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Research Article

Family Medicine and Oral Health Screening: Roles of Health Administration, Nurses, Dentists, and Laboratory Technicians

Mumdooh Raja G Alenazy[1]*, Waad Hejji Alanazi[2], Eshteyq Treef Alrwaili[3], Anwar Mukammi Kulaib Alruwaili[4], Abdulaziz Khalifa Ali Alanazi[5], Manal Mohammed L Alenezi[6], Alrawaili, Abdalmagid Gharip B[7], Hilal Khalaf Alenezi[8], Alhazmi, Reem Faleh S[9], Mohammed Muhaydi Alhazml[10], Nawer Mohammed Atallah Albaqi[11]

[1]Health Administration, North Tower Medical Hospital, KSA
* **Corresponding Author Email:** is mumdoo2h@gmail.com - **ORCID:** 0000-0002-5247-005X (you can get it in orcid.org)

[2]Dental Assistant, Al-Rabwa Health Center, KSA
Email: waa2d@gmail.com - **ORCID:** 0000-0002-5247-085X

[3]Dental Assistant, Suwayr General Hospital, KSA
Email: tree2f@gmail.com - **ORCID:** 0000-0002-5247-185X

[4]Laboratories Technologist, North Tower Medical Hospital, KSA
Email: anwa2r@gmail.com - **ORCID:** 0000-0002-5247-285X

[5]Health Administration, North Tower Medical Hospital, KSA
Email: abdulazi2z@gmail.com - **ORCID:** 0000-0002-5247-385X

[6]Senior Registrar Family Medicine, The Northern Borders Health Cluster, Arar, KSA
Email: mana2l@gmail.com - **ORCID:** 0000-0002-5247-485X

[7]Nursing, North Tower Medical Hospital, KSA
Email: ghari2p@gmail.com - **ORCID:** 0000-0002-5247-585X

[8]Nursing, Women and Children Hospital in Arar, KSA
Email: hila2l@gmail.com - **ORCID:** 0000-0002-5247-685X

[9]Nursing Technician, Prince Abdulaziz bin Musa'ad Hospital, KSA
Email: alhazm2i@gmail.com - **ORCID:** 0000-0002-5247-785X

[10]Laboratories Technologist, North Tower Medical Hospital, KSA
Email: emuhayd2i@gmail.com - **ORCID:** 0000-0002-5247-985X

[11]Nurse Technician, Maternity and Children Hospital (MCH Hail), Hail, KSA
Email: nawe2r@gmail.com - **ORCID:** 0000-0002-5247-009X

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Abstract:

The persistent historical divide between medical and dental care represents a significant flaw in healthcare delivery, with detrimental consequences for patient outcomes and systemic efficiency. Health administrators are identified as the crucial architects of system integration, responsible for policy development, workflow redesign, financial incentivization, and fostering a culture of collaboration. Nurses and primary care providers are positioned as the frontline implementers, conducting risk assessments, visual screenings, patient education, and initiating coordinated referrals. Dentists and dental hygienists serve as essential collaborative partners, providing definitive diagnosis and treatment while engaging in the co-management of patients with shared systemic conditions. Laboratory technicians underpin this model with objective data, offering diagnostic clarity through routine tests (e.g., HbA1c), microbiological analysis, and histopathological evaluation, thereby strengthening the evidence-based management of the oral-systemic link. Interdisciplinary collaboration leads to earlier disease detection, improved chronic disease management, enhanced patient outcomes, and a more efficient use of healthcare resources.

1. Introduction

The landscape of modern healthcare is increasingly defined by a paradigm shift from episodic, disease-oriented care towards comprehensive, continuous, and patient-centered models. Within this evolution, the discipline of family medicine stands as a cornerstone, entrusted with the provision of integrated, accessible health care services for individuals and families across all ages, genders, diseases, and parts of the body [1]. Its holistic philosophy positions the family physician not merely as a diagnostician of specific ailments, but as a steward of the patient's overall wellbeing, navigating the complex interplay between biological, psychological, and social determinants of health. Yet, despite this encompassing mandate, a critical component of systemic health has historically been relegated to the periphery of primary care practice: oral health. For decades, a profound and artificial schism has persisted between medicine and dentistry, creating a "silent divide" that has detrimental consequences for population health outcomes, healthcare efficiency, and equitable access to care [2].

This compartmentalization is both clinically unjustifiable and economically imprudent. A robust and compelling body of scientific evidence now unequivocally establishes that the oral cavity is not an isolated ecosystem but a mirror reflecting, and a participant influencing, systemic health. The mouth serves as a portal for infection and a site for early manifestations of numerous systemic conditions. Periodontal disease, a chronic inflammatory condition affecting the supporting structures of the teeth, is no longer viewed as a localized problem. It is now recognized as a significant risk factor for, and modulator of, several serious medical conditions. The chronic bacteremia and inflammatory mediators associated with periodontitis have been epidemiologically and biologically linked to an increased risk of atherosclerotic cardiovascular disease, poor glycemic control in diabetes mellitus, adverse pregnancy outcomes such as preterm low birth weight, and respiratory infections [3, 4]. Furthermore, the oral examination can reveal signs of nutritional deficiencies, immunological disorders (e.g., candidiasis in HIV), autoimmune diseases (e.g., oral ulcers in lupus or Behçet's disease), and even early signs of malignancies such as squamous cell carcinoma [5].

Conversely, systemic diseases and their treatments profoundly impact oral health. Diabetes mellitus impairs neutrophil function and wound healing, exacerbating periodontal disease. Medications for hypertension, depression, and epilepsy often cause xerostomia (dry mouth), which significantly increases the risk of dental caries and mucosal infections. Patients undergoing chemotherapy or radiotherapy for cancer frequently suffer from severe oral mucositis, infection, and salivary gland dysfunction [6]. This bidirectional relationship creates a critical imperative for integrated care. The traditional model, where a patient's diabetic care is managed in one clinic without inquiry into their periodontal status, or where a dentist treats refractory periodontitis without considering undiagnosed diabetes, represents a failure of the healthcare system to address the patient as a whole.

Moreover, the primary care setting, particularly family medicine, presents a unique and powerful opportunity to bridge this divide. Family medicine clinics are often the first and most frequent point of contact individuals have with the healthcare system. They serve populations across the lifespan and are strategically positioned to provide preventive services and early detection. However, oral health screening—defined as the process of identifying unrecognized oral disease or risk factors through history-taking, visual inspection, and risk assessment—has not been a standard component of the typical adult or pediatric well-visit [7]. This omission is a missed opportunity of significant magnitude. Integrating systematic oral health screening into the fabric of family medicine practice can serve as a powerful public health intervention. It can lead to the early detection of dental caries, periodontal disease, and oral cancer; improve the management of chronic systemic diseases; and facilitate timely and appropriate referral to dental professionals [8].

2. The Role of Health Administration in System Integration

The integration of oral health screening into family medicine is fundamentally a systemic and organizational challenge. It requires more than just the goodwill of clinicians; it demands deliberate structural redesign, financial incentivization, and policy leadership. Health administrators—including practice managers, hospital executives, insurance payers, and public health officials—are the architects of the healthcare delivery system. Their role is pivotal in creating an environment where interdisciplinary oral health screening is not only possible but is a standardized, sustainable, and valued component of care.

First and foremost, administrators are responsible for **developing and implementing clear clinical protocols and policies**. This involves establishing

evidence-based guidelines that define what constitutes an oral health screen in a primary care setting. Such protocols must be pragmatic, tailored to the workflow of a busy family practice, and specify the components of screening (e.g., a standardized risk assessment questionnaire, a brief visual inspection of the oral cavity using a tongue depressor and light, and inspection for obvious signs of caries, gingival inflammation, ulcerations, or lesions). These protocols must delineate the roles of different team members: what the nurse or medical assistant does, what the physician reviews and confirms, and the clear referral pathways to dental professionals [9]. Without such standardized operating procedures, screening efforts will be haphazard, inconsistent, and unlikely to be sustained.

A second critical administrative function is **workflow redesign and resource allocation**. Integrating a new screening service necessitates analyzing and modifying existing patient flow. Administrators must oversee the integration of oral health questions into electronic health record (EHR) systems, creating structured data fields for risk factors (tobacco use, sugar consumption, diabetes status), screening findings, and referral outcomes. This digital integration is crucial for tracking, quality improvement, and demonstrating value. Furthermore, resources must be allocated. This may involve funding for simple screening tools (disposable mouth mirrors, gloves, adequate lighting), but more importantly, it involves allocating the most precious resource: time. Administrators must support scheduling templates that allow for the extra few minutes required for screening and counseling, and they must justify this through its alignment with value-based care objectives [10].

Perhaps the most powerful lever at an administrator's disposal is **financing and reimbursement model innovation**. In fee-for-service environments dominated by procedure-based codes, preventive oral screening in a medical office is often unreimbursed. Health administrators, particularly those in accountable care organizations (ACOs) or value-based payment models, can advocate for and design bundled payments or performance incentives that reward holistic care metrics. These could include measures such as the percentage of diabetic patients who receive an oral health screening and referral, or the reduction in emergency department visits for dental problems among a attributed patient population. By aligning financial incentives with integrated care outcomes, administrators can drive widespread adoption [11]. They can also negotiate contracts with payers to create specific billing codes for oral health risk assessment performed by medical teams, breaking down the financial barrier that currently exists.

Finally, administrators play a key role in **fostering inter-professional collaboration and culture change**. They can facilitate the establishment of formal partnerships between family medicine clinics and dental practices or dental hygiene schools. This might involve co-locating services, creating shared referral networks, or organizing joint continuing education sessions for medical and dental staff. Administrators set the institutional tone; by championing oral health as a strategic priority, endorsing collaborative practice agreements, and celebrating successful interdisciplinary cases, they can help erode long-standing professional barriers and cultivate a shared culture of comprehensive patient care [12]. In public health administration, this role expands to population-level interventions, such as integrating oral health objectives into community health needs assessments and launching public awareness campaigns that emphasize the mouth-body connection.

3. The Pivotal Role of Nurses and Primary Care Providers

Within the re-engineered system fostered by administration, nurses—including registered nurses, nurse practitioners, and physician assistants—emerge as the operational linchpins for effective oral health integration. Their unique position at the forefront of patient interaction, combined with their skills in assessment, education, and chronic disease management, makes them exceptionally effective agents for implementing oral health screening and promotion within family medicine.

Nurses are ideally suited to conduct the **initial oral health risk assessment and screening**. During routine intake or vital signs measurement, a nurse can efficiently administer a standardized oral health questionnaire. This tool, sometimes called a "risk assessment tool," inquires about key risk factors: frequency of dental visits, history of tooth decay or gum disease, tobacco use (smoking or smokeless), consumption of sugary foods and drinks, presence of dry mouth, and history of systemic conditions like diabetes [13]. This interview-based assessment is a crucial first step that identifies patients at high risk even before a physical exam begins. Following the risk assessment, the nurse can perform a brief but systematic **visual inspection of the oral cavity**. Using a penlight and tongue depressor, and with appropriate training, the nurse can look for obvious signs of neglect or disease: visible plaque and calculus, redness or swelling of the gums (gingivitis), untreated cavitations, broken teeth, and

any lumps, red or white patches, or ulcerations that persist for more than two weeks—potential indicators of oral cancer [14]. This inspection is not a diagnostic dental exam but a screening triage designed to identify abnormalities requiring further attention from the physician or dentist.

Beyond identification, a core nursing function is **patient education and motivational counseling**. Nurses excel at translating complex health information into actionable advice for patients. They can explain the connection between oral hygiene and heart health or diabetes control in relatable terms. They can provide basic but impactful education on proper brushing and flossing techniques, the importance of fluoride, and the dangers of tobacco and excessive sugar. For parents of young children, they can deliver anticipatory guidance on preventing early childhood caries, including advice on bottle-feeding, diet, and the application of fluoride varnish—a service that nurses in many jurisdictions are now trained to provide [15]. This counseling is most effective when framed within the context of the patient's overall health goals, such as improving diabetes management or preparing for a healthy pregnancy.

Nurses also serve as crucial **coordinators of care and facilitators of referral**. Upon identifying a problem, the nurse alerts the family physician, who then confirms the findings and discusses them with the patient. The nurse's role continues in ensuring a smooth referral to a dental professional. This involves providing the patient with a list of local dentists who accept their insurance or work on a sliding scale, assisting with appointment scheduling, and, in integrated systems, facilitating direct electronic referrals with shared health records. The nurse may also follow up to ascertain whether the appointment was kept—a critical step in closing the referral loop, which often fails in fragmented systems [16]. In chronic disease management clinics (e.g., for diabetes), the nurse can make oral health a routine part of the review, repeatedly reinforcing its importance and checking on the status of dental care.

The family physician, in turn, synthesizes this information into the broader clinical picture. They interpret the oral findings in the context of the patient's systemic health, considering, for example, whether severe periodontitis might be a contributor to poorly controlled hemoglobin A1c. The physician holds the ultimate responsibility for diagnosis, medical management of systemic conditions affecting oral health, and initiating the referral. However, it is the nurse-led, protocol-driven process of screening, education, and coordination that embeds oral health into the daily rhythm of primary care, making integration scalable and sustainable.

4. The Expertise of Dentists: From Referral to Collaborative Care

The integration of oral health screening in family medicine inevitably leads to an increased volume and acuity of referrals to dental professionals. This is not a burden but the intended outcome of a functioning system, shifting dental care from a crisis-driven, episodic model to a preventive, medical-dental integrated one. Dentists and dental hygienists are the essential recipients of these referrals, providing the specialized diagnostic and therapeutic care that lies beyond the scope of primary medical practice. Their role evolves from isolated practitioners to active collaborators in a patient's overall health management team.

Upon receiving a referral from a family medicine clinic, the dentist's first role is to conduct a **comprehensive diagnostic examination and treatment planning**. The dental team builds upon the screening findings with a full-mouth assessment, including detailed periodontal probing to diagnose gingivitis or periodontitis, radiographic evaluation (e.g., bitewing and panoramic X-rays) to detect interdental caries and bone loss, and a thorough soft tissue examination. This allows for a definitive diagnosis of oral conditions. Critically, the dentist must then interpret these findings with the patient's medical history, provided through the referral, in mind. For a patient with diabetes, the dentist understands that periodontal therapy may need to be coordinated with the patient's physician to ensure glycemic stability. For a patient on anticoagulant therapy, the dentist will consult with the prescribing physician regarding any necessary modifications before surgical procedures [17]. This bidirectional communication is the cornerstone of collaborative care.

Furthermore, dentists play a vital role in **managing the oral manifestations of systemic diseases and mitigating the oral side effects of medications**. They are experts in treating the oral complications of conditions like diabetes, Sjögren's syndrome (causing severe dry mouth), or gastroesophageal reflux disease (which can erode tooth enamel). They can prescribe saliva substitutes or caries-preventive regimens for patients with xerostomia induced by antidepressants or antihypertensives. For patients undergoing head and neck radiation or chemotherapy, dentists provide essential pre-therapeutic dental clearance and manage mucositis and osteonecrosis risk [18]. In this capacity, the dentist functions as a specialist consultant to the medical team, managing a domain that directly

impacts the patient's quality of life and systemic health outcomes.

Perhaps one of the most significant collaborative opportunities lies in the **co-management of patients with chronic inflammatory conditions**, particularly diabetes and cardiovascular disease. Dentists treating periodontitis in a diabetic patient are not just providing a dental service; they are delivering an adjunctive medical therapy. By reducing the chronic inflammatory burden of periodontitis, non-surgical periodontal therapy (scaling and root planing) has been shown to contribute to improvements in glycemic control, as measured by reductions in HbA1c [19]. In this scenario, the ideal model involves shared goals: the physician monitors HbA1c, the dentist measures periodontal indices like bleeding on probing and pocket depth, and both track the patient's progress, communicating findings to each other. This represents true inter-professional co-management, where both providers are treating different facets of the same pathophysiological process.

To enable this, dentists must actively engage in **communication and information feedback loops with the medical team**. A referral should not be a one-way street. After evaluation and treatment, the dentist should send a concise report back to the referring family physician. This report should confirm the diagnosis, outline the treatment provided, note any relevant findings (e.g., "severe periodontitis noted, which may be a factor in glycemic control"), and list any recommendations for the physician (e.g., "consider monitoring HbA1c more closely during active periodontal therapy") [20]. This closes the loop, informs the physician's continued medical management, and validates the value of the referral, encouraging future collaboration.

5. The Contribution of Laboratory Technicians to the Oral-Systemic Link

While the clinical roles of administrators, nurses, and dentists are readily apparent, the contribution of laboratory medicine is often an overlooked yet critical component in validating and managing the oral-systemic health connection. Laboratory technicians and the pathologists they work under provide the objective, quantitative data that moves the discussion from clinical observation to evidence-based management. Their work spans routine diagnostics, specialized testing, and research that underpins the collaborative model.

The most direct contribution is through **routine diagnostic testing that informs risk stratification and co-management**. For the family physician managing a patient with suspected oral-systemic interactions, standard laboratory tests are indispensable. The hemoglobin A1c (HbA1c) test is a prime example. When a patient presents in the dental or medical office with severe, refractory periodontitis, an HbA1c test can screen for undiagnosed diabetes or pre-diabetes. Conversely, for a patient with known diabetes and poor glycemic control, the physician can order an HbA1c before and after periodontal therapy to objectively assess if reducing oral inflammation has a beneficial metabolic impact [21]. Similarly, a **Complete Blood Count (CBC)** can reveal leukocytosis associated with acute dental infections or neutropenia that might predispose to oral ulcerations. **Inflammatory markers** like high-sensitivity C-reactive protein (hs-CRP) provide a systemic measure of inflammation that can be elevated in periodontitis and is a known risk marker for cardiovascular disease. Monitoring hs-CRP can, in some contexts, be part of assessing the systemic inflammatory burden and response to therapy [22].

In more specialized scenarios, the laboratory's role expands. **Microbiological analysis** of subgingival plaque samples, though not routine for all cases of periodontitis, can be crucial in managing aggressive or treatment-resistant forms of the disease. Laboratory technicians culture and identify specific pathogenic bacteria (e.g., *Porphyromonas gingivalis*, *Aggregatibacter actinomycetemcomitans*), which can guide targeted antibiotic therapy in conjunction with mechanical debridement [23]. Furthermore, in cases of suspicious oral lesions, the laboratory is central to definitive diagnosis. A **biopsy** of an oral ulcer or leukoplakia is processed by histotechnologists, stained, and examined by a pathologist. Their report—distinguishing between benign inflammatory conditions, premalignant dysplasia, and squamous cell carcinoma—provides the definitive diagnosis upon which all subsequent treatment, often involving complex surgery, radiation, and medical oncology, depends [24]. The lab technician's meticulous handling and processing of these specimens are vital for accurate diagnosis.

Looking forward, laboratory science is at the heart of **emerging research and personalized medicine** in oral-systemic health. Technicians are involved in processing samples for research into salivary biomarkers. Saliva is a rich source of proteins, mRNA, and microbial DNA that can potentially be used to diagnose not only oral diseases like caries and periodontitis but also systemic conditions such as pancreatic cancer or Sjögren's syndrome [25]. While still largely in the research domain, the potential for point-of-care salivary diagnostics in the primary care setting is

immense. Additionally, genetic testing for polymorphisms associated with heightened inflammatory responses (e.g., IL-1 gene variations) can identify individuals at genetically increased risk for severe periodontitis, allowing for personalized preventive strategies [26]. The data generated by laboratory professionals thus fuels the evolving science that continually strengthens the rationale for medical-dental integration.

6. Conclusion:

The integration of oral health screening into family medicine is not merely an additive task but a transformative re-imagining of primary care. It demands a decisive departure from the outdated model of healthcare fragmentation and embraces a collaborative, patient-centric philosophy that acknowledges the fundamental unity of the human body. As this essay has detailed, this transformation is a multidisciplinary enterprise, where each professional group contributes unique and indispensable expertise.

Health administrators construct the necessary infrastructure, crafting policies, redesigning workflows, innovating payment models, and fostering a culture where collaboration is the norm, not the exception. Nurses and primary care providers operationalize this vision at the point of care, conducting risk assessments, performing visual screenings, educating patients, and initiating the crucial referral process. Dentists and dental hygienists provide the specialized diagnostic and therapeutic expertise, managing oral diseases while consciously considering their systemic implications and engaging in active co-management of shared patients. Laboratory technicians and pathologists provide the objective data that confirms diagnoses, monitors disease activity, guides targeted therapy, and advances the underlying science of the oral-systemic connection.

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