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## Hypertension Screening in Dental Settings and the Need to Address Dental Insurance Literacy

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### Cover Page Footnote

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# Hypertension Screening in Dental Settings and the Need to Address Dental Insurance Literacy

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**Abstract.** Hypertension prevalence is rising in the US. Integrating hypertension screening into dental settings and dental insurance literacy can have roles in improving public health outcomes. This research explores whether individuals in rural, town, and urban areas access dental care as frequently as medical care, hypothesizing that routine dental visits provide an opportunity for hypertension screening. Using data from a nine-month study involving interviews across three states, the findings show that dental visits occur as regularly as wellness checkups. The implication for Extension is that expanding dental insurance literacy could enhance patient self-advocacy, facilitating more effective use of hypertension screenings during dental visits.

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## INTRODUCTION

Undetected, undiagnosed, and uncontrolled hypertension are leading killers in the United States. Hypertension is one of the most prevalent and preventable risk factors in chronic disease mortality (US Burden of Disease Collaborators, 2018). Data from the 2017–2020 National Health and Nutrition Examination Survey reveal that nearly half of U.S. adults, or approximately 120 million people, have high blood pressure, and less than 25% of those individuals have it under control (Centers for Disease Control and Prevention [CDC], 2023). Just as alarming, one-third of individuals with uncontrolled blood pressure are not aware of their hypertension (Pirasath et al., 2017; Wall et al., 2014).

Hypertension is a major risk factor for heart disease and stroke, which are the first and fifth leading causes of death in the United States, respectively (CDC, 2021). This issue has become particularly salient in light of the coronavirus 2019 (COVID-19) pandemic because hypertension and certain hypertension pharmaceuticals were risk factors for COVID-19-related mortality (Zhou et al., 2020).

Primary care forms the backbone of the U.S. healthcare system, yet primary care providers are insufficiently distributed throughout the country to address the increasing burden of chronic disease (Elangovan et al., 2014). One possibility is to enlist dentists to provide primary prevention interventions, such as hypertension screenings. Integration of care between health professions has been endorsed and encouraged for

several decades, but the trend has gained momentum over the last 2 decades of the health care reform movement (L. Greenberg et al., 2012; Staras et al., 2021). Such integration would provide a valuable public health opportunity and meet an objective of the Office of Disease Prevention and Health Promotion (Singer et al., 2019).

Referred to colloquially as *chairside screening*, expanding dental services to include health screenings is a practice growing in acceptance among dental practitioners (“Expanding dental services,” 2019). Chairside hypertension screening is viewed favorably by oral health providers and primary care providers (B. Greenberg & Glick, 2018). Capability in oral health settings is already present. Dental professionals at every level—dental assistants, hygienists, and dentists—are trained in the proper techniques for taking blood pressure as part of their education, and they understand methods and reasons for conducting screening (Elangovan et al., 2014). For example, of 3,133 hygienists surveyed, 94% believed that chairside hypertension screening was important (B. Greenberg et al., 2016).

Just as health practitioners’ perception of chairside screening is generally positive, public attitudes have also trended favorably (Bin Mubayrik et al., 2021). Dental patients have demonstrated increased comfort with blood-pressure testing. A decade ago, survey results demonstrated a greater level of acceptance among clinic patients generally and younger private care patients (L. Greenburg et al., 2012).

More recently, dental patients from private practices and public clinics have responded overwhelmingly positively toward chairside screening for medical conditions, particularly hypertension, because blood-pressure testing is noninvasive and immediate (Yonel et al., 2018). Additionally, older adults and racially diverse populations believe that incorporating hypertension screening into routine dental visits is useful and convenient (Greenblatt et al., 2017; Guo et al., 2022).

Dental visits provide an opportunity for early hypertension detection. However, despite the need for an expanded reach of hypertension screening and the acceptance of chairside testing, only a modest number of dental practices integrate blood-pressure screening into their routine care, and correspondingly few patients coordinate with preventative health services when advised (Hughes, 2019). One reason is the electronic barrier between dental and health practices. Medical and dental practitioners record and share patient data by using electronic records, but the systems are rarely compatible with each other (Atchison et al., 2018). Electronic health information exchange allows doctors and other health care professionals and patients to access and share vital medical information. However due to the historically siloed nature of oral health care, such a health information exchange is seldom used in dentistry (Maryland Healthcare Commission, 2021). Therefore, responsibility falls on patients to relay screening information to their primary providers.

The gap between acceptance and practical benefit of chairside hypertension screening presents an opportunity for Extension to assess the situation and develop solutions. Changes in health care and health insurance policies continue to place higher levels of responsibility on consumers to make informed health care decisions (Edward et al., 2019). Extension exists to provide trusted, practical education, and to do so, it relies on input from community members (Association of Public and Land-Grant Universities, 2022). The first step in this process is to compare how and how frequently individuals in a cross section of environments access dental and health care.

## OBJECTIVES

This research is a segment of a larger study project. The objective of the project was to gather preliminary data on consumer usage and decision-making processes related to health care. The study examined the purchase of health-related insurance and access to health, dental, and other forms of care of those living in rural, town, and urban communities. The objective of this sub-study was to determine whether individuals from high- and low-population areas had access to dental care and to test the hypothesis that they used dental care at least as frequently as or more frequently than primary medical care. If this hypothesis were true, then Extension

oral health literacy and dental insurance literacy education could remove barriers to leveraging dental visits in the effort to detect and control the high levels of hypertension in the population.

## METHODS

Researchers from three states participated in the research and data collection. Three interview surveys with scripts were developed by the principal investigators at North Dakota State University (NDSU) and Kansas State University (KSU), with input from the principal investigator from University of Maryland (UMD). NDSU was the institutional review board (IRB) of record for all three states. Once IRB approval was given at NDSU, the other two researchers submitted their IRB applications to KSU and UMD. They were approved prior to any data collection.

## RECRUITMENT OF PARTICIPANTS AND INTERVIEW PROCESS

Participants were recruited in each state separately. Recruitment was done by social media, email LISTSERVs, and press releases. Prospective participants completed an application form. They were required to be over the age of 21 and agree to the interviews. Each state received interest from more participants than was needed for the project, and they were accepted in order of application until selection criteria were met. This process allowed the project team to select participants who represented farm/ranch families, nonurban town families, and urban families with an oversample of those living on a farm/ranch. Participation was capped at three per state each from urban and town locations.

One initial interview and eight follow-up monthly interviews were conducted. In the first and last interviews, participants were asked about their self-efficacy concerning access to health care and health insurance as well as their sense of financial wellness. In all nine interviews, participants answered questions concerning many aspects of health care usage. The first and final interviews were estimated to last 45 minutes apiece, for which each participant received an incentive of \$50. Those in between were estimated to last 30 minutes, for which each participant received \$25. There were 13 study participants from each of the three states, or 39 total. Participants answered questions and provided health care usage information for themselves and for all members of their household. In two of the questions on the baseline survey of particular interest for this sub-study, participants were asked the month and year of their last wellness checkup and month and year of their last dental exam. During each of the eight ensuing monthly interviews, participants were also asked to report whether they had seen any health providers, including dental practitioners, during the previous month.

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The researchers wrote and entered the participants' responses during the interviews. Interviews were also recorded as a backup so that the original notes could be checked for accuracy.

## DATA

Analysis was conducted on data the participants supplied for themselves and for their adult spouse/significant other (SO), if any, living in the same household. After interviews were complete, written responses were entered into Qualtrics software and recordings were destroyed, per IRB protocol. All records were reviewed to ensure that variable coding across states and participants was consistent. Time since last wellness checkup and time since last dental exam were calculated in months. Differences in time since last primary care and dental care visits were determined by using paired two sample *t* tests for means.

## SAMPLE

The project team was able to gather data for 39 individuals and their families from the three participating states over the 9-month study period. Relevant information was indeterminate for one participant and six spouses/SOs, so they were excluded from the analysis. Some participants had no additional household members. Table 1 describes our sample's demographics. The sample was split into three distinct self-identified sub-groups: those who lived on a farm/ranch, those living in a town of fewer than 50,000 people, and those living in urban areas of more than 50,000 people. There is no generally accepted definition of these three categories, but the U.S. Census Bureau designates areas with populations greater than 50,000 as urbanized (Renaud & Bennett, 2020).

## RESULTS

### DEMOGRAPHICS

The analysis was conducted on 38 study participants and 25 spouses/SOs living in the same household, for which valid health care information was provided ( $N = 63$ ). Demographics are described in Table 1. The data reported in Table 1 were obtained during the initial interview.

There were 18 from North Dakota, 22 from Kansas, and 23 from Maryland. The majority ( $n = 40$ , 63.5%) lived in rural areas, and the remainder lived in town ( $n = 11$ , 17.5%) or urban ( $n = 12$ , 19%) areas. Each state had rural, town, and urban participants. The participant sample was predominantly Caucasian ( $n = 57$ , 90.5%). The average age of participants and spouses was 43. Chronic disease information was collected on only 38 participants, and of those, 17 (43.5%) had been diagnosed with a chronic disease.

**Table 1.** Demographics

	Total N	% Total	N S1 ND	NS2 KS	N S3 MD
Total participants and spouse/significant other	63	100%	18	22	23
<i>State of residence</i>					
S1: North Dakota	18	28.6%	18	0	0
S2: Kansas	22	35.0%	0	22	0
S3: Maryland	23	36.5%	0	0	23
<i>Residence</i>					
Rural	40	63.5%	9	15	16
Town	11	17.5%	5	2	4
Urban	12	19.0%	4	5	3
<i>Sex</i>					
Female	37	58.8%	11	23	23
Male	26	41.2%	7	9	11
<i>Race</i>					
Caucasian	57	90.5%	18	21	18
Asian	2	3.2%	0	0	2
Hispanic	2	3.2%	0	1	1
Biracial	1	1.6%	0	0	1
Black	1	1.6%	0	0	1
<i>Health Exams</i>					
Had a wellness visit during the study	29	46%	7	9	13
Had a dental exam during the study	30	48%	6	10	14
Total participants only	38	100%			
Diagnosed with chronic illness	17				

### DATA ANALYSIS

The data analysis is described in Table 2.

At the first interview, we asked the number of months since the last wellness checkup and the number of months since the last dental exam. Comparisons were made between the two sets of responses to identify any significant difference between them. Our hypothesis would be supported if the mean number of months since participants' last dental visit was the same or less than the mean number of months since the last wellness visit. We analyzed the data for all the participants and determined that the mean number of months

**Table 2.** Paired *t* Test Results for Primary Care and Dental Visits

	Mean # months since primary care visit	Mean # months since dental care visit	N	df	P(T ≤ <i>t</i> )
All participants and spouse/significant other (SO)	12.93	10.95	63	62	0.2498
Rural resident participants and spouse/SO	15.99	11.13	40	39	0.1042
Town/Urban participants and spouse/SO	7.61	10.65	23	22	0.2487
Participants who have a chronic disease	7.87	5.83	17	16	0.1700
Participants who do not have a chronic disease	12.21	11.93	21	20	0.4818

since the last wellness visit was 12.93, and the mean number of months since the last dental exam was 10.95, supporting the hypothesis. Although the mean time span since the last dental visit was shorter, the statistical difference was not significant ( $P > .05$ ). This result also supports the hypothesis that consumers have dental exams at least as regularly as they have wellness checkups. We also broke down the data by those diagnosed with a chronic disease and by those living in rural versus town and urban areas to see whether the presence of disease or rural living influenced access and use of dental care. Rural and town individuals were combined in the analysis due to the small size of the sample; the sample size was too small to make meaningful comparisons between states. Regardless of grouping, participants had a statistically similar number of months since their last wellness and dental visits. Additionally, the number of individuals with a reported dental visit ( $n = 30$ ) during the 9 months of the study was only slightly more than the number of individuals with a reported wellness visit ( $n = 29$ ), further bolstering the hypothesis.

## DISCUSSION

Dental professionals are uniquely positioned to perform chairside wellness care and fill the gap in preventative health needs, including hypertension screening. The sample group indicated that for rural and town/urban residents, time since their last dental visit was statistically similar to time since their last primary care visit. This information adds to existing data showing that among the general population, people have dental care at least as often as medical care (Fleming & Singhal, 2020), that 65% of the adult population has had a dental exam within the last 12 months (Clarke et al., 2020), and that 60% have dental exams regularly (B. Greenburg et al., 2016). This result confirms the opportunity for chairside screenings. However, although dental and primary care providers generally champion chairside screening during these visits, they face several barriers translating dental testing into successful patient outcomes. One of these barriers

is patient follow-through. Medical providers usually record patient interactions, tests, diagnoses, and outcomes within electronic health records (EHRs). They refer to these records during ensuing visits to check patient follow-through with instructions and recommendations. EHRs are also used to communicate with specialists and other providers, such as pharmacists. These systems help other practitioners provide needed, accurate, and up-to-date care. Use of EHRs in dental settings has historically lagged their use in primary care (Ford, 2015), and although advances have improved integration (Acharya et al., 2018), these systems frequently do not “talk” to each other. If a patient receives hypertension screening during a dental visit, results are not usually transmissible to their primary care physician; instead, anyone who is screened to be hypertensive is responsible for reporting that information to their primary care provider. Therefore, chairside screenings place the burden of follow-through on patients, which requires them to have initiative and the self-efficacy to advocate for themselves.

This situation, in turn, places a patient education requirement on dental and medical providers, which they have neither the time nor the personnel capacity to offer (Linabarger et al., 2021).

Dentists have the expertise and willingness to incorporate routine blood-pressure screening into their patient exams, but consumers lack the self-efficacy to request and best use this opportunity (Haskins, 2018). Capacity to advocate for and act on chairside hypertension screening is dependent on health literacy. *Personal health literacy*, which includes oral health literacy and health insurance literacy, refers to the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others (Health Resources and Services Administration, 2022). *Oral health literacy* is, in part, the degree to which a person is able to get and use oral health information and services to make good decisions about health. It is estimated that only one in 10 adults in the United States can fully understand written material on health. People with low health literacy

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are also more likely to have low oral health literacy (U.S. Department of Health and Human Services, 2021). Low oral health literacy is a risk factor for disease, oral and otherwise, in rural locations (VanWormer et al., 2019) and among Hispanics (Nguyen et al., 2022), Blacks, and individuals with low socioeconomic status (Baskaradoss, 2018). Individuals with low health literacy are less likely to understand screening results and significance, make a follow-up appointment with a primary care physician, and commit to long-term treatments.

## IMPLICATIONS FOR EXTENSION

*Health insurance literacy* falls within the domain of health literacy and is defined, in part, as a person's ability to use their insurance to seek appropriate health care services (Edward et al., 2019). Health insurance literacy education works. It has been well established that health insurance education aids consumers in understanding their benefits and how to use them, increases their confidence in selecting health insurance, and reduces their confusion in making smart health decisions (Koonce et al., 2017; Russell et al., 2014). Extension has a well-developed and research-tested health insurance literacy initiative to deliver consumer education (Bartholomae et al., 2016). Since 2015, Extension has produced more than 350 certified health insurance educators.

However, the Extension Certified Health Insurance Educator program does not include content on using dental insurance. Dental practitioners are increasingly performing health-related screenings, but the results are not being transferred from dental to health settings. Because practitioners do not have the capacity themselves to educate consumers on best steps to manage those referrals, Extension could address this public need by expanding the health insurance literacy program to include a module on dental insurance. Suggested topics include (a) understanding dental insurance benefits, (b) talking to dentists about hypertension screenings, and (c) managing referrals between dentists and doctors.

Extension could make these resources available to dental and primary care practitioners as well as directly to consumers. With an army of almost 2,000 county-based family and consumer sciences agents (Wang, 2014), Extension is well positioned to create and deliver educational resources. Extension could provide consumers with the knowledge and confidence to self-advocate for chairside screenings and to overcome the limitations of EHRs in communicating chairside screening results to primary care practitioners.

## LIMITATIONS

This study does have limitations. Participants were not asked the frequency of dental or primary care visits. It was decided that the number of months since the last visit would be a sufficient and more accurate proxy question. Participants were primarily Caucasian, limiting our ability to gauge potential

racial or ethnic disparities in health care access and use. Lastly, although participants were broadly dispersed among rural, town, and urban communities in three states, the overall sample size was small.

## CONCLUSION

Dental insurance use is an overlooked piece of health insurance literacy. Dental care is a component of health care, and insurance literacy is a component of access to care. The consumers in our study had dental exams with the same frequency as primary health care visits, demonstrating the opportunity for chairside hypertension screening. However, when patients do receive chairside screenings, they are tasked with managing referrals without the aid of the electronic transmission of health information between practitioners. Dental practitioners have the expertise and willingness to perform hypertension screening, but consumers lack the knowledge and confidence to advocate for this care and act on results. Extension family and consumer sciences agents, educators, faculty, and specialists with expertise in nutrition, healthy living, finance, and health insurance supply myriad research and programming topics. There is a demonstrated need for Extension to harness and leverage this human capital to advance dental insurance literacy. Collectively, Extension could promote awareness of and provide education on chairside screening so consumers could best use that information to detect hypertension, receive care for controlling it, and stay healthier.

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