

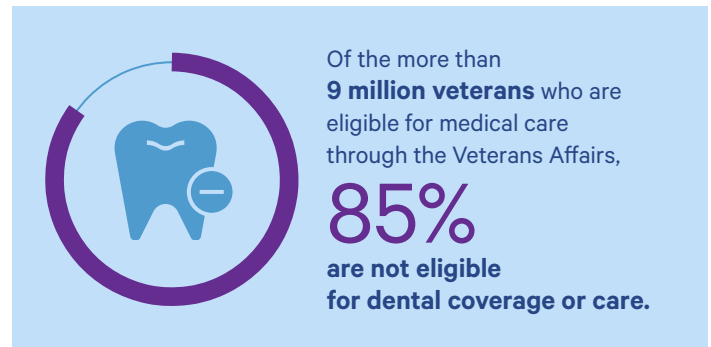
Oral Health Is Essential to Veteran Productivity and Well-Being



Dental Disparities Impact Veteran Oral Health-Related Quality of Life

There are over 17 million veterans in the United States (US), comprising about 5% of the total population.¹ Of the more than 9 million veterans who are eligible for medical care through the US Department of Veterans Affairs (VA), 85% are not eligible for dental coverage or care.² Of the 15% of veterans who are eligible for dental care through the VA, only one-third utilize their benefit each year. Unfortunately, the lack of infrastructure and coverage often results in poorer quality of life and disparate oral and overall health outcomes for veterans.³

Service to country, deployment, and combat experience amplify a veteran's risk of poor health outcomes and reduced quality of life. As a result of these social and environmental exposures, veterans are at increased risk of experiencing chronic disease conditions and oral health disparities.³⁻⁶ Determinants of veteran oral health are multifactorial, influenced by issues such as higher rates of mental health



disorders including substance abuse, increased inflammatory burden, and military culture.⁷⁻⁸ Oral health care-related barriers — including stringent criteria for accessing dental care through the VA⁹ — limit millions of veterans from accessing equitable, affordable, and timely dental care nationwide.

Untreated Dental Disease Is Connected to Increased Problems in the Workplace

Dental health has impacts far beyond the oral cavity, with effects on well-being at individual, community, and populations levels. Annually, untreated dental disease costs US adults and their employers over \$45 billion in lost work productivity.¹⁰ Nearly one-third of dental-related work production loss is associated with unplanned treatments, including dental emergencies.¹¹ Feelings of embarrassment or self-consciousness can exacerbate productivity loss. This can negatively impact a person's willingness to go for job interviews, ability to communicate, and confidence stemming from their teeth's aesthetic appearance.¹² Nearly 18% of working-age adults report that the appearance of their mouth affects their ability to interview for a job, and this number increases among individuals with lower socioeconomic statuses.¹¹ Even after hiring, dental problems may make it more

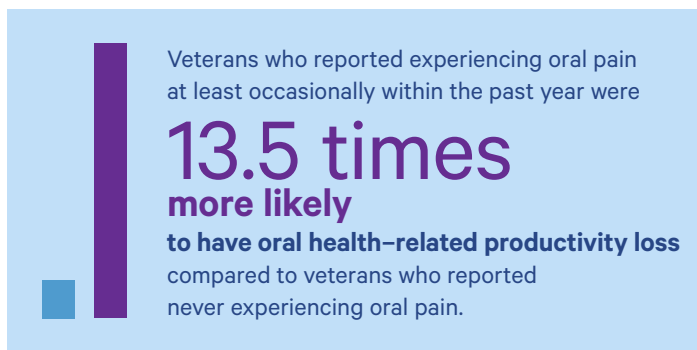
difficult to interact with colleagues, contribute to missed work time, and decrease productivity while working.

Veterans are a strong presence in the workforce, with many federal and state programs financially incentivizing employers to hire veterans.¹³ The impact of poor oral health among veterans on productivity and cost can be substantial given veterans are disproportionately impacted by dental disease. Veterans are 60% more likely to experience tooth decay compared to nonveterans, and 42% report having gum disease.^{3,6} In this analysis, we examined data from the National Health and Nutrition and Examination Survey (NHANES, 2013–2018) and the Medical Expenditure Panel Survey (MEPS, 2019) to quantify the impacts of dental care on work productivity and daily functioning among veterans.^{14,15}

Poor Oral Health Negatively Impacts Veteran Work

Analysis of NHANES data revealed that almost 600,000 veterans reported oral health-related productivity loss at least occasionally in the past year. Adding exacerbating factors, including oral pain and chronic systemic conditions, illuminates a broader narrative on work productivity. Veterans who reported experiencing oral pain at least occasionally within the past year were 13.5 times more likely to have oral health-related productivity loss, compared to veterans

who reported never experiencing oral pain (Appendix 2, Table 3). Unsurprisingly, veterans experiencing oral pain were significantly more likely to report difficulty performing their usual jobs because of issues with their teeth, mouth, or dentures. Also, 13% of veterans who reported at least occasional oral pain reported difficulty performing their usual job, compared to only 1% of their peers who never experienced oral pain.

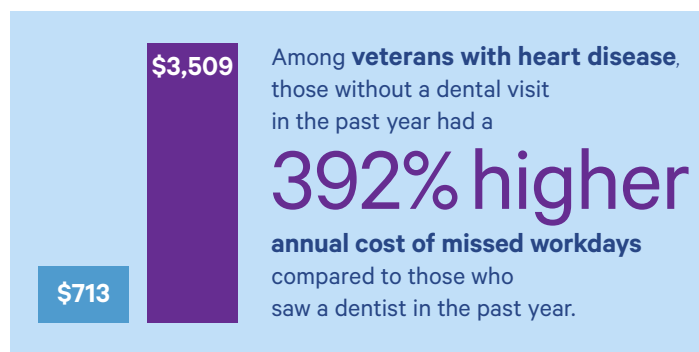
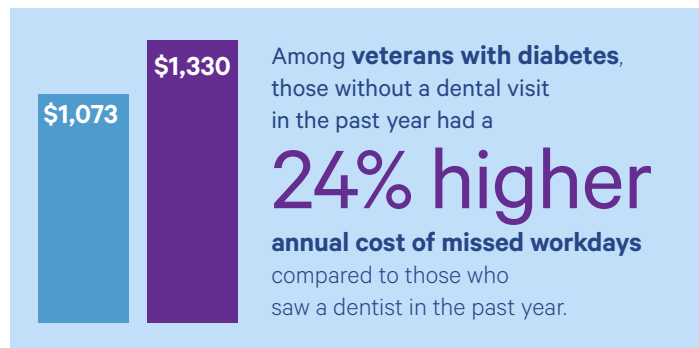


Closely linked with dental outcomes through the oral-systemic connection, chronic disease conditions like diabetes and heart disease are more likely to affect veterans. Analyses indicate that about 22% of veterans have diabetes, compared with only 12% of nonveterans; and nearly 11% have heart disease, compared to approximately 4% of nonveterans (Appendix 2, Table 1). Previous research indicates veterans with heart disease or diabetes are more likely to miss workdays and report lost income.¹⁶

Chronic Diseases and Poor Oral Health Cost Veteran Employers Time and Money

An analysis of MEPS data found that among veterans with diabetes, those without a dental visit in the past year had a 24% higher annual cost of missed workdays (\$1,330), compared to those who saw a dentist in the past year (\$1,073). Among veterans with heart disease, those without a dental visit in the past year had an astounding 392% higher annual cost of missed workdays (\$3,509), compared to veterans who visited a dentist in the past year visit (\$713) (Appendix 1, Table 3).

Major discrepancies in missed work days between veterans and nonveterans compound significant disparities in cost of care. Veterans with heart disease who had a recent dental visit missed 3 days of work compared to 15 days, on average, for those without a dental visit (Appendix 1, Table 4). Although the prevalence of heart disease among veterans is smaller compared to some other chronic diseases, like diabetes, this is a costly disease process that creates significant financial and productivity strain.

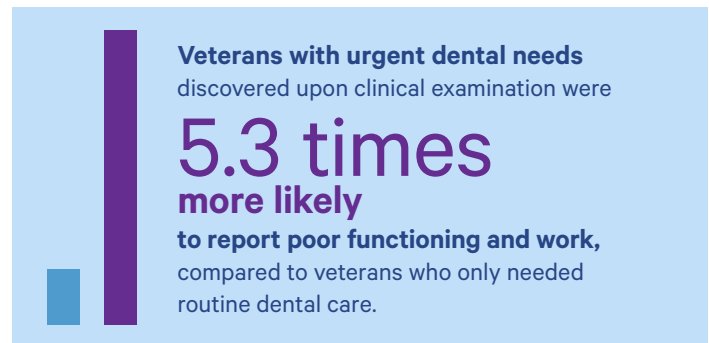
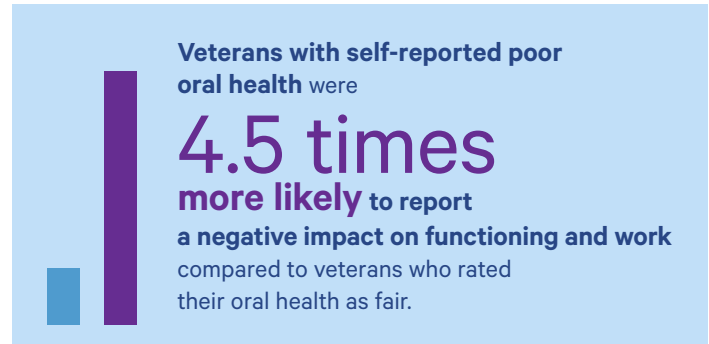


Veterans Struggle with Interpersonal Interactions Due to Poor Oral Health

Healthy teeth and gums are vital for day-to-day activities beyond the workplace setting. Crucial to chewing and swallowing, a functional dentition is necessary to eat healthy, nutritious foods. The appearance of a person's teeth plays a major role in facilitating their social interactions and relationships as well as their ability to speak clearly.

An analysis of NHANES data found that at least occasionally in the past year almost 3 million veterans experienced feeling self-conscious about or embarrassed because of their teeth, mouth, or dentures. This has profound effects on socialization and feelings of loneliness. Beyond appearance, dental disease can manifest as discomfort and pain, which can further isolate individuals. Nearly 3.5 million veterans experienced painful aching in their mouth at least occasionally in the past year. Dental pain may prohibit eating, social interactions, and the ability to take part in activities.

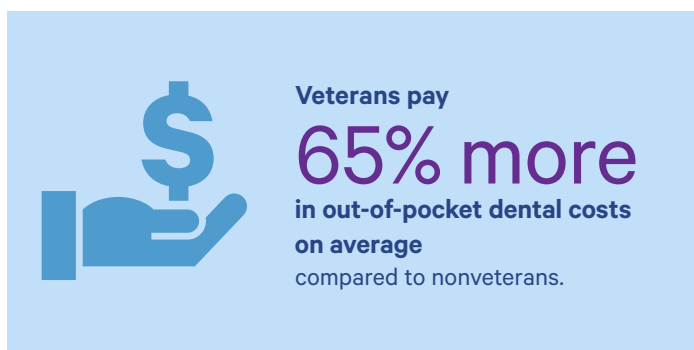
Lastly, associations were evaluated between oral health and social functioning, defined by veterans whose experience of pain or negative feelings about their oral health impacts their daily life. Veterans who reported dental pain, productivity loss in the workplace, and/or feeling self-conscious about or embarrassed because of their oral health within the past year were classified as having poor social functioning. Veterans with self-reported poor oral health were 4.5 times more likely to report a negative impact on functioning and work compared



to those who rated their oral health as fair (Appendix 2, Table 4a). Veterans with urgent dental needs discovered upon clinical examination were 5.3 times more likely to report poor functioning and work, compared to veterans who only needed routine dental care (Appendix 2, Table 4b).

The Bottom Line: Veteran Access to Integrated Care Is Essential to Saving Time and Money

Employment, work productivity, and daily social functioning are critical elements of a whole-person care approach to veteran oral and overall health care. The data clearly indicate



that lack of access to care exacerbated by chronic disease conditions costs veterans and their employers time and money. Veterans pay 65% more in out-of-pocket dental costs on average compared to nonveterans.¹³ The fragmented health care system that veterans and many Americans experience perpetuates inequitable and costly outcomes. Ultimately, this broken system burdens the US health care infrastructure and results in painful oral health outcomes — many of which result in emergency department visits. For veterans, emergency department costs amount to nearly \$1.7 billion each year.¹³



Advancing Cost-Effective and Equitable Solutions for Veterans and Their Employers

Veterans need upstream solutions that prioritize access to cost-effective, integrated health care. Avoiding dental pain and emergency department visits by ensuring access to prevention and chronic disease management is key to improving poor oral health outcomes for veterans.¹⁷ The most effective policy solution to decreasing costs and improving oral health is expanding dental eligibility criteria for veterans who are already receiving medical care and chronic disease management through the VA. Reducing out-of-pocket costs and improving access to dental care through the largest integrated health care system in the nation are the most effective upstream solutions.



The most effective policy solution to decreasing costs and improving oral health is expanding dental eligibility criteria for veterans who are already receiving medical care and chronic disease management through the VA.

Other recommendations include:

- 1. Strengthening the Community Care Network (CCN)** as an interim solution for workforce and infrastructure development that extends options for veterans who are waiting to access dental care. The CCN refers to regional networks facilitating VA-financed care for veterans in community settings. While the CCN is more expensive to implement and removes the veteran from an integrated care environment, this resource still expands the overall oral health care delivery system.
- 2. Ensuring that veterans who are eligible for dental care through the VA utilize the benefit** decreases chances of oral issues compounding over time. Previous research indicates that only one-third of eligible veterans utilize their dental benefits, indicating an opportunity for the VA and other veteran stakeholders to address lack of awareness surrounding benefits.³
- 3. Supporting Federally Qualified Health Centers (FQHCs)** as a safety net solution extends access to an affordable and integrated care environment for veterans. Many FQHCs are part of the CCN and are attuned to the specific care needs of veterans, uniquely positioning the centers to support effective oral health care.
- 4. Implementing state and local policy solutions**, like Medicaid expansion and grants, may reduce the cost of care for veterans caused by limited eligibility at the federal level. While these policies cannot fully address care integration, and therefore cannot fully realize the medical cost savings associated with effective dental care delivery, state and local entities have the opportunity to support their veteran communities by tailoring policies using community resources.

References

1. “QuickFacts: United States,” US Census Bureau, accessed January 4, 2024, <https://www.census.gov/quickfacts/fact/table/US/PST045222>.
2. David Burger, “ADA Continues to Advocate for Veterans’ Access to Care as 2024 Approaches,” ADANews, November 9, 2023, <https://adanews.ada.org/ada-news/2023/october/ada-continues-to-advocate-for-veterans-access-to-care-as-2024-approaches>.
3. The American Institute of Dental Public Health and CareQuest Institute for Oral Health, *Veteran Dental Care Stimulates the Economy and Improves Overall Health*, Boston, MA: The American Institute of Dental Public Health and CareQuest Institute for Oral Health, 2022, https://aidph.org/wp-content/uploads/2022/04/CareQuest-Institute_AIDPH_Follow-Up-Report_CMYK_4.11.22.pdf.
4. David K. Schindler, Gabriela V. Lopez Mitnik, Aida M. Soliván-Ortiz, Scott P. Irwin, Shahdokht Boroumand, and Bruce A. Dye, “Oral Health Status Among Adults with and Without Prior Active Duty Service in the U.S. Armed Forces, NHANES 2011–2014,” *Military Medicine* 186, no. 1–2 (2021): e149–e159, <https://academic.oup.com/milmed/article/186/1-2/e149/5917414>.
5. David L. Albright, Kelli Godfrey, Justin T. McDaniel, Kari L. Fletcher, Kate H. Thomas, Jessica Bertram, Dustin I. Cobb, and Teresa M. Stephens, “Oral Health among Student Veterans: Effects on Mental and Physical Health,” *Journal of American College Health* 68, no. 3 (2020): 263–270, <https://www.tandfonline.com/doi/abs/10.1080/07448481.2018.1540985>.
6. The American Institute of Dental Public Health and CareQuest Institute for Oral Health, “Veteran Oral Health: Expanding Access and Equity,” Boston, MA: CareQuest Institute, 2021, https://www.carequest.org/system/files/CareQuest_Institute_Veteran-Oral-Health.pdf.
7. Elizabeth Nunez, Gretchen Gibson, Judith A. Jones, and John A. Schinka, “Evaluating the Impact of Dental Care on Housing Intervention Program Outcomes among Homeless Veterans,” *American Journal of Public Health* 103, no. S2 (2013): S368–S373, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3969121/>.
8. Elizabeth Ralevski, Lening A. Olivera-Figueroa, and Ismene Petrakis, “PTSD and Comorbid AUD: A Review of Pharmacological and Alternative Treatment Options,” *Substance Abuse and Rehabilitation* 5 (2014): 25–36, <https://www.tandfonline.com/doi/pdf/10.2147/SAR.S37399>.
9. Valerie Nieto, Michelle Arnett, and Danielle Furgeson, “Attitudes and Access Patterns of Michigan Veterans Ineligible for Oral Healthcare Benefits: A Cross-Sectional Study,” *A Journal of Dental Hygiene* 93, no. 4 (August 2019): 6–13, <https://jdh.adha.org/content/jdenthgy/93/4/6.full.pdf>.
10. Amy J. Righolt, Milica Jevdjevic, Wagner Marcenes, and Stefan Listl, “Global-, Regional-, and Country-Level Economic Impacts of Dental Diseases in 2015,” *Journal of Dental Research* 97, no. 5 (2018): 501–507, <https://pubmed.ncbi.nlm.nih.gov/29342371/>.
11. Uma Kelekar and Shillpa Naavaal, “Hours Lost to Planned and Unplanned Dental Visits among US Adults,” *Preventing Chronic Disease* 15 (January 2018): 1–7, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5772383/pdf/PCD-15-E04.pdf>.
12. Deborah Moore and Ross Keat, “Does Dental Appearance Impact on Employability in Adults? A Scoping Review of Quantitative and Qualitative Evidence,” *British Dental Journal* (2020): 1–6, <https://www.nature.com/articles/s41415-020-2025-5>.
13. The American Institute of Dental Public Health and CareQuest Institute for Oral Health, *Inadequate Dental Care for Veterans Is Painful and Costly*, Boston, MA: The American Institute of Dental Public Health and CareQuest Institute for Oral Health, 2023, https://aidph.org/wp-content/uploads/2023/03/CareQuest_Institute_AIDPH_Inadequate-Dental-Care-for-Veterans19.pdf.
14. “Veterans Opportunity to Work,” US Department of Veterans Affairs, accessed January 4, 2024, <https://www.benefits.va.gov/VOW/for-employers.asp>.
15. “National Health and Nutrition Examination Survey,” Centers for Disease Control and Prevention, accessed January 4, 2024, <https://www.cdc.gov/nchs/nhanes/index.htm>.
16. “Medical Expenditure Panel Survey,” Agency for Healthcare Research and Quality, accessed January 4, 2024, <https://meps.ahrq.gov/mepsweb/>.
17. “About Our VA Community Care Network and Covered Services,” US Department of Veterans Affairs, accessed January 4, 2024, <https://www.va.gov/resources/about-our-va-community-care-network-and-covered-services/>.

Appendix 1

MEPS Analysis: Cost of Missed Workdays among Veterans

Methodology

The study sample included observations of 28,512 employed individuals aged ≥18 years, representing a weighted population of 327,396,693 individuals in 2019 consolidated (HC-216) from the Medical Expenditure Panel Survey (MEPS). MEPS is an ongoing national household survey for the civilian noninstitutionalized US population. The data are collected through in-person interviews and include information on the respondents' health status, demographic and socioeconomic characteristics, employment, missed workdays, and access to care. The survey collects comprehensive data on health care utilization and expenditure and has a complex survey design, which includes multistage sampling, clustering, and stratification with oversampling of minorities.¹

Variables

All variables used for analysis were based on self-report:

Veteran Status

Veteran status indicates a yes response to the question “Ever served on active duty?” For respondents who opt in to additional MEPS modules, an additional survey assessing health care access and utilization is administered. After applying exclusion criteria and appropriate sample weights, we analyzed responses of 368 individuals representing a weighted population of 5,638 veterans.

Diabetes

Diabetes indicates a yes response to the question “Have you ever been diagnosed with diabetes?”

Heart Disease

Heart disease indicates a yes response to the question “Have you ever been diagnosed with heart disease?” This survey question was limited to respondents aged 18 years and older.

Dental Care Visits

Dental care visits measured the number of times a respondent visited a dentist during 2019. These were recoded into a categorical variable where “respondent did not visit the dentist in 2019” was coded as zero and “respondent visited the dentist in 2019” was coded as one.

Missed Workdays

Missed workdays represent the number of times the respondent lost a half day or more from working in 2019 due to illness, injury, or mental or emotional problems during the survey period. Because half days and full days were not distinguished in MEPS, all days lost were recorded as full days lost, which is consistent with previous studies that used MEPS data. A response of “no workdays lost” was coded as zero.

Cost of Missed Workdays

Annual cost of missed workdays was determined by multiplying the wage of each respondent by the number of missed workdays. The daily wage rate was calculated by multiplying the non-self-employed hourly wage rate by mean hours worked per day. MEPS only collected data for usual hours worked per week, not hours worked per day. The mean hours worked per day was calculated by dividing the usual hours worked per week by five days, representing a standard work week and similar to previous MEPS studies.² Any negative values or missing values were excluded from the analyses. To calculate the mean daily wage, we multiplied the mean hours worked per day by the hourly wage. To estimate the annual cost of missed workdays per individual in the sample (veteran vs. nonveteran vs. total), we multiplied the mean daily wage by the annual missed workdays of the individual in each respective sample.

Table 1. Annual cost of missed workdays

	Veterans		Nonveterans		Total	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Average Cost of Missed Workdays						
Total	\$977.69	\$145.35	\$706.96	\$31.07	\$716.03	\$30.50
Diabetes Status						
Diabetes	\$1,215.27	\$520.51	\$1,008.90	\$109.53	\$1,013.58	\$105.64
No Diabetes	\$953.27	\$149.86	\$685.45	\$32.54	\$694.51	\$32.06
Heart Disease Status						
Heart Disease	\$2,073.19	\$983.19	\$1,275.30	\$267.47	\$1,306.86	\$250.65
No Heart Disease	\$917.70	\$138.88	\$698.70	\$31.02	\$706.68	\$30.40

Table 2. Average annual number of missed workdays

Number of Missed Workdays	Veterans		Nonveterans		Total	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Total	3.93	0.53	3.50	0.11	3.51	0.11
<i>Diabetes Status</i>						
Diabetes	5.65	2.37	5.37	0.47	5.40	0.47
No Diabetes	3.76	0.53	3.36	0.12	3.38	0.12
<i>Heart Disease Status</i>						
Heart Disease	8.73	3.62	6.38	0.98	6.45	0.92
No Heart Disease	3.67	0.50	3.46	0.11	3.5	0.11

Table 3. Annual cost of missed workdays with dental visits

		Veterans		Nonveterans	
		Estimate	Standard Error	Estimate	Standard Error
<i>Diabetes Status</i>	<i>Dental Visit Status</i>				
Diabetes	Dental Visit in the Last Year	\$1,072.83	\$523.75	\$1,282.97	\$195.48
	No Dental Visit	\$1,329.64	\$809.92	\$783.98	\$109.43
No Diabetes	Dental Visit in the Last Year	\$788.92	\$202.15	\$899.51	\$62.94
	No Dental Visit	\$1,072.57	\$213.58	\$513.85	\$29.16
<i>Heart Disease Status</i>	<i>Dental Visit Status</i>				
Heart Disease	Dental Visit in the Last Year	\$713.21	\$166.88	\$1,502.49	\$463.63
	No Dental Visit	\$3,508.95	\$1,674.94	\$1,074.09	\$288.58
No Heart Disease	Dental Visit in the Last Year	\$823.75	\$198.29	\$916.47	\$60.35
	No Dental Visit	\$985.16	\$188.53	\$524.11	\$27.73

Table 4. Average annual number of missed workdays with dental visits

		Veterans		Nonveterans	
		Estimate	Standard Error	Estimate	Standard Error
<i>Diabetes Status</i>	<i>Dental Visit Status</i>				
Diabetes	Dental Visit in the Last Year	6.29	3.44	5.85	0.79
	No Dental Visit	5.14	3.01	4.97	0.54
No Diabetes	Dental Visit in the Last Year	2.93	0.52	3.73	0.19
	No Dental Visit	4.36	0.85	3.07	0.14
<i>Heart Disease Status</i>	<i>Dental Visit Status</i>				
Heart Disease	Dental Visit in the Last Year	2.94	0.69	6.73	1.56
	No Dental Visit	14.84	5.97	6.07	1.32
No Heart Disease	Dental Visit in the Last Year	3.28	0.63	3.83	0.19
	No Dental Visit	3.95	0.74	3.16	0.13

Appendix 1 References

- i. Agency for Healthcare Research and Quality (AHRQ), Medical Expenditure Panel Survey, 2019.
- ii. Kinfe G. Bishu, Mulugeta Gebregziabher, Clara E. Dismuke, and Leonard E. Egede, "Quantifying the Incremental and Aggregate Cost of Missed Workdays in Adults with Diabetes," *Journal of General Internal Medicine* 30, no. 12 (December 2015): 1773–1779.

Appendix 2

NHANES Analysis: Daily Functioning and Financial Implications of Oral Health Outcomes

Methodology

The study sample included 29,400 respondents weighted to reflect 176,986,387 individuals in the US population from the National Health and Nutrition and Examination Survey (NHANES) (2013–2014, 2015–2016, and 2017–2018 cycles). Inclusion criteria included adults > 21 years who completed the dental examination in NHANES and provided answers to questions about oral pain experience and oral-related productivity loss. NHANES is a national survey that is representative of the noninstitutionalized population, collecting demographic and clinical data through an in-person survey interview, physical examination, and laboratory testing.^a Weights were recalibrated by dividing the sample weights by the number of cycles of data. Descriptive analyses and multivariable logistic regression were performed on weighted data. Regression analyses methodology was modeled similarly to previous investigation of associations between oral health-related productivity loss and individual characteristics of US adults.^b

Variables

Veteran Status

Veteran status indicates a yes response to the question “Ever served active duty in the US Armed Forces, military reserves, or National Guard?” After applying inclusion criteria and appropriate sample weights, the study sample included 1,380 veterans, which was weighted to reflect approximately 18,863,113 veterans nationwide.

Age

Age was categorized as follows: 21–39 years old, 40–59 years old, and 60 years and older. Those categories were recommended to reduce variability in the sample weights for estimates by age, race, and Hispanic origin.^c

Gender

Gender was considered a dichotomous variable, which was recoded into a categorical variable where “male” was coded as one and “female” was coded as zero.

Race/Ethnicity

Race/ethnicity was categorized into the following groups based on NHANES classifications: “white,” “Mexican American,” “other Hispanic,” “Black,” “Asian,” and “Other.”

Income

Income was recorded in two ways. Annual household income was reported as either above or below \$65,000. The ratio of family income to poverty level (FPL) guidelines was also considered and categorized as “< 100% FPL,” “100–199% FPL,” “200–399% FPL,” and “> 400% FPL.”

Health Insurance

The following types of health insurance were considered: private, Medicaid, Medicare, military, and no insurance. Tricare/VA/Champ-VA were considered military health plans.

Diabetes

Diabetes indicates a yes response to the question “Ever been told by a doctor or health professional that you have diabetes or sugar diabetes?”

Heart Disease

Heart disease indicates a yes response to the question “Ever been told by a doctor or other health professional that you had coronary heart disease?”

Oral Pain

Oral pain was based on the question “How often during the last year have you had painful aching anywhere in mouth?” Individuals who reported feeling pain “very often,” “fairly often,” or “occasionally” were grouped into one category, while those who answered “hardly ever” or “never” formed another group.

Last Dental Visit

Last dental visit was categorized as within the last six months to two years ago, between two and five years ago, and at least five years ago.

Reason for Last Dental Visit

The main reason for last dental visit was reported as regular if the individual “Went in on own or was called in by the dentist for check-up, examination, or cleaning”; as scheduled treatment if the person “Went in for treatment of a condition that dentist discovered at earlier checkup or examination”; and as a problem if “Something was wrong, bothering, or hurting.”

Forgone Dental Care

An individual was considered to have forgone dental care in past year if they responded yes to the question “During the past 12 months, was there a time when you needed dental care but could not get it at that time?”

Self-Reported Oral Health Status

Self-reported oral health status was based on a response of excellent, very good, good, fair, or poor to the question “Overall, how would you rate the health of your teeth and gums?”

Assessed Oral Health Status

Assessed oral health status was indicated through the examiner’s categorization of overall recommendation for care, which was “see a dentist immediately,” “see a dentist within the next two weeks,” “see a dentist at your earliest convenience,” or “continue your regular dental care.” A dental recommendation was considered urgent if the patient was recommended to see a dentist either immediately or within the next two weeks.

Productivity Loss

Productivity loss was based on the question “How often during the last year have you had difficulty doing usual jobs or attending school because of problems with teeth, mouth, or dentures?”

Embarrassment Frequency

Embarrassment frequency was based on the question “How often during the last year have you been self-conscious or embarrassed because of your teeth, mouth, or dentures?”

Table 1. Characteristics of study sample, based on veteran status (National Health and Nutrition Examination Survey, 2013–2018)

Characteristic	Veteran N = 18,863,113 ¹	Nonveteran N = 158,123,274 ¹
Age Group		
21–39	10%	25%
40–59	29%	46%
60 and Over	61%	28%
Gender		
Men	93%	43%
Women	7.3%	57%
Race/Ethnicity		
Mexican American	2.7%	8.6%
Other Hispanic	3.4%	6.2%
White	76%	65%
Black	12%	11%
Asian	0.9%	6.0%
Other	5.1%	3.6%
Income		
Less than \$65,000	55%	51%
More than \$65,000	45%	49%
Unknown	1,220,295	13,865,520
Insurance		
Medicaid	2.9%	9.2%
Medicare	14%	8.5%
Military	19%	1.5%
Private	59%	66%
Uninsured	5.2%	14%
Unknown	485,436	8,884,854
Education		
College or More	32%	33%
High School or Less	30%	37%
Some College or Associate Degree (AA)	38%	30%
Unknown	0	105,729
Diabetes		
Diabetes	21.8%	12.0%
No Diabetes	75.2%	85.1%
Borderline Diabetes	2.9%	2.8%
Coronary Heart Disease (CHD)		
Heart Disease	10.6%	3.6%
No Heart Disease	89.2%	96.2%

1. Results are presented as weighted counts and weighted percentages.

Due to rounding, all percentages may not add up to 100%. Insurance types did not include all possible insurance types and do not add up to 100%.

Table 2. Oral health measures, based on veteran status (National Health and Nutrition Examination Survey, 2013–2018)

Characteristic	Veteran N = 18,863,113 ¹	Nonveteran N = 158,123,274 ¹
Dental Utilization		
<i>Last Dental Visit</i>		
Last 6 Months	52%	47%
6 Months to 2 Years	20%	25%
2–5 Years	13%	14%
<i>Reason for Last Dental Visit</i>		
Regular	58%	63%
Scheduled Treatment	15%	11%
Problem	26%	26%
<i>Forgone Dental Care</i>		
Care Needed but Not Received	12%	18%
Care Received if Needed	88%	82%
Oral Health Status		
<i>Self-Reported</i>		
Excellent	14%	13%
Very Good	29%	26%
Good	33%	32%
Fair	16%	19%
Poor	8.7%	9.3%
<i>Assessed by Examiner</i>		
Routine	59%	60%
Earliest Convenience	33%	33%
Urgent	7.8%	6.7%
Oral Health Impacts on Functioning and Work		
<i>Oral Pain, Productivity Loss, and/or Embarrassed</i>		
Yes	26%	31%
No	74%	69%
<i>Oral Pain Frequency</i>		
Very Often	1.8%	3.0%
Fairly Often	3.3%	4.0%
Occasionally	13%	16%
Hardly Ever	31%	27%
Never	51%	50%
<i>Productivity Loss</i>		
Very Often	0.2%	0.7%
Fairly Often	0.8%	1.2%
Occasionally	2.1%	2.3%
Hardly Ever	4.8%	6.6%
Never	92%	89%
<i>Embarrassment Frequency</i>		
Very Often	4.5%	5.4%
Fairly Often	3.2%	3.7%
Occasionally	6.7%	7.5%
Hardly Ever	10%	10%
Never	76%	73%

1. Results are presented as weighted counts and weighted percentages.

Table 3. Logistic regression models of associations between oral health–related productivity loss and individual characteristics of US veterans at least 21 years old with a completed oral examination and responses to the oral pain and productivity loss questions in the National Health and Nutrition Examination Survey, 2013–2018

Characteristic	OR ¹	95% CI ¹	p-value
<i>Had Oral Pain</i>			
No	—	—	
Yes	13.2	5.72, 30.6	<0.001
<i>Age Group</i>			
21–29	—	—	
40–59	5.14	0.74, 35.6	0.093
60 and Over	3.56	0.68, 18.7	0.13
<i>Gender</i>			
Men	—	—	
Women	1.18	0.24, 5.90	0.8
<i>Race/Ethnicity</i>			
White	—	—	
Mexican American	0.11	0.00, 3.50	0.2
Other Hispanic	1.22	0.17, 8.71	0.8
Black	1.14	0.33, 3.90	0.8
Asian	0.00	0.00, 0.00	<0.001
Other	0.18	0.01, 2.97	0.2
<i>FPL</i>			
<100%	—	—	
100–199%	0.89	0.20, 4.01	0.9
200–399%	1.39	0.29, 6.57	0.7
>400%	0.02	0.00, 0.31	0.007
<i>Insurance</i>			
Private	—	—	
Medicaid	3.33	0.55, 20.0	0.2
Medicare	0.89	0.21, 3.80	0.9
Military	1.09	0.48, 2.49	0.8
Uninsured	1.06	0.22, 5.07	>0.9
<i>Education</i>			
College or More	—	—	
Some College or AA	0.73	0.14, 3.98	0.7
High School or Less	0.81	0.12, 5.37	0.8
<i>Diabetes</i>			
No Diabetes	—	—	
Diabetes	0.49	0.17, 1.47	0.2
<i>CHD</i>			
No CHD	—	—	
CHD	0.72	0.18, 2.81	0.6
<i>Last Dental Visit</i>			
Last 6 Months	—	—	
6 Months to 2 Years	0.64	0.25, 1.63	0.3
2–5 Years	0.32	0.08, 1.30	0.11
5+ Years	0.62	0.19, 2.00	0.4

1. 1 OR = Odds Ratio; CI = Confidence Interval

Table 4a. Logistic regression models of associations between self-reported oral health status and oral health impacts and functioning and work (reported dental pain, productivity loss, and/or feeling self-conscious or embarrassed because of oral health) among US veterans in the National Health and Nutrition Examination Survey, 2013–2018

Self-Reported Oral Health Status	OR ¹	95% CI ¹	p-value
Excellent	0.12	0.05, 0.27	<0.001
Very Good	0.23	0.13, 0.41	<0.001
Good	0.33	0.19, 0.57	<0.001
Fair	—	—	
Poor	4.49	1.95, 10.4	0.001

1. OR = Odds Ratio, CI = Confidence Interval
Adjusted for age, gender, race/ethnicity, education, income, insurance, education, diabetes, and heart disease.

Table 4b. Logistic regression models of associations between examiner-assessed oral health status and oral health impacts and functioning and work (reported dental pain, productivity loss, and/or feeling self-conscious or embarrassed because of oral health) among US veterans in the National Health and Nutrition Examination Survey, 2013–2018

Examiner-Assessed Oral Health Status	OR ¹	95% CI ¹	p-value
Routine	—	—	
Earliest Convenience	2.26	1.42, 3.59	0.001
Urgent	5.31	2.65, 10.6	<0.001

1. OR = Odds Ratio, CI = Confidence Interval
Adjusted for age, gender, race/ethnicity, education, income, insurance, education, diabetes, and heart disease.

Appendix 1 References

- a. “National Health and Nutrition Examination Survey Data,” Centers for Disease Control and Prevention, accessed January 4, 2024, <https://www.cdc.gov/nchs/nhanes/index.htm>.
- b. Muath Aldosari, Suellen da Rocha Mendes, Ahad Aldosari, Abdullah Aldosari, and Mauro Henrique Nogueira Guimarães de Abreu, “Factors Associated with Oral Pain and Oral Health-Related Productivity Loss in the USA, National Health and Nutrition Examination Surveys (NHANES), 2015–2018,” *PLoS ONE* 16, no. 10 (October 2021): e0258268.
- c. Centers for Disease Control and Prevention, *National Health and Nutrition Examination Survey: Analytic Guidelines, 2011–2014 and 2015–2016*, December 14, 2018, <https://www.cdc.gov/nchs/data/nhanes/analyticguidelines/11-16-analytic-guidelines.pdf>.

Suggested Citation:

The American Institute of Dental Public Health and CareQuest Institute for Oral Health. Oral Health Is Essential to Veteran Productivity and Well-Being. Boston, MA: February 2024.