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Nontraumatic Oral Health Classification for Alternative Use of Syndromic Data

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Objective

To develop a nontraumatic oral health classification that could estimate the burden of oral health-related visits in North Carolina (NC) Emergency Departments (EDs) using syndromic surveillance system data.

Introduction

Lack of access to regular dental care often results in costly, oral health visits to EDs that could otherwise have been prevented or managed by a dentist (1). Most studies on oral health-related visits to EDs have used a wide range of classifications from different databases, but none have used syndromic surveillance data. The volume, frequency, and included details of syndromic data enabled timely burden estimates of nontraumatic oral health visits for NC EDs.

Methods

Literature review, input by subject matter experts (SMEs), and analysis of syndromic data was used to create the nontraumatic oral health classification. BioSense, a near real-time, national-level, electronic health surveillance system was the source of the NC ED syndromic data. Visits with at least one oral health-related ICD-9-CM code were extracted for NC fiscal years 2008–2010. Univariate analyses of chief complaint (CC) and final diagnosis data along with SME consultation were used to determine the CC substrings and 'white list' of ICD-9-CM codes used as inclusion criteria to classify visits as oral health-related. These analyses and consultations also determined the trauma-related codes and substrings used to exclude visits.

Results

Table 1 shows all nontraumatic oral health-related ICD-9-CM codes used for the characterization. Codes likely related to the types of dental emergencies that routine dental care could not have prevented were excluded. Approximately 275,000 patient records were evaluated to determine the CC substrings. The final CC substrings chosen (Table 1) represented over 56% of visits in the candidate record dataset. Over 334,000 BioSense patient records were evaluated, and SMEs reviewed the 32 ICD-9-CM codes that co-occurred most commonly in visits containing oral health-related ICD-9-CM codes to determine which co-occurring ICD-9-CM codes (white list, Table 1) could be present and still maintain the main reason for the visit as an oral health-related problem. Trauma-related visit criteria used for exclusion were derived from a subset of BioSense sub-syndromes (Falls; Fractures and dislocation; Injury, NOS; Sprains and strains; and Motor vehicle traffic accidents) and from selected CC substrings ('assault', 'fight', and 'brawl').

In summary, an ED visit had a nontraumatic oral health classification if it contained 1) an oral health-related CC substring with no trauma-related ICD-9-CM codes or CC substrings or 2) an oral health-related ICD-9 code accompanied by no oral health-related or trauma-related CC substrings and with no other diagnosis codes except for those on the whitelist.

Conclusions

There is increasing demand to determine ways to use syndromic surveillance data in an alternative way for population health surveillance. This use of BioSense data provided a practical classification of patient records for the tracking of nontraumatic oral health-related visits to NC EDs. Visit estimates created using this classification in combination with other pertinent information could prove useful to policymakers when deciding upon resource allocation aimed at reducing this unnecessary burden on the NC ED system. The large volume of records in syndromic surveillance systems offers substantial weight of evidence for alternative use in epidemiological studies; however, accurate classification of records is required to select cases of interest. While data volume precludes validation of every included record, a combination of human expertise and data analysis can provide credible classification criteria.

Table 1. Inclusion Criteria for Nontraumatic Oral Health Classification

Oral Health-Related ICD-9-CM Codes	White List ICD-9-CM Codes		Oral Health-Related CC Substrings
521.x	780.60	388.70	Tooth and ache
522.x	305.1	682.0	Tooth and abscess
523.x	401.9	786.2	Tooth and pain
525.x	784.0	478.19	Tooth and abcess**
528.x*	784.2	780.6	Dental
	526.9		

x = includes all numbers under this ICD-9-CM subheading
*Except 528.3 and 528.5
**Most common misspelling of abscess

Keywords

Syndromic Surveillance; Oral Health; Emergency Departments

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