Published in final edited form as:

Health Promot Pract. 2018 July ; 19(4): 531–541. doi:10.1177/1524839917737752.

Integrating Medical-Dental Care for Diabetic Patients: Qualitative Assessment of Provider Perspectives

Ingrid Glurich, PhD¹ [Scientist and Core Leader for Dental Clinical Research Core in the Institute for Oral and Systemic Health (IOSH) at Marshfield Clinic Research Institute (MCRI), Marshfield, WI], Kelsey M. Schwei, PhD¹ [Post-doctoral fellow in IOSH at MCRI, Marshfield WI], Sara Lindberg, PhD² [Director of Evaluation Research at the Population Health Institute, University of Wisconsin – Madison, WI], Neel Shimpi, BDS, MM¹ [Research Specialist in IOSH at MCRI in Marshfield, WI], and Amit Acharya, BDS, MS, PhD¹ [Director of IOSH and a Dental Informatics scientist within the Biomedical Informatics Research Center at MCRI, Marshfield WI]

¹Institute for Oral and Systemic Health, Marshfield Clinic Research Institute, Marshfield, WI, USA

²Population Health Institute, Department of Population Health Sciences, University of Wisconsin – Madison, Madison WI, USA

Abstract

Globally, periodontal disease and diabetes have achieved epidemic proportions and have become a top healthcare priority. Mutual bidirectional exacerbation of these conditions driven by underlying inflammatory processes has been demonstrated. Creation of cross-disciplinary integrated care delivery (ICD) models that bridge the traditionally-siloed healthcare domains of dentistry and medicine are being advanced to improve management of both conditions. By engaging focus groups inclusive of both medical and dental providers and one-on-one interviews, this qualitative study investigated provider knowledgeability, receptiveness, and readiness to engage ICD and sought input from the medical/dental primary care practitioner participants on perceived opportunities, benefits, and challenges to achieving ICD models for patients with diabetes/prediabetes. Statewide regional representation and inclusivity of diverse practice settings were emphasized in soliciting participants. Thematic analysis of focus group and interview transcripts was undertaken to establish current state-of-the-art, gauge receptivity to alternative ICD models, and seek insights from practitioners surrounding opportunities and barriers to ICD achievement. Forty providers participated, and thematic analyses achieved saturation. Providers were well informed regarding disease interaction, receptive to ICD, including implementation of better screening and referral processes, and favored improving interdisciplinary communication inclusive of access to integrated electronic health records. Perceived barriers and opportunities communicated by participants for advancing ICD were documented.

Address correspondence to Amit Acharya, BDS, MS, PhD, Institute for Oral and Systemic Health, Marshfield Clinic Research Institute, 1000 North Oak Avenue, Marshfield WI 54449, USA. acharya.amit@mcrf.mfldclin.edu. Phone: 715-389-4460, Fax: 715-221-6402.

Conflict of Interest: The authors have no conflicts of interest to report.

Keywords

Diabetes Complications; Periodontal Diseases; Dentistry; Medicine; Delivery of Healthcare; Delivery of health care; integrated

INTRODUCTION

Globally, periodontal disease (PD) and Type 2 diabetes mellitus (T2DM) have achieved epidemic proportions and become top healthcare priorities. Mutual bidirectional exacerbation of these conditions driven by underlying inflammatory processes has been demonstrated. Reducing oral and systemic inflammatory process is posited to promote gum health, improve glycemic control in patients with diabetes and abate progression of both conditions. Notably, PD and diabetes are highly modifiable conditions responsive to low-cost interventions. A growing evidence base supports improved outcomes in both oral health and glycemic control in diabetic patients in response to implementation of improved oral hygiene practices as a component of lifestyle intervention. These observations are promoting creation of cross-disciplinary integrated care delivery (ICD) models that bridge the traditionally-siloed healthcare domains of dentistry and medicine to improve health outcomes for patients with diabetes/pre-diabetes.

Consistent with the journal's mission of exploring health promotion intervention programs and models, the focus of this study was to gauge receptiveness and perceptions of readiness on the part of primary care medical providers and general dental providers practicing in Wisconsin to adopt multidisciplinary, medical-dental integrated care delivery (ICD) models as an alternative 'best-practice' standard for clinical management of patients with these conditions to stem the escalating prevalence of these diseases. A qualitative scan of practicing medical and dental providers was undertaken statewide across Wisconsin by conduct of (1) focus groups promoting dialogue between primary care providers and general dental providers or (2) one-on-one interviews with motivated individual providers not able to attend a scheduled focus group. The purpose of these qualitative scans was to collect feedback surrounding cross-disciplinary clinical knowledgeability, informational needs of providers, perspectives on current status of ICD, perceived gaps in current care delivery models, challenges in implementing ICD models, and opportunities for promoting ICD model implementation, specifically with the goal of improving oral health management in patients with diabetes or pre-diabetes across both medical and dental domains to leverage improvements in glycemic control.

BACKGROUND

A decade and half after Surgeon General David Satcher drew attention to the burgeoning oral health crisis he characterized as a 'silent epidemic' (U.S. Department of Health and Human Services, 2000), medicine and dentistry remain largely siloed domains within the national healthcare system, with only relatively modest inroads achieved in establishing equitable oral healthcare delivery nationwide. During this same temporal frame, the evidence base supporting oral-systemic interactions in promotion of disease processes has expanded, including validation of bidirectional exacerbation of diabetes and periodontal

disease and improvement in periodontal disease on achievement of glycemic control (Corbella, Francetti, Taschieri, De Siena, & Fabbro, 2013). Periodontal disease (PD) is caused by establishment of microbial colonies contained in plaque which accumulates at or below the junction of the tooth and gum line due to poor oral hygiene and lack of periodic dental cleaning in a dental clinical setting. If left untreated, the condition is associated with chronic inflammation, erythema and painful swelling of gingival tissue, deepening dental pockets resulting in gum recession and bone erosion leading to loose teeth and eventually, tooth loss. Inflammation of the gums and systemic microbial access contribute to systemic inflammation which drives exacerbation of dysglycemia and promotes progression of diabetes and onset of diabetic complications. A systematic review reported that individuals with PD had a 50% increase in risk for developing diabetes. (Borgnakke, Ylostalo, Taylor, & Genco, 2013) Mutual exacerbation of these conditions has been attributed to chronic inflammatory processes, altered immune response secondary to dysglycemia, and macro- and micro-vascular pathogenesis. (Corbella et al, 2013; Glurich, Acharya, Shukla, Nycz, & Brilliant, 2013) Consequently, periodontal disease has been classified as an early emergent complication of diabetes. Meanwhile, parallel escalation on an epidemic scale is being reported for diabetes, prediabetes and periodontal disease with 30, 86, and 65 million people, respectively, impacted by these conditions in the United States (Centers for Disease Control and Prevention 2014; Eke et al., 2015) These conditions are known to drive other chronic illnesses including cardiovascular diseases and chronic renal failure. Notably, further escalations in disease prevalence, morbidity, mortality, and consequent escalation in already-formidable healthcare costs are being projected. (Boyle, Thompson, Gregg, Barker, & Williamson, 2010; Eke et al., 2016)

The response to the growing diabetes epidemic has been creation of a paradigm involving clinical disease management by primary care providers (PCPs). Because of the close oral-systemic relationships, ICD models involving inter-disciplinary care delivery by primary care providers and general dental practitioners are being proposed. Although population-based screening for dysglycemia is currently not supported in the dental setting (Waugh, Shyangdan, Taylor-Phillips, Suri, & Hall, 2013), pilot studies examining feasibility of screening in dental practice settings are reporting undiagnosed dysglycemia at rates of 30–40%. (Genco et al., 2014; Lalla, Kunzel, Burkett, Cheng, & Lamster, 2011)

To compound the growing crisis, disparity populations impacted by diabetes and exhibiting high rates of periodontal disease continue to face healthcare access barriers, especially in the dental care arena when individuals lack adequate insurance coverage. To counter escalations in numbers of individuals with no dental care access, public health, government leaders, and healthcare industry across Wisconsin have joined forces and successfully increased access by expanding the community-based dental health clinic infrastructure to alleviate this crisis, often targeting co-location near medical centers (Snyder 2015). This expanded access further supports opportunities for implementing alternative models incorporating multidisciplinary ICD across medical/dental domains. The current study sought to investigate the overall receptivity of PCPs and general dental practitioners regarding a translational shift towards an ICD paradigm to help stem the epidemic tide of both diabetes and periodontal disease.

METHODS

Employing a qualitative research approach, the study team recruited medical and dental providers to participate in in-person focus groups or one-on-one phone interviews, based on availability of providers statewide for scheduling. Recruitment of participants was undertaken with the intention of achieving a representative sample of Wisconsin providers statewide across various practice settings and arranged in settings where representative numbers of dental and medical providers could be recruited. To achieve regional representation statewide, one-on-one interviews were conducted in regions where establishment of focus groups was not possible. A semi-structured moderator script was developed, informed by an environmental scan of the literature conducted by the study team surrounding opportunities, barriers, and current state-of-the-art in medical-dental ICD in the context of diabetes. Questions were standardized across focus groups and interviews. Discussion points were topical and arranged to elicit information about providers' current knowledgeability, practice patterns, informational needs, perceived opportunities, benefits, and challenges to achieving medical-dental ICD models, with specific focus on care delivery to diagnosed and undiagnosed diabetic/prediabetic patients. The following prompts served to stimulate and guide thematic discussion with focus group and interview participants:

- a. Screening: Do you presently conduct screening in your practice for oral and systemic conditions? Be specific about types of conditions and screening approaches. If you do not screen, share your rationale.
- b. Referrals and ICD surrounding patients with known or suspected diabetes: Do you practice cross-disciplinary referral? Discuss the process and how you conduct follow-up when you initiate referrals.
- c. Education: Do you feel that your schooling integrated medical and dental education at a curriculum and student level? Discuss resources you access for continuing education and your approach to patient education.
- d. Information sharing: How do you conduct interdisciplinary communication? Describe your process for information sharing with patients surrounding their oral-systemic health in the context of diabetes.
- e. Barriers: What barriers do you encounter surrounding information sharing across disciplines and with patients? Discuss how they impact on care delivery for patients with diagnosed or undiagnosed diabetes.
- f. ICD: What would be most helpful in developing holistic ICD? Identify opportunities you see for promoting ICD for patients with, or at risk for, diabetes.

Participants

Focus groups participants were strategically assembled to include balanced representation of both medical primary care providers and general dental care providers from around the state of Wisconsin. Primary care providers eligible for participation included the following specialties: internal medicine, family medicine, obstetrics and gynecology, pediatrics, med-

pediatric, and urgent care. Within these primary care domains physicians, physician assistants, and nurse practitioners were eligible for participation. From the general dental care domain, dentists and dental hygienists were eligible for participation. The study sought to enroll 20 to 25 providers, each, across both the medical and dental domains over the course of 4–6 focus groups convened in various geographic locations, both rural and urban, across the State. Eligibility criteria for interview participants were identical to those of focus group participants. Providers interviewed included individuals who met inclusion criteria but were either not unavailable to participate in scheduled focus groups, or lived in other geographic regions where achievement of a representative number of participants from medical and dental primary care settings required to convene a focus group was not possible. A total enrollment of 40–50 medical/dental participants was targeted. Participants were offered a \$50 incentive to offset travel, expenses and time commitment.

Analysis

Focus group and interview audio recordings were transcribed verbatim with quality checks conducted to detect and correct errors. Transcripts were uploaded to QSR NVivo 10 (QSR International Pty Ltd., Melbourne, Australia). Researchers developed a thematic schema based on the moderator script and responses from one focus group discussion to generate a preliminary codebook. A qualitative approach to content analysis using both conventional (codes derived during analysis) and directed (initial coding scheme based on the moderator script) content analysis was used (Hsieh & Shannon, 2005). Two reviewers then conducted coding on a further focus group transcript to test completeness of thematic capture of the codebook and resolved any discrepancies or achieved agreement on any newly emergent themes. Inter-rater agreement was assessed by determining Cohen's Kappa coefficient. A 10% quality assurance across all transcripts was additionally conducted.

This study was approved by the Institutional Review Board (IRB) as exempt from further IRB review (45 CFR 46.101(b)(2)). No identifiers were collected or retained in the course of transcribing the sessions to ensure participant anonymity.

RESULTS

Codebook Validation

The codebook was organized into 13 broad themes and 38 additional sub-codes. A mean Kappa score of 0.84 was achieved across all codes following coding of the second focus group transcripts by the two reviewers, supporting further coding of the rest of the focus group transcripts by only a single reviewer based on demonstration of high inter-rater agreement, while the second reviewer conducted coding on a 10% sample of each focus group for quality assurance of subsequent coding. The mean Kappa score achieved across all codes based on quality assurance analyses was 0.98. The 4 focus groups were assigned between 31 and 41 codes each; whereas the 17 interviews were each assigned between 18 and 28 codes. Interviewer codes overlapped those identified during focus group analyses. Investigators agreed that thematic saturation was achieved, since no new themes emerged during completion of thematic analyses of all focus group and interview transcripts following initial definition of relevant codes.

Qualitative analyses focus group/interview transcripts surrounding thematic

content—A total of 40 participants—23 medical and 17 dental providers—participated either in one of 4 focus groups or 17 one-on-one interviews. Figure 1 illustrates the provider status and geographic distribution of participants across Wisconsin. Concept mapping was undertaken to summarize key themes emerging from thematic analysis.

As summarized graphically in Figure 2 the following barriers, benefits, and opportunities for establishment of integrated medical-dental ICD for patients with diabetes/prediabetes identified by participants of either focus groups or interviews.

Barriers—Communication, cost, lack of educational materials, siloed provider education, poor patient cooperation or attitude, access disparities, insurance status, low health literacy, provider cooperation or attitude, system level barriers, lack of equipment or technology, unmet access to required clinical information, lack of capacity to ensure informational accuracy or quality; security, privacy, and compliance concerns, were among identified barriers.

Benefits—Access to accurate medical and dental information, efficiency and/or time savings during care delivery, health benefits for the patient, and ongoing provider education were identified as potential benefits by participants.

Opportunities—Among topics suggested by providers to promote establishment of alternative cross disciplinary integrated care models for dental-medical management of diabetic patients were: improvement in access to dental care, greater proactive administration or system level involvement, continuing education, sharable after-visit summary, integration of an oral health educator on the medical side, multi-media approaches to provider education or training, improved health literacy for patients via provision of educational materials accessible across a spectrum of venues including social media or patient portals, generation of educational materials in a variety of formats in a waiting room setting, improved access solutions, oral standard of care and quality metrics, standardized screening approaches, alternative models for reimbursement for care, same-day access, improved informatics capacity to share medical-dental record data. Table 1 provides a sampling of quotations from focus group and interview participants regarding opportunities and challenges related to the top five most referenced codes and categories.

DISCUSSION

In the late 1990s, Wisconsin experienced a growing dental access crisis and found itself among the top five states with the worst track record in the nation. In ensuing years, a public health intervention involving collaborative efforts between the government, community health centers, local communities, and medical centers began to turn the tide, which increased dental access by 418% between 2003 and 2014 (data provided by Community Health Centers of Wisconsin). The access intervention resulted in construction of new state-of-the-art dental facilities and new access regionally across the state, including colocation of dental-medical services in some settings and access to an integrated medical-dental electronic health record for an infrastructure of ten new dental centers partnering with a

large regional clinic serving north-central Wisconsin (Acharya, 2016). The evolving dental-medical healthcare delivery system statewide offered an ideal testbed for gauging perspectives and current state-of-the art surrounding practice patterns, barriers, benefits, and opportunities for achieving integrated care delivery by sampling experiences and perceptions of providers across a broad range of dental and medical settings statewide.

A summary of barriers to integrating medicine and dentistry presented in a report by Grantsmakers in Health (2012) included: time, education and experience, lack of evidence-based guidelines, payment structures, scope of practice and staffing model concerns, and availability of consolidated referral resources. Figure 1 shows our study revealed similar codes. Below we present a qualitative summary of findings that emerged from thematic analyses expanding on those presented in the results section.

Knowledgeability, Receptivity and Educational Status of Providers and Patients

Overall, knowledgeability surrounding oral-systemic health connection was high among participants. Interviews and focus group conversations universally reflected a siloed medical-dental education experienced by participants, but there was also a perception that provider training was evolving to a more cross-disciplinary model, as reflected in the following comment from an interview participant:

“The (new educational) model includes that all dental, nursing, physical therapy, pharmacy students– take their classes together for the first year or two, that you begin to work with each other as part of a greater medical team. That includes social workers too. Older physicians may have more difficulty trying to say ‘oh, that’s one more thing I’ve got to do’ where younger physicians are more flexibly saying ‘no, we’ve got to go there, that just fits’. And I think that’s where a lot of the barriers will begin to go away.”

All providers indicated engaging in high levels of continuing education, emphasizing that demonstration of educational engagement was required for maintaining licensure.

Participants perceived low levels of patient health literacy surrounding oral-systemic health, but many reported high receptivity. Most participants indicated they verbally conduct patient education, and only few distributed educational materials in any venue, with some providers citing a lack of educational materials. Some providers also noted that, however well informed, patients reported access barriers often related to insurance coverage and failure to receive necessary care.

Screening

Providers reported collection of medical history and physical examination as the current state-of-the-art surrounding screening and considered this as integral to assessing patient health holistically. As summarized by one respondent: “We screen in the sense that we’re asking people questions but not that we’re doing any testing.”

Monitoring for dysglycemia in the dental setting was minimally cited, although one medical participant stated: “I’d like to have them (dentists) start routinely doing HbA1Cs as well, which might actually improve that kind of conversation back towards medical”. However,

providers demonstrated knowledgeability concerning barriers to screening as exemplified by this statement: “Let’s say we were reimbursed for doing the A1C test—I guarantee you that would make a difference in people at high risk being tested in a dental office.”

Communication and Referral

Most providers reported engaging in referrals, although processes ranged broadly from verbal suggestion or providing provider contact information to formal appointment arrangement. Providers practicing where medical and dental services were co-located more frequently reported standardized processes with designated personnel organizing appointments. Providers noted that insurance status was often critical in securing appointments. No standardized follow-up on referral compliance was identified, with providers reporting a range in follow-up from active to none. One provider noted: “In medical, it seems like in general, you’ve got a good process in tracking. If I make a referral to the cardiologist, tracking makes sure that the patient went there and that I get the notes back. We don’t – or we haven’t consistently done that with dental.”

Overall, providers cited a lack of standardized communication channels between medical and dental providers, noting that communication was often problematic and lagged other systems previously established to bridge communication across other health-related domains. For example, one provider cited the pharmacy systems’ use of a dedicated phone line to fast-track access to a consult and suggested “having uniform protocols that everyone buys into is very helpful”.

Providers uniformly agreed that a universally formatted, shared electronic health record with capacity to capture both medical and dental data would facilitate better care delivery if relevant patient data were readily accessible in a user-friendly format to facilitate communication across medical-dental domains. One provider observed: “There is a lot of delay in care that happens as a result of not having a unified health record.”

Notably, good communication as a component of healthcare delivery to patients with diabetes was demonstrated as being critical to achieving good patient outcomes (Ciechanowski Katon, Russo, & Walker, 2001). Providers expressed concern regarding completeness of information they had regarding pharmaceutical exposures as a consequence of siloed healthcare delivery. The following observation was echoed by multiple providers:

“There are just logistical system barriers to sharing information. It seems like there are not that many dental systems and medical systems that actually talk to each other. I think there are definitely down sides of not sharing that information, like dentists not having updated medication lists or being able to see what previous blood pressures were in clinic. We don’t have a common system that is HIPAA-secure where we can easily send each other messages regarding patients.”

Perspectives on Achieving Integrated Care Delivery

Of interest were recommendations from active practitioners surrounding potential pathways to achieving better ICD models. Implementing oral health educators within a medical clinic was mentioned in three out of four focus groups. Some providers believed that re-integrating

oral health delivery into medicine as a specialty would alleviate the barriers created by siloing the two healthcare delivery systems into separate domains. Other suggestions included integrating hygienists or mid-level practitioners into medical delivery systems or nurses into the oral health delivery system to alleviate barriers created by disparate insurance systems currently in place for medical/dental reimbursement. Some providers further suggested a role for public health in coordinating medical-dental integration. However, providers also acknowledged that solving integration and access were complex problems, with one participant reflecting: “I still think that one model isn’t going to fit all, so that makes it really complicated.”

Limitations

Although only four focus groups were conducted, thematic saturation was observed, suggesting that central themes had been successfully identified and engagement of further focus groups offered no additional value. However, one-on-one phone interviews, which allowed the participant to voice individual perspectives rather than assuming unanimous agreement among a group of participants, were undertaken to minimize potential for Delphi consensus limitations. Thematic continuity was also noted across thematic analyses of interviews. Although participants were solicited from different practice types across the state, findings reflected in the present study may not be generalizable to all providers statewide. Finally, because providers voluntarily self-selected to participate, topically-related or experiential biases associated with their practice settings cannot be ruled out. However, with the exception of referral, where more standardization was reported across co-located medical-dental settings, dissonant provider perspectives across various practice settings were not evident.

CONCLUSIONS

In summary, the study determined that providers: 1) were well informed regarding bi-directional disease exacerbation between of periodontal disease and diabetes; 2) recognized value in ICD to achieving improved health outcomes; 3) were generally receptive to implementing better screening and referral processes; 4) favored development of a unified medical-dental electronic health record with relevant information organized in a sharable, user-friendly format, including oversight of prescription history; 5) identified low patient health literacy as an important interventional target; and 6) identified key barriers and opportunities for advancing ICD models based on their clinical vantage and experience.

Acknowledgments

The research described herein was supported by a research grant from Delta Dental of Wisconsin, a training grant from National Library of Medicine (NLM) to the Computation and Informatics in Biology and Medicine Training Program (NLM5T15LM007359) and funds from Marshfield Clinic Research Foundation, and Family Health Center of Marshfield, Inc. Its contents are solely the responsibility of the authors and do not necessarily represent the official view of NLM or Delta Dental of Wisconsin. Authors acknowledge Ariel Marcoe for assistance with literature searches and draft editing, Dixie Schroeder for assistance with coordinating focus groups and interviews, Marie Fleisner for editorial assistance with manuscript formatting and submission.

References

- Acharya A. Marshfield Clinic Health System: Integrated Care Case Study. *J Calif Dent Assoc.* 2016; 44:177–181. [PubMed: 27044239]
- Borgnakke WS, Ylostalo PV, Taylor GW, Genco RJ. Effect of periodontal disease on diabetes: systematic review of epidemiologic observational evidence. *J Clin Periodontol.* 2013; 40(Suppl 14):S135–S152. DOI: 10.1111/jcpe.12080 [PubMed: 23627324]
- Boyle JP, Thompson TJ, Gregg LB, Barker LE, Williamson DF. Projection of the year 2050 US adult population: dynamic modeling of incidence, mortality and prediabetes prevalence. *Popul Health Metr.* 2010; 8:29.doi: 10.1186/1478-7954-8-29 [PubMed: 20969750]
- Centers for Disease Control and Prevention. National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014. Atlanta, GA: U.S. Department of Health and Human Services; 2014. Retrieved from <https://www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf>
- Ciechanowski PS, Katon WJ, Russo JE, Walker EA. The patient-provider relationship: attachment theory and adherence to treatment in diabetes. *Am J Psychiatry.* 2001; 158:29–35. [PubMed: 11136630]
- Corbella S, Francetti L, Taschieri S, De Siena F, Fabbro MD. Effect of periodontal treatment on glycemic control of patients with diabetes: A systematic review and meta-analysis. *J Diabetes Investig.* 2013; 4:502–509. DOI: 10.1111/jdi.12088
- Eke PI, Dye BA, Wei L, Slade GD, Thorton-Evans GO, Borgnakke WS, Taylor GW, Page RC, Beck JD, Genco RJ. Update on prevalence of periodontitis in adults in the United States: NHANES 2009–2012. *J Periodontol.* 2015; 86:611–622. DOI: 10.1902/jop.2015.140520 [PubMed: 25688694]
- Eke PI, Zhang X, Lu H, Thorton-Evans G, Greenlund KJ, Holt JB, Croft JB. Predicting Periodontitis at State and Local Levels in the United States. *J Dent Res.* 2016; 95:515–522. DOI: 10.1177/0022034516629112 [PubMed: 26848071]
- Genco RJ, Schifferle RE, Dunford RG, Falkner KL, Hsu WC, Balukjian J. Screening for diabetes mellitus in dental practices: a field trial. *J Am Dent Assoc.* 2014; 145:57–64. DOI: 10.14219/jada.2013.7 [PubMed: 24379330]
- Glurich I, Acharya A, Shukla SK, Nycz GR, Brilliant MH. The oral systemic personalized medicine model at Marshfield Clinic. *Oral Dis.* 2013; 19:1–17. DOI: 10.1111/j.1601-0825.2012.01921.x [PubMed: 22458294]
- Grantsmakers in Health. Issue Brief #40. Washington DC: 2012. Sep. Returning the mouth to the body: integrating oral health and primary care. 2012Retrieved from http://www.gih.org/files/FileDownloads/Returning_the_Mouth_to_the_Body_no40_September_2012.pdf
- Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res.* 2005; 15:1277–1288. [PubMed: 16204405]
- Lalla E, Kunzel C, Burkett S, Cheng B, Lamster IB. Identification of unrecognized diabetes and prediabetes in a dental setting. *J Dent Res.* 2011; 90:855–860. DOI: 10.1177/0022034511407069 [PubMed: 21531917]
- U.S. Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health; 2000. Retrieved from <https://www.nidcr.nih.gov/DataStatistics/SurgeonGeneral/Documents/hck1ocv.@www.surgeon.fullrpt.pdf>
- Snyder, A. Oral Health and the triple aim: Evidence and strategies to improve care and reduce costs. 2015. Retrieved from <http://www.nashp.org/wp-content/uploads/2015/04/Oral-Triple-Aim.pdf>
- Waugh NR, Shyangdan S, Taylor-Phillips S, Suri G, Hall B. Screening for type 2 diabetes: a short report for the National Screening Committee. *Health Technol Assess.* 2013; 17:1–90. DOI: 10.3310/hta17350

Figure 1.
Participant characteristics and Geographic origin

Figure 2. Concept map graphically summarizing key themes emerging from thematic analysis of focus group discussions among dental and medical providers and one-on-one provider interviews.

TABLE 1

Sample Responses Surrounding ‘Barriers’ or ‘Opportunities’ for the Top Five Most Frequently Referenced Topics

Referrals		# of references= 153
➤	Barriers	
	<ul style="list-style-type: none"> “Right now, I can’t refer, consult, or transfer care to many medical specialties. It has to become an official order, and then we have staff that arranges appointments for patients.” “A lot of our patients I will say that we have to look how they access the healthcare system. Because some of them are uninsured and that’s a major barrier. And they don’t want come in and get a diagnosis that is going to potentially have them coming back on a weekly or a monthly basis. And they know what their history is and they know in the back of their own mind, yes I do have this disease. I know I do. But I just can’t afford it.” 	
➤	Opportunities	
	<ul style="list-style-type: none"> “My endpoint at this time is to make sure my diabetic patients are seeing their dentist routinely. On the dental end, my vision would be ideally, that if there is risk for diabetes, that those patients are either screened or referred to someone who can screen them for diabetes” “Because patients have a regular physician that they see and then we give them a referral to (our partnering Institution’s) dental clinic. (Our partnering Institution) has a dental clinic for mostly low-income patients and also obviously their regular clinics, so I think we already are kind of doing that (integration) in the sense that I’ve given them a referral. And if more medical providers could – or different hospitals could see that having a dental clinic (access for patient referral) and then themselves set up a referral process and have a dentist that they would bring on, they (patients) could have that care through their insurance and that would be beneficial.” “If we could integrate a referral to dentistry, and I could put that in with a diagnosis, and then we could have a person that has a list of dentists and phone numbers or electronic mentions that, again, user-friendly and time-friendly basis, they can call, help arrange those appointments, set them up for the patients, I think that would be extremely valuable.” “If patients do not have a dental home and they’re diabetic, there’s an in-place referral mechanism that I follow to offer them an internal referral to a dental clinic to establish a dental home”. 	
Integration		# of references= 143
➤	Barriers	
	<ul style="list-style-type: none"> “I think a lot of this comes back to the knowledge-base of the patients and our education process. So, despite the fact that we collaborate, if the patient isn’t educated to a point where they’re on board, it’s not a team situation.” “I work with a very underserved population and they don’t always have the luxury of leaving work to go back and forth to a bunch of different providers. The more we can do to make things one-stop shopping for people the better.” 	
➤	Opportunities	
	<ul style="list-style-type: none"> “I know there’s some thought nationally that dentistry should be a specialty of medicine...if it was, there would be better collaboration and even the public would see the whole interaction as a common thing...because when I send someone to a foot doctor, they don’t think twice”. “The vision for the future is that the oral exam will be part of the quality metrics and that it’s going to be standard or care just like a foot exam.” “We have the beginnings, the seeds of a possible integrated practice here, but there are excellent, successful integrated practices at community health centers across the state. I think that’s a model that more vocations should be looking at.” “If hygienists or mid-level dental practitioners, had higher scopes of practice and could do more in a variety of settings, including perhaps a primary care setting like ours, or if there were a mid-level practitioner that could help supplement the dental workforce in the state, we would also be able to increase the geographic and locational and insurance accessibility of some of these services.” 	
Information Sharing		# of references= 137
➤	Barriers	
	<ul style="list-style-type: none"> “Sharing information between two information systems would be a barrier to getting the right information to the right people.” “There is not really any formal system to make communication happen.” “For sharing medical and dental information, I suppose ...time and lack of a unified record”. 	

Referrals		# of references= 153
<ul style="list-style-type: none"> “We have to go through a lot of hoops sometimes to access the information from medical providers. They’re not available or we can’t get the information we need, so being able to access that electronically would save a lot of time for our patients who are in the chair waiting for that medical consult to come back before we extract a tooth and they’re in pain or abscessed.” “We certainly have concerns about prescription drugs, especially for chronic pain patients who may use dental contact to get anxiolytics or narcotics. We think we understand what medications patients are on and find out that they’re using dental care as another source for medications. That is an interface problem”. 		
➤	Opportunities	
<ul style="list-style-type: none"> “It’s important for us to have a medical history on a number of different levels. And we do take that very seriously and if it came to it we can educate folks and I don’t think they’re as resistant with the exception of a few questions that we ask. You know, why are you asking this? Because essentially we do such an assessment of our patients so that they understand that there’s a lot more to it than just the teeth in their head. So, I think that’s where we need to be in the holistic sense. In the communication sense. In the collaborative sense that this mouth is just part of my body and for my body to be healthy, this mouth has to be healthy to some extent. They (patients) are really impressed by the fact that we make mention that we want them to see a dentist regularly and take recommendations pretty seriously. You eliminate barriers to the referral process.” “If there was an independent care coordinator to give the person a little more information, that might be helpful”. “If the systems (medical records) were more integrated, and you could just go in, and it was just one big record where you could see medical and dental that would be something useful to all” 		
Provider training		# of references= 122
➤	Barriers	
<ul style="list-style-type: none"> “In my courses in periodontology...and different courses I’ve taken to get my degree, we’re definitely told that if someone has a chronic disease such as diabetes, that it has been studied and there is evidence that it’s correlated (with periodontal disease). But it’s not integrated; there’s a barrier. So we’re told that there needs to be some improvement with us working with physicians.” “(During my training)...what I witnessed was the culture of physicians collaborating with each other. Interaction with dentists while it wasn’t discouraged, you just didn’t see it happening much-it’s a problem” “My experience was the same-essentially it (education) was separated and there weren’t a lot of conjunctional courses. Obviously more things have come to light in the last 5 years and over the past 25 years, especially oral-systemic points.” “Professionals are just starting now to get the correlation. So it’s a long time in coming. So our patients are in that same learning curve”. 		
➤	Opportunities	
<ul style="list-style-type: none"> “There is a huge push for interprofessional education.” “So five years difference, oral health is part of their educational training which was not even part of my curriculum. In general, across the nation (there is) a huge push towards interprofessional model where they are encouraging more collaboration”. “We’re all required to do CME’s and I have a fair amount delivered to my mailbox so whenever I have a minute of free time I try to take some courses online or read a quick article. I’m consulting Up-to-Date a fair amount during my clinic day to make sure I’m not missing anything as things are moving through. There is always formal CME that’s done yearly as well as part of maintenance certification. I had a concentration in community health-my program actually required that we complete Smiles for Life curriculum as part of that.” 		
Screening		# of references= 101
➤	Barriers	
<ul style="list-style-type: none"> “I haven’t ordered HbA1C-normally I recommend they see their physician...I’m not going to be following their condition (diabetes). If it’s a situation where they have perio, we know that about half of the patients that potentially have diabetes go undiagnosed. So there is a large loophole that we need to fix.” 		
➤	Opportunities	
<ul style="list-style-type: none"> “The hope is that if there are signs and symptoms of systemic disease, just like you do with blood pressures (in the dental setting), that it becomes a sort of standard of care with future dentists and dental education that the expectation will be screening for diabetes”. “we (hygienists and dentists) actually use our mobile equipment to go out to the Family Health Center and we screen patients that the doctors recommend need dental care. They could be patients that are type II diabetic or very low income and haven’t ever seen the dentist or are in pain. We get a copy of their medical records and if he (the dentist) has any questions whatsoever, the doctors are right there.” 		