ORAL MEDICAL CARE COORDINATION: A Systematic Literature Review and Guide Forward

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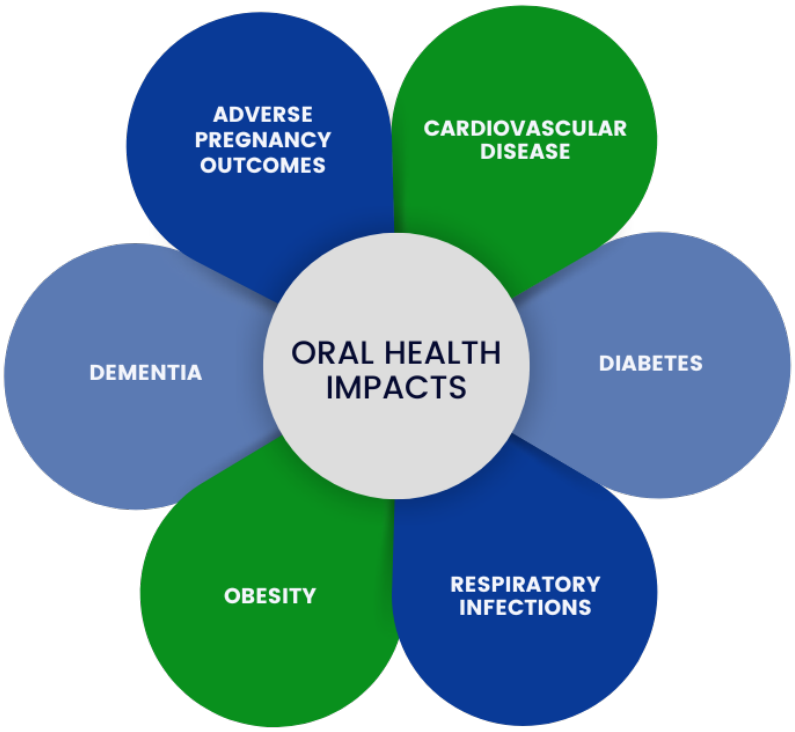
I. EXECUTIVE SUMMARY

Systemic barriers to oral medical care coordination for whole person care (oral medical care coordination) include challenges such as lack of awareness, limited professional education, lack of technology integration, limited financial reimbursement, and outdated policies. However, the literature widely suggests that it is possible to mitigate these barriers through collective effort. Utilizing the University of Iowa's environmental scan, conducted between September 2016 and September 2017,[1] as a launch point, our review analyzes *N*=715 pieces of literature and categorizes them into five primary segments: education exploratory, education implemented, provider exploratory, provider implemented, and informative. Based on these segments, we highlight the ways in which the literature exemplifies four main themes, or "pillars": **Awareness**, **Workforce Development and Operations**, **Information Exchange**, and **Payment**. Finally, our report provides recommendations for future frameworks to address oral medical care coordination.

II. INTRODUCTION

The integration of medical and dental services represents a transformative approach to healthcare, emphasizing the importance of holistic, patient-centered care that addresses both oral and systemic health. Historically, medical and dental care have operated independently, leading to fragmented care that often overlooks the critical connections between oral health and overall well-being. In this paper, we explore the pressing need for oral medical care coordination for whole person care (oral medical care coordination) and present comprehensive recommendations based on our extensive review of over 700 pieces of literature.



The fragmentation of medical and dental care is not just a matter of professional boundaries; it involves deep implications for patient health outcomes. Poor oral health is associated with a range of systemic conditions including cardiovascular disease, diabetes, respiratory infections, and adverse pregnancy outcomes.[2-7] Conversely, many chronic diseases can manifest with oral health symptoms.[8-10] Despite this well-documented interrelationship, patients often receive disjointed care, with limited communication and coordination between their medical and dental providers.[11-14]

Several factors drive the urgency for oral medical care coordination. Demographic changes, such as an aging population, and increasing prevalence of chronic diseases necessitate more comprehensive care models.[15-21] Additionally, disparities in access to dental care persist, particularly among low-income and minority populations.[22-27] Integrating medical and dental services can help mitigate these disparities by making oral health care more accessible within the primary care setting.

The path to effective oral medical care coordination implementation involves overcoming significant challenges and barriers including:

- Lack of patient and provider awareness
- Limited professional education
- Poor technological integration
- Limited financial reimbursement
- Outdated policies

Despite the growing recognition of the interconnectedness between oral health and overall health, there remains a significant gap in awareness among both healthcare providers and the general public regarding the importance of oral medical care coordination.[28-30] This lack of awareness contributes to fragmented care and missed opportunities for early detection and management of chronic diseases that manifest oral symptoms. Studies have shown that healthcare professionals often lack sufficient training and knowledge about the oral-systemic health connection, leading to inadequate coordination between medical and dental care providers.[31-34] Roughly 27 million people visit a dentist, but not a physician, annually.[35] So, while screening for oral symptoms of chronic disease during medical appointments is key, there is a growing call for oral health providers to also screen for chronic disease risk factors (e.g., hypertension, prediabetes, and hemoglobin A1C) which could reduce US health care costs by an annual $102.6 million.[35]

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Lack of *public* awareness is another significant barrier, as many individuals, particularly those with lower health literacy, may not recognize the importance of integrated care services for improving overall health outcomes.[36] Without understanding the vital role of oral health in maintaining overall well-being, the population is less likely to seek out or accept these services.

Limited professional education and insufficient awareness among *healthcare providers* often leave them unprepared to effectively address both dental and primary care issues.[13,29] Without cohesive training, healthcare providers from different specialties may not appreciate the role of their colleagues in other fields or understand how their work can complement and enhance overall patient care. This gap in education not only limits collaboration but also hinders the development of a shared language and understanding essential for integrated care. Consequently, providers may miss opportunities to offer

comprehensive care that addresses both dental and primary health needs, resulting in suboptimal patient outcomes.

The lack of integration between dental and medical technological systems, including electronic health records (EHRs), prevents dentists from accessing medical records and primary care doctors from accessing dental records, perpetuating fragmented care.[13,36] When healthcare providers cannot consider the full spectrum of a patient's health, they potentially miss critical connections between oral and systemic conditions, which can lead to misdiagnoses or incomplete treatment plans. The absence of combined EHRs hinders the efficient sharing of patient information, making it challenging for providers to collaborate effectively. This technological barrier not only increases redundancies and administrative burdens but also compromises the continuity of care that is crucial for managing chronic conditions and improving overall health outcomes.

Current fee-for-service financial models often create barriers to integrated care by incentivizing volume over value, thus not supporting oral medical care coordination.[13,37] These models focus on the quantity of services provided rather than the quality or outcomes of care, making it financially challenging for providers to adopt integrated practices. Without transitioning to value-based care models that reward providers for achieving positive health outcomes, the uptake of integrated care practices remains limited. Value-based care models encourage preventive care and the coordinated management of chronic conditions, which can lead to cost savings and better health outcomes. However, the existing financial structures discourage these practices, thereby hindering the integration of dental and primary care services. Overcoming this barrier requires a fundamental shift in financing healthcare, emphasizing value and outcomes rather than the sheer volume of services provided. Such a transition would incentivize providers to focus on comprehensive, patient-centered care that addresses both oral and systemic health needs.

Furthermore, policy barriers impede the successful integration of medical and dental services, exacerbating systemic and financial challenges. Legislative action is necessary to expand insurance coverage to include more comprehensive preventive dental services and to standardize reimbursement rates across states.[13] Without such policies, integrated care remains financially unviable for many providers. The absence of uniform billing codes for both medical and dental services complicate the reimbursement process and increases administrative burdens, discouraging providers from adopting integrated care models. Additionally, restrictive scope of practice laws for dental hygienists and mid-level providers limits their ability to deliver preventive services in various settings, further impeding the support for integrated care.

By addressing these challenges, the healthcare system can move toward a model of care that truly integrates medical and dental services, improving the quality of care and health outcomes for all patients. This paper aims to explore the current landscape of oral medical care coordination literature and provide a comprehensive framework for achieving meaningful oral medical care coordination.

III. METHODOLOGY

To conduct a comprehensive landscape assessment and analysis of current programmatic and clinical oral medical care coordination activities, we first conducted a systematic literature review. The review aimed to identify and analyze changes in oral medical care coordination strategies since the University of Iowa's environmental scan was conducted between September 2016 and September 2017.[1] Our methodology involved an iterative approach to literature scanning, data extraction, and coding to ensure a thorough and robust analysis of relevant studies and reports in response to the question *"How is oral medical care coordination implemented by medical and dental professionals in the United States?"*

The preliminary search involved a review of the University of Iowa Environmental Scan (2017) which identified and analyzed existing oral medical care coordination strategies and practices from September 2016 to September 2017[1]. This environmental scan served as a foundational framework, revealing key areas of focus, methodologies, and gaps in current integration efforts, thus guiding the subsequent comprehensive literature review and data analysis. After this review, we began our own search on the databases PubMed and CINAHL using an iterative approach. Initially, we filtered for inclusion criteria (see **Box 1**) and used predetermined combinations of search terms, followed by additional keywords identified from the initial literature and cited articles. We continued this process until we reached a saturation point and identified no new sources. We detail our selection process in **Figure 2**.

Box 1. Literature review inclusion and exclusion criteria

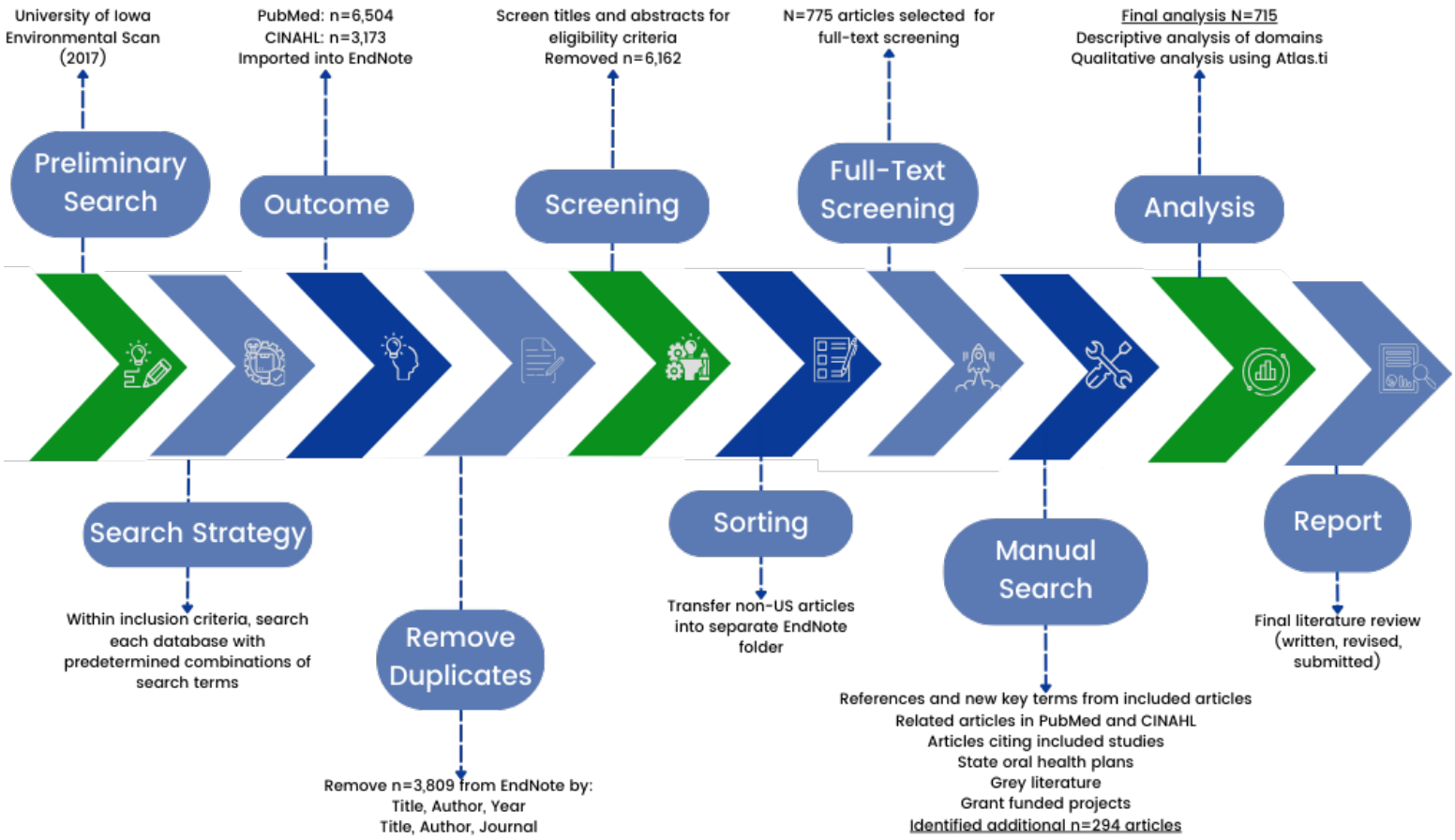
Inclusion criteria

- Written in English
- Published between July 2013 and December 2021
- Focused on studies conducted in the United States (U.S.), United Kingdom (U.K.), Australia, and Canada
- Included human subjects and a description of activities linking medical and dental health

Exclusion criteria

- No information about a specific mechanism to address medical/dental entities
- Editorial or opinion pieces

Figure 2. Flow diagram for selection of literature reviewed



IV. DATA ANALYSIS

We coded articles in Excel and ATLAS.ti on dimensions including provider/student type, type of educational program, setting and location, article themes and focus, patient population, disease or condition, implementation outcomes, and key takeaways. Additionally, we summarized grey literature such as state oral health and chronic disease plans and other relevant documents in tables, capturing detailed information about development processes, implementation strategies, facilitators, barriers, and sustainability.

Then, we used a comprehensive re-coding process to identify key themes and findings related to oral medical care coordination. For analysis, we categorized articles into five main segments: education exploratory, education implemented, provider exploratory, provider implemented, and informative. We define these segments in **Box 2**.

Our analysis of the five segments led to the identification of four primary themes or "pillars": **Awareness**, **Workforce Development and Operations**, **Information Exchange**, and **Payment**. We searched each article for detailed information on the four pillars, the roles involved in oral medical care coordination implementation, methods of implementation, facilitators and barriers encountered, and sustainability practices. Then, we synthesized themes by examining patterns and recurring topics across the coded articles. This iterative approach ensured a thorough synthesis of the

Through our analysis, these five segments led to the identification of four primary themes or "pillars": **Awareness, Workforce Development and Operations, Information Exchange,** and **Payment**.

Box 2. Article segments

Education Exploratory: Articles that explore the presence of interprofessional education in professional degrees, residencies, and continuing education programs

Education Implemented: Articles that describe the implementation and evaluate the effects and/or the feasibility (quantitative or qualitative) of interprofessional education in professional degrees, residencies, and continuing education programs

Provider Exploratory: Articles that explore the presence of oral medical care coordination for health care professionals using descriptive data

Provider Implemented: Articles that describe the implementation and evaluation of the effects of and/or the feasibility (quantitative or qualitative) of oral medical care coordination with healthcare professionals

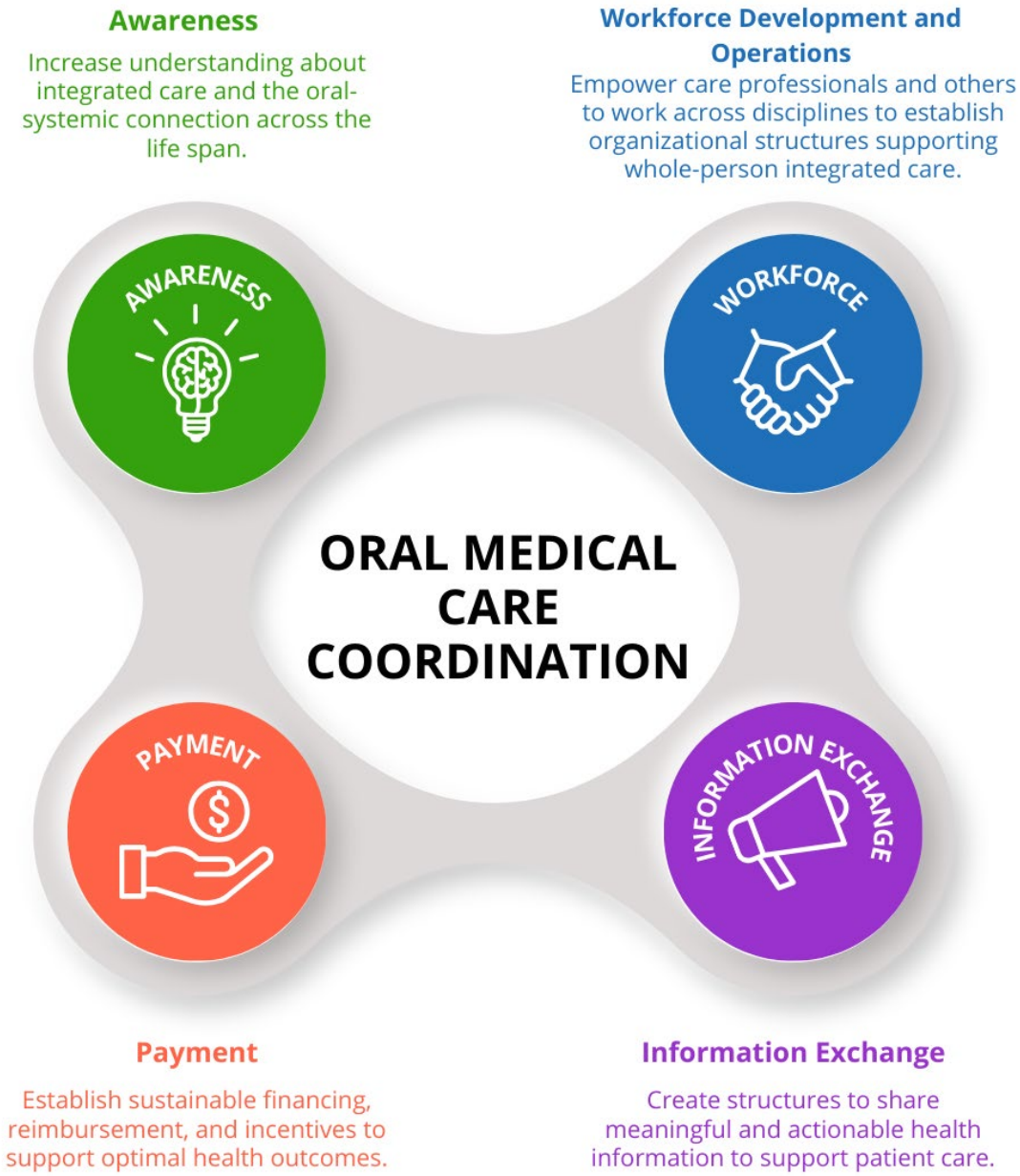
Informative: Articles that use supportive information such as evidence in the literature, cost analyses, policies, and surveys of the public to describe and provide recommendations for medical-dental integration

literature, allowing for the identification of common themes and unique findings.

The limitations of this review include potential publication bias, as we limited the search to published articles and grey literature. The exclusion of non-English literature may have led to the omission of relevant studies conducted in non-English speaking populations. Additionally, the reliance on pre-existing literature means that the findings are contingent on the quality and scope of the included studies. Despite these limitations, the systematic and comprehensive approach employed by this review provides a robust overview of the current landscape of oral medical care coordination, offering valuable insights into the facilitators, barriers, and sustainability of integrative practices.

V. KEY THEMES AND FINDINGS

Our analysis targeted the five primary challenges to oral medical care coordination outlined previously (lack of awareness, limited professional education, poor technological integration, limited financial reimbursement, and outdated policies). Upon review of our article segmentation, it is evident that four main pillars are pivotal to developing a future framework for oral medical care coordination. While we have separated these themes in our description below, it is imperative to note the inextricable link between them.



VI. PILLAR ONE: AWARENESS

DEFINITION

The **Awareness** pillar focuses on increasing recognition, knowledge, understanding, and perception about equitable, whole-person integrated care, as well as the oral-systemic connection across the lifespan. This pillar involves efforts to educate healthcare professionals, patients, and the public about the critical role of oral health in overall health and the benefits of integrated oral medical care coordination.

KEY THEMES

- Improving professional education and training
- Advocating for public awareness campaigns
- Encouraging interdisciplinary collaboration
- Identifying and addressing institutional and systemic barriers

SUMMARY OF FINDINGS

The literature reveals varying degrees of awareness and acceptance among different health professions. Healthcare professionals, including physicians, nurses, physician assistants, and dental professionals, have mixed understandings of the importance of oral medical care coordination. Many medical professionals recognize the connection between oral health and systemic conditions, such as diabetes and cardiovascular disease, but often feel inadequately trained to address these nuances in their practice. Dental professionals may be more aware of the systemic implications of oral health, but conversely lack the confidence to conduct medical screenings.

Public awareness and acceptance of integrated care are equally important for the successful implementation of oral medical care coordination. The general public's understanding of the connection between oral health and overall health can significantly influence their acceptance and utilization of integrated care services. Individuals tend to have a more positive perception of oral medical care coordination when they understand the benefits of integrated care, and thus, are more likely to seek out such treatment. However, there is a substantial gap in awareness about the importance of oral health and its impact on overall health. Many people view dental care as separate from general healthcare, which can lead to underutilization of dental services and a lack of interest in integrated care models.

DISCUSSION

In addressing discrepancies in awareness, the literature frequently points to the pivotal role of interprofessional education (IPE) in cultivating positive attitudes and readiness for oral medical care coordination among healthcare professionals. Studies consistently indicate that healthcare students and professionals who receive IPE are more likely to appreciate the importance of integrated care and collaborate effectively across disciplines. Enhancing knowledge and understanding of the oral-systemic health connection is fundamental to transforming professional attitudes and behaviors.

VII. PILLAR TWO: WORKFORCE DEVELOPMENT AND OPERATIONS

DEFINITION

The **Workforce Development and Operations** pillar focuses on preparing and enabling healthcare professionals to work across disciplines, establishing organizational structures to facilitate collaboration, and empowering staff to use systems that support whole-person integrated care. This pillar emphasizes IPE, continuous training, and the creation of integrated care models that include both medical and dental professionals.

KEY THEMES

- Interprofessional education (IPE)
- Continuous professional development
- Recommendations for organizational structure and policies
- Expanded scope of practice

SUMMARY OF FINDINGS

Part One – Development of Education

IPE seeks to foster collaborative practice among healthcare professionals by integrating educational experiences across various disciplines. Exploratory studies on IPE have investigated the presence and attitudes toward this approach in professional degree programs, residencies, and continuing education.

Existing studies have surveyed students, faculty, and administrators from healthcare professional schools, including medical, dental, physician assistant, nurse practitioner, midwifery, nursing, dental hygiene, pharmacy, public health, social work, respiratory therapy, and physical therapy programs. These studies have found that while students often hold positive attitudes toward interprofessional education requirements, significant barriers exist at the institutional level. For instance, students recognize the importance of collaborative practice and express a need for shared values, principles, ethics, responsibilities, and respect to work effectively in interprofessional teams. However, faculty and administrators frequently reported challenges in teaching interprofessional curricula due to lack of time, expertise, and confidence.

Studies evaluating the implementation and impact of IPE programs have documented various approaches to integrating oral health and medical education. Implemented IPE programs aimed to build skills in oral health and integrated care through diverse educational formats, including traditional lectures, clinical

rotations, case studies, simulation exercises, community service practicums, and online modules. For instance, educators widely use the Smiles for Life curriculum[38] to train non-dental professionals in oral health care, emphasizing the oral-systemic connection and the importance of integrated care.

The impact of implemented IPE programs is often measured in terms of knowledge, attitudes, practices, and facilitators/barriers. These programs have generally succeeded in increasing awareness of oral health's role in overall health among students and faculty. However, the programs have experienced barriers such as limited curriculum time, lack of faculty buy-in, and insufficient organizational support that hinder full implementation.

Workforce development through IPE has prepared healthcare professionals to work in interdisciplinary teams, improving the delivery of integrated care. Professionals trained through these programs reported greater confidence in performing oral health assessments, applying fluoride varnish, and making appropriate referrals to dental specialists. Additionally, programs that included co-located training experiences in medical and dental clinics demonstrated improved collaboration and communication among healthcare professionals.

Part Two – Integration

Integrating oral medical care coordination into existing healthcare practices involves significant workforce development and operational adjustments. The process entails preparing and enabling healthcare professionals to deliver integrated care by performing oral-systemic screenings, examinations, interventions, and referrals. Healthcare professionals, including medical and dental providers, benefit from multidisciplinary training to enhance the delivery of oral medical care coordination.

For the oral health workforce, integrated care activities include monitoring, detecting, educating, and referring patients for non-communicable and chronic diseases with oral-systemic connections. Health promotion techniques, such as motivational interviewing, goal setting, and patient counseling, are essential components. Education in health professional programs and continuing education, particularly through IPE, prepares the oral health workforce for integrated care. Expanding the scope of practice through state practice acts and licensing enables oral health professionals to provide a broader range of services in various settings, although not all states have adopted such policies.

For the medical workforce, integrated care activities include preventive oral health services, patient education on oral health promotion, and screenings for conditions like oral cancer and periodontal disease. Training medical professionals on oral health competencies occurs through health professional programs, continuing medical education, and dental clinical experiences. Examples of integrated care

activities for the medical workforce include the application of fluoride varnish, counseling for oral health promotion, and assessment of oral health during clinical evaluations.

DISCUSSION

Workforce Development and Operations is central to the successful implementation of oral medical care coordination. Numerous studies detail the necessity for comprehensive training programs that encompass both medical and dental components. Effective workforce development requires not only initial education but also ongoing training and support to adapt to evolving integrated care models. The interaction between this pillar and **Awareness** is evident: well-informed professionals are better equipped to execute integrated care practices, and continuous education reinforces their understanding and commitment to these practices.

The barriers to such an integrated workforce cannot be ignored. There is a widespread lack of IPE in many health professional curricula, resulting in healthcare providers who are not adequately prepared to deliver integrated care. Time constraints, insufficient training, and lack of organizational support further impede the adoption of oral medical care coordination practices. These issues are compounded by the cultural and professional silos that exist between medical and dental fields, which can lead to resistance to change and collaboration.

However, the implications of IPE applications are significant. IPE must become a cornerstone of health professional curricula to foster a new generation of healthcare providers who are comfortable and competent in delivering integrated care. This will ready the healthcare workforce to engage in collaborative practices, thereby improving patient care outcomes, and continuous professional development and training programs will keep current practitioners up to date on the best practices of integrated care.

VIII. PILLAR THREE: INFORMATION EXCHANGE

DEFINITION

We define the **Information Exchange** pillar as the sharing and promotion of access to meaningful and actionable information (e.g., patient, practice, research, population) to enable whole-person integrated care. This pillar emphasizes the importance of using technology and communication strategies to facilitate seamless information flow between medical and dental professionals, improving the coordination and quality of care provided to patients.

KEY THEMES

- Technological integration
- Communication mechanisms
- Interoperability challenges
- Standardized protocols
- Best practices

SUMMARY OF FINDINGS

Part One – Integrated Communication

Technological integration, particularly through EHRs, plays a crucial role in facilitating oral medical care coordination. EHRs enable healthcare professionals to share patient information efficiently, track health outcomes, and provide comprehensive care. The use of EHRs allows for the documentation of patient health histories, including oral health information, which is essential for coordinated care. Integrated EHRs can prompt healthcare providers to include dental history during physical exams, document oral care, and utilize clinical decision support tools. This integration ensures that both medical and dental professionals have access to comprehensive patient data, enabling better-informed clinical decisions.

Effective communication between medical and dental professionals is also fundamental to the success of oral medical care coordination. Communication facilitates the referral process, ensures continuity of care, and enhances collaborative decision-making. The literature highlights that professionals use EHRs not only for documentation but also for communication through shared medical and dental notes, provider messaging, and referral mechanisms. This integrated communication system supports timely consultations and follow-ups, which are crucial for comprehensive patient care and optimal health outcomes.

Face-to-face communication in co-located clinics and virtual consultations are also effective in fostering collaboration between healthcare providers. These interactions enable immediate consultations and the sharing of expertise, which can lead to improved patient outcomes. Moreover, establishing clear referral

networks and having care coordinators can bridge communication gaps and streamline the referral process. This approach supports patient care management more effectively and ensures that patients receive the necessary follow-up and treatment.

Part Two – Personnel Integration

Within the **Awareness** pillar, we discussed that studies examining oral medical care coordination among healthcare professionals have focused on understanding existing attitudes, knowledge, and practices related to oral medical care coordination. We further discussed medical professionals, such as primary care physicians and pediatricians, often recognize the importance of oral health but may lack confidence in their ability to provide oral health services due to limited training and expertise in this area. Similarly, dental professionals acknowledge the systemic impacts of oral health on overall health but may face challenges in integrating medical assessments into their routine dental practice. To address this, we weave in studies evaluating the implementation and outcomes of oral medical care coordination in practice which provide valuable insights into how integrated care models are operationalized and their impact on patient care.

Programs that have implemented oral medical care coordination strategies typically aim to create a more cohesive and collaborative approach to patient care by incorporating oral health assessments and services into medical settings and vice versa. Various settings, including primary care clinics, dental offices, community health centers, federally qualified health centers (FQHCs), and hospital systems, have implemented these programs. There are two common models for implementing oral medical care coordination.

1. Physical co-location of medical and dental services:
    a. Allows direct collaboration and communication between providers which has proven to improve patient access to comprehensive care and facilitate timely referrals and consultations.
2. Interprofessional teams:
    a. Involves medical and dental providers working together to address patients' health needs holistically. These teams may consist of any combination of physicians, dentists, dental hygienists, nurse practitioners, physician assistants, and/or community health workers, all collaborating to provide integrated care. For example, a pediatric or primary care practice could employ a dental hygienist, ensuring that oral health assessments and preventive care are seamlessly integrated into routine medical visits. Similarly, a dental office might

include a physician assistant, providing medical support and addressing systemic health issues that may impact oral health.

The outcomes of implemented oral medical care coordination programs have been positive, demonstrating improvements in patient health outcomes, increased access to preventive services, and enhanced provider satisfaction. Studies have reported reductions in oral health disparities, better management of chronic conditions such as diabetes, and overall improvements in patients' oral and systemic health. Integrated care models have been particularly effective in increasing access to preventive services, such as fluoride varnish applications and oral health screenings, especially in underserved populations. Both providers and patients have reported high levels of satisfaction with integrated care models, citing the convenience and comprehensiveness of services provided.

DISCUSSION

Information Exchange, particularly through EHRs, is necessary to facilitate seamless communication and coordination between medical and dental providers. The literature highlights significant barriers related to technological interoperability and the need for standardized systems that can bridge the gap between different healthcare domains. Specifically, the lack of interoperability between different EHR systems, which hinders effective information exchange. Separate EHR systems for medical and dental records prevent seamless communication and coordination between healthcare providers, which is essential for comprehensive patient care. The need for standardized, interoperable EHR systems is evident, but the development and implementation of such systems face significant logistical and financial challenges. From a technological standpoint, the integration of medical and dental services will demand significant advancements in health information technology. However, the development and implementation of interoperable EHR systems are essential for facilitating seamless communication and information sharing between medical and dental providers. Technological integration will facilitate comprehensive patient care, streamline care coordination, reduce redundancies, and improve the overall quality of care. Furthermore, leveraging data analytics and health IT can provide insights into patient care patterns, helping to identify areas for improvement and optimize resource allocation.

IX. PILLAR FOUR: PAYMENT

DEFINITION

The **Payment** pillar is the component of integrated care that focuses on establishing sustainable financial models and reimbursement structures that incentivize and support the delivery of coordinated medical and dental services. This pillar emphasizes the creation of payment systems that reward value and patient outcomes rather than the volume of services, while ensuring that providers are financially supported in offering comprehensive, integrated care.

KEY THEMES

- Updated reimbursement models
- Adequate insurance coverage
- Financial incentives
- Billing code standardization

SUMMARY OF FINDINGS

The transformation into a cohesive system of oral medical care coordination presents unique challenges, particularly concerning payment models and financial barriers. Existing payment structures predominantly operate within a fee-for-service model, which often separates medical and dental care. This segregation creates significant obstacles in reimbursing services that overlap both fields, such as preventive oral health services performed in medical settings or medical screenings conducted in dental offices.

Public insurances may offer some reimbursement for integrated care services, such as fluoride varnish application and oral health risk assessments. However, these reimbursements vary widely by state, with differing policies on eligibility, service coverage, and reimbursement rates. This variability can deter healthcare providers from offering integrated services due to uncertainties about reimbursement and the administrative burden of navigating complex billing systems.

Private medical insurance plans do not always cover dental services, further exacerbating the financial barrier to integrated oral medical care coordination. Those that do cover dental services may limit coverage and fail to structure it to support comprehensive integrated care. This limitation leads to underutilization of preventive services that could be beneficial in a primary care setting, thereby missing opportunities for early detection and management of oral-systemic health conditions.

Another significant limitation of the current system is the lack of uniform billing codes and procedures that are used across medical and dental fields. Current Procedural Terminology codes[39] and dental billing codes are not always compatible, complicating the billing process for integrated services which may discourage healthcare providers from adopting integrated care practices because it adds to their administrative workload without clear financial benefits.

DISCUSSION

The **Payment** pillar presents multifaceted challenges to oral medical care coordination with differing payment models and complex reimbursement structures. Fee-for-service models face limitations and significant intricacies for navigating varying reimbursement policies for medical and dental services which often deters providers from adopting such integrated care. The literature suggests that value-based care models, which align financial incentives with patient outcomes, could offer a viable solution to these financial barriers, promoting more widespread adoption of integrated care practices by shifting the focus from volume to value. This model would incentivize healthcare providers to deliver high-quality, coordinated care that addresses both medical and dental health, leading to better patient outcomes and potential long-term cost savings. This model further emphasizes coordinated care and shared savings by rewarding healthcare providers for meeting specific health outcomes and efficiency metrics. Healthcare systems can promote comprehensive care that encompasses both oral and systemic health through these frameworks.

While the initial investment into training, technology, and restructuring may appear significant, the long-term benefits include reduced healthcare costs through preventive care, better management of chronic conditions, more sustainable healthcare financing, improved patient satisfaction, and overall system efficiency.

X. RECOMMENDATIONS

Our review highlights several future directions in the pursuit of oral medical care coordination. We have identified key next steps in the graphic on page 23. However, while each of the pillar areas have distinct activities associated with promoting oral medical care coordination, we cannot ignore the intersection of each of these pillars. While the integration of any of these recommendations alone provides a necessary first step, complete oral medical care coordination cannot be achieved without addressing all of them.

While noting continued overlap, the recommendations within each pillar cannot be accomplished without significant health policy shifts, including:

- Expanding insurance coverage options:
    - Include payment for more preventive dental services by medical plans
    - Increase reimbursement rates for chronic disease risk factor screenings and preventive services by dental plans
    - Broaden and improve payment structures for oral health services (e.g., oral health screenings) provided in medical settings. While the American Medical Association (AMA) has established a standardized billing code for fluoride varnish, which Medicaid reimburses, private insurers often do not. Similar billing codes should be adopted across all oral health services and insurance plans.
- Standardize billing codes and procedures across medical and dental services:
    - Simplify the reimbursement process and reduce administrative burdens
    - Ensure both consistency and quality in integrated care delivery
    - Further allow for seamless financial transactions between medical and dental practices
- Promote value-based care models:
    - Align financial incentives with patient outcomes
    - Encourage providers to adopt integrated care practices
- Encourage collaboration between policymakers and dental/medical care professionals:
    - Incorporate experts in the creation of legislation which funds integrated care initiatives
    - Create insurance coverage mandates for preventive dental services in medical settings to create a sustainable environment for integrated care
- Expand the scope of practice through state practice acts:
    - Enable dental hygienists and other mid-level providers to deliver preventive services in non-dental settings
    - Broaden access to integrated care, particularly in underserved populations

AWARENESS

- **Public Awareness Campaigns:** Implement targeted education and communication strategies to inform the public about the connection between oral and systemic health, emphasizing the benefits of integrated care.
- **Professional Education:** Develop and promote training programs for healthcare providers to enhance their understanding of the oral-systemic health connection, encouraging interdisciplinary collaboration.
- **Institutional Support:** Address institutional and systemic barriers to improve awareness and acceptance of integrated care among healthcare professionals.

WORKFORCE DEVELOPMENT & OPERATIONS

- **Interprofessional Education (IPE):** Incorporate IPE programs into health professional curricula and promote continuous professional development
- **Interprofessional Collaboration:** Expand practice workflows to incorporate oral health assessments in routine medical exams and establish referral networks.
- **Scope of Practice:** Expand the scope of practice for dental hygienists and other mid-level providers through state practice acts and licensing.
- **Organizational Support:** Invest in infrastructure and training to create a collaborative and innovative environment.

- **Policy Changes:** Policymakers should expand insurance coverage plans to include more preventive dental services and increase reimbursement rates to make integrated care financially viable for providers.
- **Standardized Billing Codes:** Standardize billing codes and procedures across medical and dental services to simplify the reimbursement process and reduce administrative burdens.
- **Value-Based Care Models:** Promote value-based care models through policy initiatives that align financial incentives with patient outcomes, encouraging providers to adopt integrated care practices (including models, such as Accountable Care Organizations (ACOs) and Patient-Centered Medical Homes (PCMHs))

PAYMENT

- **Integrated EHR Systems:** Adopt integrated EHR systems that enable healthcare providers to share patient information efficiently, track health outcomes, and provide comprehensive care.
- **Communication Mechanisms:** Improve communication between medical and dental professionals through shared medical and dental notes, provider messaging, and referral mechanisms within EHR systems.
- **Referral Networks:** Establish clear referral networks and employ care coordinators to bridge communication gaps, streamline the referral process, and ensure patients receive necessary follow-up and treatment.

INFORMATION EXCHANGE

XI. CONCLUSION

The coordination of medical and dental services has the potential to significantly reshape the landscape of healthcare delivery. By breaking down the traditional barriers between these fields, integrated care models can provide more comprehensive, patient-centered care. Systemic barriers to oral medical care coordination for whole person integrated care are not insignificant, but the literature widely suggests that it is possible to mitigate them with collective effort. Our literature review categorizes previous work into five segments: education exploratory, education implemented, provider exploratory, provider implemented, and informative, which we utilized to reflect four main themes, or pillars: **Awareness**, **Workforce Development and Operations**, **Information Exchange**, and **Payment**. While addressing any of these pillars individually may mitigate some barriers, implementing oral medical care coordination will be most effective by addressing all four pillars collectively.

The interaction between the four pillars provides a deeper understanding of the dynamics of oral medical care coordination. The **Awareness** and **Workforce Development** pillars are intrinsically linked: a well-informed workforce is essential for effective implementation, and ongoing education is crucial to maintaining professional understanding and acceptance of integrated care.

Information Exchange supports the operationalization of knowledge and skills acquired through **Workforce Development** programs. Integrated EHRs and other technological tools facilitate the sharing of patient information, which is crucial for coordinated care. The literature on health information uptake by providers illustrates how healthcare professionals utilize information exchange to enhance patient care and manage chronic diseases through integrated approaches.

Payment models and financial structures are foundational to the feasibility of all other pillars. Without sustainable financing, even the most well-designed educational programs and technological systems cannot be effectively maintained. The above recommendations, such as value-based care, can support oral medical care coordination by aligning financial incentives with patient outcomes.

The interplay among these elements is complex yet integral to the success of oral medical care coordination. Our review acknowledges the operational work that has begun within the field at the micro level (i.e., one clinic at a time) and set the goal to assess that initial work from a macro level (i.e., the entire oral medical system) to provide synthesized suggestions for a path forward to complete oral medical care coordination. From this perspective, we find that this shift necessitates a reevaluation of current clinical practices and workflows, emphasizing the importance of interprofessional collaboration. The anticipated outcome is not just an improvement in individual patient outcomes but also enhanced efficiency in the healthcare system overall.

REFERENCES

[1]McKernan, S. C., Kuthy, R., Tuggle, L., & García, D. T. (2018). Medical-Dental Integration in Public Health Settings: An Environmental Scan.

[2]Frese, W., Nowak, A., Royston, L., Mathew, T., Casamassimo, P., Wright, R., Silverman, J., & Yin, H. *Caries Risk Factors for Primary Care Providers Based on Shared Determinants of Health*.

[3]George, A., Dahlen, H. G., Blinkhorn, A., Ajwani, S., Bhole, S., Ellis, S., Yeo, A., Elcombe, E., & Johnson, M. (2018). Evaluation of a midwifery initiated oral health-dental service program to improve oral health and birth outcomes for pregnant women: A multi-centre randomised controlled trial. *Int J Nurs Stud*, *82*, 49-57. https://doi.org/10.1016/j.ijnurstu.2018.03.006

[4]Marshall, S., Schrimshaw, E. W., Metcalf, S. S., Greenblatt, A. P., Cruz, L. D. L., Kunzel, C., & Northridge, M. E. (2015). Evidence from ElderSmile for diabetes and hypertension screening in oral health programs. *J Calif Dent Assoc*, *43*(7), 379-387. https://pubmed.ncbi.nlm.nih.gov/26451080/

[5]Mosley, M., Offenbacher, S., Phillips, C., Granger, C., & Wilder, R. S. (2015). North Carolina Cardiologists' Knowledge, Opinions and Practice Behaviors Regarding the Relationship between Periodontal Disease and Cardiovascular Disease. *J Dent Hyg*, *89 Suppl 2*, 38-48.

[6]Sanchez, P., Everett, B., Salamonson, Y., Redfern, J., Ajwani, S., Bhole, S., Bishop, J., Lintern, K., Nolan, S., Rajaratnam, R., Sheehan, M., Skarligos, F., Spencer, L., Srinivas, R., & George, A. (2019). The oral health status, behaviours and knowledge of patients with cardiovascular disease in Sydney Australia: a cross-sectional survey. *BMC Oral Health*, *19*(1), 12. https://doi.org/10.1186/s12903-018-0697-x

[7]CareQuest Institute for Oral Health. (2021). CareQuest Institute Impacts Beyond the Mouth Infographic. In.

[8]Metsch, L. R., Pereyra, M., Messinger, S., Jeanty, Y., Parish, C., Valverde, E., Cardenas, G., Boza, H., & Tomar, S. (2015). Effects of a Brief Case Management Intervention Linking People With HIV to Oral Health Care: Project SMILE. *Am J Public Health*, *105*(1), 77-84. https://doi.org/10.2105/AJPH.2014.301871

[9]Rosedale, M. T., Strauss, S. M., Kaur, N., Danoff, A., & Malaspina, D. (2018). Identification of diabetes risk in dental settings: Implications for physical and mental health. *International Journal of Mental Health*, *47*(1), 64-73. https://doi.org/10.1080/00207411.2017.1377803

[10]Southerland, J. H., Gill, D. G., Gangula, P. R., Halpern, L. R., Cardona, C. Y., & Mouton, C. P. (2016). Dental management in patients with hypertension: challenges and solutions. *Clin Cosmet Investig Dent*, *17*(8), 111-120. https://doi.org/https://doi.org/10.2147/ccide.s99446

[11]Boynes, S. G., Lauer, A., Deutchman, M., & Martin, A. B. (2017). An Assessment of Participant-Described Interprofessional Oral Health Referral Systems Across Rurality. *J Rural Health*, *33*(4), 427-437. https://doi.org/10.1111/jrh.12274

[12]Miloro, M. B., & Vujicic, M. (2016). Physicians Dissatisfied with Current Referral Process to Dentists. *Health Policy Institute*. http://www.ada.org/~/media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0316_5.pdf

[13]Norwood, C. W., Maxey, H. L., Randolph, C., Gano, L., & Kochlar, K. (2017). Administrative challenges to the integration of oral health with primary care: A SWOTanalysis of health care executives at Federally Qualified Health Centers. *J Ambul Care Manage*, *40*(3), 204-213. https://doi.org/https://doi.org/10.1097/jac.0000000000000151

[14]Vernon, L. T., Teng, K. A., Kaelber, D. C., Heintschel, G. P., & Nelson, S. (2021). Time to integrate oral health screening into medicine? A survey of primary care providers of older adults and an evidence-based rationale for integration. https://doi.org/10.1111/ger.12561

[15]Bernabe, E., Marcenes, W., Hernandez, C. R., Bailey, J., Abreu, L. G., Alipour, V., Amini, S., Arabloo, J., Arefi, Z., Arora, A., Ayanore, M. A., Barnighausen, T. W., Bijani, A., Cho, D. Y., Chu, D. T., Crowe, C. S., Demoz, G. T., Demsie, D. G., Dibaji Forooshani, Z. S., . . . Kassebaum, N. J.

(2020). Global, Regional, and National Levels and Trends in Burden of Oral Conditions from 1990 to 2017: A Systematic Analysis for the Global Burden of Disease 2017 Study. *J Dent Res*, *99*(4), 362-373. https://doi.org/10.1177/0022034520908533

[16]Provention Health Foundation. (2019). Thought Leader Roundtable on Oral Health and Chronic Disease in Older Adults: Summary Report and Key Recommendations,. In.

[17]Alabama Department of Public Health. (2014). Coordinated Chronic Disease State Plan.

[18]Holt K, Tinanoff N, Garcia RI, Kleinman D, Battrell A, Casamassimo P, & J., G. (2017). *Healthy Futures: Engaging the Oral Health Community in Childhood Obesity Prevention National Conference—Executive Summary*.

[19]Lin, M., Griffin, S. O., Gooch, B. F., Espinoza, L., Wei, L., Li, C.-H., Thornton-Evans, G., Junger, M., Robison, V. A., Fleming, E. B., & Beltran, E. Oral Health Surveillance Report: Trends in Dental Caries and Sealants, Tooth Retention, and Edentulism, United States, 1999-2004 to 2011-2016,. In.

[20]Shuman, S. K., Chen, X., Friedman, P. K., Ghezzi, E. M., Saunders, M. J., & Wu, B. *A New National Initiative to Enhance Geriatric Oral Health: Oral Health An Essential Element of Healthy Aging*. for the Gerontological Society of America.

[21]Translating Ideas: Implementation and Building Partnerships for Healthy Aging,. In.

[22]Behar-Horenstein, L. S., Feng, X., Roberts, K. W., Gibbs, M., Catalanotto, F. A., & Hudson-Vassell, C. M. (2015). Developing Dental Students' Awareness of Health Care Disparities and Desire to Serve Vulnerable Populations Through Service-Learning. *J Dent Educ*, *79*(10), 1189-1200.

[23]Biordi, D. L., Heitzer, M., Mundy, E., DiMarco, M., Thacker, S., Taylor, E., Huff, M., Marino, D., & Fitzgerald, K. (2015). Improving access and provision of preventive oral health care for very young, poor, and low-income children through a new interdisciplinary partnership. *Am J Public Health*, *105 Suppl 2*(Suppl 2), e23-29. https://doi.org/10.2105/ajph.2014.302486

[24]Center, O. H. W. R., Surdu, S., Langelier, M., Li, Q., Dhar, S., & Stufflebeam, M. (2019). Consumer Survey of Barriers to and Facilitators of Access to Oral Health Services. In.

[25]Cunha-Cruz, J. *What is the problem of access to oral care services and improvement in oral health?* University of Washington.

[26]Office of Health Disparities. (2018). *Addressing Oral Health Disparities in Urban Settings: A Strategic Approach to Advance Access to Oral Health Care*. Salt Lake City, Utah

[27]Riggs, E., Yelland, J., Shankumar, R., & Kilpatrick, N. (2016). 'We are all scared for the baby': promoting access to dental services for refugee background women during pregnancy. *BMC Pregnancy Childbirth*, *16*, 12. https://doi.org/10.1186/s12884-015-0787-6

[28]Daley, E. M., Thompson, E. L., Vamos, C. A., Griner, S. B., Vazquez-Otero, C., Best, A. L., Kline, N. S., & Merrell, L. K. (2018). HPV-Related Knowledge Among Dentists and Dental Hygienists. https://doi.org/https://doi.org/10.1007/s13187-016-1156-5

[29]Munz, S. M., Kim, R. Y., Holley, T. J., Donkersloot, J. N., & Inglehart, M. R. (2017). Dental Hygiene, Dental, and Medical Students' OMFS/Hospital Dentistry-Related Knowledge/Skills, Attitudes, and Behavior: An Exploration. *J Dent Educ*, *81*(2), 149-161.

[30]Singer, R. H., Feaster, D. J., Stoutenberg, M., Hlaing, W. M., Pereyra, M., Abel, S., Pollack, H., Gellman, M. D., Schneiderman, N., & Metsch, L. R. (2019). Dentists' willingness to screen for cardiovascular disease in the dental care setting: Findings from a nationally representative survey. *Community Dent Oral Epidemiol*, *47*(4), 299-308. https://doi.org/10.1111/cdoe.12457

[31]Johnson, L. B., Boyd, L. D., Rainchuso, L., Rothman, A., & Mayer, B. (2017). Eating disorder professionals' perceptions of oral health knowledge. *Int J Dent Hyg*, *15*(3), 164-171. https://doi.org/10.1111/idh.12183

[32]Quinonez, R. B., Kranz, A. M., Lewis, C. W., Barone, L., Boulter, S., O'Connor, K. G., & Keels, M. A. (2014). Oral health opinions and practices of pediatricians: updated results from a national survey. https://doi.org/https://doi.org/10.1016/j.acap.2014.07.001

[33]Shimpi, N., Schroeder, D., Kilsdonk, J., Chyou, P. H., Glurich, I., Penniman, E., & Acharya, A. (2016). Medical Providers' Oral Health Knowledgeability, Attitudes, and Practice Behaviors: An

Opportunity for Interprofessional Collaboration. *J Evid Based Dent Pract*, *16*(1), 19-29. https://doi.org/10.1016/j.jebdp.2016.01.002

[34]Weatherspoon, D. J., Horowitz, A. M., & Kleinman, D. V. (2016). Maryland Physicians' Knowledge, Opinions, and Practices Related to Dental Caries Etiology and Prevention in Children. *Pediatr Dent*, *38*(1), 61-67.

[35]Fleming, E., & Singhal, A. (2020). Chronic Disease Counseling and Screening by Dental Professionals: Results From NHANES, 2011–2016. *Preventing Chronic Disease*, *17*. https://doi.org/http://dx.doi.org/10.5888/pcd17.200152

[36]Atchison, K. A., Rozier, R. G., & Weintraub, J. A. (2018). Integration of Oral Health and Primary Care: Communication, Coordination, and Referral. https://doi.org/https://doi.org/10.31478/201810e

[37]Riley, W., Doherty, M., & Love, K. (2019). A framework for oral health care value-based payment approaches. *The Journal of the American Dental Association*, *150*(3), 178-185. https://doi.org/https://doi.org/10.1016/j.adaj.2018.10.021

[38]Smiles for Life. *Smiles for Life: A National Oral Health Curriculum*. Retrieved 8/16/2024 from https://www.smilesforlifeoralhealth.org/

[39]Kim, P., Daly, J. M., Berkowitz, S., & Levy, B. T. (2020). Use of the Fluoride Varnish Billing Code in a Tertiary Care Center Setting. *J Prim Care Community Health*, *11*, 1-11. https://doi.org/10.1177/2150132720913736