



## Medical-Dental Integration in Public Health Settings: An Environmental Scan

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# Executive Summary

Noncommunicable chronic diseases (NCDs) account for almost 90% of total deaths in the United States.<sup>1</sup> The four most common NCDs—cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases—share common risk factors, including cigarette use, alcohol use, and dietary behaviors associated with obesity and elevated blood sugar.<sup>1</sup> The most common oral diseases—dental caries, periodontal disease, and oral cancer—also share these same risk factors.

A coordinated approach to primary prevention, the “common risk factor approach,” argues that coordinated primary prevention of oral and systemic diseases will reduce programmatic costs, and increase efficiency and effectiveness.<sup>2</sup> However, use and evaluation of this coordinated approach in primary prevention activities in the United States has not been well documented.

This report describes the results of an environmental scan to identify, categorize, and describe examples of medical-dental integration in US public health settings. Findings are intended to inform public health officials and other stakeholders about existing programs and policies that encourage coordination and integration.

## Methods

Between September 2016 and September 2017, we collected information about programs through a three-step process:

- 1) A literature review that included a scoping review of peer-reviewed publications and a search of grey literature (i.e., conference proceedings, presentations, technical reports)
- 2) A series of web-based surveys administered to three groups of stakeholders: state oral health programs, state chronic disease programs, and community dental programs
- 3) Key informant interviews of selected stakeholders identified from the previous activities

## Results

The majority of integrated programs that we identified were clinic-based and categorized according to risk factor or chronic condition targeted:

- 1) Cardiovascular disease and oral health
- 2) Diabetes and periodontal disease
- 3) Maternal and child health
- 4) Obesity and nutrition
- 5) Tobacco use and oropharyngeal cancer

Other major categories of programs, which broadly target multiple common risk factors, included:

- 1) Multimedia health campaigns
- 2) Co-location of medical and dental services
- 3) Health workforce innovations
- 4) Integrated insurance benefits

## Key Findings

### *Cardiovascular disease and oral health*

- Integrated activities targeting cardiovascular and oral health in public health settings typically involve clinical screenings of dental patients for hypertension.
- Well-developed programs generally include formalized clinical protocols for screening and referral, standardized training, and electronic health record (EHR) systems that facilitate and track outcomes.

### *Diabetes and periodontal disease*

- Chairside (point-of-care) screenings for diabetes in dental settings will identify a substantial

proportion of adult patients with elevated blood glucose; thus, programs may wish to target activities towards their most at-risk patients.

- Clinical co-location, as well as shared EHR systems, facilitate bidirectional referrals between medical and dental providers for patients with diabetes.
- The type of device used for chairside screenings should be chosen carefully in order to minimize the chance of false positives or negatives.

### *Maternal and child health*

- Programs integrating medical and dental care for pregnant women and children most commonly involve dental referrals from pediatric primary care providers, who may also provide fluoride varnish and anticipatory guidance related to oral health.

### *Obesity, nutrition, and oral health*

- Integrated efforts targeting nutrition often take the form of media campaigns and largely focus on reducing sugar-sweetened beverage consumption and increasing water consumption.
- Several community oral health programs report local activities related to dietary counseling, improving food security, and dental referrals for nutritional counseling.

### *Tobacco use and oropharyngeal cancer*

- Programs primarily offer integrated approaches to tobacco cessation and counseling; they may also encourage medical providers to perform oral cancer screenings.
- HPV vaccinations and their role in preventing oral cancer is an emerging area of medical-dental integration in public health activities.

### *Non-clinical approaches*

- **Multimedia health campaigns** that explicitly target both oral and general health outcomes focus on reducing sugar-sweetened beverage consumption. The two campaigns detailed in this report target large audiences using strong, central messages.
- **Co-location of medical and dental providers** facilitate bidirectional referrals and flagging records of dental patients who have chronic conditions. Co-located delivery systems may include medical and dental providers located under one roof or, alternatively, medical and dental providers working at separate facilities within a centrally managed system of care.
- **Innovative health workforce models** that contribute to integrated medical and dental care include dental hygienists working in primary medical care settings as well as community health workers (CHWs) whose scope spans oral and systemic health.
- **Integrated insurance benefits** offer innovative models that provide dental coverage to individuals with chronic medical conditions. Preliminary research on these programs has demonstrated overall cost savings by including a dental benefit for these populations.
- **Health care reform** activities related to medical-dental integration primarily include emerging value-based purchasing models as well as Accountable Care Organizations. However, the degree of dental involvement in these activities is currently quite limited.

## **Challenges**

Most of the challenges identified by this environmental scan are not unique to medical-dental integration, but shared with other public health activities. These include lack of funding, stakeholder buy-in, competing priorities, scalability, and sustainability. Specific challenges in this field are largely related to:

- 1) **Evidence of effectiveness.** Many integrated activities lack documentation of effectiveness for cost and health outcomes.
- 2) **Professional guidance.** Stakeholders note a lack of standardized guidance from professional organizations and agencies, and a lack of established protocols for implementing integrated activities.

- 3) **Reimbursement for services.** Payment mechanisms to reimburse providers for cross-disciplinary services are lacking, although some state Medicaid agencies have made progress here.

## Recommendations for future directions

- 1) **Patient referrals.** Many programs that target oral health and chronic diseases include cross-disciplinary patient referrals. For example, dental providers who screen patients for diabetes often refer high-risk patients for primary care follow-ups. Active referral methods, including “warm hand-offs” and direct patient scheduling, can improve referral completion rates. Completions are also improved by establishing formalized protocols within an organization and training providers in these protocols. Active methods that use shared EHRs also allow for programs to evaluate outcomes.
- 2) **Professional guidelines.** Creating interprofessional guidelines and toolkits for integrated activities would reduce start-up barriers to implementation, improve provider confidence, and facilitate standardization.
- 3) **Holistic targeting of risk factors.** Many programs target multiple common risk factors. For example, it was not uncommon to find that community health centers that perform point-of-care diabetes screenings in dental settings also perform blood pressure screenings. Future initiatives should consider targeting common risk factors using a holistic approach where this is appropriate.
- 4) **Prioritization of local community needs.** Although this type of holistic approach was often noted with large-scale organizations, several smaller programs targeted single risk factors based on local needs assessment. This approach may be more appropriate for organizations that serve smaller populations or have fewer resources.
- 5) **Integration of health care teams.** Innovations that capitalize on workforce flexibility of dental hygienists and CHWs help bridge the gap between medical and dental care. In addition to preventive services, these workers can also assist with case management, care coordination, and social services. By incorporating these workers into integrated care teams, public health programs can extend the reach of medical and dental services to address social determinants of health.
- 6) **Develop public health legislation to target chronic diseases and oral health.** Legislation that supports workforce flexibility, targets sugar-sweetened beverage consumption, and improves reimbursement for cross-disciplinary services promotes high-level systems change to support integration.

## Conclusions

Public health activities targeting oral health and chronic diseases operate at multiple levels, including public policy, community-level campaigns, health care delivery systems, and clinical interventions. Well-developed efforts were especially noted for environmental approaches targeting sugar-sweetened beverage consumption, state-level efforts targeting tobacco use and oral cancer, and co-location of medical and dental services. The lack of robust evaluation and effectiveness data surrounding most of the activities described in this report may hamper widespread implementation, sustainability, and stakeholder support.



# 1. Introduction

Noncommunicable chronic diseases (NCDs) account for almost 90% of total deaths in the United States.<sup>1</sup> The four most common NCDs—cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases—share common risk factors, including tobacco and alcohol use and dietary behaviors associated with obesity and elevated blood sugar.<sup>1</sup> The most common oral diseases—dental caries, periodontal disease, and oral cancer—share these common risk factors. A coordinated approach to primary prevention, the “common risk factor approach,” argues that coordinated primary prevention of oral and systemic diseases will reduce programmatic costs and increase efficiency and effectiveness.<sup>2</sup> However, use of this coordinated approach in primary prevention activities in the United States is not well documented.

While a common risk factor approach outlines opportunities for coordinated primary prevention of oral and systemic diseases, increasing evidence also supports the integration of secondary and tertiary prevention approaches. Studies have found associations between periodontal and cardiovascular disease,<sup>3</sup> and a recent Cochrane systematic review found that control of periodontal disease results in a statistically significant reduction in glycated hemoglobin (A1C) levels in people with diabetes, indicating improved metabolic control.<sup>4</sup> Additionally, oral health status can be an indicator of other systemic diseases; oral exams can detect signs of nutritional deficiencies and immune disorders, including the many oral manifestations of HIV/AIDS infection.<sup>5</sup>

In response to growing evidence of linkages between oral and systemic health, national public health priorities aim to increase medical and dental integration. Healthy People 2020 objectives call for increasing the proportion of adults who receive chronic disease preventive services in dental settings, including:

- Tobacco screening and cessation counseling (*TU-9.3, OH-14.1*)
- Testing and referrals for glycemic control (*OH-14.3*)
- Screenings for oral and pharyngeal cancer (*OH-14.2*)
- Dental visits for persons with diabetes (*D-8*)

Despite prioritization, baseline data for several of these objectives do not exist.

Although many state and local interventions address medical-dental integration, national recommendations to guide development and implementation of best practices in this area are lacking. Recent national efforts to reform health care delivery provide an ideal opportunity for policymakers to advocate for the inclusion of oral health in these changes. Currently, lack of knowledge about integrated practices prevents policymakers from appropriate prioritization.

This report addresses that knowledge gap with an environmental scan of medical-dental integration in US public health settings and the inclusion of oral health in health care reform. The aim is to provide information that can be used by policy makers and other public health stakeholders to maximize existing public health resources in order to effectively use our limited public health resources to address common risk factors for NCDs and oral disease.

## 2. Methods

Broadly, this environmental scan comprised three primary activities:

- 1) **Literature review.** The literature review included a scoping review of peer-reviewed publications and a search of grey literature.
- 2) **Stakeholder surveys.** Primary data collection was performed through web-based surveys of three groups of public health stakeholders.
- 3) **Key informant interviews.** We conducted key informant interviews of selected stakeholders identified from the previous two activities.

### *Literature Review*

#### *Search Strategy*

We identified material for the literature review from the following sources:

- 1) Database searches for peer-reviewed research publications
- 2) Current state oral health plans
- 3) Grey literature, including conference proceedings and technical reports

#### Database searches

PubMed searches were conducted for each chronic disease and risk factor using the additional Medical Subject Headings (MeSH) terms and search parameters listed below (**Table 1**). Google Scholar searches were also performed using the same terms, along with multiple variations of each (e.g., cardiovascular diseases and heart disease). Titles and abstracts were reviewed for inclusion; results were limited to studies or programs conducted in the United States. Reference lists from these articles, along with other related articles that did not meet our inclusion criteria (e.g., international programs), were reviewed in order to identify additional publications.

#### State oral health plans

We conducted a review of current state oral health plans to identify whether integration was addressed by the state oral health program. We defined current plans as any document valid from 2015 onwards, as of July 2017 when the search was performed. State oral health plans were identified from the CDC Division of Oral Health's clearinghouse of state oral health plans (available at [https://www.cdc.gov/oralhealth/state\\_programs/oh\\_plans/](https://www.cdc.gov/oralhealth/state_programs/oh_plans/)). If a state did not have an oral health plan listed, a web search was performed to identify whether an oral health plan existed elsewhere. Documents were reviewed to identify whether they specifically addressed any chronic condition of interest (e.g., diabetes, hypertension, cardiovascular disease) or common risk factors (e.g., obesity, nutrition, tobacco use).

**Table 1. Examples of Search Terms Used in PubMed and Targeted Web Search**

<b>Risk factors and chronic diseases</b>	Diabetes mellitus (includes prediabetic state, gestational diabetes) Cardiovascular diseases Hypertension Maternal health, maternal health services Obesity Tobacco use Tobacco use cessation
<b>Intervention</b>	Public health Primary health care
<b>Dental outcome</b>	Dental care Oral health Periodontal diseases Periodontitis

#### Grey literature

Web searches were conducted by inputting various combinations of these and related terms (e.g., "diabetes and oral health intervention") in the Google search engine. Presentations from annual National Oral Health Conference (NOHC) meetings (available at <http://www.>



[nationaloralhealthconference.com/index.php?page=presentations](http://nationaloralhealthconference.com/index.php?page=presentations)) from 2012 through 2016 were reviewed. Presentation titles and slides were screened to identify potential topics of interest. The Association of State and Territorial Dental Directors (ASTDD) Best Practice Approach Reports and State Activities were reviewed by keyword searches followed by a review of full listings of activities by topic. Additional websites from various medical and dental organizations, including ASTDD, Agency for Healthcare Research and Quality (AHRQ), and American Association of Pediatric Dentistry, were also reviewed to identify interventions.

### Search criteria

We applied the following parameters to our literature search:

- English language
- Location limited to the United States
- No target population or age group limitations
- 1995 to present
- Human subjects

### Additional search criteria:

- Articles must describe a specific activity that linked medical and dental health.
- Articles that mentioned medical-dental integration in passing (e.g., the importance of treating periodontal disease in patients with diabetes) were excluded if they did not include information about a specific mechanism to address these two disease entities.
- We excluded editorials and opinion pieces from all sources, including review articles and position papers that advocated for medical-dental integration.

### Data Collection

After identifying programs, we summarized information using an online form developed in REDCap (Research Electronic Data Capture), a secure web application for managing surveys and databases. A modified form of the Community Guide Data Abstraction framework from the Community Preventive Services Task Force was created to classify and describe integrated programs.<sup>6</sup> This modified instrument is provided in Appendix A. Data elements broadly included:

- **Program setting and scope**—type of organization implementing the program (clinical organization, public health agency, academic organization, community-based organization, etc.) and target population.
- **Program characteristics**—what services are delivered, how the program is being implemented, who is being targeted, and where the program is implemented (hospital, clinic, community-based organization, community, etc.).
- **Program components**—broadly categorized into provision of information, behavioral interventions, environmental interventions, legislation or regulation, clinical interventions, and public health or medical care system interventions.
- **Risk factors and chronic diseases targeted**—programs are categorized as self-reported. For example, if a program's stated objective was to target obesity by reducing sugar-sweetened beverage consumption, we included it in the section related to obesity, even though an argument could be made that this intervention could also contribute to reductions in diabetes or early childhood caries.
- **Feasibility**—including costs, potential harms, other benefits, implementation, community acceptance, and other key issues.

Elements describing program quality were captured using the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework.<sup>7</sup> Items from this framework were modified as relevant to this project and incorporated into the data collection form.

### Surveys

A series of surveys was designed through an iterative process in collaboration with ASTDD to

capture information about current activities of interest, examples of medical-dental collaboration, and to identify targets for key informant interviews. Three web-based surveys were administered in February and March 2017. An initial invitation to participate in each survey was followed by two reminder emails sent at one-week intervals.

### **Survey 1. State oral health programs**

In collaboration with ASTDD, this survey was administered to state and territorial oral health programs. Respondents were asked about integrated activities and collaboration with state chronic disease programs, along with barriers and funding sources for collaboration. The complete survey instrument is provided in Appendix B.

### **Survey 2. State chronic disease programs**

In collaboration with the National Association of Chronic Disease Directors, this survey was administered to state chronic disease directors. Respondents were asked about activities conducted in collaboration with their state oral health counterparts and perceived barriers to collaboration (Appendix C).

### **Survey 3. Community dental programs**

This survey was administered to local dental programs via the Community Oral Health Programs Discussion List—a subscription-based email forum for the American Association for Community Dental Programs. Since there are no requirements or restrictions for subscribing, this list contains a very diverse and self-selected group of local programs. Respondents were broadly asked about population served, clinical services provided by dental providers, oral health services provided by medical providers, and health promotion and education activities (Appendix D).

### *Key Informant Interviews*

The purpose of the key informant interviews was to obtain in-depth information regarding the quality of programs or organizations beyond what was collected during the literature review and surveys. Three iterative rounds of interviews were conducted to sample programs across the major settings we identified in the literature review and surveys: state oral health programs, community-based organizations, and medical care systems. Specific targets for interview subjects were selected in collaboration with ASTDD. These were selected for diversity across dimensions represented by the modified Community Guide Data Abstraction framework. Specifically, we selected participants to maximize diversity across disease/risk factor targets (e.g., diabetes, cardiovascular disease, tobacco use, etc.) and activity settings (e.g., community-based organizations, medical care systems, etc.). Programs that appeared promising but had few published details were selected as targets.

Interviews were conducted between July and September 2017 by a single investigator (LT). Interview participants were initially contacted by email with a brief description of the environmental scan, acknowledgement of the research team's interest in their program, and a request to arrange a 10- to 30-minute phone call to discuss the specific program. The interview guide was based on the RE-AIM framework to capture information about program quality (Appendix E). Interviews were recorded, transcribed, and analyzed to highlight pertinent details. Data extraction was performed using a worksheet that highlighted key issues related to program design, quality assessment, and sustainability.

### 3. Integration in Clinical Settings

The majority of integrated programs that we identified were based in clinics. We have organized findings into sections based on the systemic disease or risk factor primarily targeted by each program:

- 1) Cardiovascular Disease and Oral Health
- 2) Diabetes and Periodontal Disease
- 3) Maternal and Child Health
- 4) Obesity, Nutrition, and Oral Health
- 5) Tobacco Use and Oropharyngeal Cancer

For programs that target more than one risk factor, we have included information about each in the relevant sections of this report.

### 3-1. Cardiovascular Disease and Oral Health

Cardiovascular disease and oral health are interrelated, primarily through links between periodontal disease and atherosclerosis. Periodontal disease and heart disease share common risk factors, including cigarette smoking and diabetes. Although there is no conclusive evidence of a causal relationship, periodontal disease and cardiovascular disease share key physiologic features, including bacterial profiles and levels of inflammatory mediators.<sup>8</sup> Early research has demonstrated the potential for cost savings by targeting oral health improvement in patients with heart disease.

The major modifiable risk factors for heart disease include high blood pressure, high cholesterol, cigarette smoking, diabetes, unhealthy diet, physical inactivity, and overweight and obesity.<sup>9</sup> This chapter focuses primarily on integrated programs that target high blood pressure (hypertension) and high cholesterol (hypercholesterolemia). Other risk factors for heart disease—namely, tobacco use, diabetes, diet and physical activity, and overweight and obesity—are covered as separate program targets within this report.

The integrated activities that we identified related to cardiovascular and oral health are aimed at diagnosis and management of hypertension or hypercholesterolemia.

#### Guidelines for the detection of high blood pressure in adults

It should be noted that data collection for this environmental scan was conducted prior to the November 2017 release of updated clinical practice guidelines for high blood pressure (BP) (**Table 2**). Previous guidelines identified hypertension as a systolic BP  $\geq 140$  mm Hg or a diastolic BP  $\geq 90$  mm Hg.

**Table 2. 2017 Guidelines for Classification of Blood Pressure<sup>10,a</sup>**

Category	Blood pressure
Normal	<120/80 mm Hg
Elevated	120-129/<80 mm Hg
Stage 1 hypertension	130-139/80-89 mm Hg
Stage 2 hypertension	$\geq 140$ systolic or $\geq 90$ mm Hg diastolic

a Based on accurate measurements and an average of at least two readings on two or more occasions.

#### Environmental Scan of Publications

Eleven programs that targeted hypertension in clinical settings, including one that also targeted hypercholesterolemia, were identified by an internet search of peer-reviewed literature, reports, conference proceedings, and other publicly available information. Brief program descriptions are listed in **Table 3**.

##### *Program Settings and Scope*

#### Co-location of primary care and oral health services

Eight of the 11 programs identified by this scan involve co-location of medical and dental services in clinical settings—typically, community health centers. Two other programs were led by academic institutions (Columbia University College of Dental Medicine’s ElderSmile program and the University of Medicine and Dentistry of New Jersey). Although the ElderSmile program was instituted by Columbia University with public and private partners, it is a community-based program that provides prevention, transportation, and treatment services in 27 “prevention centers” located in senior centers and other gathering sites in northern Manhattan.<sup>11</sup>

The **ElderSmile program** focuses on reducing health disparities by targeting minority adults age 50 and older.<sup>12</sup> Initiated in 2006 by the Columbia University College of Dental Medicine, the program initially focused on oral health education and dental screenings. In 2010, the program began also providing screenings for hypertension and diabetes with prompt referrals to nearby treatment centers for patients with positive screenings. Preliminary program findings found a high rate of positive hypertension screenings among those previously undiagnosed.<sup>12</sup>

**Table 3. Integrated Programs That Target Cardiovascular and Oral Health**

Program	State	Brief description
Blackstone Valley Community Health Care	RI	Co-location of medical and dental care: screenings for diabetes and cardiovascular disease for all adults in dental settings
ElderSmile	NY	Screenings for dental problems, diabetes, and hypertension; referrals as indicated
Gary and Mary West Senior Dental Center	CA	Senior Dental Center is located within the Senior Wellness Center; provides comprehensive medical and social services for low-income elderly
Kaiser Permanente Cedar Hills Dental & Medical Office	OR	Co-location of medical and dental care: dentists can arrange for primary care services to be provided during dental appointments, including blood pressure checks
Neighborcare Health	WA	Co-location of medical and dental care: blood pressure screenings on all patients; medical referrals as needed
Ohio Association of Community Health Centers	OH	Co-location of medical and dental care: blood pressure screenings on intake for dental patients at 81 health centers
Permanente Dental Associates, Inc	OR, WA	Co-location of medical and dental care: blood pressure taken during dental visits, medical referrals as needed
Salud Family Health Centers	CO	Co-location of medical and dental care: blood pressure screenings on all patients; medical referrals as needed <sup>a</sup>
University of Medicine and Dentistry of New Jersey pilot study	NJ	Pilot study using oral health care providers to identify patients with increased risk for heart disease by screening for several risk factors, including hypercholesterolemia
Wayne Memorial Community Health Centers	PA	Co-location of medical and dental care: blood pressure screenings on all patients; medical referrals as needed
Yakima Valley Farm Workers Clinic	WA	Co-location of medical and dental care: blood pressure screenings on all patients; medical referrals as needed <sup>b</sup>
<sup>a</sup> Key informant interview, September 8, 2017. <sup>b</sup> Key informant interview, September 6, 2017.		

### Targeting hypertension in dental settings

The most common clinical component among the identified programs was blood pressure screenings performed by dental providers (n=10). Most programs that provided blood pressure screenings also implemented formal protocols for referrals of high-risk patients to primary care. One notable exception among programs that we identified was the **Ohio Association of Community Health Centers**.<sup>13</sup> A key informant interview with that association revealed that the organization is focusing current efforts on incorporating blood pressure screenings into the routine dental workflow; future efforts will focus on “closing the referral loop” (key informant interview, August 29, 2017). The intent behind this staging of activities was to avoid overburdening primary care services with referrals from dental providers.

## Evaluation of programs targeting heart disease and oral health

Four programs provided information about outcomes evaluations:

- The **ElderSmile** program (New York City, NY) has published post-implementation information about program outcomes,<sup>14</sup> with an AHRQ evidence rating of “suggestive”—indicating nonexperimental support for an association between this program and targeted health care outcomes.
- The **Neighborcare Integrated Oral Health Program** (Seattle, WA) is reported to take blood pressure measurements on all patients; those with elevated readings are referred to the medical clinic.<sup>15</sup> Reportedly, Neighborcare collects information about selected quality metrics (e.g., percent of pregnant women receiving dental care prior to delivery), although we did not identify specific information related to blood pressure screenings.
- An initiative by **Ohio Association of Community Health Centers** reported numbers of dental sites, operatories, patients screened, and patients identified with elevated readings (>140/90).<sup>13</sup>
- A pilot project conducted by investigators at the **University of Medicine and Dentistry of New Jersey** reported the proportions of screened patients found to have abnormal levels of various risk factors, including cholesterol, blood pressure, A1C, and body mass index.<sup>16</sup>

### Other common risk factors targeted

Several programs that targeted heart disease were also likely to target other common risk factors or conditions, including diabetes, obesity, or diet/nutrition. These are summarized in **Table 4**.

**Table 4. Other Conditions or Common Risk Factors Targeted by Programs**

Other conditions or common risk factors	Programs	Example
<b>Diabetes</b>	Blackstone Valley Community Health Care ElderSmile program Gary and Mary West Senior Dental Center Neighborcare Health Salud Family Health Center	A1C screening in the dental setting for patients with risk factors or symptoms
<b>Obesity or diet/nutrition</b>	Gary and Mary West Senior Dental Center Salud Family Health Center	Nutrition education alongside oral health education
<b>Pregnancy/OB-GYN</b>	Blackstone Valley Community Health Care Neighborcare Health Salud Family Health Center	Education and facilitation of dental care, including CHW home visits
<b>HIV</b>	Neighborcare Health	Aims to increase use of preventive services

### Community Oral Health Programs

In our online survey of community dental programs, 21 of 30 respondents reported that dental providers in their organization performed blood pressure checks. Among these respondents, the majority (n=20) have a mechanism to refer patients with high blood pressure to primary care providers.

Mechanisms for referring high risk patients to primary care providers ranged from passive (e.g., handouts with list of resources or verbal recommendations) to active. Active referral mechanisms reported by survey respondents include:

- Required medical consults
- “Warm hand-offs,” whereby staff escort patients for scheduling
- Flagging electronic charts and having the front desk schedule an appointment

### State Chronic Disease and Oral Health Programs

In our online survey of state and territorial oral health programs, 10 out of 26 respondents reported



that their office supports (i.e., funds or promotes) blood pressure checks and referrals to primary care providers. Few reported coordinating their efforts with the state chronic disease program.

In one example of collaboration, the Maryland Office of Oral Health has recently collaborated with their chronic disease program to establish a program to make blood pressure checks routine in dental settings, including providing referrals to physicians to help patients get treatment (key informant interview, August 7, 2017). This integration has two goals: to establish a stronger connection between physicians and oral health providers and to improve chronic health problems such as heart disease, diabetes, and periodontal disease. The Office of Oral Health is responsible for developing program protocols, while the Center for Chronic Disease Prevention and Control leads evaluation of these activities. This collaboration was originally funded by a CDC grant. Nineteen dental practices enrolled in the program and 15 are currently participating in screenings. Settings include county clinics, federally qualified health centers (FQHCs), and private practices. The program has plans to expand to 50 practices by the end of 2018 and to release a social marketing campaign (“15 minutes with your dentist will save your life”) to increase awareness among the public and dentists.

Evaluation by the Maryland Office of Oral Health primarily assesses process measures, including:

- Number of participating dental practices
- Number of patients referred to primary care
- Number of patients who made an appointment with a primary care provider

In a pilot project funded by the CDC (*Hypertension: Models of Collaboration*), the Minnesota State Oral Health Program addresses bidirectional referrals between dental and medical providers to target hypertension and periodontal disease (key informant interview, August 14, 2017). In FQHC and private practice settings, medical patients with hypertension receive dental screenings from dental assistants; patients with complex symptoms or other vulnerabilities are targeted for dental referrals to address periodontal needs. In dental settings, patients who are identified to have high blood pressure are either referred to urgent care or for routine primary care, accordingly.

Outcomes considered by this project are similar to the ones addressed by Maryland (e.g., numbers of patients and completed referrals); number of patients with periodontal disease that requires treatment is also compiled. One substantial challenge faced by Minnesota is that treatment of periodontal disease is not included in the adult dental benefits covered by Minnesota Medicaid.

In North Carolina, the Oral Health Section collaborates with the Chronic Disease Section to promote the dental team as part of the health care team for blood pressure control. The Chronic Disease Section trains dental providers to perform blood pressure screenings and refer to primary care for abnormal readings.

### *State Oral Health Plans*

From our review of current state oral health plans (n=18), only two directly addressed the topic of cardiovascular disease: Alaska and Iowa. The **Alaska Oral Health Plan** (2012-2016) included a goal to support educational activities to increase awareness of oral health and implications for general health, including cardiovascular disease.<sup>17</sup> One strategy to meet this goal was to collaborate with Chronic Disease Prevention and Health Promotion programs to increase awareness of risks associated with oral disease and cardiovascular disease. Another strategy to enhance medical-dental integration was to integrate information on the importance of oral health in publications and materials produced by Chronic Disease programs.

The **Iowa Oral Health Plan** (2016-2020) included a goal to increase the number of dental professionals who provide chronic disease assessment, including blood pressure screenings and referrals to primary care.<sup>18</sup>

### *Conclusions*

*Integrated activities targeting cardiovascular and oral health in public health settings typically involve clinical screenings of patients for hypertension. Programs that target hypertension are typically found in community health centers or other settings where medical and dental services are co-located.*

The ElderSmile program (New York City, NY) is an example of a well-established, ongoing

community-based program. It is the only example of an integrated activity targeting heart disease and oral health we were able to identify that has published post-implementation information about program outcomes,<sup>14</sup> with an AHRQ evidence rating of “suggestive”—indicating nonexperimental support for an association between this program and targeted health care outcomes.

*Well-developed clinical programs shared several key characteristics:*

- 1) An official protocol for identification and management of patients with elevated blood pressure is used.
- 2) Dental providers often receive standardized training to perform blood pressure screenings.
- 3) Diabetes screenings are also commonly performed in settings that target hypertension.
- 4) Providers use a formalized protocol for active referrals of at-risk patients to a primary care provider.
- 5) Electronic health records (EHR) facilitate and track outcomes of primary care referrals.

**Among the identified programs targeting heart disease and oral health, most also target diabetes.** This is likely due to large overlap among the populations with these diseases: a majority of American adults (74%) with diagnosed diabetes also have high blood pressure or take prescription medication for this.<sup>19</sup>

## Challenges

The major challenges for integrated activities targeting cardiovascular disease and oral health identified by this scan include:

- Dental providers’ level of interest may not be sufficient; however, reimbursement for the referral process and patient education may help incentivize medical-dental integration for dentists.
- Limited information about effectiveness and health outcomes associated with these programs.
- Coordinating new efforts into existing activities and coordination across agencies (e.g., chronic disease and oral health programs) can be difficult.

In addition to the challenges listed above, the limited inclusion of cardiovascular disease as a topic addressed by state oral health programs may also limit emphasis and visibility of medical-dental integration in this area. The 2017 Synopses of State Dental Public Health Programs found that only 13 state oral health programs collaborate with their chronic disease counterparts to address blood pressure.<sup>20</sup> Additionally, a 2014 survey of state oral health programs<sup>21</sup> found that the majority (69%) of programs rated state heart disease/stroke programs in the category of “least collaboration.”

## Recommendations

- 1) Evaluate health outcomes associated with blood pressure screenings in dental settings.
- 2) Incorporate active referrals to primary care for high-risk patients identified in dental settings.
- 3) Explore potential cost-effectiveness of programs that target heart disease and diabetes jointly in dental settings, because these diseases share common risk factors.
- 4) Consider incorporating cholesterol screenings concurrently with blood pressure and A1C testing.
- 5) Identify sustainable funding streams, including public and private partnerships.
- 6) Develop professional guidelines and a toolkit for use in various settings on how to plan, implement, and evaluate prevention and referral activities around cardiovascular disease and oral health.

## 3-2. Diabetes and Periodontal Disease

The relationship between periodontal disease and type 2 diabetes is well established, if not well defined, although recent evidence supports a bidirectional relationship between the two diseases.<sup>22</sup> Since diabetes is known to be a major risk factor for periodontal disease, the 2018 Standards of Medical Care in Diabetes recommend referral to a dentist for comprehensive evaluation as part of initial care management.<sup>23</sup> Diabetes is often associated with other oral health problems, including xerostomia and candida infections. Recent evidence indicates that providing periodontal therapy to individuals with diabetes may result in medical cost savings.<sup>24</sup>

Given these relationships, most integrated activities in this area fall into one of two categories:

- **Referring medical patients with diabetes for dental care.** Referrals from primary medical care to the dentist aim to control oral manifestations of the disease, including gum disease and tooth loss.
- **Blood glucose screenings of adult dental patients.** Screenings in dental settings aim to help identify and manage cases of prediabetes or diabetes.

These types of activities recognize that coordinated management of diabetes and periodontitis improve outcomes for both diseases. A third category of integrated activity focuses on environmental interventions to reduce sugar-sweetened beverage consumption. Details about environmental approaches such as multimedia campaigns are provided in **section 4**.

### *Environmental Scan of Publications*

This section provides an overview of integrated activities targeting type 2 diabetes or prediabetes and oral health. We have not attempted to provide a complete list of publications related to diabetes screenings in dental settings, since the literature in this area is extensive. Rather, we have identified key publications based on relevance to our charge and innovation. For interested readers, several articles offer comprehensive reviews about the rationale for conducting screenings for type 2 diabetes in dental studies.<sup>25,26</sup>

### **About chairside screenings**

Point-of-care screening for type 2 diabetes in dental settings is typically done by measuring blood glucose levels or glycated hemoglobin (A1C) levels. Results from these tests are not sufficient for diagnosis<sup>27</sup>; additionally, dental professionals are not permitted to diagnose prediabetes or diabetes. Referrals to primary care providers for patients with abnormal test results are required in order to diagnose and manage the disease. Recent feasibility and pilot studies are summarized in **Table 5**.

### **About diabetes risk assessment**

Several of the studies in **Table 5** use the American Diabetes Association Diabetes Risk Test (available at <http://main.diabetes.org/dorg/PDFs/risk-test-paper-version.pdf>) or a slightly modified version by the National Diabetes Education Program (NDEP) (available at <https://www.niddk.nih.gov/health-information/diabetes/overview/risk-factors-type-2-diabetes/diabetes-risk-test>). This test generates a patient risk score ranging from 0 to 11, with scores greater than or equal to 5 indicating increased risk for type 2 diabetes. One previous study used the Diabetes Risk Test to prescreen patients: patients with high risk scores were targeted to receive chairside A1C testing.<sup>28</sup> However, two studies that we reviewed did not find significant associations between high Diabetes Risk Test scores and abnormal blood glucose or A1C levels.<sup>29,30</sup>

**Table 5. Chairside Screenings in Dental Settings: Feasibility and Pilot Studies**

Study	Brief description	Findings
Barasch et al, 2012 <sup>31</sup>	Pilot study to train practice-based research network (PBRN) practices (N=28) in United States and Sweden to use glucometers; surveys of patients and dental personnel about barriers	Dental practice survey (n=67 personnel): 100% of dental respondents thought that blood glucose testing was well received by patients and easy to perform. Major barriers: lack of reimbursement, insufficient patient demand. Dental patient survey (n=498): 90% felt testing showed a high level of care. Gaps: did not perform A1C testing, which is more expensive than finger-stick testing.
Barasch et al, 2013 <sup>32</sup>	Examined frequency of elevated plasma glucose in at-risk patients screened (N=498) via chairside glucometer in PBRN practices	"Opportunistic screenings" based on risk factors defined by the American Diabetes Association was highly acceptable to patients. Among patients with at least one risk factor, 31% had non-fasting glucose values $\geq 126$ mg/dl. Gaps: communication of findings with medical providers, provider guidelines, and treatment.
Bossart et al, 2016 <sup>33</sup>	Pilot study of dental hygienists performing chairside finger-stick test of A1C in patients with periodontitis and at least one risk factor for diabetes	A1C testing of at-risk patients (N=50) found 34% of participants had values indicating prediabetes or diabetes. Direct cost per screening was \$9; mean screening time, including patient education, was 14 minutes. 53% of participants with elevated A1C values contacted their primary care provider (PCP) within two weeks as recommended. Gaps: protocol to identify at-risk patients for screening.
Genco et al, 2014 <sup>34</sup>	Field trial of feasibility of screening for diabetes in dental offices and a community health center using risk test and A1C finger-stick test	Among adults aged 45 or older (N=1022), 41% had elevated A1C values. Patients referred to primary care from the community health clinic (CHC) were significantly more likely to follow up than patients seen in private practice (79% vs. 22%, respectively; $p=.001$ ); having a physician of record at the same CHC with shared health records facilitated follow-up. Gaps: poor follow-up with primary care among patients screened in private dental practices.
Giblin et al, 2016 <sup>35</sup>	Pilot study screening of patients in an academic hygiene clinic	Patients (N=154) screened using the American Diabetes Association NDEP Risk Test; 42% found to have increased risk for diabetes. Among patients tested, 61% had elevated A1C indicating prediabetes or diabetes ( $\geq 5.7\%$ ) and received written referrals to follow-up with primary care. Gaps: lack of patient-physician follow-up to confirm diagnosis.
Lalla et al, 2015 <sup>36</sup>	Randomized control trial of an intervention to improve follow-up with a primary care provider after elevated A1C screening	Baseline exam of patients (N=239) identified 42% with elevated A1C ( $\geq 5.7\%$ ) who were then randomized to receive either a basic (control) or enhanced (test) intervention. Intervention focused on education; no significant differences seen at six-month follow-up. Among all participants, 84% reported follow-up with a physician.
Rosedale et al, 2017 <sup>37</sup>	Barriers to primary care follow-up after elevated screening results in a dental setting	Among contacted adults who were referred to PCP for follow-up (N=112), 55% had received the recommended care within three months. Screening letters from the dentist were alternatively viewed as helpful and motivating or burdensome. Most adults appreciated a three-month follow-up call, either to get more information or to alleviate fears. Cost of follow-up care, lack of a regular PCP, fear, and denial were common barriers to follow-up.
Strauss et al, 2014 <sup>38</sup>	Pilot test of a point-of-care A1C device in an academic dental clinic	Readings from lab test compared with point-of-care results were statistically different; in two-thirds of cases, the point-of-care values were greater than lab values, resulting in high proportions of false positive readings.

## Studies of Patient and Provider Attitudes and Experiences

Several recent studies have examined provider attitudes and experiences with conducting chairside diabetes screenings in dental settings (**Table 6**). Study methods primarily include surveys of dental providers, medical providers, and dental patients about attitudes, experiences, perceived importance, and barriers to chairside diabetes screening. According to these studies, providers and patients generally believe that chairside screenings for diabetes is an important component of patient care. Providers are likely to provide counseling or patient education about the link between oral health and diabetes within their current clinical practice.

### Dental providers' attitudes towards diabetes screenings in dental settings

When asked about current practices, comfort, and willingness to implement tests for diabetes screening into patient care, dental provider attitudes were mixed. For example, two studies found that few dentists inquired about A1C levels in patients with diabetes or recorded A1C levels in the EHR. Several studies found that dental providers were not likely to use a glucometer, including one study in which a majority of dental students believed that using a glucometer was outside of their scope of practice. However, two national surveys, one of dentists and one of dental hygienists, found that over half of both provider types were willing to conduct finger-stick tests.

### Perceived barriers to chairside diabetes screenings in dental settings

Certain barriers are likely to impact dentist willingness to conduct chairside diabetes screening tests. Several studies have found that patient willingness, cost/reimbursement, time required, and legal issues related to scope of practice are important to dentists as they consider whether to implement medical screenings in dental practice (**Table 6**). Among those issues, one study found that dentists ranked patient willingness, cost, and time as the most important considerations.<sup>39</sup> Similarly, a study on patient attitudes toward chairside medical screenings found that the vast majority of patients viewed confidentiality, insurance coverage, and time as important.<sup>40</sup>

It is promising that providers and patients generally agree on the importance of conducting diabetes screenings in dental settings; however, certain barriers to widespread implementation include provider comfort with conducting finger-stick tests, as well as the time and cost required.

**Table 6. Chairside Diabetes Screenings in Dental Settings: Studies of Patient and Provider Attitudes and Experiences**

Study	Brief description	Findings
Greenberg et al, 2010 <sup>39</sup>	National survey of general dentists (n=7,400) about attitudes and willingness regarding chairside medical screenings	More than three-quarters of respondents believed it was important to screen for diabetes in the dental office, and 56% were willing to conduct finger-stick tests to screen their patients for diabetes.
Greenberg et al, 2012 <sup>40</sup>	Survey of adult patients at an inner-city dental school clinic (n=288) and two private dental practices (n=182) about dentists conducting chairside screenings	All respondents had favorable attitudes toward chairside screening for medical conditions, although private practice patients had less favorable attitudes than dental school clinic patients. Patients viewed chairside screenings as important, and a majority of both groups indicated willingness to undergo finger-stick tests.
Efurd et al, 2012 <sup>41</sup>	Survey of Arkansas dentists and dental hygienists (n=318) about practice behaviors and management of patients with diabetes	Survey of Arkansas providers with low response rate (17%). Limited proportion of providers (11% of dentists and 8% of dental hygienists) reportedly question patients with diabetes about their A1C levels. 51% of respondents were not confident about their ability to screen patients using a point-of-care glucose meter.
Wilder et al, 2014 <sup>42</sup>	Survey of North Carolina dentists (n=1350) to identify practices and perceived barriers into clinical practice	Only 8% of dentists recorded blood sugar levels of patients with diabetes, and 4% recorded A1C values. Only 8% were likely to use a glucometer to measure blood glucose. However, 60% were likely to counsel patients on the relationship between oral health and glycemic control.
Anders et al, 2014 <sup>43</sup>	Survey of dental students' (n=157) attitudes and barriers towards use of glucometer in dental settings	A majority of students agreed on the importance of educating patients about oral-systemic linkages and diabetes management. However, only 23% agreed that screening for diabetes with a glucometer is within the scope of dental practice.
Greenberg et al, 2015 <sup>16</sup>	National survey of primary care physicians' (n=1,508) attitudes toward medical screening in a dental setting.	Survey of allopathic and osteopathic primary care providers with a response rate of 22%. The majority of respondents felt dental screening for major chronic diseases was valuable, including for cardiovascular disease (61%), hypertension (77%), diabetes (71%), and HIV (64%).
Greenberg et al, 2017 <sup>44</sup>	National survey of dental hygienists' (DHs) (n=3,133) attitudes towards chairside screenings.	Survey of DHs in the United States with a response rate of 49%. Majority of respondents felt chairside screening for major chronic disease was important, including for hypertension (94%), diabetes (89%), cardiovascular disease (85%), HIV (79%), and hepatitis (78%). 94% also reported they were willing to refer a patient for a medical consultation.

Twelve programs that target diabetes and oral health were identified by an internet search of peer-reviewed literature, reports, conference proceedings, and other publicly available information (Table 7).



## Program Settings and Scope

The integrated clinical programs identified by this scan can be broadly categorized as:

- 1) Programs that target diabetes in dental settings
- 2) Programs that target oral health in primary care settings
- 3) Programs with co-located integration of medical and dental services (see section 5)
- 4) Integration of medical and dental insurance benefits (see section 7)

### Targeting diabetes in dental settings

The most common clinical component among the identified programs was diabetes testing performed by dental providers. The **Gary and Mary West Senior Dental Center** (San Diego, CA) provides services to elderly patients. Blood pressure and A1C are taken at every dental visit since many patients do not see a primary care provider regularly (key informant interview, August 24, 2017). Patients with elevated screening results are referred for primary care. The Senior Dental Center is located at the Senior Wellness Center in downtown San Diego, where clients have access to nutrition, housing and social services, and care management.

The **ElderSmile** program integrates screenings for diabetes and hypertension in community-based senior centers in Manhattan.<sup>45</sup> ElderSmile is a clinical program implemented by Columbia University College of Dental Medicine in 2006. This program consists of 51 “prevention centers,” where participants receive oral health education and oral examinations. In 2010, ElderSmile expanded its activities to provide chairside A1C and blood pressure screenings. Patients with elevated screenings results were referred to local primary care facilities.

**Table 7. Integrated Programs That Target Diabetes and Oral Health**

<b>Program<sup>a</sup></b>	<b>State</b>	<b>Brief description</b>
Blackstone Valley Community Health Care (BVCHC)	RI	Study to screen dental patients for diabetes risk with oral health screening, periodontal exam, and A1C finger-prick test; bidirectional referrals for high-risk patients
DentaQuest MORE Care (Medical Oral Expanded Care)	CO, PA, SC	Primary and secondary preventive oral health services provided in primary care offices for rural patients with referrals to dentists
Diabetes Healthy Outcomes Program (DHOP) at Hamilton Health Center	PA	Pilot study of diabetes management program to provide multidisciplinary services for uninsured patients with diabetes
ElderSmile	NY	Identification and care provided to seniors at risk for diabetes; blood glucose screening, referrals to PCP, appointment facilitation, and education provided for all patients at risk
Family Health Center of Marshfield, Inc	WI	Bidirectional referrals and EHRs; all patients with diabetes seen in dental setting receive risk assessment, blood glucose screenings, education, and referrals to primary care
Gary and Mary West Senior Dental Center	CA	Senior Dental Center is located within the Senior Wellness Center and provides comprehensive medical and social services for low-income elderly
Neighborcare Health	WA	Bidirectional referrals to increase the percentage of patients with diabetes that receive dental care; oral health procedure training for PCPs
Ravenswood Family Health Center (RFHC)	CA	Bidirectional referrals between medical and dental providers; physicians refer patients with diabetes for an annual dental visit
Salud Family Health Center	CO	Blood glucose screenings performed on all dental patients with diabetes; dental hygienist is embedded in primary care clinic
St. Elizabeth Ann Seton Dental Clinic	WI	Pilot program to provide dental care for patients seen in primary medical clinic with diabetes and other chronic conditions
Terry Reilly Health Services	ID	Diabetes collaborative includes a dental exam; PCPs refer patients with diabetes to a dental clinic and patients receive a microscopy periodontal assessment in the dental setting
United Community and Family Services	CA	Bidirectional referrals between medical and dental providers

<sup>a</sup>Programs listed are limited to clinic-based activities and exclude programs that involve integration of insurance benefits.

## Targeting oral health in primary care settings

The **Ravenswood Family Health Center** (RFHC) (East Palo Alto, CA) refers patients with diabetes to receive an annual dental visit as part of the standardized care protocol.<sup>46</sup> A previous qualitative study of the RFHC identified that the lack of shared EHR between the medical and dental clinics of RFHC limits the ability to track patients.<sup>46</sup> Currently, referrals are made on paper and faxed between clinics.

In 2015, DentaQuest Institute partnered with the South Carolina Office of Rural Health and Medical University of South Carolina to pilot test a 12-month project to provide preventive dental services in seven rural primary care practices.<sup>47</sup> The **MORE Care (Medical Oral Expanded Care)** project targets adults with a diagnosis of diabetes, along with children aged 0-12. One key component of this project includes building a network of local dentists to provide care.<sup>48</sup>

**St. Elizabeth Ann Seton Dental Clinic** (Milwaukee, WI) provides dental care to people without insurance. In 2015, Seton Dental Clinic began a two-year pilot program to address the needs of patients with diabetes (key informant interview, September 18, 2017). Patients seen at a partnering medical clinic—Columbia St. Mary's Family Health Center—are referred to a dental hygienist who screens patients and provides preventive services using mobile dental equipment. Patients who need restorative care are then referred to the dental clinic for treatment. One initial challenge to this program was occupational regulation that prevented the dental hygienist from performing screenings and services without direct supervision of a dentist. However, recent legislative changes in Wisconsin now permit dental hygienists to work independently and bill Medicaid for services provided in a range of community settings, including charitable institutions and nonprofit dental programs.<sup>49</sup>

**Terry Reilly Health Services** (Boise, ID) refers medical patients with diabetes to an off-site dental clinic. When seen at the dental clinic, patients review microscopy periodontal assessments “to contribute to patients’ engagement in self-therapy measures.”<sup>50</sup> Completion rates for referrals to the dental clinic were noted to be low, which was hypothesized to be related to the off-site location.

One recent project screened adults for diabetes risk in a dental setting. As part of a research study conducted by the University of Buffalo with the dental clinic at **Blackstone Valley Community Health Center**, adults aged 45 and older were screened for diabetes risk, including a periodontal exam and a chairside A1C test.<sup>46</sup> Patients with A1C levels greater than or equal to 5.7% were referred for primary care at the health center.

## Co-location of primary care and oral health services

Co-location of medical and dental providers was a common feature of public health activities that target integration of medical and dental care for patients with diabetes. Co-location facilitates bidirectional referrals of patients and also supports use of a common EHR between medical and dental providers. Additional details about co-location of services is described in a separate section of this report.

## Additional program activities

In addition to the clinical activities, programs were found to frequently incorporate other activities:

- Provision of information (notable efforts to provide patient education)
  - Diabetes Healthy Outcome Program (DHOP) at Hamilton Health Center referred eligible patients to evening informational workshops.
  - ElderSmile providers gave presentations about oral health, hygiene, diabetes, and other chronic conditions to seniors.
  - Gary and Mary West Senior Dental Center provided education about nutrition and oral health to seniors.
  - Terry Reilly Health Services provided patients who were pregnant or had diabetes with the opportunity to review microscopic analysis of their oral bacteria and receive information on how to eliminate bacteria that cause dental decay.

- Provider or dental student training
  - **Family Health Center of Marshfield, Inc.**, dedicated space and facilities in multiple dental clinics to train medical and dental students and provide an integrative model of care.
  - **Terry Reilly Health Services** dental providers train medical providers regarding the importance of oral health in the prevention and treatment of chronic diseases. These trainings have increased buy-in and interest in an integrated model of care.
- Other services
  - **DHOP at Hamilton Health Center** provided patients with a variety of health and wellness services, including vision services and free YMCA memberships.

### Other common risk factors targeted

We found that programs that targeted diabetes were also likely to target other common risk factors or conditions, including cardiovascular disease or tobacco use (**Table 8**).

### Community Oral Health Programs

The online survey of community health programs indicated that only three of 30 respondents provide active screening for diabetes, with two of the programs having a formal mechanism for dental providers to refer patients with high blood glucose levels to primary care providers. These mechanisms include:

- a written policy that requires a medical consult when the dentist suspects that the patient has diabetes, or
- a computerized notification that the patient requires medical follow-up.

One of the respondents uses a public health hygienist to refer patients for diabetes screening and another program indicated that it employs a dental hygienist in its primary care location to provide dental services to diabetic patients.

**Table 8. Other Conditions or Common Risk Factors Targeted by Programs**

Other common risk factors	Programs	Example
Cardiovascular disease	Blackstone Valley Community Health Care DHOP at Hamilton Health Center ElderSmile Gary and Mary West Senior Dental Center Neighborcare Health Salud Family Health Center	Cardiovascular risk screening for all adults in the dental setting
Tobacco use	United Community and Family Services	Dental hygienists discuss tobacco use with parents during pediatric visit
Obesity or diet/nutrition	Gary and Mary West Senior Dental Center Salud Family Health Center United Community and Family Services	Nutrition education alongside oral health education
Pregnancy/OB-GYN	Blackstone Valley Community Health Care Family Health Center of Marshfield, Inc Neighborcare Health Ravenswood Family Health Center Salud Family Health Center St. Elizabeth Ann Seton Dental Clinic Terry Reilly Health Services United Community and Family Services	Education and facilitation of dental care, including CHW home visits
HIV	Neighborcare Health	Increase preventive services

## *State Chronic Disease and Oral Health Programs*

In our online survey of state and territorial oral health programs, eight out of 26 respondents that their dental providers perform prediabetes and/or diabetes screening and referrals to primary care providers. However, most often programs are using proxy measures (i.e., risk factors) rather than performing blood draws to screen for A1C. Few states reported diabetes-specific targeted joint programs with the state chronic disease programs. When diabetes was mentioned, it was more likely to be the oral health program's educational efforts in reducing sugar-sweetened beverage consumption in relation with obesity, cardiovascular disease, diabetes, and dental caries.

More recently—and with CDC grant funding to support oral-medical integration in state oral health programs—there has a greater emphasis to creating alliances to address improving the oral health condition for those with prediabetes and diabetes. The two following states are examples where inroads are being made for oral-medical integration directly relating to patients with diabetes.

The state oral health program in Colorado initiated the **Diabetes Oral Health Integration (DOHI)** model, starting pilot implementation in one to two clinics. This model is based on input from experts on the oral health impact of diabetes, combined with efforts of an advisory board that also includes representatives who have worked with mental-physical health integration activities in the state. Moreover, the state oral health program is actively working with other statewide agencies to more fully develop the DOHI. For example, the Oral Health Unit (OHU) has worked with the primary care association to capture process maps as part of DOHI. OHU, in conjunction with the state's chronic disease program, created a shared metric for addressing diabetes performance indicators. Thus, OHU is able to use its current surveillance system to track progress in improvements (i.e., increasing the number of people screened for diabetes in dental settings, cross referrals between medical and dental, and treatment completion rate) concerning oral health for those with diabetes. The OHU is also planning on creating an oral health-diabetes fact sheet for general circulation.

Besides the incorporation of oral health questions into statewide diabetes surveys, the Idaho Oral Health Program recently cosponsored a session about diabetes and oral health screenings at the annual Idaho Physician Assistant Conference as part of its effort with the national Smiles for Life curriculum. The Oral Health Program is also partnering with the chronic disease section to develop and implement a community health program model for training community health workers to target higher risk patients, such as patients with diabetes, and then link these patients to local resources to manage their chronic condition.

### *State Oral Health Plans*

Current state oral health plans from six states address the topic of diabetes: Alaska, Idaho, Iowa, Michigan, Minnesota, and Oregon. Examples from Alaska, Minnesota, and Oregon follow.

The Alaska Oral Health Plan (2012-2016) collaborates with Maternal and Child Health programs and Chronic Disease Prevention and Health Promotion programs to support educational activities that increase awareness of oral health and implications for general health.<sup>51</sup>

The Minnesota Oral Health Program includes at least two objectives, with accompanying strategies that address the topic of diabetes.<sup>52</sup> Within the goal of implementing strategies that reduce oral disease and mitigate risks, there is a strategy to promote use of risk assessment (e.g., for periodontal disease, diabetes, or tobacco use) among medical and dental providers so that the state can determine a baseline for the number of providers who use standardized, evidence-based oral disease risk assessment tools. Second, there is a strategy of promoting inclusion of oral health evaluation in care guidelines for the aging and persons with diabetes and special health care needs, with a goal that calls for the development and promotion of clinical preventive oral health guidelines for use in settings outside the dental office.

The Strategic Plan for Oral Health in Oregon (2014-2020) includes the objective of implementing evidence-based prevention strategies across the lifespan.<sup>53</sup> One of the strategies to achieve this objective is to integrate oral health with chronic disease prevention and management by including dental screening and risk assessments in chronic disease programs, including oral health information in prevention materials relating to chronic diseases (e.g., diabetes), and requesting reimbursement for chronic disease prevention activities by dental professionals.

## Conclusions

**Chairside (point-of-care) screenings for diabetes in dental settings will identify a substantial proportion of adult patients with elevated blood glucose.** Recent national data estimate that 14% of Americans aged 20 years or older have diabetes, including one-third of Americans aged 65 or older.<sup>54</sup> An additional 38% of Americans have prediabetes. Studies examining the prevalence of elevated blood glucose or A1C among dental patients are abundant and indicate that approximately 30-60% of patients screened in dental settings will have abnormal A1C or blood glucose levels, with prevalence varying depending on how patients are chosen for screenings (e.g., prescreening based on risk factors or the American Diabetes Association's Diabetes Risk Test).

**Chairside screenings for diabetes in dental settings have broad acceptance.** Additional studies demonstrate that chairside screenings for diabetes are widely accepted by dentists, dental hygienists, dental students, and patients.

**Expanded oral health teams offer workforce flexibility and increased capacity.** Several programs utilized expanded function dental assistants, dental hygienists, dental therapists, and community health workers to expand services beyond traditional dental care.

**Co-located medical and dental clinics can implement bidirectional referrals for patients with diabetes.** In addition to dental professionals' recognition of oral health concerns in this population, national guidelines recommend that primary care providers refer these patients to dentists for a periodontal exam. Several programs that we identified employ bidirectional referrals between medical and dental providers. However, we found very little specific information about guidelines, protocols, or outcomes associated with these systems of care.

**Shared EHR systems facilitate referrals between medical and dental providers.** However, published information and our key informants indicate that referral completion rates are low without explicit protocols, even when shared EHRs are in place.

**The type of device used for chairside screenings should be chosen carefully in order to minimize the chance of false positives or negatives.** One study comparing chairside screenings results with lab testing found high rates of false positives.<sup>38</sup> In addition to ethical considerations, this is important to keep in mind since rates of follow-up with primary care physicians tend to be low unless active referrals are implemented.

## Challenges

- Point-of-care A1C testing (i.e., chairside finger-stick testing) is not recommended for diagnosis.<sup>27</sup> Dental providers should be aware of this and other limitations to chairside screenings; results should be presented to patients accordingly.
- Most programs have low rates of patient follow-up for primary care after elevated screening results in a dental setting. Patients have substantial barriers to follow-up that should be addressed in order for screenings to be useful.
- Shared EHRs facilitate integration by flagging records of at-risk patients, arranging for referrals, and scheduling across disciplines. Several sources identified lack of shared EHR systems as a major limitation.

## Recommendations

- 1) Develop professional guidelines and toolkits to target at-risk patients in order to reduce start-up barriers, improve provider confidence, and facilitate standardization.
- 2) Perform needs assessment to identify the at-risk target population, health care provider partners, resources, and program priorities.
- 3) Perform A1C finger-stick testing using a method certified by the NGSP.<sup>27</sup>
- 4) Include patient reminders that elevated screening results do not always mean they have prediabetes or diabetes; diagnosis confirmation must be performed by a medical provider.<sup>27</sup>
- 5) Provide patients with screening letters that describe test results—letters can serve as a cue to action and patients can take these to their primary care follow-up.
- 6) Make follow-up calls to patients with abnormal test results—phone calls can collect information about rates of follow-up, remind patients to seek care, and answer questions.



## 3-3. Maternal and Child Health

Dentistry has a strong history of supporting early childhood oral health through organized public health activities, interprofessional collaboration, and preventive services provided in public health settings to high-risk populations. More recently, increased efforts in this area have targeted pregnant women and their perinatal oral health.

### *Environmental Scan of Publications*

Each program listed in Table 9 describes interventions related to maternal and child health. This is not an exhaustive list of interventions in this area. Specifically, it does not encompass the wide body of policy and evidence supporting interprofessional collaboration for early childhood oral health.<sup>55</sup>

### **Program Settings and Scope**

While most of the integrated activities targeting maternal and child oral health noted were clinic-based, two environmental approaches were also seen in Michigan's Perinatal Oral Health Initiative and the UCLA-First 5 LA Oral Health Program. Both programs offer clinical components and, thus, are included in this section.

**Blackstone Valley Community Health Care** integrates oral health with primary care for all children ages 1-3 years.<sup>46</sup> Pediatricians refer children at age 1 or first tooth eruption to a dentist at the FQHC. Attempts are made to see the child on the same day. Children are then scheduled for dental appointments every six months to receive fluoride varnish; parents receive education about child oral health care at these appointments. Additionally, the dental clinic coordinator reviews medical records to identify families who have had babies over the past year; mothers are then invited to bring the child into the dental clinic for a screening at age 1.

The **UCLA-First 5 Children's Dental Care Project** includes two programs: the 21st Century Dental Homes Project and the Children's Dental Care Program.<sup>56</sup> Twenty-two clinics, primarily FQHCs, with high concentrations of Medicaid-enrolled children, are targeted by the program. The program interventions address barriers to care through four broad activities<sup>56</sup>:

- 1) Infrastructure development targeting personnel, facilities, equipment, and information technology.
- 2) Practice management technical assistance provided by DentaQuest Institute's Safety Net Solutions.
- 3) Clinical training for dental, medical, and childcare providers.
- 4) Quality improvement to improve integration of oral health care delivery by the health care team.

Michigan's **Perinatal Oral Health Plan** is part of the state's Infant Mortality Reduction Plan. The comprehensive action plan for this initiative includes<sup>57</sup>:

- 1) Development of evidence-based guidelines
- 2) Integration of oral health into the health home for women and children
- 3) Interdisciplinary professional education
- 4) Increased public awareness about the importance of oral health
- 5) Development of a financing system to support perinatal oral health

**Table 9. Integrated Programs That Target Maternal and Child Health**

Program	State	Brief description
Blackstone Valley Community Health Care	RI	Pediatricians in the FQHC refer all children at age 1 or at first tooth eruption to the dental clinic. Dental coordinator also performs outreach to new mothers to set up an age 1 dental visit.
Dorchester House Multi- Services Center	MA	All children aged 0-5 years in the pediatric clinic receive oral health screening and risk assessment, fluoride varnish, and anticipatory guidance for parents.
Michigan Perinatal Oral Health Initiative	MI	Initiative includes multiple components to improve oral health of pregnant women and infants.
Neighborcare Health	WA	Program targets prenatal patients early in pregnancy for education and oral hygiene.
NYU Lutheran Family Health Services	NY	Dental clinic hosts a baby shower for pregnant patients at the obstetrical clinic to provide patient engagement and education.
UCLA-First 5 LA Oral Health Program	CA	Multiple components to improve access to dental care for children aged 0-5, including provider trainings and infrastructure development.
United Community & Family Services	CT	Dental hygienist provides screenings for children aged 1-3 during routine pediatric medical visits (see section on Health Workforce Innovations).
Ravenswood Family Health Center	CA	Nurse midwife refers all women for an oral health visit to a preexisting dental home or the FQHC's dental clinic. The FQHC also participates in the Virtual Dental Home pilot project.
Yakima Valley Farm Workers Clinic	OR, WA	Staff and providers in the WIC clinic, primary care clinic, and outreach services perform oral health risk assessments.

**Neighborcare Health** tracks quality metrics, including the percent of pregnant women receiving dental care prior to delivery.<sup>15</sup> The FQHC has used this metric as an example of continuous quality improvement in its application for NCQA Patient-Centered Medical Home recognition.

The **Yakima Valley Farm Workers Clinic** has targeted low-income infants, children, and new mothers in order to reduce oral health disparities.<sup>58</sup> Oral health risk assessments are performed for all children in multiple settings, including WIC clinics, primary care, and during outreach. Children and mothers who have not received dental care within the past six months or those with dental need are flagged as “high risk” and referred for same-day dental care. Additionally, the clinic’s EHR auto-generates dental referrals for patients who go longer than six months between dental visits. A dental outreach coordinator communicates directly with patients and clinics to arrange for same-day appointments—especially for WIC patients.

### *Community Oral Health Programs*

Two notable examples that target maternal and child health were reported in our survey of community oral health programs:

- 1) The oral health program at **Price County Health and Human Services Department** (Phillips, WI) works collaboratively between medical and dental in targeting higher-risk prenatal women for care coordination. This activity is facilitated by an established referral mechanism for pregnant women.
- 2) **Ascension-St. Elizabeth Ann Seton Dental Clinic** (Milwaukee, WI) is an example of a local oral health program that is conducting health promotional activities to encourage prenatal dental care as one component for a healthier birth outcome.<sup>59</sup>

Additionally, 14 of 30 respondents noted that medical providers within their organizations perform dental screenings for children.

## *State Chronic Disease and Oral Health Programs*

Most, if not all, oral health programs have historically focused at least part of their educational and clinical efforts toward maternal and child health. However, we direct readers to other sections of this document for risk factor–specific initiatives that address oral and overall preventive health measures in these populations (e.g., the Tobacco Use, Oral Cancer, and Oral Health section or the Obesity, Nutrition, and Oral Health section).

Of the 26 responses to the online survey, 17 state oral health programs indicated that medical providers routinely provided dental screenings. New Mexico also noted that medical providers provided dental screenings for mothers at WIC clinics.

Of the 19 chronic disease directors who responded to this survey, several indicated that they conducted activities relating to mothers or children in the areas of surveillance (e.g., Behavioral Risk Factor Surveillance System [BRFSS], Body Mass Index [BMI]) and preventive and educational programs directed to prevent or minimize the deleterious effects of oral disease. This section only contains information about one type of surveillance: BRFSS. The reader is directed to the Obesity, Nutrition, and Oral Health section and the Tobacco Use, Oral Cancer, and Oral Health section for other preventive and cessation activities involving collaborations between chronic disease and oral health programs.

Only three chronic disease programs (Georgia, New York, and Pennsylvania) identified the BRFSS as a state activity (with input from oral health programs) that is directed toward either mother or child. For example, New York’s Division of Chronic Disease Prevention seeks input from oral health experts about dental-related questions as it develops and conducts the survey.

## *State Oral Health Plans*

Although many states address maternal and/or child health generically in their oral health plans, fewer states provide specific objectives or strategies to serve these populations. Some states—such as Colorado, South Dakota, and Vermont—that have the objective of increasing the percentage of pregnant women who receive information about optimal oral health often employ strategies that either provide education to pregnant women about maternal and infant oral health or about the relationship between oral health and overall well-being for both mother and child.

Some states, such as Virginia, emphasize partnering with other health professionals (i.e., Obstetrics-Gynecology) to educate expectant mothers about the importance of oral health, whereas other states like Rhode Island include specific recommendations for promoting either the incorporation or expansion of preventive oral health measures, especially during perinatal and well-child visits.

Other states are more specific about their recommendations and strategies. One of the ways that **California** uses a Health Resources and Services Administration (HRSA)–funded Perinatal and Infant Oral Health Quality Improvement grant to address a perceived barrier to dental care is by providing technical assistance and training for supporting oral health inclusion in Promotora and community health worker programs and home visitation programs. Similarly, Maryland initiated a Spanish-language social marketing campaign that helps create awareness about the importance of oral health during pregnancy.

Michigan, with a goal toward health literacy, explicitly created measurable objectives and strategies. For example, one objective is to “increase the number of programs and/or interventions that educate parents on how to prevent early childhood caries among children aged 0-3 by 10%.” This objective is coupled with a strategy that develops messaging for pregnant women and community organizations that serve children on preventive oral health measures.

## *Conclusions*

State oral health programs have traditionally addressed the topic of maternal and child oral health; the majority of state oral health programs surveyed indicated that affiliated medical providers routinely provided dental screenings.

## Challenges

- Not all states provide dental benefits for pregnant women with Medicaid coverage.
- Coordination of activities between state oral health and chronic disease programs can be difficult.

## Recommendations

- 1) Several states have well-established efforts targeting maternal and child oral health—for example, Michigan’s Perinatal Oral Health Action Plan<sup>57</sup>—which can be expanded upon in order to increase reach and effectiveness.
- 2) Utilize existing educational resources (e.g., Smiles for Life national oral health curriculum) to provide standardized training for providers.
- 3) Encourage linkage between state oral health programs and chronic disease programs to develop interdisciplinary interventions.
- 4) Programs looking to address maternal and child oral health in clinical or community-based settings should consider use of integrated care teams, including case managers, social workers, and midwives.
- 5) Continue to explore workforce innovations, including embedding dental hygienists within primary care clinics, in order to target high-risk populations.

## 3-4. Obesity, Nutrition, and Oral Health

Nutrition and dietary habits can have a direct impact on both oral health and body weight. Because diet is a modifiable risk factor for both obesity and dental diseases, public health activities targeting dietary habits offer the potential to improve outcomes associated with both physical and oral health.

### *Environmental Scan of Publications*

#### **Program Settings and Scope**

Results of this environmental scan found that public health activities targeting obesity, nutrition, and oral health primarily address sugar-sweetened beverage consumption.

Beverage choice is the target of numerous educational campaigns. Overall, public health activities targeting this risk behavior can be categorized as:

- 1) Legislative campaigns to implement sugar-sweetened beverage excise taxes (“soda taxes”)
- 2) Educational campaigns to promote healthy beverage choice, including drinking water availability and sanitation
- 3) Cross-disciplinary referrals for clinical interventions targeting dietary habits and weight

### *Community Oral Health Programs*

Most local health agencies provide some form of dietary instruction to individual patients or population groups (e.g., schoolchildren). Twenty organizations (of 30 survey respondents) noted that they target diet/nutrition as a risk factor while educating their clientele. Two local organizations specifically indicated that there is a formal mechanism for referral of a perceived medical need for either diet/nutrition or weight reduction to the appropriate health care provider:

- The oral health program at **Health Care for the Homeless** (Baltimore, MD) refers many of its patients for nutrition counseling.
- **Nationwide Children’s Hospital** (Columbus, OH) has a mechanism for referring obese children.

**Health Care for the Homeless** also provides small group sessions about diet/nutrition. Since part of its target clientele is those with special health care needs, **St. Ann Center-Gardetto Family Dental Clinic** (Milwaukee, WI) provides instruction to caregivers about oral hygiene and dietary issues.

One community oral health program indicated that **Community Dental Services, Inc.**, (Albuquerque, NM) partners with the local foodbank to screen all patients for food insecurity. If a patient answers affirmatively to any of a series of screening questions and they also are being treated for periodontal disease, then the patient is “prescribed” access to free foods at a special Healthy Foods Center.

Some oral health programs have health promotion and education programs that target both oral and overall health outcomes:

- The **Alaska Native Tribal Health Consortium** (Anchorage, AK) collaborates with the state dental director in a statewide preventive initiative to fight obesity.
- The **Open Door Family Medical Centers** in New York use diet/nutritional strategies to prevent childhood obesity and dental caries.

### *State Chronic Disease and Oral Health Programs*

Six of the responding 19 chronic disease directors indicated that they cooperate with their oral health counterparts in developing, implementing, and/or collecting height and weight information to assess BMI, conducted when school-aged children are generally also being assessed for oral disease (e.g., during third grade): Connecticut, Idaho, North Dakota, Ohio, Oregon, and Wisconsin. Such collaborations are enhanced when the chronic disease and oral health programs are located within the same administrative unit, as seen in Connecticut and Ohio.

Wisconsin’s Chronic Disease Program provides the content expertise about height and weight

measurement to oral health staff who perform these procedures in conjunction with an oral screening.

According to chronic disease directors, nine states work closely with the state oral health program on educational and policy efforts that will reduce the consumption of sugar-sweetened beverages and increase water intake: Alaska, Colorado, Connecticut, Iowa, New York, Oregon, Pennsylvania, Virginia, and West Virginia.

Alaska, for example, has collaborated substantially with its state oral health and obesity prevention programs through coordinated social marketing campaigns about reducing consumption of sugary drinks. Also, in some states (e.g., West Virginia), representatives from both the chronic disease and oral health programs serve on committees where more proactive measures, such as a sugar-sweetened beverage tax, are under consideration.

Twenty-six oral health programs responded to the online survey. Of the 17 state oral health programs that conduct health promotion and education activities to address common risk factors for oral health and chronic diseases, 14 states are involved in efforts relating to diet/nutrition. Many state oral health programs participate as coalition members to address these common risk factors.

Several states (Connecticut, Idaho, North Dakota, Ohio, Oregon, and Wisconsin) also work collaboratively with chronic disease programs in collecting weight and BMI measurements when oral health staff perform dental screenings and examinations for needs assessment efforts.

California has initiated a campaign to ReThink Your Drink, which focuses on encouraging people to drink (hopefully fluoridated) tap water instead of sugar-sweetened beverages.

New Hampshire and West Virginia are exploring the potential of taxing beverages containing sugar as part of initiatives to reduce dental caries and other chronic diseases and conditions.

### *State Oral Health Plans*

Several current state oral health plans directly address either diet or nutrition and how it impacts oral health.

- South Dakota addresses the issue of healthy dietary intake, which includes decreasing the consumption of sweetened beverages, in an objective relating to education and awareness.
- Alaska is developing and implementing strategies to reduce the consumption of sugar-sweetened beverages by children, including an initiative at the Alaska Native Medical Center to “Stop the Pop.” Additionally, some school districts in Alaska have reduced the availability of soda pop during school hours, while there have been efforts to encourage other schools to adopt policies to reduce sugar-sweetened beverages by replacing them with healthier alternatives.
- Oregon is attempting to expand evidence-based oral health programs in schools by educating school communities about the impact of sweetened drinks and other junk foods and the possibility of restricting the marketing of these products on school grounds.
- Minnesota has an objective that is targeted at a different audience. The state health department has collaborated with the Minnesota Hospital Association (MHA) to reduce oral disease and mitigate risks by promoting the effect of diet and nutrition on oral health to hospital food service directors, older-adult service establishments (i.e., assisted living and nursing homes), and nutrition staff at such facilities. In addition, the state health department intends to provide educational sessions about the relationship between diet and dental disease at MHA conferences.
- West Virginia is exploring financial strategies within their state oral health plan, such as a soft drink tax, to encourage residents to make healthier choices.

### *Conclusions*

Integrated efforts to target obesity were seen primarily at the state level; several state oral health and chronic disease programs collect information about BMI through routine surveillance. Integrated efforts targeting nutrition largely focus on reducing sugar-sweetened beverage consumption and increasing water consumption. Several community oral health programs report local activities



related to dietary counseling, improving food security, and dental referrals for nutritional counseling.

## **Challenges**

- Limited information was found about interventions conducted within health care systems or in safety net clinical settings.
- Evidence of the effects of public health activities related to nutrition and oral health outcomes was lacking.

## **Recommendations**

- 1) Given the diversity of educational campaigns and legislative efforts related to sugar-sweetened beverage consumption, applied research should evaluate oral outcomes associated with these interventions. Examples include effects of soda taxes and drinking water campaigns on oral health.
- 2) Develop continuing education for dental providers to provide specific nutritional counseling, especially as it relates to beverage choice, and referrals to primary care for care coordination.

### 3-5. Tobacco Use, Oral Cancer, and Oral Health

Tobacco use is a common risk factor for multiple systemic and oral conditions, and has long been a risk factor addressed by both medicine and dentistry. Tobacco use includes combustible and smokeless tobacco products, as well as electronic cigarettes. Long-term systemic health effects of cigarette smoking include various types of cancer, as well as cardiovascular and respiratory diseases, among others.<sup>60</sup> Related to oral health, cigarette smoking is a major risk factor for periodontal disease and oropharyngeal cancer, and smokeless tobacco use is associated with the development of precancerous lesions in the mouth. Smoking also has other negative effects on oral health by contributing to dental implant failure, oral candidiasis, smoker’s palate, and smoker’s melanosis.<sup>61</sup>

In the dental setting, patients are commonly screened for tobacco use. However, less is known about the extent of counseling or referral for cessation in dental settings. Due to the overlapping impact of tobacco use on oral and systemic health, it is of interest to identify opportunities for integrated activities so that medical and dental care systems may collaboratively support patients to reduce tobacco use and design effective public health interventions to address this health risk behavior.

#### *Environmental Scan of Publications*

Each program listed in **Table 10** had published information describing interventions related to tobacco use. We have not included programs that provided only minimal references to this topic without accompanying descriptions of what activities were performed. It should be noted that we also excluded studies that primarily detailed tobacco cessation interventions that are performed exclusively within the dental setting; for the purposes of this environmental scan, we did not consider activities that did not involve cross-disciplinary interactions to be integrated activities.

#### **Program Settings and Scope**

The most commonly seen activities included screenings for tobacco use, patient education, and referrals for cessation services.

**Table 10. Integrated Programs That Target Tobacco Use and Oral Health**

Program	State	Brief description
Kaiser Permanente Cedar Hills Dental & Medical Office	OR	All patients over aged 13 are asked about tobacco use with referrals for cessation services
Kaiser Permanente Dental Associates	OR, WA	Care coordination between dental and primary care; screenings and tobacco cessation referrals by dental providers
Trillium Coordinated Care Organization	OR	Accountable care organization (ACO) offers integrated dental and medical care to a county’s Medicaid population; dental providers offer smoking cessation counseling
United Community & Family Services	CT	Dental hygienist provides parental education about smoking and tobacco use during pediatric oral health screenings

#### *Community Oral Health Programs*

For the 30 online survey respondents, 21 local organizations indicated they provide some form of support for tobacco/smoking cessation.

- **Pharmacotherapy.** Only one program (Alleghany County Health Department Dental Clinic in Cumberland, MD) indicated that it prescribes some type of pharmacotherapy (e.g., bupropion SR, nicotine gum) to assist patients in tobacco cessation.
- **HPV vaccinations.** Four respondents indicated that they are involved in some capacity with HPV vaccinations. For example, dental hygienists at Price County Health and Human Services Department (Phillips, WI) refer age-appropriate children to public health nurses for the series of vaccinations. Likewise, in addition to advising individual patients, SUNY Oral Dental Hygiene Department and Clinic (Middletown, NY) displays posters in its clinic about the importance of the HPV vaccine.

- **Oral cancer screenings.** Nine respondents indicated that medical providers within their systems provide oral cancer screenings on a regular basis.
- **Education.** Thirteen community oral health programs target tobacco use and five programs target alcohol use with health promotion and education activities.
- **Tobacco cessation counseling.** Thirteen oral health programs indicated that they perform tobacco cessation counseling
- **Quitlines.** Thirteen oral health programs report that they refer tobacco users to quitline (hotlines to aid in smoking cessation) services.

### *State Chronic Disease and Oral Health Programs*

Most state oral health programs who responded to the survey (24 of 26) indicated that oral health care workers provide tobacco/smoking cessation support. Support is most often provided in the form of quitline referrals and tobacco cessation counseling. However, states report wide variation in their activities to address tobacco use and oral health:

- **Pharmacotherapy.** Six states (Arizona, Minnesota, Montana, South Dakota, Virginia, and West Virginia) either prescribe or facilitate the use of pharmacotherapy to assist with tobacco cessation.
- **HPV vaccinations.** Ten state oral health programs are involved either with providing or promoting HPV vaccine use in their states as a cancer preventive measure.
- **Oral cancer screenings.** Five states or territories (Nebraska, New Mexico, Palau, South Carolina, and West Virginia) indicate that oral cancer screenings are performed by medical providers.
- **Continuing education for health care providers.** North Carolina has developed continuing education for medical and oral health providers about new and emerging tobacco products. Moreover, the Tobacco Prevention and Control Branch within North Carolina's Chronic Disease and Injury Section has worked with the Oral Health Section to develop a program at East Carolina University dental school to train dentists and dental students about tobacco cessation. In North Dakota, the Oral Health Program works with the Coordinated Chronic Disease Prevention Program to set up educational opportunities for oral health providers and suggests dental sites to pilot tobacco interventions.
- **Web-based toolkit.** Montana uses a web-based toolkit to educate dental providers about evidence-based interventions to address tobacco addiction.

Ten of the responding state chronic disease programs (Colorado, Connecticut, Georgia, Idaho, North Carolina, Ohio, Oregon, Pennsylvania, West Virginia, and Wisconsin) noted existing and continued collaborations relating to tobacco prevention and cessation activities. While many states noted in their surveys that they are generically focused on reducing tobacco intake, two states highlighted initiatives toward a certain product:

- Wisconsin targets chewing tobacco.
- North Carolina targets electronic nicotine delivery systems.

Finally, the chronic disease program in New York pointed out that dentists can be reimbursed by its state Medicaid program for tobacco cessation services.

### *State Oral Health Plans*

Eighteen of the current state oral health plans directly or indirectly address the topic of tobacco use and oral health, primarily by various educational efforts in reducing tobacco use.

Broad objectives and strategies to target tobacco use and oral health include:

- 1) Education of the public
- 2) Education of health professionals
- 3) Enforcement of existing laws and regulations
- 4) Reimbursement for tobacco cessation activities
- 5) Data collection

Specific objectives and strategies identified in state oral health plans address a variety of interventions:

- **Education.** Mechanisms to educate individuals and high-risk populations about the adverse impact of tobacco use (Alaska, California, Idaho, Maryland, Missouri, South Dakota, Vermont, and West Virginia)
- **Quitlines.** Activities related to tobacco quit lines (Alaska and South Dakota)
- **Standardized screening protocols.** Strategies that focus on consistent screening protocols or consistent messaging to assist people in discontinuing tobacco use (California, Michigan, and Minnesota)
- **Support for HPV vaccinations.** Recommendations for dental providers to encourage families with age-eligible children to receive HPV vaccination (Maryland)
- **Environmental interventions.** Enforcement of tobacco-free policies, particularly at schools (Colorado)
- **Provider reimbursement.** An objective for dental providers to be reimbursed for tobacco cessation counseling (Rhode Island)

Two notable partnerships are found in Alaska's and Minnesota's state oral health plans.

- Alaska is working with its cancer control and prevention program to develop a question about oral cancer on its BRFSS survey.
- Minnesota is working with the American Cancer Society to incorporate oral and pharyngeal cancer screenings in Medicare physical examinations.

### *Conclusions*

Integration of medical and dental activities to target tobacco use and oral health was most commonly found to occur administratively at higher levels—specifically, state oral health and chronic disease programs. Of the 17 state oral health programs that conduct health promotion and education activities in this area, 14 states target tobacco use and five states target alcohol use. Several of these programs do so as part of statewide coalitions that target cancer.

### **Challenges**

- State-level initiatives and recommendations require diffusion to the level of local care providers to be effective.
- Messaging and protocols for screenings, referrals, and patient education should be standardized.
- Recognition of HPV as a risk factor for oral cancer and of dental providers' role in this area must be increased.

### **Recommendations**

- 1) Continue to refine and develop the role of state oral health and chronic disease programs in coordinating public health activities that target tobacco use.
- 2) Develop professional guidance regarding the role of dental professionals—especially those providing services to children and adolescents in public health settings—regarding HPV vaccination.

## 4. Multimedia Health Campaigns

Health campaigns are environmental approaches to target community wellness. They aim to change behavior through education and influencing social norms.<sup>62</sup> Health campaigns are potentially more cost-effective than traditional service delivery due to low implementation costs and the opportunity to reach a large target audience. We identified several multimedia health campaigns that targeted common risk factors, including oral health.

### Program Settings and Scope

The majority of health campaigns identified by this environmental scan are related to sugar-sweetened beverage consumption and beverage choice. One example in this area, the Open Truth Campaign, is described below. A second program described here, Well-Ahead Louisiana, offers an environmental approach targeting common risk factors and chronic diseases, including oral health.

#### Open Truth Campaign (San Francisco, CA)

The **Open Truth Campaign** is a multimedia campaign to highlight the health impacts of sugary drinks.<sup>63</sup> Heart disease is a key focus of this campaign, which targets the young adult population of San Francisco, with an emphasis on the Latino community. Other disease and risk factors addressed by this program include tooth decay, diabetes, cancer, obesity, sexual dysfunction, and premature death.

Project partners include the Shape Up San Francisco Coalition (a project of the Population Health Division of the San Francisco Department of Public Health), Alameda County Department of Public Health, and several other major stakeholders. Open Truth goals are to:

- Increase awareness about health effects of sugary drinks
- Describe marketing tactics of the beverage industry
- Inspire policy change<sup>63</sup>

Campaign materials are available at the campaign's website (<http://www.opentruthnow.org/>) and include ads, lesson plans, and social media content, with many materials available in Spanish.

#### Well-Ahead Louisiana

Launched in 2014, Well-Ahead Louisiana is an initiative of the Louisiana Department of Health aimed at improving overall health and wellness of state residents. The program has created over 2,000 WellSpots (i.e., work sites, education centers) statewide to meet wellness benchmarks in five areas:

- Early childhood and pregnancy
- Body weight
- Heart health
- Oral health ("Healthy Smiles")
- Air quality

Well-Ahead targets chronic disease prevention, including dental disease (through the "Healthy Smiles" initiative), with education about links between chronic conditions and oral health.

This campaign also offers educational materials and other social media content on its website (<http://wellaheadla.com/>). WellSpot benchmarks provide guidelines for various types of organizations, ranging from schools to hospitals to restaurants, to create healthier environments.<sup>64</sup>

### Conclusions

Limited information is available about health campaigns that target common risk factors and explicitly include oral health considerations besides sugar-sweetened beverage consumption. The two campaigns detailed in this section target large audiences with strong, central messages. Both are also initiatives developed by a broad group of high-level stakeholders, including state and county health departments.

## **Challenges**

Challenges inherent to public health activities are likely to apply here, including sources of funding, sustainability, interagency cooperation, and evidence of effectiveness.

## **Recommendations**

- 1) Evaluate health and cost outcomes associated with existing health campaigns that target common risk factors, chronic disease, and oral health.



## 5. Co-location of Medical and Dental Services

Co-location of medical and dental providers encompasses both shared physical facilities as well as organized systems of care that employ medical and dental personnel at multiple sites. Co-location facilitates integration by allowing for coordination of services within comprehensive systems of care.

### *Environmental Scan of Publications*

Nine examples of co-location were noted in this environmental scan (**Table 11**); these programs are also discussed in sections of this report relevant to the risk factor or chronic disease targets of each.

**Table 11. Co-location of Medical and Dental Services**

Program	State	Brief description
Blackstone Valley CHC	RI	All dental patients are also required to be primary care medical patients at the clinic
Marshfield Clinic	WI	Bidirectional referrals across multiple sites facilitated by shared EHR
Hamilton Health Center	PA	Free health care, including dental, for patients with diabetes
Neighborcare Health	WA	Bidirectional referrals between medical and dental providers; referrals are ordered in the EHR
Salud Family Health Center	KS	Dental hygienists are embedded in the medical clinic; dental providers also test blood sugar on patients with diabetes
Terry Reilly Health Services	ID	Five dental clinics and seven medical/behavioral health clinics; EHR prompts medical staff to make referrals to the dental clinic
Trillium Coordinated Care Organization	OR	Coordinated care organization (CCO) that contracts with four local Medicaid dental plans to coordinate dental and medical care
United Community and Family Services	CA	Children are seen by a dental hygienist during periodic well visits in the pediatric primary care clinic
Yakima Valley Farm Workers Clinic	OR, WA	EHR generates automatic referrals for dental care; dental outreach coordinator facilitates referrals and arranges follow-ups

### Program Settings and Scope

At **Blackstone Valley Community Health Care (BVCHC)** (Pawtucket, RI), all dental patients are also required to be primary care medical patients at the clinic.<sup>46</sup> BVCHC views this requirement as crucial for development of a comprehensive health home. Primary care providers perform oral examinations and refer patients for annual dental care. Dental staff at BVCHC have participated in a field study to screen patients for diabetes risk and refer patients at elevated risk for primary care.

The **Marshfield Clinic**, in partnership with Family Health Center of Marshfield, Inc, is one of the largest private group medical practices in Wisconsin.<sup>65</sup> With multiple locations, the Marshfield Clinic offers medical-dental integration via bidirectional referrals, facilitated by a shared EHR.<sup>15</sup> Marshfield also provides cross-disciplinary case management for patients with diabetes. Oral health services are recommended by primary care providers based on routine visual oral examination and clinical decision support tools. Pilot projects are also testing routine monitoring of blood sugar of patients with diabetes who are seen in the dental office.

**Hamilton Health Center** (Pennsylvania) participated in a pilot study—the Diabetes Healthy Outcomes Project—to provide free health care for uninsured patients with diabetes.<sup>66</sup> This two-year program received funding from the Highmark Foundation and offered multidisciplinary services, including prescription drugs, eye care services, dental care, podiatry services, nutrition services, an exercise program, and diabetes education. Among the 189 participants, the proportion of patients with controlled diabetes was lower at the end of the program than at study start (28% vs. 38%). The investigators speculated that addressing other barriers to care, including transportation and lack of

social support, may be necessary to improve outcomes.

With five dental sites serving 18 primary care locations, **Neighborcare Health** (Seattle, WA) has limited its dental services to existing patients within their medical clinics.<sup>15</sup> The oral health program at Neighborcare focuses on special populations: high-risk children, pregnant women, HIV patients, and patients with diabetes. For patients with diabetes, bidirectional referrals between primary care and dental care can be initiated in the shared EHR system. Three of the dental sites are co-located with medical facilities and expanded function assistants apply sealants and fluoride varnish, and also place restorations.

Medical and dental services are co-located at **Salud Family Health Center's** 10 sites (Fort Lupton, CO). Salud embeds dental hygienists in the medical clinics, where they are able to provide screenings and preventive services, including fluoride varnish.<sup>58</sup> Although current efforts emphasize oral health screenings for pediatric patients, the hygienists also focus on patients with diabetes (key informant interview, September 8, 2017). Future efforts are planned to specifically target and provide dental care to patients with diabetes in order to help control blood sugar. In addition to these activities in the medical setting, dental providers also test blood sugar levels on all patients with diabetes.

The **United Community and Family Services** organization in California implements bidirectional referrals for patients with diabetes and other chronic conditions.<sup>46</sup> Care is coordinated across the FQHC system comprising three primary care practices, five behavioral health practices, and one dental clinic. In one example of integration, a dental hygienist provides screenings to 1-3 year olds during routine well-child visits at the pediatric primary care clinic.

**Trillium Coordinated Care Organization** (Lane County, OR) was established in 2011 and serves over 90,000 Medicaid members.<sup>67</sup> Trillium is contracted with all four local dental plans to provide integrated care for Medicaid enrollees.

### *Conclusions*

Co-location of services often refers to medical and dental providers located under one roof; alternately, it can encompass medical and dental providers working at separate facilities within a centrally managed system of care. In either model, shared EHRs facilitate bidirectional referrals and flagging records of dental patients who have chronic conditions.

### **Challenges**

- Noted barriers to integrated care provided within the framework of co-location include limited buy-in from medical providers, funding for oral health preventive services performed in medical settings, and insurance payment for services.<sup>15</sup>
- Co-location requires substantial investments in infrastructure, such as shared EHRs, shared or commonly managed facilities, and a multidisciplinary workforce.

### **Recommendations**

- 1) Create professional guidelines or toolkits for integrated activities, including bidirectional referrals, in order to reduce start-up barriers to implementation, improve provider confidence, and facilitate standardization.
- 2) Payment models that reimburse cross-disciplinary procedures can improve sustainability.
- 3) Cross-training of medical providers by their dental counterparts (and vice versa) can increase buy-in and contribute to standardization of protocols for disease management.

## 6. Health Workforce Innovations

Models of workforce innovation related to medical-dental integration that we identified in this environmental scan include:

- 1) Use of community health workers (CHWs) in medical or co-located dental settings
- 2) Employing dental hygienists or assistants in nontraditional settings, such as primary care medical clinics, WIC clinics, or mobile health units

### Community Health Workers

CHWs are skilled community members that aim to improve the health of their communities through a variety of strategies such as providing preventive health education, direct services, and health care navigation.<sup>68,69</sup> One of the defining characteristics that distinguishes CHWs within the health care workforce is that these individuals are members of the same underserved communities that they serve. As a result, CHWs are often viewed as the link between the health care system and individuals affected by poverty, racism, immigration issues, language barriers, and related adverse health outcomes.

Although CHW programs have widely been used in the United States since the sixties, more recently they have been identified as a way to connect with hard-to-reach, marginalized populations in order to ameliorate racial/ethnic disparities in health care.<sup>70</sup> CHWs have direct opportunities to promote patients' oral health by providing culturally appropriate health information, care coordination, and advocacy for clients and providers.<sup>71,72</sup>

In 2006, the American Dental Association (ADA) developed the Community Dental Health Coordinator (CDHC) program as a strategy to integrate CHWs into the oral health system to address oral health disparities.<sup>73</sup> This program trains CDHCs in community-based outreach, oral health education and promotion, navigation, case management, and the provision of clinical preventive services under the supervision of a dentist. The CDHC curriculum takes about one year to complete through one of the 17 affiliated educational institutions. The curriculum also could be integrated into dental hygiene and dental assistant programs. This model can be adapted to clinics, private practices, social services agencies, and community settings. Aside from the ADA's CDHC program, CHWs have also been integrated into the oral health system through a variety of different models given that CHW training and certification standards vary by state.

Within integrated care teams, CHWs commonly work across three areas:

- 1) Health promotion—including patient education and community outreach
- 2) Care coordination—including referrals and emergency department (ED) diversion
- 3) Provision of preventive services—including topical fluoride varnish

Table 12 outlines seven programs, identified through published reports and publicly available information, which incorporate CHWs in the integrated care team.

**Table 12. Programs That Incorporate Community Health Workers (CHWs)**

Program	State	CHW role	Brief description
Benton County Health Services	OR	Health navigation	Care coordination through multidisciplinary team in the primary care setting
Blackstone Valley Community Health Care	RI	Care coordination	Care coordination through the use of EHRs and home visits for missed appointments and ED use for dental services
Hennepin County Medical Center	MN	Care coordination, health promotion	Care coordination for emergency department diversion program; targeted community-based oral health education to vulnerable populations
Maryland Mountain Health Alliance	MD	Care coordination	Care coordination for emergency department diversion program
NYU Lutheran Family Health Services	NY	Health navigation	Health navigation in the dental setting and referrals to co-located primary care
Wayne Memorial Community Health Centers	PA	Preventive services, health promotion, health navigation	Community-based oral health and disease prevention education using motivational interviewing techniques; preventive services provided using portable equipment at affiliated primary care sites
Yakima Valley Farm Workers Clinic	OR, WA	Care coordination	Care coordination through structured referrals using EHRs and co-location of services

**Health promotion and service provision**

**Wayne Memorial Community Health Centers** employs a public health dental hygiene practitioner who is also a qualified community dental health coordinator (CHDC).<sup>46</sup> In Pennsylvania, public health dental hygiene practitioners are permitted to perform dental hygiene services in public health settings (e.g., schools, nursing facilities, FQHCs) without prior authorization by a dentist. This public health hygienist/CHDC treats adults and children in medical settings at primary care sites affiliated with the FQHC.

The **Hennepin County Medical Center’s** emergency department diversion program is implemented by an integrated care team comprised of a social worker, a registered nurse clinical coordinator, and a CHW. Within this team, the CHW educates patients on the importance of dental and medical preventive services.<sup>74,20</sup>

Health promotion strategies to integrate oral health and primary care health also include community outreach. In addition to the use of CHWs in the ED diversion programs, the **Hennepin County Medical Center** also employs community outreach workers who provide targeted oral health education to vulnerable populations in the community setting. Similarly, the CDHC in the **Wayne Memorial County Health Centers** conducts community outreach to raise awareness of oral health.

**Care coordination**

In **Benton County Health Services**, CHWs are integrated within the multidisciplinary care team to conduct health navigation covering a wide range of areas including clinical, insurance, interpretation/translation, community and policy, school, and dental.<sup>75</sup> Similarly, the CDHC in **Wayne Memorial Community Health Centers** provides health navigation to the dental clinic for primary care patients without a preexisting medical home.<sup>76</sup>

CHWs' role in health navigation also helps foster trust and rapport with the patient. In **NYU Lutheran Family Health Services**, the patient care treatment coordinator facilitates the patient's orientation to the clinic, which enables assistance with other health and social service needs unrelated to dental care.<sup>46</sup>

In **Yakima Valley Farm Workers Clinic**, a dental outreach coordinator in the care team serves as the intermediary between primary care clinics and the patient by arranging dental referrals and follow-ups. The dental referral process is facilitated through the co-location of medical and dental services as well as the use of EHRs. Structured referrals to dental and social services play a vital role in breaking down barriers that prevent underserved populations from receiving prevention and treatment services they need.<sup>72</sup>

CHWs in **Hennepin County Medical Center** reroute non-emergent dental cases from the emergency room to dental offices for care and essential social services through structured referral services.<sup>74,77</sup>

## Embedded Dental Hygienist in Primary Care Settings

Several programs have recently embedded dental hygienists in primary care settings. These embedded hygienists provide screenings and offer preventive dental services, including fluoride varnish. These hygienists also facilitate referrals to a dentist as needed.

- **Salina Family Healthcare Center (KS)**—embedded hygienist provides services to all pediatric patients at every primary care visit.
- **Salud Family Health Center (CO)**—embedded hygienist applies fluoride varnish to pediatric patients during primary care appointments.
- **United Community & Family Services (CT)**—dental hygienist provides services during periodic well-child visits in the pediatric primary care clinic.<sup>46</sup>

### *State Chronic Disease and Oral Health Programs*

Chronic disease programs from a few states provided some possible innovative workforce initiatives. Idaho and Wisconsin noted that they are using CHWs to improve the public's ability to address their own health.

In **Wisconsin**, working with guidance from the chronic disease and oral health programs, CHWs use the Community HUB and Pathways model of care coordination, which focuses on reducing modifiable risk factors for high-risk individuals and populations. This initiative serves as a conduit for the Oral Health Program to interact with community health workers who would normally be less accessible as partners.

Similarly, because **Idaho's** Oral Health Program resides in the Bureau of Community and Oral Health, oral health has become a training component for CHWs within the state's community health program model.

### *State Oral Health Plans*

Two states include either objectives or activities that specifically relate to case management:

- Missouri includes a goal to “support and enhance access to preventive health services and appropriate emergency dental care” that includes the promotion of case management to successfully complete dental treatment and then encourage returns for ongoing preventive maintenance.
- With an objective to promote the health care home concept, Minnesota includes a strategy to increase training opportunities in oral health for non-dental professionals, including health plan case managers, in order to develop patient-centered skills.

Although not directly related to case management per se, Maryland has a goal to “improve collaboration between oral health and other health and human services providers so that patients understand how to navigate the oral health care system and establish a dental home.”

## Conclusions

As the topic of workforce relates to this environmental scan, medical-dental integration can be facilitated by including additional members of the health care team to address issues related to oral health. Examples include the use of case managers or the integration of dental hygienists and CHWs in primary care and oral health integration activities. In FQHCs, efforts of the core dental team are enhanced through the integrated care team consisting of primary care clinicians, patient advocates and access workers, community specialty dentists, and CHWs.<sup>46</sup>

Future development surrounding the use of CHWs as part of integrated care teams should respect the historical origins of this profession, which evolved to serve the needs of local communities.<sup>69</sup> Establishing national credentialing and training requirements for CHWs could create an economic burden, which would result in the loss of a substantial volunteer base that has direct ties to underserved communities.<sup>78</sup>

## Challenges

- There are no formal guidelines or curriculum that standardize CHW training across US programs.<sup>79</sup>
- Scope of practice for health care workers, including dental hygienists and assistants, varies by state.
- Integrating nontraditional health-related workers in integrated activities requires sustainable funding mechanisms.

## Recommendations

- 1) Develop standardized CHW training specific to oral health and primary care integration, while respecting the origins of this workforce and economic constraints.
- 2) *Develop primary care quality improvement measures to strengthen the evidence base for CHW effectiveness.*
- 3) *Efforts to integrate CHWs in primary care and oral health integration teams could be strengthened through patient-centered sustainable policies that include CHWs as reimbursable members of the oral health team.*
- 4) *Facilitate care coordination through co-location of services and structured referrals using EHRs.*



## 7. Integrated Insurance Benefits

Several recent efforts have explored the potential for cost savings by providing dental benefits to members with chronic medical conditions. A recent evaluation of UnitedHealthcare claims data examined the impact of dental treatment on medical and pharmacy costs for adults under the age of 65 with chronic medical conditions.<sup>80</sup> Based on claims incurred between 2008 and 2011, the study found that:

- 1) Members with diabetes who received dental care (i.e., periodontal treatment or cleanings) had lower total medical costs compared to those that did not receive dental care.
- 2) Overall, total health care costs were lower for individuals with chronic medical conditions who received dental care, even when considering the costs of dental care.
- 3) Cost savings were observed across all chronic disease categories in this study, including: diabetes, asthma, congestive heart failure, coronary artery disease, chronic obstructive pulmonary disease, and chronic kidney/renal failure.

We identified two insurance companies that offer integrated medical and dental benefits for members with chronic medical conditions.

### Program Settings and Scope

#### Aetna Dental Medical Integration Project

The **Aetna Dental Medical Integration (DMI)** project offers integrated medical-dental benefits for pregnant women and members with chronic conditions, including diabetes and heart disease.<sup>81</sup> High-risk members who have not had a dental visit are contacted by dental coordinators for assistance with finding a dental provider. Members in the DMI project receive enhanced dental benefits covered at 100%.

A retrospective two-year claims analysis (2001-2002) of the Aetna DMI project found that periodontitis treatment for Aetna members with diabetes, coronary artery disease, or cerebrovascular disease was associated with higher per member per month (PMPM) medical costs compared to patients who received treatment for gingivitis.<sup>24</sup> Although overall PMPM costs were higher, the overall risk for their chronic condition (as measured using Episode Risk Groups, or ERGs) was significantly lower.

#### Cigna Oral Health Integration Program

**Cigna's Oral Health Integration Program** takes a similar approach: members who are pregnant or who have diabetes, heart disease, history of stroke, history of radiation for head and neck cancer, organ transplants, or chronic kidney disease receive 100% reimbursement of their copay/coinsurance for certain dental services.<sup>82</sup>

### Conclusions

A recent cost evaluation estimated hypothetical costs or savings to the Medicare program if a new dental benefit was offered to older adults to cover periodontal disease treatment and management in members with three chronic conditions: diabetes, heart disease, or stroke.<sup>83</sup> Overall, the authors estimated cost savings to the Medicare program at \$63.5 billion, realized over a 10-year period, based on reduced spending related to the three chronic conditions.

These estimates, along with information from the Aetna and Cigna programs, indicate that integrated insurance benefits may offer cost-savings for insurers and improved health outcomes for members.

### Challenges

- In order for benefits to be realized, insured members must utilize preventive dental services. This may be more feasible for certain populations; rural residents and people dwelling in dental shortage areas may experience difficulties accessing dental care.
- Most publications reviewed for this environmental scan have high potential for bias and serious methodological shortcomings.

## Recommendations

- 1) Although the published evidence appears promising, there is a need for independent, rigorous evaluation of program outcomes.

## 8. Health Care Reform

### *National Initiatives Targeting Integration*

Several recent federal initiatives have targeted integration of medical and dental care. In response to recommendations from a 2011 Institute of Medicine report,<sup>84</sup> the HRSA developed the Integration of Oral Health and Primary Care Practice initiative, which was tasked to develop a set of core competencies for provision of preventive oral health services by primary care providers.<sup>85</sup> Federal support for medical-dental integration is also evident in agencies' funding priorities; HRSA, Centers for Medicare and Medicaid Services (CMS), CDC, and other agencies have provided support for demonstration projects targeting integration.<sup>86</sup>

### *Delivery System Reform*

Delivery system-level reform activities targeting oral health and medical-dental integration primarily focus on coverage and payment transformation. While the Affordable Care Act (ACA) increased population dental insurance coverage, other delivery system reforms include:

- Value-based purchasing (VBP)
- Pay for performance (P4P) models
- Inclusion of dental care in ACOs

While private dental insurance has traditionally been provided via stand-alone dental plans, the ACA has supported movement toward models that either **bundle or embed dental coverage** within medical plans. The trend toward integrated medical and dental benefits is expected to continue.<sup>87,88</sup>

### **Value-based Purchasing (VBP) and Pay for Performance (P4P)**

VBP and P4P models are alternatives to traditional fee-for-service arrangements. Payment is tied to health improvement rather than the volume of services provided. While VBP and P4P models are being utilized on a broad scale in medicine, currently their use in dentistry has been limited to isolated demonstration projects. The Medicaid Innovation Accelerator Program of CMS provides technical support to states wanting to use VBP approaches to incentivize oral health improvement for Medicaid-enrolled children. VBP projects in Michigan, New Hampshire, and the District of Columbia are currently underway.<sup>89</sup>

Examples of these models in dentistry include two large dental group practices that incentivize payments into providers' compensation structure:

- 1) HealthPartners Dental Group (Minnesota)—incentives are based on risk assessment completion and patient satisfaction.<sup>90</sup>
- 2) Permanente Dental Associates (Oregon and Washington)—incentive payments are based on provider- and clinic-level targeted goals.<sup>91</sup>

### **Accountable Care Organizations (ACOs)**

**Accountable care organizations** are another delivery system reform model with widespread adoption in medicine. However, there is limited integration of dental services within existing ACOs. Designed to improve health outcomes and lower cost, there are numerous barriers to incorporating dental care into ACOs, including limited integration of medical and dental health information technology, and exclusion of dental coverage from Medicare.<sup>92</sup>

Two examples of dental integration in ACOs include:

- 1) Hennepin Health, an ACO for the Medicaid-expansion population in Hennepin County, Minnesota
- 2) Oregon's CCOs for the state Medicaid population

In both models above, the ACO or CCO receives a global capitated PMPM rate that covers needed medical and dental care. Hallmarks of these programs include care coordination following dental-related visits to the emergency department and financial incentives to increase utilization of preventive services.<sup>93</sup>

## 9. Conclusions

A core group of modifiable risk factors is common to major chronic diseases, including cardiovascular diseases, diabetes, cancer, and chronic obstructive pulmonary diseases.<sup>5</sup> Oral diseases share many of common risk factors, including dietary habits and tobacco use. Low-income and socially marginalized populations are disproportionately affected by these conditions.<sup>5</sup>

Common risk factors and chronic diseases are increasingly common in the United States.

- 9% of the US population (30.3 million people) has diabetes; nearly one-quarter of these cases are undiagnosed.<sup>19</sup>
- An additional 33% of the US adult population has prediabetes.
- 29% of adults have hypercholesterolemia.
- 34% of adults have hypertension; approximately half of these cases are uncontrolled.
- 38% of American adults and 20% of adolescents are considered obese.
- 16% of adults aged 25 and older report current cigarette smoking.<sup>94</sup>

Public health activities that target common risk factors through medical and dental integration aim to improve cost-effectiveness of these efforts and reduce health disparities. Medical-dental integration in public health settings can minimize duplication of efforts and enable consistent messaging. Integration that simultaneously targets medical and dental conditions can increase the efficient use of public health resources to improve oral health and physical well-being. Many of the programs described in this report target more than one risk factor or behavior. This was commonly found in organizations that offer co-location of medical and dental clinical services and in organizations that serve relatively large populations.

### *Models of Medical-Dental Integration*

The National Maternal and Child Oral Health Policy Center has proposed a framework for medical-dental integration to describe potential health home models.<sup>95</sup>

- 1) **Full medical-dental integration.** In this model, dental and medical providers are members of an interprofessional group practice at a single location.
- 2) **Co-location.** Medical and dental providers are located at the same facility but do not work in an integrated care team. Co-location enhances communication between providers and facilitates active referrals.
- 3) **Shared financing.** This payer model includes risk-based models of care such as ACOs, where medical and dental providers share financial risk.
- 4) **Virtual integration.** This model involves a shared EHR system, which facilitates bidirectional referrals and identification of high-risk patients.
- 5) **Facilitated referrals.** This is the least integrated model, where formalized referrals between medical and dental providers can facilitate follow-up.

The programs and activities that we identified in this environmental scan frequently demonstrate elements from several of these models. For example, some co-located medical and dental clinics have a shared EHR; however, several programs noted this as a limitation to integration. Although not completely applicable to the activities reviewed here, this framework does offer a helpful schema for considering types of integration.

### *State Activities*

State oral health and chronic disease programs can provide support for higher-level system changes by addressing medical-dental integration in strategic planning efforts, including state oral health plans. We found several examples of states that embrace the concept of oral health-medical integration, albeit with different approaches.

- **South Carolina** has a recommendation from its Oral Health Coalition that includes chronic disease within its dental public health priorities, with the understanding that common risk factors should not be overlooked.

- **Maryland** has action steps for increasing the ability and capacity of oral health professionals to screen for various chronic diseases and refer to the appropriate health care professional for more definitive evaluation and treatment.
- **Michigan** includes in its state oral health plan an objective that proposes to “increase the number of oral health care providers who have formal relationships (e.g., Memorandum of Understanding for patient referrals) with other health care providers by 10%.” The intent is to promote oral health providers as an integral part of the health care team with bidirectional referrals for health concerns.
- As part of a priority area related to prevention and systems of care, **Oregon** includes a strategy to reimburse dental professionals for chronic disease prevention activities, including diabetes screenings and tobacco cessation services.
- Similarly, **Colorado** calls for an increase in the number of reimbursable procedures that can be performed by primary care providers (with proper training) to prevent oral disease.
- **Colorado** also explicitly includes an activity to “collect and provide data that shows the connection between oral health and chronic disease” as a strategy within its financing objective. The intent is to ensure that Colorado adults have access to oral health preventive and treatment services that are covered by public insurance programs.

### *Outcomes*

Overall, published information about program evaluations and outcomes is limited. In most instances, programs that tracked outcomes did so in the form of numbers of patients screened or who received a certain service. For example, Trillium Coordinated Care Organization in Oregon reports metrics that include number of patients who receive smoking cessation counseling from dental providers. We identified only one publication that evaluated health outcomes associated with integrated activities in a public health clinical setting. In a randomized clinical trial, Lalla et al<sup>36</sup> identified dental patients with elevated A1C levels and evaluated the effectiveness of an intervention designed to improve health outcomes following positive screening findings in a dental setting. The intervention included patient education about the implications of screening results and a written report for patients to take to the recommended primary care follow-up.

Although that study did not find any difference in A1C levels and rates of primary care follow-up between the control and intervention groups, the authors note that even the control group received minimal advice from the dental professional about diabetes risk and the need for follow-up.<sup>36</sup>

### *Challenges*

Most of the challenges identified by this environmental scan are not unique to medical-dental integration but shared with other public health activities: lack of funding, stakeholder buy-in, competing priorities, scalability, and sustainability. Specific challenges in this field are largely related to:

- 6) **Evidence of effectiveness.** Many integrated activities lack documentation of effectiveness for cost and health outcomes.
- 7) **Professional guidelines.** Stakeholders note a lack of standardized guidance from professional organizations and agencies and a lack of established protocols for implementing integrated activities.
- 8) **Patient follow-up.** Risk factor and disease screenings can improve health outcomes when patients complete recommended follow-ups with medical or dental providers. Several programs identified in this report did not have a mechanism in place to assist patients with follow-ups. Without help from systems of care, it is unlikely that patients will be able to resolve existing barriers that have prevented them from receiving recommended services.
- 9) **Reimbursement for services.** Payment mechanisms to reimburse providers for cross-disciplinary services are lacking, although some state Medicaid agencies have made progress here.
- 10) **Sustainable funding.** Grants from the CDC and private foundations are often major funders of activities related to medical-dental integration. While these funding mechanisms support exploration of innovative programs and pilot projects, our key informants and survey respondents frequently identified lack of sustainable funding as a major challenge

to continue programmatic activities. However, one benefit of grant-funded initiatives is that funders can require evaluation components, which we found to be the source of most outcomes information that we were able to identify.

### *Recommendations*

- 1) **Patient referrals.** Many integrated programs include cross-disciplinary patient referrals. For example, dental providers who screen patients for diabetes often refer high-risk patients for primary care follow-ups. Active referral methods, including “warm hand-offs” and direct patient scheduling, can improve referral completion rates. Completions are also improved by establishing formalized protocols within an organization and training providers in these protocols. Active methods that use shared EHRs also allow for programs to evaluate outcomes.
- 2) **Professional guidelines.** Creating professional guidelines and toolkits for integrated activities would reduce start-up barriers to implementation, improve provider confidence, and facilitate standardization. As an example, several state oral health plans (California, Michigan, and Minnesota) already emphasize consistent screening protocols or consistent messaging to assist people in discontinuing tobacco use.
- 3) **Holistic targeting of risk factors.** Many programs target multiple common risk factors. For example, it was not uncommon to find that if a community health center performed point-of-care diabetes screenings in dental settings, it also performed blood pressure screenings. Future initiatives should consider targeting common risk factors using a holistic approach where this is appropriate.
- 4) **Prioritization of local community needs.** Although this type of holistic approach was often noted with large-scale organizations, several smaller programs targeted single risk factors based on local needs assessment. This approach may be more appropriate for organizations that serve smaller populations or have fewer resources.
- 5) **Integration of health care teams.** Innovations that capitalize on workforce flexibility of dental hygienists and CHWs help bridge the gap between medical and dental care. In addition to preventive services, these workers can also assist with case management, care coordination, and social services. By incorporating these workers into integrated care teams, public health programs can extend the reach of medical and dental services to address social determinants of health.
- 6) **Develop public health legislation to target chronic diseases and oral health.** Legislation that supports workforce flexibility, targets sugar-sweetened beverage consumption, and improves reimbursement for cross-disciplinary services promotes high-level systems change to support integration.

### *Additional Resources*

Several previous publications offer in-depth case studies describing well-established programs that integrate primary care medical and dental services in clinical settings. For additional details about these case studies, we recommended the following resources.

- “Oral Health Integration in the Patient-Centered Medical Home (PCMH) Environment: Case Studies from Community Health Centers”<sup>15</sup>
  - 1) Neighborcare Health (Seattle, WA)
  - 2) Dorchester House Multi Service Center (Boston, MA)
  - 3) The Marshfield Clinic (Marshfield, WI)
  - 4) Terry Reilly Health Services (Boise, ID)
- “Case Studies of 8 Federally Qualified Health Centers: Strategies to Integrate Oral Health with Primary Care”<sup>46</sup>
  - 1) Blackstone Valley Community Health Care (Pawtucket, RI)
  - 2) Ravenswood Family Health Center (East Palo Alto, CA)
  - 3) United Community & Family Services (Norwich, CT)
  - 4) Wayne Memorial Community Health Centers (Honesdale, PA)



- “White Paper: Integrating Oral Health with Primary Health Care”<sup>77</sup>
  - 1) Yakima Valley Farm Workers Clinic (multiple sites, WA and OR)
  - 2) Hennepin Health (MN)
- “Integration of Oral Health with Primary Care in Health Centers: Profiles of Five Innovative Models”<sup>58</sup>
  - 1) Bluegrass Community Health Center (Lexington, KY)
  - 2) Holyoke Health Center (Holyoke, MA)
  - 3) Salina Family Healthcare Center (Salina, KS)
  - 4) Salud Family Health Center (Fort Lupton, CO)
  - 5) Yakima Valley Farm Workers Clinic (multiple sites, WA and OR)

“Kick the Can” is an initiative to document current public health activities related to the negative health effects of sugar-sweetened beverages. Kick the Can’s website ([www.kickthecan.info](http://www.kickthecan.info)) offers advocacy tools, links to recent research studies, and examples of targeted policies. Public health officials and stakeholders interested in educational campaigns and policy initiatives targeting sugar-sweetened beverage consumption and healthy beverage choices are referred to this resource.



Topic(s) - check all that apply

- Diabetes
- Cardiovascular disease
- Obesity
- HIV infection
- Hepatitis
- Early childhood caries
- Oropharyngeal cancer
- Periodontal disease
- Tobacco use
- Screenings
- Referrals
- Co-location of services
- Oral health preventive services (eg, fluoride)
- Accountable Care Organizations
- Tooth decay
- Geriatrics
- Pregnancy or Ob/Gyn
- Diet or nutrition
- Other

Other topic (describe)

\_\_\_\_\_

Report title, citation, or publishing agency

\_\_\_\_\_

CDC Domain of Chronic Disease Prevention

Epidemiology & Surveillance - systems used to track chronic diseases and their risk factors, including use of health information technology.

Environmental Approaches - changes in policies and social/physical environments to promote health and healthy behaviors.

Health Care System Interventions - improve effective delivery and use of clinical and high-value preventive services.

Community-Clinical Links - community interventions to help patients prevent and manage chronic diseases with guidance from their doctor (e.g., smoking quit-lines).

- Epidemiology & Surveillance
- Environmental Approaches
- Health Care System Interventions
- Community-Clinical Links

Publication type

- Published article (peer-reviewed)
- Report (technical, non-technical, activity, etc.)
- Abstract/Presentation
- Website
- Other

Website (add url)

\_\_\_\_\_

Other publication type (describe)

\_\_\_\_\_

Name of organization that implemented the intervention

\_\_\_\_\_

Type of organization that implemented the intervention (i.e directly interacted with the population, not organizations that might have provided scientific or financial support)	<input type="checkbox"/> Public health agency <input type="checkbox"/> Medical care system <input type="checkbox"/> Managed care organization <input type="checkbox"/> Other clinical organization <input type="checkbox"/> Academic organization <input type="checkbox"/> Community-based organization <input type="checkbox"/> Other <input type="checkbox"/> Unknown
Type of public health agency	<input type="radio"/> Federal <input type="radio"/> State <input type="radio"/> Local
Other type of organization (describe)	_____
Intervention components	<input type="checkbox"/> Provision of information <input type="checkbox"/> Behavioral intervention <input type="checkbox"/> Provider/workforce trainings <input type="checkbox"/> Environmental intervention <input type="checkbox"/> Legislation/Regulation/Enforcement <input type="checkbox"/> Clinical <input type="checkbox"/> Public health or medical care system intervention (eg, care coordination) <input type="checkbox"/> Campaign <input type="checkbox"/> Other <input type="checkbox"/> Not described
Briefly describe	_____
Clinical intervention: provider type	_____
Target population (briefly identify)	_____
Setting in which the intervention was implemented	<input type="checkbox"/> Clinic or health-care provider office <input type="checkbox"/> Community-based organization <input type="checkbox"/> Academic institution <input type="checkbox"/> School <input type="checkbox"/> Nursing home/senior center <input type="checkbox"/> Community-wide <input type="checkbox"/> Child day care center or WIC center <input type="checkbox"/> Other
Other setting (describe)	_____

**Primary outcome measure(s):**

Patient behavior  Yes  
 No

Describe

\_\_\_\_\_

Provider behavior  Yes  
 No

Describe

\_\_\_\_\_

Intermediate or mediating outcome  Yes  
 No

Describe

\_\_\_\_\_

Health effect  Yes  
 No

Describe

\_\_\_\_\_

Severity of illness  Yes  
 No

Describe

\_\_\_\_\_

Other primary outcome measure  Yes  
 No

Describe other primary outcome measure

\_\_\_\_\_

**Description of the intervention: What is the proposed intervention and how is it being delivered?**

Scale of focus (individual, family, group, community, or general public)

\_\_\_\_\_

Services, materials, and other information delivered

\_\_\_\_\_

Policy or law enacted	_____
Who delivered the intervention? (e.g., health professional, volunteer, peer)	_____
How did the target population learn about the intervention?	_____
Time period, frequency, and duration of the intervention	_____
Scope of the intervention (i.e. how many members of the target group(s) were reached by the intervention)	_____
Extent of coordination with other agencies/organizations and the target community	_____
Program dates	_____
Funding sources	_____
URL (additional info or documents)	_____
Notes	_____



## Appendix B. Survey of State Oral Health Programs

Which of the following **activities or services** that integrate oral health and chronic disease prevention does your state oral health program support (e.g., fund or promote)?

1. Chronic disease activities performed by dental providers (in any setting):

- a. Blood pressure checks and referrals to primary care providers *[Yes/No]*
- b. Tobacco/smoking cessation support *[Yes/No]*

[If yes] Check all that apply:

Quitline referrals

Prescribing pharmacotherapy (e.g., bupropion SR, nicotine gum)

Tobacco cessation counseling

Other. Please describe

- c. BMI and nutritional assessments
- d. Prediabetes and/or diabetes screening (i.e., A1C) and referrals to primary care providers *[Yes/No]*
- e. HPV vaccinations *[Yes/No]*
- f. Other. Please describe

2. Oral health activities performed by medical providers (in any setting):

- a. Dental screenings *[Yes/No]*

Check all that apply:

Oral cancer screenings

Children's dental screenings

Other. Please describe

- b. Dental referrals for patients with diabetes *[Yes/No]*
- c. Preventive dental services *[Yes/No]*

Check all that apply

Topical fluoride (e.g., varnish)

Other. Please describe

- d. Other. Please describe

The following questions ask about health promotion and education activities offered by the state health department that address common risk factors for oral health and chronic diseases. Common risk factors include tobacco and alcohol use, along with diet.

3. Does the state **oral health program** conduct health promotion and education activities that address any of these common risk factors?

We are interested in only those activities that actively target both oral and overall health outcomes (e.g., obesity and tooth decay, or lung cancer and periodontal disease).

- a. Yes
  - b. No
  - c. Don't know/Not sure
- 
4. Which risk factors do these activities target? *Select all that apply.*
    - a. Diet/nutrition
    - b. Tobacco use
    - c. Alcohol use
    - d. Other (please describe):\_\_\_\_\_
- 
5. Please briefly describe how these activities target both oral and overall health outcomes:
- 
6. Does your state oral health program collaborate with the state **chronic disease program** to conduct health promotion and education activities that address any of these risk factors for oral health and chronic disease?
    - a. Yes
    - b. No
    - c. Don't know/Not sure
- 
7. Which risk factors do these activities target? *Select all that apply.*
    - a. Diet/nutrition
    - b. Tobacco use
    - c. Alcohol use
    - d. Other (please describe):\_\_\_\_\_

8. Please briefly describe how these activities target both oral and overall health outcomes.
9. What resources support the existing oral health and chronic disease collaboration programs? *Select all that apply*
  - a. Centers for Disease Control and Prevention (CDC)
  - b. Health Resources and Services Administration (HRSA) – including MCHB or BPHC
  - c. National Institutes of Health (NIH)
  - d. National foundation (e.g., DentaQuest, Pew, WK Kellogg)
  - e. State or local foundation (e.g., Delta Dental)
  - f. State general revenue funds
  - g. Other (please describe)
10. What is the **most important** barrier, if any, that has impacted your ability to collaborate with your state chronic disease program?
11. If we have more questions about your responses, may we contact you for a brief follow-up?
  - a. No
  - b. Yes

## Appendix C. Survey of State Chronic Disease Programs

### Epidemiology and Surveillance

1. Does your state chronic disease program conduct any surveillance activities that include **both** oral health and chronic disease?
  - Examples may include collecting oral health information as part of chronic disease surveillance activities or collecting BMI or other chronic disease data as part of oral health surveillance activities.
    - a. Yes. Please describe
    - b. No [skip to #3]
2. Do you collaborate with your state oral health program on these activities?
  - a. Yes. Please describe the nature of the collaboration
  - b. No

### Environmental Approaches

3. Does your state chronic disease program conduct or support (e.g., fund or promote) environmental approaches that target healthy lifestyle choices that impact **both** oral health and other chronic diseases?
  - Examples include programs or policies aimed at reducing intake of sugar-sweetened beverages, increasing consumption of tap water, or reducing tobacco and alcohol use.
    - a. Yes. Please describe
    - b. No [Skip to #5]
4. Do you collaborate with your state oral health program on these activities?
  - a. Yes. Please describe the nature of the collaboration
  - b. No

### Health Care System Interventions

5. Does your state chronic disease program conduct or support (e.g., fund or promote) any activities that integrate provision of medical and dental care?
  - Examples include:
    - Dental providers conduct screenings for hypertension or diabetes with referrals to primary care
    - Medical providers conduct dental screenings and referrals

- Medical providers apply fluoride varnish or other preventive dental services
  - a. Yes. Please describe
  - b. No [Skip to #7]
- 6. Do you collaborate with your state oral health program on these activities?
  - a. Yes. Please describe the nature of the collaboration
  - b. No

Community Programs Linked to Clinical Services

- 7. With respect to activities that link community programs and clinical services to improve chronic disease management, does your state chronic disease program include or support (e.g., fund or promote) oral health integration within these activities?
  - Examples may include the use of community health workers, team based care models, or community health programs that include an emphasis on oral health.
    - a. Yes. Please describe
    - b. No [Skip to #9]
- 8. Do you collaborate with your state oral health program on these activities?
  - a. Yes. Please describe the nature of the collaboration
  - b. No

These final questions are about general integration of oral health in your chronic disease program.

- 9. Are any oral health activities included in your current state chronic disease plan?
  - a. Yes. Please describe
  - b. No
- 10. What is the **most important** barrier, if any, that has impacted your ability to collaborate with your state oral health program?
- 11. If we have more questions about your responses, may we contact you for a brief follow-up?
  - a. Yes
  - b. N

## Appendix D. Survey of Community Dental Programs

The following questions ask about your work setting.

1. What is the name of your organization/agency/clinic?
2. In what city is your organization/agency/clinic located?
3. In what state is your organization/agency/clinic located?
4. Which of the following best describes your organization?
  - a. Local health department
  - b. Local non-profit organization
  - c. Community Health Center or FQHC
  - d. Other local organization or agency. *Please describe*
5. Approximately what size population does this organization serve?
  - a. < 25,000
  - b. 25,000 – 74,999
  - c. 75,000 – 999,999
  - d. ≥ 1,000,000

The following questions ask about clinical activities offered by your organization that integrate oral health and chronic disease prevention. Examples of clinical services may include dental services (e.g., screenings, referrals, preventive services) provided by medical providers or chronic disease screenings (e.g., blood pressure or A1C) performed in dental settings.

**Please indicate if any of the following integrated clinical services are provided.**

*[Select all that apply]*

6. Chronic disease activities **performed by dental providers** in your organization:
  - a. Blood pressure checks *[Yes/No]*

*[If yes]* Is there a mechanism for dental providers to refer patients with high blood pressure to primary care providers? *[Yes/No]*

*[If yes]* Please describe
  - b. Tobacco/smoking cessation support *[Yes/No]*
    - *[If yes]* Check all that apply:
    - Quitline referrals
    - Prescribing pharmacotherapy (e.g., bupropion SR, nicotine gum)
    - Tobacco cessation counseling
    - Other. Please describe
  - c. Diabetes screening (i.e., A1C) *[Yes/No]*

*[If yes]* Is there a mechanism for dental providers to refer patients with high blood glucose to primary care providers? *[Yes/No]*



*[If yes] Please describe*

- d. HPV vaccinations *[Yes/No]*
  - e. Other. Please describe
7. Oral health activities **performed by medical providers** in your organization:
- a. Dental screenings *[Yes/No]*
  - *[If yes] Check all that apply:*
  - Oral cancer screenings
    - Children’s dental screenings
      - [If yes] Is there a mechanism for medical providers to refer children with oral health needs to dental providers? [Yes/No]*
      - [If yes] Please describe*
      - Other. *Please describe*
  - b. Dental referrals for patients with diabetes *[Yes/No]*
  - c. Preventive dental services *[Yes/No]*
  - *[If yes] Check all that apply*
  - Topical fluoride (e.g., varnish)
  - Other. Please describe
    - d. Other. Please describe
8. Does your organization use electronic health records (EHR) to integrate dental and medical patient information?
- a. Yes. Please describe
  - b. No

The following questions ask about health promotion and education activities offered by your organization that address common risk factors for oral health and chronic diseases. Common risk factors include tobacco and alcohol use, along with diet. *We are interested in only those activities that actively target both oral and overall health outcomes (e.g., obesity and tooth decay, or lung cancer and periodontal disease).*

9. Does your organization conduct health promotion and education activities that target both oral and overall health outcomes?
- a. Yes *[Go to Question 10]*
  - b. No *[Go to Question 12]*
  - c. Don’t know/Not sure *[Go to Question 12]*
10. Which risk factors do these activities target? *Select all that apply.*
- a. Diet/nutrition
  - b. Tobacco use
  - c. Alcohol use

- d. Other (please describe)
11. Please briefly describe how these activities target both oral and overall health outcomes.
  12. If we have more questions about your responses, can we contact you for a brief follow-up?
    - a. No
    - b. Yes

# Appendix E. Key Informant Interview Guide

## KEY INFORMANT INTERVIEW GUIDE

**Bold text = key questions and content**

Nonbold text = prompt/follow-up questions (if needed)

Thank you for your willingness to share more information about your program. Before we begin, if it is all right with you I will be recording this phone call for notetaking purposes only. To confirm, we will not identify you individually, but may specify your state or program in our reporting.

Background: To start, I'd like to ask you a few background questions regarding the program.

**Q1. What is the title of the project?**

**Q2. In 2-3 sentences, can you briefly describe the program?**

**Q3. When was the project initiated?**

**Q4. Briefly, what was the ultimate goal of this project? How was this goal chosen?**

**Q5. Who did you collaborate with on this project? Were they involved in all phases of the project? (e.g., program planning & development, implementation, and evaluation)**

- What is/was the role of your organization in the program planning & Implementation process?
- Is the community/target population part of the decision-making process?

**Q6. What stage is the project currently in? {use the answer to this question to guide skip patterns below} (e.g., in development, initial implementation (within past 6 months), in progress)**

Needs assessment and program development:

**Q7. What factors led to the creation of this project? (e.g., secondary data, community identified need, funding opportunity) How were the main activities chosen?**

- How was the program created/adapted to cater to this target population (i.e. recruitment, staff, protocols, location)?

**Q8. How was the target population chosen? Where there any subgroups you were especially interested in reaching?**

**Q9. How were the settings for this project chosen?**

- How were settings approached about participating?
- Were there any challenges in this process (i.e. settings not interested in participating) or factors that facilitated the process (i.e. existing partnerships)?

**Q10. Was cost-effectiveness considered in the development of this project? (if so, how?)**

Implementation, evaluation, & sustainability:

**Q11. What are some factors that have made this program successful?**

**Q12. How does your organization measure the success of this program? How do you collect outcome data?**

**Q13. What are some challenges this program has faced and how were they addressed?**

Q14. What factors influence the future of this project (sustainability)?

Q15. What challenges do you foresee (i.e. funding, infrastructure, collaboration)?

Final thoughts:

Is there anything else that you would like to share with us today that has not yet been covered?

Thank you again for participating in this project. If you have any questions or suggestions, please feel free to contact myself or my supervisor, Dr. Susan McKernan.

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