

should engage and promote consistent practices regarding antibiotics. Some physicians who should be included are infectious disease specialists, cardiologists, and orthopedic surgeons. The expansion of access to preventive oral health services should also be promoted.

Fourth, trends in antibiotic prescribing within each dental practice should be tracked. Electronic billing can be a source for tracking data. The data should be audited to provide feedback

to the dental providers with the hope of improving antibiotic prescribing practices.

Siegel JD, Epson E: Antibiotic prescribing and stewardship in dentistry: A public health perspective. *Calif Dent Assoc J* 46:755-756, 2018

Reprints available from J Siegel; e-mail: Jane.Siegel@cdph.ca.gov

IMPLANTS

Prevalence and projected prevalence of implant use



BACKGROUND

Implant placement has become a desirable course of treatment for replacing missing teeth because of its high rate of success and predictable outcomes. Patients especially value the retention of adjacent tooth structure and bone and experience better masticatory function and better quality of life. The impression is that the prevalence of dental implant use among the US population has been steadily increasing. The data collected through the National Health and Nutrition Examination Survey (NHANES) from 1999 to 2016 were evaluated to determine trends in the prevalence of dental implants among adults as well as sociodemographic characteristics of implant recipients and projections regarding implant use to 2026.

METHODS

Seven NHANES from 1999 to 2016 were reviewed. Dental implant prevalence data among adults missing any teeth were estimated for each survey period according to sociodemographic characteristics of the implant recipients. Absolute and relative differences were calculated from 1999-2000 to 2015-2016 and fitted to logistic regression models to estimate changes with time. Multivariable logistic regression was used to estimate any independent associations of sociodemographic covariates with the presence of an implant. Using all these data, a projection was made regarding the proportion of patients who would be treated with dental implants in 2026 under various assumptions of how the temporal trend would continue.

RESULTS

Of the US adults age 18 years or older, 32,758 had at least 1 missing tooth and 618 had at least 1 implant. Fifty-six percent of these individuals were women, and 77% had more than a high school education. Twenty-eight percent of the individuals were age 65 to 77 years, 80% were White, and about 54% had private health insurance.

When individuals with missing teeth who did not have implants were considered, a slightly lower proportion of women was noted. In addition, just 59% had a high school education, 70% were White, and a much lower proportion had health insurance compared to those with implants.

From the 1999-2000 data, the prevalence of implants in adults missing at least 1 tooth was 0.7%, but this increased in 2009-2010 to 1.9%, then jumped to 5.7% in 2015-2016. A similar increasing trend was seen across all the sociodemographic variables that were evaluated. The highest absolute increase in implant prevalence was 12.9% and occurred in individuals age 65 to 74 years. The largest relative increase was 1034% among those age 55 to 64 years.

The implants were placed fairly equally in mandibular and maxillary sites. Most were in posterior sites, except in 1999-2000, when almost 54% were placed in anterior sites. The most common tooth replaced by an implant was either number 19 or number 30.

From 1999-2000 to 2015-2016, the average covariate-adjusted increase in implant prevalence per year was 14%. Specific characteristics linked to a higher use of implants included a nearly 13-fold increase in prevalence in adults age 65 to 74 years compared to those age 18 to 34 years. Having private insurance and an education exceeding high school were each associated with a 2-fold increase in implant prevalence. The temporal trend was much stronger for those age 65 to 74 years, with a considerably slower increase in implant prevalence among people without medical insurance compared to those with either public or private insurance. People with a high school education or less had a much slower increase in implant prevalence compared to those having more than a high school education.

Projections to 2026 under the most conservative scenario were less than 10% (Figure 2). However, if the trend toward the use of

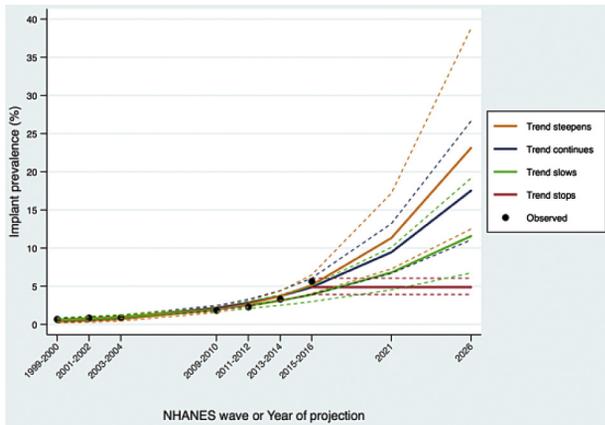


Figure 2. Observed, predicted, and projected implant prevalence among adults with missing teeth in the National Health and Nutrition Examination Survey (NHANES) from 1999 to 2016 and projected to 2021 and 2026. Estimates are from survey-weighted multivariable logistic regression models. For projection scenario 1) trend stops: implant prevalence is estimated to be the same average probability estimated by the regression line in 2015–2016; 2) trend continues at the same pace: the slope of the regression line included all years 2000–2016; 3) trend slows: the slope of the regression line included all years excluding 2015–2016; and 4) trend steepens: the slope of the regression line included all years excluding 1999–2000 and 2001–2002. Solid lines represent the estimated prevalence (for 2016 and earlier) and projected prevalence (after 2016), and dashed lines represent the 95% prediction intervals for those estimates. (Courtesy of Elani HW, Starr JR, Da Silva JD, et al: Trends in dental implant use in the U.S., 1999–2016, and projections to 2026. *J Dent Res* 97:1424–1430, 2018.)

implants continues at the current pace, a 17% prevalence could be expected by 2026. Should a steeper trend develop, the prevalence could reach 23% by 2026.

DISCUSSION

The prevalence of dental implants in adults missing at least 1 tooth increased to a large degree between 1999 and 2016. Although it generally occurred throughout all sociodemographic groups, it was slower among those without health insurance and with a high school education or less. Older adults, those between ages 65 and 74 years, had the most pronounced growth in the use of dental implants.

Clinical Significance

The risk of losing teeth among the US population is decreasing, but the population is also aging, which will likely spur an increase in the use of implants for missing teeth. Disparities in sociodemographic characteristics seem likely to influence the growth of implant prevalence. These findings should be used to help in planning for workforce development and for the implant industry so that future demands can be met and to provide for populations who currently do not see implants as an option for replacing missing teeth.

Elani HW, Starr JR, Da Silva JD, et al: Trends in dental implant use in the U.S., 1999–2016, and projections to 2026. *J Dent Res* 97:1424–1430, 2018

Reprints available from HW Elani, Dept of Restorative Dentistry and Biomaterial Science, Harvard School of Dental Medicine, 188 Longwood Ave, Boston, MA 02115; e-mail: hawazin_elani@hsdm.harvard.edu

LAW AND ETHICS

Doing what's right



BACKGROUND

Conflicts can occur between what is legal and what is ethical. The American Dental Association Principles of Ethics and Code of Professional Conduct (ADA Code) recognizes the difference between law and ethics and applies each to the behavior of dental professionals.

LAW

Law fulfills a societal role and expresses the minimal societal ethical values. Society is willing to enforce this minimal level through civil judgments or criminal sanctions. Law can be either civil or criminal and can be set at all governmental levels. It is developed through the formal processes of legislation, regulation,

and decisions by courts or agencies. Just as formal procedures exist for creating law, similar processes exist for challenging law and changing law.

Law applies to a wide range of people and exists despite culture, religion, or worldview. As a result, it is by nature general and should be fairly and evenly applied. It is a basic ingredient in the framework of society. People are expected to abide by the law, but ethics reaches beyond this minimal level to a higher plane of behavior.

ETHICS

Ethics is based on well-developed standards of right and wrong that lay out what humans are supposed to do, usually with