	17.04-22.28	860	212	24.65	43.1	21.77-27.53
75-80	97	19	19.59	39.69	11.69-27.49	115	13	11.3	31.66	5.52-17.09
85+	12	2	16.67	37.27	0-37.75	15	4	26.67	44.22	4.29-49.05
Sex										
Female	20456	5010	24.49	43	23.9-25.08	20409	5320	26.07	43.9	25.46-26.67
Male	15447	3252	21.05	40.77	20.41-21.7	15344	3503	22.83	41.97	22.17-23.49
Geographic Location										
Urban	27655	6605	23.88	42.64	23.38-24.39	27417	6991	25.5	43.59	24.98-26.01
Rural	7801	1532	19.64	39.73	18.76-20.52	7837	1701	21.7	41.22	20.79-22.62
Unknown/Missing	447	125	27.96	44.88	23.8-32.12	499	131	26.25	44	22.39-30.11
Race/Ethnicity										
Non-Hispanic White	19428	4261	21.93	41.38	21.35-22.51	18589	4370	23.51	42.41	22.9-24.12
Non-Hispanic Black	1325	372	28.08	44.94	25.66-30.5	1351	348	25.76	43.73	23.43-28.09
Hispanic	3398	801	23.57	42.45	22.15-25	3047	808	26.52	44.14	24.95-28.09
Other	2398	613	25.56	43.62	23.82-27.31	2109	591	28.02	44.91	26.11-29.94
Unknown/Missing	9354	2215	23.68	42.51	22.82-24.54	10657	2706	25.39	43.53	24.57-26.22

2016	Dental Wellness Plan					Medicaid-FMAP					Medicaid-SSI				
	Den	Num	Rate	95% CI	SD	Den	Num	Rate	95% CI	SD	Den	Num	Rate	95% CI	SD
TOTAL	**9,950**	**3,392**	**34.1%**	**33-35%**	**0.47**	**1877**	**568**	**30.3%**	**28-32%**	**0.46**	**3,619**	**880**	**24.3%**	**25-28%**	**0.43**
Age															
18	0	0				0	0				0	0			
19-20	120	38	32%	23-40%	0.46	12	2	17%	-4-38%	0.39	26	9	35%	16-53%	0.49
21-24	220	73	33%	27-39%	0.47	44	13	30%	16-43%	0.46	43	11	26%	13-39%	0.44
25-34	908	287	32%	29-35%	0.47	384	131	34%	29-39%	0.48	199	62	31%	25-38%	0.46
35-44	1,889	650	34%	32-37%	0.48	803	236	29%	26-33%	0.46	441	107	24%	20-28%	0.43
45-54	3,335	1,139	34%	33-36%	0.47	491	152	31%	27-35%	0.46	1,121	280	25%	22-28%	0.43
55-64	3,476	1,205	35%	33-36%	0.48	143	34	24%	17-31%	0.43	1,784	411	23%	21-25%	0.42
65-74	2	0									5	0			
75-80															
85+															
Sex															
Female	5,285	1,955	37%	35-39%	0.48	1,316	425	32%	30-35%	0.47	2,187	558	24-27%	25-29%	0.44
Male	4,665	1,437	31%	28-33%	0.46	561	143	25%	22-33%	0.44	1,432	322	20-25%	23-28%	0.42
Geographic Location															
Urban	6,439	2,242	35%	34-36%	0.48	1,253	397	32%	29-34%	0%	2,328	572	25%	23-26%	0.43
Rural	3,503	1,148	33%	31-34%	0.47	624	171	27%	24-31%	0.45	1,282	305	24%	21-26%	0.43
Unknown/ Missing	8	2	25%	-5-55%	0.46	0	0	NA	NA	NA	9	3	33%	3-64%	0.50
Race/Ethnicity															
Non-Hispanic White	6,490	2,125	33%	32-34%	0.47	1,116	335	30%	27-33%	0.46	2,326	553	24%	22-26%	0.43
Non-Hispanic Black	761	261	34%	31-38%	0.48	246	71	29%	23-53%	0.45	448	135	30%	26-34%	0.46
Hispanic	698	303	43%	40-47%	0.50	141	56	40%	32-48%	0.49	72	21	29%	19-40%	0.46
Other	440	165	38%	33-42%	0.49	117	36	31%	22-39%	0.46	87	15	17%	9-25%	0.38
Unknown/ Missing	1,561	538	34%	32-37%	0.48	257	70	27%	22-33%	0.45	686	156	23%	20-26%	0.42

2015	DWP					FMAP					SSI				
	DEN	NUM	RATE	95% CI	SD	DEN	NUM	RATE	95% CI	SD	DEN	NUM	RATE	95% CI	SD
TOTAL	8390	2777	33.1%	32-34%	0.471	1461	431	29.5%	27-32%	0.456	3138	820	26.1%	25-28%	0.439
Age															
18	0	0	0%			16	3	19%	0-38%	0.403	10	6	60%	30-90%	0.516
19-20	110	35	32%	23-41%	0.428	8	6	75%	45-105%	0.463	19	6	32%	11-52%	0.478
21-24	218	52	24%	18-30%	0.427	37	12	32%	17-48%	0.475	41	16	39%	24-54%	0.494
25-34	804	256	32%	29-35%	0.466	299	90	30%	25-35%	0.459	170	63	37%	30-44%	0.484
35-44	1630	530	33%	31-35%	0.469	601	175	29%	25-33%	0.455	387	102	26%	22-31%	0.441
45-54	2802	957	34%	32-36%	0.474	394	113	29%	24-33%	0.453	1008	267	26%	24-29%	0.441
55-64	2822	945	33%	31-35%	0.472	106	32	30%	21-39%	0.461	1497	359	24%	22-26%	0.427
65-74	4	2	50%	-13-79%	0.577	0	0	N/A			6	1	17%	-13-46%	0.408
75-84	0	0	N/A			0	0	N/A			0	0	N/A		
85+	0	0	N/A			0	0	N/A			0	0	N/A		
Unknown/Missin	0	0	N/A			0	0	N/A			0	0	N/A		
Sex															
Female	4499	1584	35%	34-37%	0.478	1013	307	30%	27-33%	0.46	1895	503	27%	25-29%	0.448
Male	3891	1193	31%	29-32%	0.461	448	124	28%	24-32%	0.448	1243	317	26%	23-28%	0.436
Unknown/Missing	0	0	N/A	N/A		0	0	N/A			0	0	N/A		
Geographic Location															
Urban	5534	1810	33%	31-34%	0.469	956	291	30%	28-33%	0.46	1989	515	26%	24-28%	0.438
Rural	2851	964	34%	32-36%	0.473	505	140	28%	24-32%	0.448	1142	305	27%	24-29%	0.443
Unknown/Missing	5	3	60%	17-103%	0.548	0	0	N/A	N/A		7	0			
Race/Ethnicity															
Non-Hispanic White	5433	1773	33%	31-34%	0.469	897	264	29%	26-32%	0.456	2048	531	26%	24-28%	0.438
Non-Hispanic Black	673	215	32%	28-35%	0.467	181	46	25%	19-32%	0.437	373	103	28%	23-32%	0.448
Hispanic	561	216	39%	34-43%	0.487	121	49	40%	32-49%	0.493	60	19	32%	20-43%	0.469
Other	367	121	33%	28-38%	0.471	93	28	30%	21-39%	0.461	57	20	35%	23-47%	0.481
Unknown/Missing	1356	452	33%	31-36%	0.472	169	44	26%	19-33%	0.44	600	147	25%	21-28%	0.430

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Research Team

University of California San Francisco
Eni Obadan-Udoh, DDS, MPH, DMSc
Matthew Jura
Alfa-Ibrahim Yansane, PhD

University of Iowa
Susan McKernan, DMD, MS, PhD
Elizabeth Momany, PhD
Peter Damiano, DDS, MPH
Jason Wachsmuth

Oregon Health & Science University
Richie Kohli, BDS, MS (DPH)
Harjit Sehgal, BDS, MS (FAGE)
Garima Arora, BDS
Timothy Kilgore

Dental Quality Alliance Measures Development and Maintenance Committee

Craig W. Amundson, DDS, General Dentist, HealthPartners, National Association of Dental Plans. Dr. Amundson serves as chair for the Committee.

Mark Casey, DDS, MPH, Dental Director, North Carolina Department of Health and Human Services Division of Medical Assistance

Natalia Chalmers, DDS, PhD, Diplomate, American Board of Pediatric Dentistry, Dental Officer, Center for Drug Evaluation and Research, Division of Dermatology and Dental Products, U.S. Food and Drug Administration

Frederick Eichmiller, DDS, Vice President & Science Officer, Delta Dental of Wisconsin

Chris Farrell, RDH, BSDH, MPA, Oral Health Program Director, Michigan Department of Health and Human Services

Gretchen Gibson DDS, MPH, Director, Oral Health Quality Group, VHACO Office of Dentistry, Veterans Health Care System of the Ozarks (VHSO)

DQA Executive Committee Liaison to the MDMC
Cary J Limberakis, DMD, ADA/ Council on Dental Practice

DQA Leadership
Allen Moffitt, DMD, Orthodontist, 2019 Chair, Dental Quality Alliance

Mark Koday, DDS, 2019 Chair-Elect, Dental Quality Alliance

The Committee was supported by:
Krishna Aravamudhan, BDS, MS, Sr. Director, ADA/ Center for Dental Benefits, Coding and Quality

Jill Boylston Herndon, PhD, Methodology Consultant to the DQA; Managing Member and Principal, Key Analytics and Consulting

Diptee Ojha, BDS, PhD, Senior Manager, ADA/ Office of Quality Assessment and Improvement

Lauren Kirk, BS. Coordinator, ADA/ Office of Quality Assessment and Improvement