

**Guidance on Assessing Emergency Department Data for Non-Traumatic Dental Conditions**

**July 2017 (updated September 2017)**

***Due to the technical nature of this topic, this information will be most helpful to dental directors, data analysts, epidemiologists and statisticians.***

**Does your state want to assess the use of emergency departments for non-traumatic dental conditions?**

If yes, then you probably have questions about data sources, indicators of interest, diagnostic codes, analysis methods, target populations and potential predictive factors. The purpose of this document is to provide a standardized framework for how state oral health programs (SOHPs) should evaluate and document the use of emergency departments (EDs) for non-traumatic dental conditions (NTDCs). By following this guidance, SOHPs will be able to compare their ED data to information from other states and have the ability to assess trends in ED use over time. While the focus of this guidance is the generation of state specific estimates using statewide ED discharge databases, the recommended codes and analysis techniques can be used for databases that are specific to a local community (e.g., hospital service area) or target population (e.g., Medicaid). This guidance is an abbreviated version of the ASTDD report, [*Recommended Guidelines for Surveillance of Non-Traumatic Dental Care in Emergency Departments*](https://www.astdd.org/docs/ed-dental-care-protocols-w-appendices-july-6-2017.docx)*.* If you need more detailed information, including previously published research, please refer to [*Recommended Guidelines for Surveillance of Non-Traumatic Dental Care in Emergency Departments*](https://www.astdd.org/docs/ed-dental-care-protocols-w-appendices-july-6-2017.docx)and its companion report, [*Methods of Assessing Non-Traumatic Dental Care in Emergency Departments*](http://www.astdd.org/docs/ed-dental-care-report-jan-2016.docx)*.*

**Where do I get state specific ED discharge data?**

In general, there are two sources for state specific ED data: (1) the [State Emergency Department Databases](https://www.hcup-us.ahrq.gov/seddoverview.jsp) (SEDD) and (2) other state ED databases.

*State Emergency Department Databases*

The SEDD are a set of databases and software tools developed for the Agency for Healthcare Research and Quality’s [Healthcare Cost and Utilization Project](https://www.hcup-us.ahrq.gov/overview.jsp) (HCUP). The SEDD capture emergency visits at hospital-affiliated EDs that do not result in hospitalization. The SEDD files include all patients, regardless of payer, providing a unique view of ED care in a state over time. As of July 2017, [35 states](https://www.hcup-us.ahrq.gov/partners.jsp?SEDD) participate in the SEDD. The SEDD contain a large number of clinical and non-clinical variables included in a hospital discharge abstract, such as:

* All-listed diagnoses and procedures
* Patient demographic characteristics (e.g., sex, age and, for some states, race)
* Expected payment source
* Total charges.

Variables included in the SEDD are not always available for all states; refer to [Availability of Data Elements by Year](https://www.hcup-us.ahrq.gov/db/state/sedddist/sedddist_ddeavailbyyear.jsp) for additional information on which variables are available for your state. SEDD releases can be purchased through the [HCUP Central Distributor](https://www.hcup-us.ahrq.gov/tech_assist/centdist.jsp). Costs vary by state; for 2014 they ranged from $50 to $3,200. Data for earlier years are often available at a lower cost.

*Other State ED Databases*

If your state does not participate in the SEDD, there may be another source for statewide ED data. ASTDD recommends that SOHPs discuss the issue of use of EDs for NTDCs with your state health officer and determine if SEDD or another state ED discharge database is available for analysis. The recommendations and methods presented in this document should be generally applicable to both SEDD and non-SEDD state ED discharge databases.

**What diagnostic codes should we use?**

Based on the ICD-9 and ICD-10 diagnostic codes, ASTDD has created two broad categories for ***ED visit due to an oral condition***: (1) non-traumatic dental condition (NTDC) and (2) caries, periodontal or associated preventive procedures (CPP). NTDC includes caries, periodontal disease, erosion, occlusal anomalies, cysts, impacted teeth, teething, and all other non-traumatic conditions associated with the oral cavity. Diagnoses that are deemed due to trauma are excluded from this definition. CPP includes only those conditions directly associated with dental caries, periodontal disease, or preventive procedures associated with these diseases that are routinely provided in a dental clinic setting. CPP would include diagnoses related to dental caries, gingival and periodontal conditions, loss of teeth (not due to trauma), endodontic conditions, and caries and periodontal related preventive procedures. The codes for NTDC are a subset of all oral and facial related codes, and the codes for CPP are a subset of the NTDC codes. Refer to Appendix 1 for a listing of the specific ICD-9 and ICD-10 codes for NTDC and CPP. If you want all oral and facial related codes and codes for NTDC and CPP as an Excel spreadsheet for easier use in data analysis, [click here](https://www.astdd.org/docs/ed-project-icd9-icd-10-conversion-table-july-6-2017.xlsx).

***To assure comparability between states, ASTDD recommends that all states use the ICD codes listed in Appendix 1.***

**IMPORTANT NOTE:** On October 1, 2015, the United States transitioned from using ICD-9 to ICD-10 code sets. The SEDD databases are annual, calendar-year files. The introduction of ICD-10 on October 1 means that the 2015 databases include a combination of codes: nine months of the data with ICD-9 codes (01-01-2015 to 09-30- 2015) and three months of data with ICD-10 codes (10-01-2015 to 12-31-2015). Therefore, for 2015, code sets determining ED oral condition visit outcomes will include both ICD-9 and ICD-10 codes. NOTE: The comparability of estimates across the ICD-9 to ICD-10 transition is uncertain and may potentially over- or under-estimate various indicators. ASTDD recommends keeping your analysis distinct to either ICD-9 or ICD-10, and using caution when comparing across the transition.

**Should I use the reason for visit codes or the diagnostic codes?**

The SEDD databases contain codes for reason for visit, often referred to as presenting complaint(s), plus codes for ED physician’s diagnoses, which may not necessarily match the patient’s reason(s) for visit. For example, a patient may have a presenting complaint of “chest pain” while the physician’s diagnosis is “hiatal hernia.” Since reason for visit and diagnosis provide valuable yet potentially different (patient vs. physician) information on ED use for NTDCs, ASTDD has developed indicators that assess both types of codes (refer to Table 1). Using both types of indicators can be especially important for ED discharge data having an oral related reason for visit without a corresponding oral related diagnostic code (or vice versa). NOTE: Some ED discharge databases may not contain code(s) for reason for visit.

**Should I evaluate first listed diagnosis or any listed diagnosis?**

An ED record may include multiple diagnostic codes. The first listed diagnosis is often considered to be the “primary” or most important diagnosis by the physician. For example, a patient may have a first listed diagnosis of a non-oral medical condition or a trauma related oral condition such as “dislocation of the jaw” and a second listed diagnosis of “unspecified gingival and periodontal disease.” If only the first listed diagnosis is included in the analysis, this patient would not be classified as having an ED visit for a NTDC. If all listed diagnoses are considered, this patient would be classified as having an ED visit for a NTDC. By using all diagnoses, untreated dental conditions presenting at an ED can be tracked, even if the condition was not the primary diagnosis for the ED visit. ASTDD has developed indicators that assess both first listed diagnosis and any listed diagnosis (refer to Table 1).

**What oral health indicators should we evaluate?**

Analyzing an ED database will allow you to evaluate a multitude of oral health indicators. Because the total number of indicators can be overwhelming, ASTDD has developed a core or foundational set of five indicators to include in a state ED-NTDC surveillance system. We encourage states to expand their ED-NTDC surveillance to include a wider variety of indicators and predictors based on the needs and resources of the individual state. For information on other potential indicators and predictors, refer to [*Recommended Guidelines for Surveillance of Non-Traumatic Dental Care in Emergency Department*](https://www.astdd.org/docs/ed-dental-care-protocols-w-appendices-july-6-2017.docx)*.* If you are interested in expanding your ED-NTDC surveillance system beyond the core set of five indicators and recommended predictors, Appendix 2 provides information on optional factors/analyses that you may want to consider.

Recommended indicators (refer to Table 1 for additional detail):

1. ED visit for NTDC based on ***first listed*** diagnosis
2. ED visit for NTDC based on ***any listed*** diagnosis
3. ED visit for NTDC based on ***first listed reason for visit***
4. ED visit for NTDC based on ***any listed reason for visit***
5. ED visit for NTDC based on ***any listed diagnosis and/or any listed reason for visit (most inclusive).***

Recommended reporting and stratification variables (refer to Table 2 for additional detail):

* For each of the five recommended indicators, ASTDD suggests that states report, ***at a minimum***:
  + Count – number of ED visits associated with specific outcome in a given year
  + Rate per 100,000 population using [Census Bureau population estimates](https://www2.census.gov/programs-surveys/popest/tables/2010-2016/state/totals/nst-est2016-01.xlsx)
    - Count divided by population multiplied by 100,000
    - It may not be possible to calculate rate per 100,000 population when data are stratified by primary payer or race/ethnicity
  + Rate per 10,000 ED visits
    - Count divided by total ED visits multiplied by 10,000
  + Total charges associated with each indicator (use SEDD variable – TOTCHG)
* States, ***at a minimum***, should report overall estimates plus estimates stratified by:
  + Age (< 20, 20-44, 45-64, 65+)
    - These age groups were selected because population estimates are readily available from the U.S. Census. As part of an expanded ED-NTDC surveillance system, states may opt to generate estimates for smaller age groupings.
  + Primary payer (Medicare, Medicaid, private insurance, uninsured, other)
    - NOTE: Information on the number of individuals with each payer type is not readily available. Because of this, it may not be possible to generate rate per 100,000 population.
  + Race/ethnicity if available (white, black, Hispanic, Asian/Pacific Islander, Native American, other)
    - NOTE: The SEDD coding for race does not align with the U.S. Census coding for race. Because of this, it is not possible to generate rate per 100,000 population.

Table 1: Recommended ED-NTDC indicators and the appropriate SEDD data elements

|  |  |  |  |
| --- | --- | --- | --- |
| Indicator | SEDD Data Element, ICD-9 | SEDD Data Element, ICD-10 | Comments/Notes |
| 1. NTDC 1st diagnosis | DX1 | I10\_DX1 | Include 1st listed diagnosis only |
| 1. NTDC any diagnosis | DXn | I10\_DXn | Include all listed diagnoses |
| 1. NTDC 1st reason visit | DX\_Visit\_Reason1 | I10\_Visit\_Reason1 | Include 1st listed reason only |
| 1. NTDC any reason visit | DX\_Visit\_Reasonn | I10\_Visit\_Reasonn | Include all listed reasons |
| 1. NTDC any diagnosis/visit | DXn & DX\_Visit\_Reasonn | I10\_DXn & I10\_Visit\_Reasonn | Include all listed diagnoses & reasons |

Table 2: Recommended ED-NTDC analysis and stratification factors with SEDD data element names

|  |  |  |
| --- | --- | --- |
| Description | SEDD Data Element | Comments/Notes |
| Total Charges | TOTCHG | Generally, TOTCHG does not include professional fees and non-covered charges. Refer to SEDD’s [state specific notes](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=totchg) for additional detail. |
| Age | AGE or AGEGROUP | Most states report age while some may only report by age group. |
| Primary payer | PAY1 | To ensure uniformity across states, PAY1 combines detailed categories into more general groups. Refer to SEDD’s [state specific notes](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=pay1) for additional detail. |
| Race/ethnicity  (if available) | RACE | HCUP coding includes race/ethnicity in one data element (RACE). If the state supplied race and ethnicity in separate data elements, ethnicity takes precedence over race in setting the HCUP value for race. Race is not available for all states. Refer to SEDD’s [state specific notes](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=race) . |

**What statistical software package and program code should I use?**

Any statistical software package can be used. If you are using a SEDD database, the HCUP Central Distributor provides load programs for SAS, SPSS and Stata. Refer to Appendix 3 for sample SAS code.

**Limitations and general issues to be aware of:**

* Some individuals may seek care for NTDCs at urgent care clinics rather than hospital-based EDs. ED discharge databases such as SEDD do not include information from urgent care clinics.
* SEDD ED discharge databases include information on patients that were discharged from the ED, but do not include information on patients that presented at the ED and were subsequently admitted to the hospital. Information about patients initially seen in the ED and then admitted to the hospital is included in the [State Inpatient Databases](https://www.hcup-us.ahrq.gov/sidoverview.jsp) (SID). SID can be used by states interested in assessing the increment of oral condition ED visits resulting in hospital admission.
* Some patients may live in one state but seek ED care in a bordering state; the resident state ED database will not capture information on patients obtaining cross-state care. If a state wants to determine the extent of cross-state care, the ED discharge database for the neighboring state can be evaluated using the SEDD variable for patient state (PSTATE).
* Many ED datasets use unique identifiers associated with an ED visit, not a specific person. Because of this, repeat visits by a person cannot be identified and the extent of repeat visits to EDs for the same oral problem cannot be quantified. Check individual states to determine if linking variables (VisitLink, DaysToEvent –see Appendix 2) are available to assess repeat visits.
* Drug-seeking behavior may result in oral pain given as the reason for visit, skewing the picture of true oral care in EDs.
* Refer to [*Recommended Guidelines for Surveillance of Non-Traumatic Dental Care in Emergency Departments*](https://www.astdd.org/docs/ed-dental-care-protocols-w-appendices-july-6-2017.docx)for a more complete description of limitations and concerns.

**Where can I get additional help?**

ASTDD may be able to help you with your analysis process. Please contact us if you have any questions.

Association of State & Territorial Dental Directors

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**Acknowledgements**

Supported by a generous grant from the DentaQuest Foundation. Contents are solely the responsibility of the authors and do not necessarily represent the official views of the DentaQuest Foundation. ASTDD would like to thank Michael Manz for researching and preparing ASTDD’s non-traumatic dental care in emergency department reports. In addition, ASTDD would like to thank Emanuel Alcala, Krishna Aravamudhan, Marlene Bengiamin, John Capitman, Donna Carden, Amber Costantino, Mary Foley, Donald Hayes, Renee Joskow, Rich Manski, Lynn Mouden, Junhie Oh, Kathy Phipps, Eli Schwarz, Scott L. Tomar, and David A. Williams for their assistance in the development and review of this guidance and Beverly Isman and Chris Wood for their editing skills.

**References and additional resources**

* [Recommended Guidelines for Surveillance of Non-Traumatic Dental Care in Emergency Departments](https://www.astdd.org/docs/ed-dental-care-protocols-w-appendices-july-6-2017.docx)
* [Methods of Assessing Non-Traumatic Dental Care in Emergency Departments](http://www.astdd.org/docs/ed-dental-care-report-jan-2016.docx)
* [Overview of the State Emergency Department Databases](https://www.hcup-us.ahrq.gov/seddoverview.jsp)

**Appendix 1**

**The Recommended ICD-9 and ICD-10 Codes for Defining NTDC and CPP**

| ICD- 9 Description | ICD-9 Code | ICD-10 Code | ICD-10 Description (if different) | NTDC | CPP |
| --- | --- | --- | --- | --- | --- |
| Anodontia | 5200 | K000 |  | NTDC |  |
| Supernumerary teeth | 5201 | K001 |  | NTDC |  |
| Abnormalities of size and form of teeth | 5202 | K002 |  | NTDC |  |
| Mottled teeth | 5203 | K003 |  | NTDC |  |
| Disturbances of tooth formation | 5204 | K004 |  | NTDC |  |
| Hereditary disturbances in tooth structure, not elsewhere classified | 5205 | K005 |  | NTDC |  |
| Disturbances in tooth eruption | 5206 | K006 | Disturbances in tooth eruption | NTDC |  |
| Disturbances in tooth eruption | 5206 | K010 | Embedded teeth | NTDC |  |
| Disturbances in tooth eruption | 5206 | K011 | Impacted teeth | NTDC |  |
| Teething syndrome | 5207 | K007 | Teething syndrome | NTDC |  |
| Other specified disorders of tooth development and eruption | 5208 | K008 | Other specified disorders of tooth development | NTDC |  |
| Unspecified disorder of tooth development and eruption | 5209 | K009 | Disorder of tooth development, unspecified | NTDC |  |
| Dental caries, unspecified | 52100 | K029 | Dental caries, unspecified | NTDC | CPP |
| Dental caries limited to enamel | 52101 | K0261 | Dental caries on smooth surface limited to enamel | NTDC | CPP |
| Dental caries extending into dentine | 52102 | K0262 | Dental caries on smooth surface penetrating into dentine | NTDC | CPP |
| Dental caries extending into pulp | 52103 | K0263 | Dental caries on smooth surface penetrating into pulp | NTDC | CPP |
| Arrested dental caries | 52104 | K023 | Arrested dental caries | NTDC | CPP |
| Odontoclasia | 52105 | K0389 | Other specified diseases of hard tissues of teeth | NTDC | CPP |
| Dental caries pit and fissure | 52106 | K0251 | Dental caries pit and fissure surface limited to enamel | NTDC | CPP |
| Dental caries of smooth surface | 52107 | K0261 | Dental caries on smooth surface limited to enamel | NTDC | CPP |
| Dental caries of smooth surface | 52107 | K0262 | Dental caries on smooth surface penetrating into dentine | NTDC | CPP |
| Dental caries of smooth surface | 52107 | K0263 | Dental caries on smooth surface penetrating into pulp | NTDC | CPP |
| Dental caries of root surface | 52108 | K027 | Dental root caries | NTDC | CPP |
| Other dental caries | 52109 | K029 | Dental caries, unspecified | NTDC | CPP |
| Excessive dental attrition, unspecified | 52110 | K030 | Excessive attrition of teeth | NTDC |  |
| Excessive attrition, limited to enamel | 52111 | K030 | Excessive attrition of teeth | NTDC |  |
| Excessive attrition, extending into dentine | 52112 | K030 | Excessive attrition of teeth | NTDC |  |
| Excessive attrition, extending into pulp | 52113 | K030 | Excessive attrition of teeth | NTDC |  |
| Excessive attrition, localized | 52114 | K030 | Excessive attrition of teeth | NTDC |  |
| Excessive attrition, generalized | 52115 | K030 | Excessive attrition of teeth | NTDC |  |
| Abrasion of teeth, unspecified | 52120 | K031 | Abrasion of teeth | NTDC |  |
| Abrasion, limited to enamel | 52121 | K031 | Abrasion of teeth | NTDC |  |
| Abrasion, extending into dentine | 52122 | K031 | Abrasion of teeth | NTDC |  |
| Abrasion, extending into pulp | 52123 | K031 | Abrasion of teeth | NTDC |  |
| Abrasion, localized | 52124 | K031 | Abrasion of teeth | NTDC |  |
| Abrasion, generalized | 52125 | K031 | Abrasion of teeth | NTDC |  |
| Erosion, unspecified | 52130 | K032 | Erosion of teeth | NTDC |  |
| Erosion, limited to enamel | 52131 | K032 | Erosion of teeth | NTDC |  |
| Erosion, extending into dentine | 52132 | K032 | Erosion of teeth | NTDC |  |
| Erosion, extending into pulp | 52133 | K032 | Erosion of teeth | NTDC |  |
| Erosion, localized | 52134 | K032 | Erosion of teeth | NTDC |  |
| Erosion, generalized | 52135 | K032 | Erosion of teeth | NTDC |  |
| Pathological resorption, unspecified | 52140 | K033 | Pathological resorption of teeth | NTDC |  |
| Pathological resorption, internal | 52141 | K033 | Pathological resorption of teeth | NTDC |  |
| Pathological resorption, external | 52142 | K033 | Pathological resorption of teeth | NTDC |  |
| Other pathological resorption | 52149 | K033 | Pathological resorption of teeth | NTDC |  |
| Hypercementosis | 5215 | K034 |  | NTDC |  |
| Ankylosis of teeth | 5216 | K035 |  | NTDC |  |
| Intrinsic posteruptive color changes of teeth | 5217 | K037 | Intrinsic posteruptive color changes of hard tissues of teeth | NTDC |  |
| Cracked tooth | 52181 | K0381 |  | NTDC | CPP |
| Other specific diseases of hard tissues of teeth | 52189 | K0389 |  | NTDC | CPP |
| Unspecified disease of hard tissues of teeth | 5219 | K039 | Disease of hard tissues of teeth, unspecified | NTDC | CPP |
| Pulpitis | 5220 | K040 |  | NTDC | CPP |
| Necrosis of the pulp | 5221 | K041 |  | NTDC | CPP |
| Pulp degeneration | 5222 | K042 |  | NTDC | CPP |
| Abnormal hard tissue formation in pulp | 5223 | K043 |  | NTDC |  |
| Acute apical periodontitis of pulpal origin | 5224 | K044 |  | NTDC | CPP |
| Periapical abscess without sinus | 5225 | K047 |  | NTDC | CPP |
| Chronic apical periodontitis | 5226 | K045 |  | NTDC | CPP |
| Periapical abscess with sinus | 5227 | K046 |  | NTDC | CPP |
| Radicular cyst | 5228 | K048 |  | NTDC |  |
| Other and unspecified diseases of pulp and periapical tissues | 5229 | K0490 | Unspecified diseases of pulp and periapical tissues | NTDC | CPP |
| Other and unspecified diseases of pulp and periapical tissues | 5229 | K0499 | Other diseases of pulp and periapical tissues | NTDC | CPP |
| Acute gingivitis, plaque induced | 52300 | K0500 |  | NTDC | CPP |
| Acute gingivitis, non-plaque induced | 52301 | K0501 |  | NTDC | CPP |
| Chronic gingivitis, plaque induced | 52310 | K0510 |  | NTDC | CPP |
| Chronic gingivitis, non-plaque induced | 52311 | K0511 |  | NTDC | CPP |
| Gingival recession, unspecified | 52320 | K060 | Gingival recession | NTDC | CPP |
| Gingival recession, minimal | 52321 | K060 | Gingival recession | NTDC | CPP |
| Gingival recession, moderate | 52322 | K060 | Gingival recession | NTDC | CPP |
| Gingival recession, severe | 52323 | K060 | Gingival recession | NTDC | CPP |
| Gingival recession, localized | 52324 | K060 | Gingival recession | NTDC | CPP |
| Gingival recession, generalized | 52325 | K060 | Gingival recession | NTDC | CPP |
| Aggressive periodontitis, unspecified | 52330 | K0520 |  | NTDC | CPP |
| Aggressive periodontitis, localized | 52331 | K0521 |  | NTDC | CPP |
| Aggressive periodontitis, generalized | 52332 | K0522 |  | NTDC | CPP |
| Acute periodontitis | 52333 | K0520 |  | NTDC | CPP |
| Chronic periodontitis, unspecified | 52340 | K0530 |  | NTDC | CPP |
| Chronic periodontitis, localized | 52341 | K0531 |  | NTDC | CPP |
| Chronic periodontitis, generalized | 52342 | K0532 |  | NTDC | CPP |
| Periodontosis | 5235 | K0540 |  | NTDC | CPP |
| Accretions on teeth | 5236 | K036 | Deposits (accretions) on teeth | NTDC | CPP |
| Other specified periodontal diseases | 5238 | K055 | Other periodontal diseases | NTDC | CPP |
| Other specified periodontal diseases | 5238 | K061 | Gingival enlargement | NTDC | CPP |
| Unspecified gingival and periodontal disease | 5239 | K056 | Periodontal disease, unspecified | NTDC | CPP |
| Major anomalies of jaw size, unspecified anomaly | 52400 | M2600 | Unspecified anomaly of jaw size | NTDC |  |
| Major anomalies of jaw size, maxillary hyperplasia | 52401 | M2601 | Maxillary hyperplasia | NTDC |  |
| Major anomalies of jaw size, | 52402 | M2603 | Mandibular hyperplasia | NTDC |  |
| Major anomalies of jaw size, maxillary hypoplasia | 52403 | M2602 | Maxillary hypoplasia | NTDC |  |
| Major anomalies of jaw size, mandibular hypoplasia | 52404 | M2604 | Mandibular hypoplasia | NTDC |  |
| Major anomalies of jaw size, macrogenia | 52405 | M2605 | Macrogenia | NTDC |  |
| Major anomalies of jaw size, microgenia | 52406 | M2606 | Microgenia | NTDC |  |
| Excessive tuberosity of jaw | 52407 | M2607 |  | NTDC |  |
| Major anomalies of jaw size, other specified anomaly | 52409 | M2609 | Other specified anomalies of jaw size | NTDC |  |
| Anomalies of relationship of jaw to cranial base, unspecified anomaly | 52410 | M2610 | Unspecified anomaly of relationship of jaw-cranial base relationship | NTDC |  |
| Anomalies of relationship of jaw to cranial base, maxillary asymmetry | 52411 | M2611 | Maxillary asymmetry | NTDC |  |
| Anomalies of relationship of jaw to cranial base, other jaw asymmetry | 52412 | M2612 | Other jaw asymmetry | NTDC |  |
| Anomalies of relationship of jaw to cranial base, other specified anomaly | 52419 | M2619 | Other specified anomalies of jaw-cranial base relationship | NTDC |  |
| Unspecified anomaly of dental arch relationship | 52420 | M2620 |  | NTDC |  |
| Malocclusion, Angle's class I | 52421 | M26211 |  | NTDC |  |
| Malocclusion, Angle's class II | 52422 | M26212 |  | NTDC |  |
| Malocclusion, Angle's class III | 52423 | M26213 |  | NTDC |  |
| Open anterior occlusal relationship | 52424 | M26220 |  | NTDC |  |
| Open posterior occlusal relationship | 52425 | M26221 |  | NTDC |  |
| Excessive horizontal overlap | 52426 | M2623 |  | NTDC |  |
| Reverse articulation | 52427 | M2624 |  | NTDC |  |
| Anomalies of interarch distance | 52428 | M2625 |  | NTDC |  |
| Other anomalies of dental arch relationship | 52429 | M2629 |  | NTDC |  |
| Unspecified anomaly of tooth position of fully erupted teeth | 52430 | M2630 | Unspecified anomaly of tooth position of fully erupted tooth or teeth | NTDC |  |
| Crowding of teeth | 52431 | M2631 | Crowding of fully erupted teeth | NTDC |  |
| Excessive spacing of teeth | 52432 | M2632 | Excessive spacing of fully erupted teeth | NTDC |  |
| Horizontal displacement of teeth | 52433 | M2633 | Horizontal displacement of fully erupted tooth or teeth | NTDC |  |
| Vertical displacement of teeth | 52434 | M2634 | Vertical displacement of fully erupted tooth or teeth | NTDC |  |
| Rotation of tooth/teeth | 52435 | M2635 | Rotation of fully erupted tooth or teeth | NTDC |  |
| Insufficient interocclusal distance of teeth (ridge) | 52436 | M2636 | Insufficient interocclusal distance of fully erupted teeth (ridge) | NTDC |  |
| Excessive interocclusal distance of teeth | 52437 | M2637 | Excessive interocclusal distance of fully erupted teeth | NTDC |  |
| Other anomalies of tooth position | 52439 | M2639 | Other anomalies of tooth position of fully erupted tooth or teeth | NTDC |  |
| Malocclusion, unspecified | 5244 | M264 |  | NTDC |  |
| Dentofacial functional abnormality, unspecified | 52450 | M2650 | Dentofacial functional abnormalities, unspecified | NTDC |  |
| Abnormal jaw closure | 52451 | M2651 |  | NTDC |  |
| Limited mandibular range of motion | 52452 | M2652 |  | NTDC |  |
| Deviation in opening and closing of the mandible | 52453 | M2653 |  | NTDC |  |
| Insufficient anterior guidance | 52454 | M2654 |  | NTDC |  |
| Centric occlusion maximum intercuspation discrepancy | 52455 | M2655 |  | NTDC |  |
| Non-working side interference | 52456 | M2656 |  | NTDC |  |
| Lack of posterior occlusal support | 52457 | M2657 |  | NTDC |  |
| Other dentofacial functional abnormalities | 52459 | M2659 |  | NTDC |  |
| Temporomandibular joint disorders, unspecified | 52460 | M2660 | Temporomandibular joint disorder, unspecified | NTDC |  |
| Temporomandibular joint disorders, unspecified | 52460 | M2669 | Other specified disorders of temporomandibular joint | NTDC |  |
| Temporomandibular joint disorders, adhesions and ankylosis (bony or fibrous) | 52461 | M2661 | Adhesions and ankylosis of temporomandibular joint | NTDC |  |
| Temporomandibular joint disorders, arthralgia of temporomandibular joint | 52462 | M2662 | Arthralgia of temporomandibular joint | NTDC |  |
| Temporomandibular joint disorders, articular disc disorder (reducing or non-reducing) | 52463 | M2663 | Articular disc disorder of temporomandibular joint | NTDC |  |
| Temporomandibular joint sounds on opening and/or closing the jaw | 52464 | M2669 | Other specified disorders of temporomandibular joint | NTDC |  |
| Other specified temporomandibular joint disorders | 52469 | M2669 | Other specified disorders of temporomandibular joint | NTDC |  |
| Dental alveolar anomalies, unspecified alveolar anomaly | 52470 | M2670 | Unspecified alveolar anomaly | NTDC |  |
| Alveolar maxillary hyperplasia | 52471 | M2671 |  | NTDC |  |
| Alveolar mandibular hyperplasia | 52472 | M2672 |  | NTDC |  |
| Alveolar maxillary hypoplasia | 52473 | M2673 |  | NTDC |  |
| Alveolar mandibular hypoplasia | 52474 | M2674 |  | NTDC |  |
| Vertical displacement of alveolus and teeth | 52475 | M2679 | Other specified alveolar anomaly | NTDC |  |
| Occlusal plane deviation | 52476 | M2679 | Other specified alveolar anomaly | NTDC |  |
| Other specified alveolar anomaly | 52479 | M2679 | Other specified alveolar anomaly | NTDC |  |
| Anterior soft tissue impingement | 52481 | M2681 |  | NTDC |  |
| Posterior soft tissue impingement | 52482 | M2682 |  | NTDC |  |
| Other specified dentofacial anomalies | 52489 | M264 | Malocclusion, unspecified | NTDC |  |
| Other specified dentofacial anomalies | 52489 | M2689 | Other dentofacial anomalies | NTDC |  |
| Unspecified dentofacial anomalies | 5249 | M269 | Dentofacial anomaly, unspecified | NTDC |  |
| Exfoliation of teeth due to systemic causes | 5250 | K080 |  | NTDC |  |
| Acquired absence of teeth, unspecified | 52510 | K08109 | Complete loss of teeth, unspecified cause, unspecified class | NTDC |  |
| Loss of teeth due to periodontal disease | 52512 | K08429 | Partial loss of teeth due to periodontal diseases, unspecified class | NTDC | CPP |
| Loss of teeth due to caries | 52513 | K08439 | Partial loss of teeth due to caries unspecified class | NTDC | CPP |
| Other loss of teeth | 52519 | K08499 | Partial loss of teeth due to other unspecified cause, unspecified class | NTDC | CPP |
| Unspecified atrophy of edentulous alveolar ridge | 52520 | K0820 |  | NTDC |  |
| Minimal atrophy of the mandible | 52521 | K0821 |  | NTDC |  |
| Moderate atrophy of the mandible | 52522 | K0822 |  | NTDC |  |
| Severe atrophy of the mandible | 52523 | K0823 |  | NTDC |  |
| Minimal atrophy of the maxilla | 52524 | K0824 |  | NTDC |  |
| Moderate atrophy of the maxilla | 52525 | K0825 |  | NTDC |  |
| Severe atrophy of the maxilla | 52526 | K0826 |  | NTDC |  |
| Retained dental root | 5253 | K083 |  | NTDC |  |
| Complete edentulism, unspecified | 52540 | K08109 | Complete loss of teeth, unspecified cause, unspecified class | NTDC |  |
| Complete edentulism, class I | 52541 | K08101 | Complete loss of teeth, unspecified cause, class I | NTDC |  |
| Complete edentulism, class II | 52542 | K08102 | Complete loss of teeth, unspecified cause, class II | NTDC |  |
| Complete edentulism, class III | 52543 | K08103 | Complete loss of teeth, unspecified cause, class III | NTDC |  |
| Complete edentulism, class IV | 52544 | K08104 | Complete loss of teeth, unspecified cause, class IV | NTDC |  |
| Partial edentulism, unspecified | 52550 | K08409 | Partial loss of teeth, unspecified cause, unspecified class | NTDC | CPP |
| Partial edentulism, class I | 52551 | K08401 | Partial loss of teeth, unspecified cause, class I | NTDC | CPP |
| Partial edentulism, class II | 52552 | K08402 | Partial loss of teeth, unspecified cause, class II | NTDC | CPP |
| Partial edentulism, class III | 52553 | K08403 | Partial loss of teeth, unspecified cause, class III | NTDC | CPP |
| Partial edentulism, class IV | 52554 | K08404 | Partial loss of teeth, unspecified cause, class IV | NTDC | CPP |
| Unspecified unsatisfactory restoration of tooth | 52560 | K0850 | Unsatisfactory restoration of tooth, unspecified | NTDC | CPP |
| Open restoration margins | 52561 | K0851 | Open restoration margins of tooth | NTDC | CPP |
| Unrepairable overhanging of dental restorative materials | 52562 | K0852 |  | NTDC | CPP |
| Fractured dental restorative material without loss of material | 52563 | K08530 |  | NTDC | CPP |
| Fractured dental restorative material with loss of material | 52564 | K08531 |  | NTDC | CPP |
| Contour of existing restoration of tooth biologically incompatible with oral health | 52565 | K0854 |  | NTDC | CPP |
| Allergy to existing dental restorative material | 52566 | K0855 |  | NTDC | CPP |
| Poor aesthetics of existing restoration | 52567 | K0856 | Poor aesthetic of existing restoration of tooth | NTDC | CPP |
| Other unsatisfactory restoration of existing tooth | 52569 | K0859 | Other unsatisfactory restoration of tooth | NTDC | CPP |
| Osseointegration failure of dental implant | 52571 | M2761 |  | NTDC | CPP |
| Post-osseointegration biological failure of dental implant | 52572 | M2762 |  | NTDC | CPP |
| Post-osseointegration mechanical failure of dental implant | 52573 | M2763 |  | NTDC | CPP |
| Other endosseous dental implant failure | 52579 | M2769 |  | NTDC | CPP |
| Other specified disorders of the teeth and supporting structures | 5258 | K088 | Other specified disorders of teeth and supporting structures | NTDC | CPP |
| Other specified disorders of the teeth and supporting structures |  | M2679 | Other specified alveolar anomalies | NTDC |  |
| Unspecified disorder of the teeth and supporting structures | 5259 | K089 | Disorder of teeth and supporting structures, unspecified | NTDC | CPP |
| Developmental odontogenic cysts | 5260 | K090 |  | NTDC |  |
| Fissural cysts of jaw | 5261 | K091 | Developmental (nonodotogenic) cysts of oral region | NTDC |  |
| Other cysts of jaws | 5262 | M2749 |  | NTDC |  |
| Central giant cell (reparative) granuloma | 5263 | M271 | Giant cell granuloma, central | NTDC |  |
| Inflammatory conditions of jaw | 5264 | M272 |  | NTDC |  |
| Alveolitis of jaw | 5265 | M273 |  | NTDC |  |
| Perforation of root canal space | 52661 | M2751 | Perforation of root canal space due to endodontic treatment | NTDC | CPP |
| Endodontic overfill | 52662 | M2752 |  | NTDC | CPP |
| Endodontic underfill | 52663 | M2753 |  | NTDC | CPP |
| Other periradicular pathology associated with previous endodontic treatment | 52669 | M2759 |  | NTDC | CPP |
| Exostosis of jaw | 52681 | M278 | Other specified diseases of jaws | NTDC |  |
| Other specified diseases of the jaws | 52689 | M278 | Other specified diseases of jaws | NTDC |  |
| Unspecified disease of the jaws | 5269 | M279 | Disease of the jaws, unspecified | NTDC |  |
| Atrophy of salivary gland | 5270 | K110 |  | NTDC |  |
| Hypertrophy of salivary gland | 5271 | K111 |  | NTDC |  |
| Sialoadenitis | 5272 | K1120 | Sialoadenitis, unspecified | NTDC |  |
| Abscess of salivary gland | 5273 | K113 |  | NTDC |  |
| Fistula of salivary gland | 5274 | K114 |  | NTDC |  |
| Sialolithiasis | 5275 | K115 |  | NTDC |  |
| Mucocele of salivary gland | 5276 | K116 |  | NTDC |  |
| Disturbance of salivary secretion | 5277 | K117 | Disturbances of salivary secretion | NTDC |  |
| Disturbance of salivary secretion | 5277 | R682 | Dry mouth, unspecified | NTDC |  |
| Other specified diseases of the salivary glands | 5278 | K118 | Other diseases of salivary glands | NTDC |  |
| Unspecified disease of the salivary glands | 5279 | K119 | Disease of the salivary glands, unspecified | NTDC |  |
| Stomatitis and mucositis, unspecified | 52800 | K122 | Cellulitis and abscess of mouth | NTDC |  |
| Stomatitis and mucositis, unspecified | 52800 | K1230 | Oral mucositis (ulcerative), unspecified | NTDC |  |
| Mucositis (ulcerative) due to antineoplastic therapy | 52801 | K1231 | Oral mucositis (ulcerative) due to antineoplastic therapy | NTDC |  |
| Mucositis (ulcerative) due to antineoplastic therapy | 52801 | K1233 | Oral mucositis (ulcerative) due to radiation | NTDC |  |
| Mucositis (ulcerative) due to other drugs | 52802 | K1232 | Oral mucositis (ulcerative) due to other drugs | NTDC |  |
| Other stomatitis and mucositis (ulcerative) | 52809 | K121 | Other forms of stomatitis | NTDC |  |
| Other stomatitis and mucositis (ulcerative) | 52809 | K1239 | Other oral mucositis (ulcerative) | NTDC |  |
| Cancrum oris | 5281 | A690 | Necrotizing ulcerative stomatitis | NTDC |  |
| Oral aphthae | 5282 | K120 | Recurrent oral aphthae | NTDC |  |
| Cellulitis and abscess of oral soft tissues | 5283 | K122 | Cellulitis and abscess of mouth | NTDC |  |
| Cysts of oral soft tissues | 5284 | K098 | Other cysts of oral region, not elsewhere classified | NTDC |  |
| Diseases of lips | 5285 | K130 |  | NTDC |  |
| Leukoplakia of oral mucosa, including tongue | 5286 | K1321 |  | NTDC |  |
| Minimal keratinized residual ridge mucosa | 52871 | K1322 |  | NTDC |  |
| Excessive keratinized residual ridge mucosa | 52872 | K1323 |  | NTDC |  |
| Other disturbances of oral epithelium, including tongue | 52879 | K1329 |  | NTDC |  |
| Oral submucosal fibrosis, including of tongue | 5288 | K135 | Oral submucosal fibrosis | NTDC |  |
| Other and unspecified diseases of the oral soft tissues | 5289 | K1370 | Unspecified lesions of oral mucosa | NTDC |  |
| Other and unspecified diseases of the oral soft tissues | 5289 | K1379 | Other lesions of oral mucosa | NTDC |  |
| Glossitis | 5290 | K140 |  | NTDC |  |
| Geographic tongue | 5291 | K141 |  | NTDC |  |
| Median rhomboid glossitis | 5292 | K142 |  | NTDC |  |
| Hypertrophy of tongue papillae | 5293 | K143 |  | NTDC |  |
| Atrophy of tongue papillae | 5294 | K144 |  | NTDC |  |
| Plicated tongue | 5295 | K145 |  | NTDC |  |
| Glossodynia | 5296 | K146 |  | NTDC |  |
| Other specified conditions of the tongue | 5298 | K148 | Other diseases of the tongue | NTDC |  |
| Unspecified condition of the tongue | 5299 | K149 | Disease of tongue, unspecified | NTDC |  |
| Jaw pain | 78492 | R6884 |  | NTDC | CPP |
| Nonspecific abnormal findings in saliva | 7924 | R859 | Unspecified abnormal finding in specimens from digestive organs and abdominal cavity | NTDC |  |
| Fitting and adjustment of dental prosthetic device | V523 | Z463 | Encounter for fitting and adjustment of dental prosthetic device | NTDC | CPP |
| Fitting and adjustment of orthodontic devices | V534 | Z464 | Encounter for fitting and adjustment of orthodontic device | NTDC | CPP |
| Orthodontics aftercare | V585 | Z464 | Encounter for fitting and adjustment of orthodontic device | NTDC | CPP |
| Dental examination | V722 | Z0120 | Encounter for dental examination and cleaning without abnormal findings | NTDC | CPP |
| Dental examination | V723 | Z0121 | Encounter for dental examination and cleaning with abnormal findings | NTDC | CPP |

**APPENDIX 2**

**OPTIONAL FACTORS/ANALYSES THAT MAY BE INCLUDED IN AN EXPANDED ED-NTDC SURVEILLANCE SYSTEM**

**Optional Indicators**

1. ED visit for CPP based on ***first listed*** diagnosis
2. ED visit for CPP based on ***any listed*** diagnosis
3. ED visit for CPP based on ***first listed reason for visit***
4. ED visit for CPP based on ***any listed reason for visit***
5. ED visit for CPP based on ***any listed diagnosis and/or any listed reason for visit***
6. ED visit for any oral condition based on ***first listed*** diagnosis
7. ED visit for any oral condition based on ***any listed*** diagnosis
8. ED visit for any oral condition based on ***first listed reason for visit***
9. ED visit for any oral condition based on ***any listed reason for visit***
10. ED visit for any oral condition based on ***any listed diagnosis and/or any listed reason for visit***

|  |  |  |  |
| --- | --- | --- | --- |
| Optional Indicator | SEDD Data Element, ICD-9 | SEDD Data Element, ICD-10 | Comments/Notes |
| 1. CPP 1st diagnosis | DX1 | I10\_DX1 | Include 1st listed diagnosis only |
| 1. CPP any diagnosis | DXn | I10\_DXn | Include all listed diagnoses |
| 1. CPP 1st reason visit | DX\_Visit\_Reason1 | I10\_Visit\_Reason1 | Include 1st listed reason only |
| 1. CPP any reason visit | DX\_Visit\_Reasonn | I10\_Visit\_Reasonn | Include all listed reasons |
| 1. CPP any diagnosis/visit | DXn & DX\_Visit\_Reasonn | I10\_DXn & I10\_Visit\_Reasonn | Include all listed diagnoses & reasons |
| 1. Any oral 1st diagnosis | DX1 | I10\_DX1 | Include 1st listed diagnosis only |
| 1. Any oral any diagnosis | DXn | I10\_DXn | Include all listed diagnoses |
| 1. Any oral 1st reason visit | DX\_Visit\_Reason1 | I10\_Visit\_Reason1 | Include 1st listed reason only |
| 1. Any oral any reason visit | DX\_Visit\_Reasonn | I10\_Visit\_Reasonn | Include all listed reasons |
| 1. Any oral any diagnosis/visit | DXn & DX\_Visit\_Reasonn | I10\_DXn & I10\_Visit\_Reasonn | Include all listed diagnoses & reasons |

**Optional Stratification Factors and Analyses**

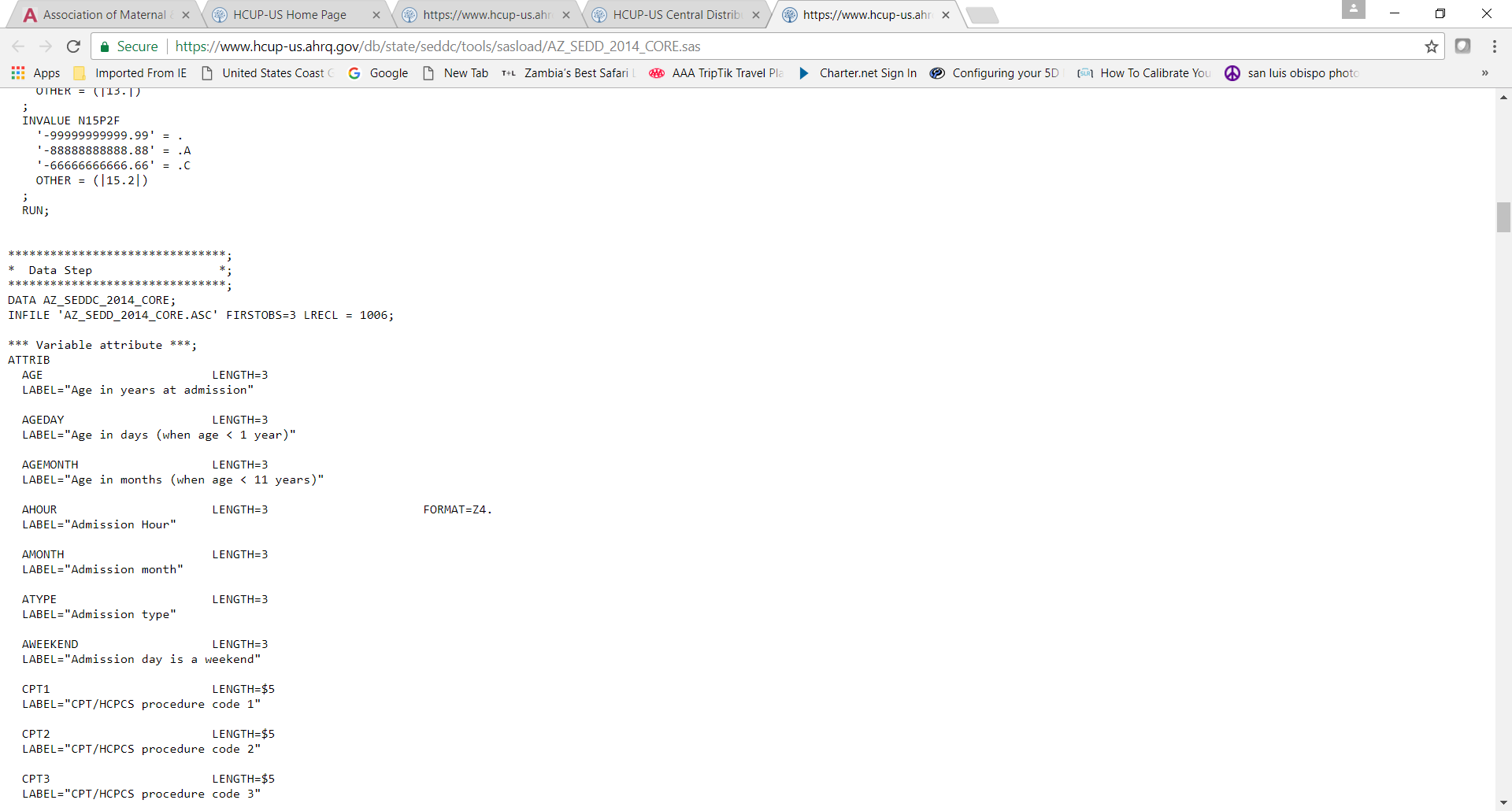
|  |  |  |
| --- | --- | --- |
| Factors/Analyses | SEDD Data Element Name | Notes/Comments |
| Sex | [FEMALE](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=female) |  |
| Marital status | [MARITALSTATUSUB04](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=maritalstatusub04) |  |
| Geographic location | [ZIP](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=zip) or [ZIP3](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=zip3) | Patient zip code can be used to define geographic locations |
| Homelessness | [Homeless](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=homeless) | Not available for all states. |
| Weekend admission | [AWEEKEND](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=aweekend) |  |
| Income | [ZIPINC\_QRTL](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=zipinc_qrtl) | ZIPINC\_QRTL provides a quartile classification of the estimated median household income of residents in the patient's ZIP Code. The quartiles are identified by values of 1 to 4, indicating the poorest to wealthiest populations. These values are derived from ZIP Code-demographic data obtained from Claritas. Because these estimates are updated annually, the value ranges for the ZIPINC\_QRTL categories vary by year. |
| Revisit by same patient | [VisitLink](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=visitlink) & [DaysToEvent](https://www.hcup-us.ahrq.gov/db/vars/sedddistnote.jsp?var=daystoevent) | The VisitLink data element is one of two data elements that are supplemental information created for HCUP States for which there are encrypted person identifiers. The visit linkage variable (VisitLink) can be used in tandem with the timing variable (DaysToEvent) to study multiple hospital visits for the same patient across hospitals and time while adhering to strict privacy regulations. Not available for all states. |
| Trends over time |  | Generate indicators for multiple years to determine if ED visits due to NTDC have increased, decreased or remained the same. |

**APPENDIX 3**

**SAMPLE SAS CODE**

**General Information**

To assist states with the process of generating the ED-NTDC indicators, ASTDD is providing sample SAS code. If you are using SPSS or Stata you will need to modify the code accordingly. ***IMPORTANT:*** ***All states should review and revise the sample code to meet their individual needs.*** States may have multiple SEDD files for a given year, but the data needed for the recommended ED-NTDC indicators are in the core file. Following are instructions on how to load the core file into your statistical package.

* Go to the HCUP website: <https://www.hcup-us.ahrq.gov/db/state/sedddbdocumentation.jsp>
* **Scroll down to “File Specifications and Load Programs”.** Click on the load program link for the statistical software package you will be using (SAS, SPSS, Stata). This example uses SAS.
  + Select the state and year you want to download
  + For the database option select SEDD
  + Click “Find”
  + A set of load programs for your state and year will appear at the bottom of the page
  + Select “Core SAS load program” and save to your hard drive
* After saving the load program, insert the correct file address and name for your state “core.asc” file in the code line at the beginning of the Data Step
* Run the load program and the core.asc file will be loaded into SAS

**Sample SAS Code**

**NOTE:** Before using this code you should change the “set” file name to match the name and location of your data file. ***All states should review and revise the sample code to meet their individual needs.***

*\*Coding for recommended indicator #1, ED visit for NTDC based on* ***first listed diagnosis****. This coding is for* ***pre-2015*** *data sets with ICD-9 diagnostic codes. For 2015 datasets, both ICD-9 and ICD-10 codes should be included.*

data StateCore; set StateCore;

NTDC\_dx1=0; \*set variable to 0 and then change to 1 if first DX variable has an NTDC code;

If DX1 in ('5200', '5201', '5202', '5203', '5204', '5205', '5206', '5207', '5208', '5209', '52100', '52101', '52102', '52103',

'52104', '52105', '52106', '52107', '52108', '52109', '52110', '52111', '52112', '52113', '52114', '52115', '52120', '52121',

'52122', '52123', '52124', '52125', '52130', '52131', '52132', '52133', '52134', '52135', '52140', '52141', '52142', '52149',

'5215', '5216', '5217', '52181', '52189', '5219', '5220', '5221', '5222', '5223', '5224', '5225', '5226', '5227', '5228', '5229',

'52300', '52301', '52310', '52311', '52320', '52321', '52322', '52323', '52324', '52325', '52330', '52331', '52332', '52333',

'52340', '52341', '52342', '5235', '5236', '5238', '5239', '52400', '52401', '52402', '52403', '52404', '52405', '52406', '52407',

'52409', '52410', '52411', '52412', '52419', '52420', '52421', '52422', '52423', '52424', '52425', '52426', '52427', '52428',

'52429', '52430', '52431', '52432', '52433', '52434', '52435', '52436', '52437', '52439', '5244', '52450', '52451', '52452',

'52453', '52454', '52455', '52456', '52457', '52459', '52460', '52461', '52462', '52463', '52464', '52469', '52470', '52471',

'52472', '52473', '52474', '52475', '52476', '52479', '52481', '52482', '52489', '5249', '5250', '52510', '52512', '52513',

'52519', '52520', '52521', '52522', '52523', '52524', '52525', '52526', '5253', '52540', '52541', '52542', '52543', '52544',

'52550', '52551', '52552', '52553', '52554', '52560', '52561', '52562', '52563', '52564', '52565', '52566', '52567', '52569',

'52571', '52572', '52573', '52579', '5258', '5259', '5260', '5261', '5262', '5263', '5264', '5265', '52661', '52662', '52663',

'52669', '52681', '52689', '5269', '5270', '5271', '5272', '5273', '5274', '5275', '5276', '5277', '5278', '5279', '52800', '52801',

'52802', '52809', '5281', '5282', '5283', '5284', '5285', '5286', '52871', '52872', '52879', '5288', '5289', '5290', '5291', '5292',

'5293', '5294', '5295', '5296', '5298', '5299', '78492', '7924', 'V523', 'V534', 'V585', 'V722', 'V723')

then NTDC\_dx1=1;

run;

*\*Coding for recommended indicator #1, ED visit for NTDC based on* ***first listed diagnosis****. This coding is for* ***post-2015*** *data sets with ICD-10 diagnostic codes. For 2015 datasets, both ICD-9 and ICD-10 codes should be included.*

data StateCore; set StateCore;

NTDC\_dx1=0; \*set variable to 0 and then change to 1 if first I10\_DX variable has an NTDC code;

If I10\_DX1 in ('A690', 'K000', 'K001', 'K002', 'K003', 'K004', 'K005', 'K006', 'K007', 'K008', 'K009', 'K010', 'K011', 'K023', 'K0251',

'K0261', 'K0262', 'K0263', 'K027', 'K029', 'K030', 'K031', 'K032', 'K033', 'K034', 'K035', 'K036', 'K037', 'K0381', 'K0389', 'K039',

'K040', 'K041', 'K042', 'K043', 'K044', 'K045', 'K046', 'K047', 'K048', 'K0490', 'K0499', 'K0500', 'K0501', 'K0510', 'K0511',

'K0520', 'K0521', 'K0522', 'K0530', 'K0531', 'K0532', 'K0540', 'K055', 'K056', 'K060', 'K061', 'K080', 'K08101', 'K08102',

'K08103', 'K08104', 'K08109', 'K0820', 'K0821', 'K0822', 'K0823', 'K0824', 'K0825', 'K0826', 'K083', 'K08401', 'K08402',

'K08403', 'K08404', 'K08409', 'K08429', 'K08439', 'K08499', 'K0850', 'K0851', 'K0852', 'K08530', 'K08531', 'K0854', 'K0855',

'K0856', 'K0859', 'K088', 'K089', 'K090', 'K091', 'K098', 'K110', 'K111', 'K1120', 'K113', 'K114', 'K115', 'K116', 'K117', 'K118',

'K119', 'K120', 'K121', 'K122', 'K1230', 'K1231', 'K1232', 'K1233', 'K1239', 'K130', 'K1321', 'K1322', 'K1323', 'K1329', 'K135',

'K1370', 'K1379', 'K140', 'K141', 'K142', 'K143', 'K144', 'K145', 'K146', 'K148', 'K149', 'M2600', 'M2601', 'M2602', 'M2603',

'M2604', 'M2605', 'M2606', 'M2607', 'M2609', 'M2610', 'M2611', 'M2612', 'M2619', 'M2620', 'M26211', 'M26212',

'M26213', 'M26220', 'M26221', 'M2623', 'M2624', 'M2625', 'M2629', 'M2630', 'M2631', 'M2632', 'M2633', 'M2634',

'M2635', 'M2636', 'M2637', 'M2639', 'M264', 'M2650', 'M2651', 'M2652', 'M2653', 'M2654', 'M2655', 'M2656', 'M2657',

'M2659', 'M2660', 'M2661', 'M2662', 'M2663', 'M2669', 'M2670', 'M2671', 'M2672', 'M2673', 'M2674', 'M2679', 'M2681',

'M2682', 'M2689', 'M269', 'M271', 'M272', 'M273', 'M2749', 'M2751', 'M2752', 'M2753', 'M2759', 'M2761', 'M2762',

'M2763', 'M2769', 'M278', 'M279', 'R682', 'R6884', 'R859', 'Z0120', 'Z0121', 'Z463', 'Z464')

then NTDC\_dx1=1;

run;

*\*Coding for recommended indicator #2, ED visit for NTDC based on* ***any listed diagnosis****. This coding is for* ***pre-2015*** *data sets with ICD-9 diagnostic codes. For 2015 datasets, both ICD-9 and ICD-10 codes should be included. NOTE: SEDD has variables for up to 25 diagnoses.*

data StateCore; set StateCore;

array DX{25} DX1--DX25;

NTDC\_dx\_any=0; \*set variable to 0 and then change to 1 if any DX variables have an NTDC code;

Do i=1 to 25;

if DX{i} in (***insert ICD-9 codes listed for recommended indicator #1***)

then NTDC\_dx\_any=1;

end;

run;

*\*Coding for recommended indicator #2, ED visit for NTDC based on* ***any listed diagnosis.*** *This coding is for* ***post-2015*** *data sets with ICD-10 diagnostic codes. For 2015 datasets, both ICD-9 and ICD-10 codes should be included. NOTE: SEDD has variables for up to 25 diagnoses.*

data StateCore; set StateCore;

array DX{25} I10\_DX1—I10\_DX25;

NTDC\_dx\_any=0; \*set variable to 0 and then change to 1 if any I10\_DX variables have an NTDC code;

Do i=1 to 25;

if DX{i} in (***insert ICD-10 codes listed for recommended indicator #1***)

then NTDC\_dx\_any=1;

end; run;

*\*Coding for recommended indicator #3, ED visit for NTDC based on* ***first listed reason for visit****. This coding is for* ***pre-2015*** *data sets with ICD-9 diagnostic codes. For 2015 datasets, both ICD-9 and ICD-10 codes should be included.*

data StateCore; set StateCore;

NTDC\_RsnVis1=0;

If DX\_Visit\_Reason1 in (***insert ICD-9 codes listed for recommended indicator #1***)

then NTDC\_RsnVis1=1;

run;

*\*Coding for recommended indicator #3, ED visit for NTDC based on* ***first listed reason for visit****. This coding is for* ***post-2015*** *data sets with ICD-10 diagnostic codes. For 2015 datasets, both ICD-9 and ICD-10 codes should be included.*

data StateCore; set StateCore;

NTDC\_RsnVis1=0;

If I10\_Visit\_Reason1 in (***insert ICD-10 codes listed for recommended indicator #1***)

then NTDC\_RsnVis1=1;

run;

*\*Coding for recommended indicator #4, ED visit for NTDC based on* ***any listed reason for visit.*** *This coding is for* ***pre-2015*** *data sets with ICD-9 diagnostic codes. For 2015 datasets, both ICD-9 and ICD-10 codes should be included. NOTE: SEDD has variables for up to 3 reasons for visit.*

data StateCore; set StateCore;

array rsn{3} DX\_Visit\_Reason1--DX\_Visit\_Reason3;

NTDC\_RsnVis\_any=0; \*set variable to 0 and then change to 1 if any DX\_Visit\_ReasonN variables have an NTDC code;

Do i=1 to 3;

if rsn{i} in ( ***insert ICD-9 codes listed for recommended indicator #1***)

then NTDC\_RsnVis\_any=1;

end;

run;

*\*Coding for recommended indicator #4, ED visit for NTDC based on* ***any listed reason for visit.*** *This coding is for* ***post-2015*** *data sets with ICD-10 diagnostic codes. For 2015 datasets, both ICD-9 and ICD-10 codes should be included. NOTE: SEDD has variables for up to 3 reasons for visit.*

data StateCore; set StateCore;

array rsn{3} I10\_Visit\_Reason1—I10\_Visit\_Reason3;

NTDC\_RsnVis\_any=0; \*set variable to 0 and then change to 1 if any I10\_Visit\_ReasonN variables have an NTDC code;

Do i=1 to 3;

if rsn{i} in ( ***insert ICD-10 codes listed for recommended indicator #1***)

then NTDC\_RsnVis\_any=1;

end;

run;

*\*Coding for recommended indicator #5, ED visit for NTDC based on* ***any listed diagnosis and/or any listed reason for visit.***

data StateCore; set StateCore;

NTDC\_DXorRsn=0;

if NTDC\_dx\_any=1 or NTDC\_RsnVis\_any=1 then NTDC\_DXorRsn=1;

run;

*\*To generate counts for the five indicators.*

proc freq data = StateCore;

tables NTDC\_dx1 NTDC\_dx\_any NTDC\_RsnVis1 NTDC\_RsnVis\_any NTDC\_DXorRsn;

run;

*\*To generate rate per 100,000 population. NOTE: This is* ***not*** *SAS code.*

(indicator count/population estimate) \* 100,000

Example: First diagnosis NTDC count is 36,188, state population estimate is 4,400,477

Rate of ED NTDC visits per 100,000 population = (36,188 / 4,400,477) \* 100,000 = 822.4 per 100,000 population

*\*To generate rate per 10,000 ED visits. NOTE: This is* ***not*** *SAS code.*

(indicator count / total ED visit count) \* 10,000

Example: First diagnosis NTDC count is 36,188, total ED visit count is 2,036,780

rate of ED NTDC per 10,000 ED visits = (36,188 / 2,036,780) \* 10,000 = 177.7 per 10,000 ED visits

*\*To generate total charges, use the following SAS code. The first diagnosis indicator is used in this example.*

proc means data=StateCore mean median min max stddev sum;

var totchg;

where NTDC\_dx1=1;

run;

*\*For recommended stratified analyses by age group, race/ethnicity, and primary payer, use variables AGE, PAY1, and RACE.*

data StateCore; set StateCore;

if age lt 20 then agecat=1;

if age ge 20 and age lt 45 then agecat=2;

if age ge 45 and age lt 65 then agecat=3;

if age ge 65 then agecat=4;

run;

PROC FORMAT; \*to format primary payer, race, and new age category variables;

value agec 1='<20 years' 2='20-44 years' 3='45-64 years' 4='65 or more years';

value pay 1='Medicare' 2='Medicaid' 3='Private' 4='Self Pay' 5='No charge' 6='Other';

value rac 1='white' 2='black' 3='Hispanic' 4='Asian/PacIsl' 5='NatAmer' 6='Other';

value yn 0='No' 1='Yes';

run;

*\*Example - stratified analysis for NTDC first diagnosis indicator.*

proc freq data=StateCore;

tables agecat pay1 race;

where NTDC\_dx1=1;

format agecat agec. pay1 pay. race rac.;

run;

*\*Example - to compare NTDC=yes vs. NTDC=no stratified analysis for NTDC first diagnosis.*

proc freq data=StateCore;

tables NTDC\_dx1\*(agecat pay1 race);

format agecat agec. pay1 pay. race rac. NTDC\_dx1 yn.;

run;

**APPENDIX 4**

**ACRONYMS USED IN THIS DOCUMENT**

ASTDD Association of State and Territorial Dental Directors

CPP Conditions associated with caries, periodontal disease or associated preventive procedures

ED Emergency department

HCUP Healthcare cost and utilization project (<https://www.hcup-us.ahrq.gov/>)

ICD-9 International Classification of Diseases, Ninth Revision

ICD-10 International Classification of Diseases, Tenth Revision

NTDC Non-traumatic dental condition

SEDD State emergency department databases (<https://www.hcup-us.ahrq.gov/seddoverview.jsp>)

SID State inpatient databases (<https://www.hcup-us.ahrq.gov/sidoverview.jsp>)

SOHP State oral health program