ADA CE Program ARTICLE 3

Longitudinal outcomes of using a fluoride performance measure for adults at high risk of experiencing caries

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ABSTRACT

Background. Staff of the VA Office of Dentistry, the dental care arm of the U.S. Department of Veterans Affairs' Veterans Health Administration, developed a performance measure (PM) regarding appropriate fluoride use. The authors hypothesized that after the implementation of this PM, veterans at high risk of experiencing caries would require fewer new dental restorations than in the past.

Methods. In a retrospective longitudinal analysis, the authors evaluated the effectiveness of a PM in reducing restoration rates in veterans at high risk of experiencing caries. They evaluated changes in restoration rates for all eligible veterans, as well as the subpopulation at high risk of experiencing caries (defined as receiving two or more restorations in 12 months) both before and after the implementation of the PM.

Results. In 2012, 81 percent of clinics provided fluoride for more than 90 percent of their patients at high risk of experiencing caries. After use of the PM for four years, there were 8.6 percent fewer patients needing two or more restorations, a 10.8 percent decrease in the mean number of restorations and a modest 3.4 percent fewer patients at high risk of experiencing caries who required new restorations after the initial 12-month period.

Conclusions. Fluoride use for patients at high risk of experiencing caries rose from 51.8 percent in 2008 to 93.6 percent in 2012. Restoration rates rose before implementation of the PM and fell consistently after its implementation.

Practical Implications. Fluoride use reduces the need for future restorations in adults at high risk of experiencing caries.

Key Words. Performance measure; fluoride; caries; restoration; caries prevention.

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The Institute of Medicine defined quality as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge."[1] The measurement of quality historically has been more fragmented in dentistry than in many other health care professions.[2] Various public and private dental groups have joined to form the American Dental Association's Dental Quality Alliance to promote the "establishment of measurements to identify and monitor innovative strategies to reduce the incidence of oral disease."[3] To this end, large dental care organizations are well positioned to make an impact on public health and share useful data and outcomes assessment.

The U.S. Department of Veterans Affairs (VA) has a dental service that is national in scope, with 210 clinical sites of care and more than 800 dentists and more than 300 dental hygienists on staff. All services share an electronic health record (EHR) with comprehensive care and dental data collected on a national level. The VA uses evidence-based processes and data-driven performance measures (PMs) focusing on medical issues.[4] The VA's PMs are possible owing, in large part, to the ability to use various computerized registries and EHRs on a national level.

CARIES AND THE FLUORIDE PERFORMANCE MEASURE

Dental caries remains a primary dental problem for adults in the United States—particularly older adults, those of racial and ethnic minorities and those who are

living in poverty or have low levels of education.[5] The dental population treated by the VA includes a large proportion of veterans at high risk of experiencing caries.[6,7] In 2008, the VA Office of Dentistry committed to addressing the issue of dental caries by using a medically based preventive approach.

Beginning in fiscal year (FY) 2009, which began on Oct. 1, 2008, the VA implemented the fluoride PM, called "Fluoride Treatment for Patients at High Risk for Dental Caries," as a quality PM. This PM was intended to increase the appropriate use of fluoride in dental patients at high risk of experiencing caries. To accomplish this, the VA Office of Dentistry recommended that veterans identified as having a high risk of developing caries be provided either a professional application of or a pharmacy prescription for fluoride. The VA Office of Dentistry defined high risk of caries experience, with respect to this PM, as the placement of two or more single-tooth restorations in a 12-month period. Before initiation of this PM, the VA Oral Health Quality Group (OHQG)—a public-private partnership housed at the VA Center for Healthcare Organization and Implementation Research (CHOIR) in Bedford, Mass.—worked with other VA Office of Dentistry groups to provide background information and educational webinars about fluoride use on a national scale. Recommendations regarding the assessment of caries risk and the appropriate use of fluoride were published in a systematic review[8] and presented by members of the OHQG and the VA Office of Dentistry in writing and during national webinars available to all dental health care teams throughout the VA. Fluoride varnish (5.0 percent sodium fluoride) as well as 1.1 percent neutral sodium fluoride paste and gel were made available to all dental services through the national formulary, and patient education posters were distributed throughout VA dental services nationwide.

After more than four years of use of the PM, the VA Office of Dentistry sought to assess whether any changes in disease burden could be noted. Thus, we conducted a study to examine the effectiveness of the PM in reducing the overall rate of restorations in dental patients eligible for continuous and comprehensive care, and specifically in veterans at high risk of experiencing caries. We hypothesized that restoration rates would decrease in these veterans after the introduction of the PM on Oct. 1, 2008. Furthermore, we hypothesized that fewer new restorations would be placed one year after patients were identified as being at high risk of experiencing caries.

METHODS

Study design. We conducted a retrospective longitudinal analysis of existing data in which we examined the effectiveness of the introduction of the VA fluoride PM in reducing the rate of restorations in veterans at high risk of experiencing caries. We evaluated changes in restoration rates in all veterans who were eligible for continuous and comprehensive care, as well as the subpopulation considered to be at high risk of experiencing caries.

Institutional review. This study was approved by the institutional review boards at the Edith Nourse Rogers Memorial Veterans Hospital in Bedford, Mass., and Boston University. The study received a waiver of consent because the research was designed to evaluate a public service program.

Sample. The sample consisted of all veterans who were eligible for continuous and comprehensive dental care within the VA and a subset of the population at high risk of experiencing dental caries, all of whom constituted the temporal subset of veterans eligible for the fluoride PM. Figure 1 shows the patient populations in the numerator and denominator of the PM. Specifically, the cohort of the PM is derived from the patients who were eligible for continuous and comprehensive dental care within the VA. The denominator includes patients who had two or more separate dental restorations during a 12-month period (the index period), as noted by documentation of any of the Current Dental Terminology (CDT) codes listed in Table 1[9] (page 446) (all permanent direct and indirect single-tooth restorations). The numerator includes all people in the denominator who also received fluoride, either as a professionally applied fluoride treatment (gel, rinse or varnish) during an office visit (as indicated by the procedure codes in Table 1[9]) or by the dispensing of a prescription fluoride as noted through a VA pharmacy database anywhere from 12 months before placement of the first restoration to six months after placement of the second restoration. Data were documented by dental care providers throughout the VA nationwide as part of each veteran's regular dental care for the period from Oct. 1, 2004, through Sept. 30, 2012.

Data sources. We used VA data files from four primary sources: the Dental Encounter System, the Outpatient Files, the Inpatient Treatment File and the Decision Support Services Pharmacy database.

Intervention. The PM was introduced in FY 2009, which began on Oct. 1, 2008. The fluoride PM tracks the percentage of veterans at high risk of experiencing caries who received a prescription self-applied or professionally applied fluoride treatment up to 12 months before placement of their first restoration and six months after placement of their last restoration, stratified according to VA dental facility. Table 1[9] lists the CDT codes used to document a clinical fluoride intervention. We accessed the VA pharmacy database to assess whether any fluoride was prescribed to the patient during the specified period.

ABBREVIATION KEY. **CDT:** Current Dental Terminology. **CHOIR:** Center for Healthcare Organization and Implementation Research. **EHR:** Electronic health record. **FY:** Fiscal year. **OHQG:** Oral Health Quality Group. **PM:** Performance measure. **Q:** Quarter. **VA:** Veterans Affairs.