

Integrating Periodontal Care into Chronic Disease Prevention for Underserved Populations: A Narrative Review of Oral-Systemic Health Models in the United States

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Abstract

Periodontal disease disproportionately affects low-income, minority, and rural U.S. populations and shares bidirectional inflammatory pathways with type 2 diabetes mellitus and cardiovascular disease. Despite robust biological and epidemiological evidence linking oral and systemic health, structural separation between dental and medical care systems limits preventive impact in vulnerable communities. This narrative review synthesizes evidence on oral-systemic disease relationships, health disparities, medical-dental integration models, non-surgical periodontal therapy outcomes, health literacy strategies, and emerging technology-assisted approaches. Literature was identified via PubMed/MEDLINE using MeSH terms and Boolean operators. Periodontal inflammation contributes to glycemic dysregulation and cardiovascular risk through shared cytokine-mediated pathways. Federally Qualified Health Centers provide viable integration frameworks yet face persistent financing and workforce barriers. Non-surgical periodontal therapy demonstrates clinically relevant reductions in systemic inflammatory markers. Community health workers and culturally adapted interventions extend preventive reach. Artificial intelligence tools for risk stratification show promise but require equitable dataset development. Achieving population-level impact requires coordinated policy reform, reimbursement innovation, and interprofessional workforce training.

Keywords: Periodontitis; Oral-systemic health; Health disparities; Medical-dental integration; Underserved populations; Chronic disease prevention; Federally Qualified Health Centers; Health equity

INTRODUCTION

Periodontal disease represents one of the most prevalent chronic infections in the United States, affecting approximately 47.2% of adults aged 30 years and older, with severe forms reaching 8.9% of the population according to National Health and Nutrition Examination Survey (NHANES) data [1]. Far from being an isolated oral condition, periodontitis initiates and sustains systemic inflammatory cascades that intersect with the pathophysiology of type 2 diabetes mellitus (T2DM), cardiovascular disease (CVD), adverse pregnancy

outcomes, and respiratory conditions [2]. Establishing these biological and epidemiological foundations is essential to understanding why periodontal care must be repositioned as a component of chronic disease prevention [3,4].

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The pathological mechanism linking periodontitis to systemic disease centers on dysregulated host immune responses to a polymicrobial biofilm dominated by keystone pathogens including *Porphyromonas gingivalis*, *Tannerella forsythia*, and *Treponema denticola* [2]. Gingival tissue invasion and ulceration facilitate bacteremia and the systemic dissemination of lipopolysaccharides (LPS), triggering monocyte and macrophage activation with subsequent elevation of pro-inflammatory mediators including interleukin-6 (IL-6), tumor necrosis factor- α (TNF- α), and C-reactive protein (CRP) [3]. These shared inflammatory pathways directly modulate insulin receptor signaling, contributing to peripheral insulin resistance in patients with T2DM, and promote endothelial dysfunction and atherosclerotic plaque instability in CVD [4].

The bidirectional relationship between periodontitis and T2DM is among the most rigorously studied oral-systemic associations [5]. Patients with poorly controlled diabetes demonstrate impaired neutrophil function, altered collagen metabolism, and elevated advanced glycation end-products (AGEs) that accelerate periodontal tissue destruction [5,6]. Conversely, meta-

analyses have demonstrated that successful non-surgical periodontal therapy is associated with a statistically significant reduction in glycated hemoglobin (HbA1c) of approximately 0.36–0.40 percentage points, a magnitude clinically comparable to the addition of a second pharmacological agent [6]. For CVD, periodontal pathogens have been identified in atheromatous plaques, and periodontitis has been independently associated with increased risk of myocardial infarction and stroke after controlling for traditional cardiovascular risk factors [7].

The epidemiological burden of periodontal disease is not uniformly distributed. NHANES surveillance data consistently document higher prevalence and severity among non-Hispanic Black adults (58.7%), Hispanic adults (63.0%), and adults below 100% of the federal poverty level (65.4%), populations who simultaneously carry disproportionate burdens of T2DM and CVD [8]. This convergence of oral and systemic disease burden within the same marginalized communities creates both a compelling public health rationale and an urgent equity imperative for integrated preventive care models [9].

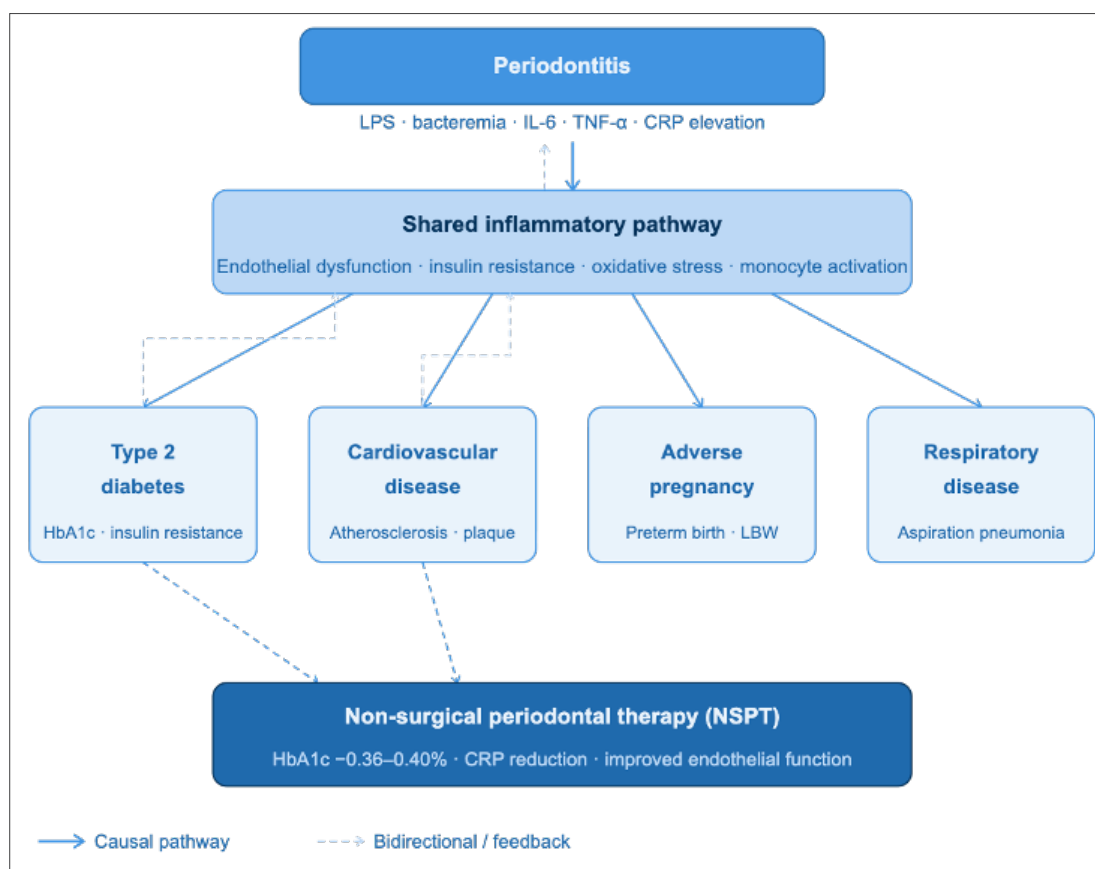


Figure 1. Bidirectional pathways between periodontitis and systemic diseases. Solid arrows indicate causal pathways; dashed arrows indicate bidirectional/feedback relationships. IL-6 = interleukin-6; TNF- α = tumor necrosis factor- α ; CRP = C-reactive protein; LPS = lipopolysaccharide; NSPT = non-surgical periodontal therapy. [1–8.]

Despite the robust biological and epidemiological evidence linking periodontitis to systemic disease, a critical translational gap persists between this scientific knowledge and its equitable clinical application in underserved U.S. populations [9]. Existing literature has addressed individual components of this challenge, the oral-systemic axis, access barriers, integration models, or clinical protocols in isolation, without synthesizing them within a unified preventive care framework oriented toward health equity [10]. No comprehensive narrative review has integrated the biological, structural, clinical, educational, and technological dimensions of this problem specifically in the context of underserved U.S. adults with comorbid periodontal disease and chronic systemic conditions [11].

Therefore, the aim of this narrative review is to synthesize the current evidence on oral-systemic

disease relationships, health disparities and access barriers, medical-dental integration models, non-surgical periodontal therapy outcomes in high-risk patients, health literacy and culturally responsive education strategies, and emerging AI-assisted tools and workforce development approaches, within a single conceptual framework informed by a qualitative PICO question: in underserved U.S. adults with periodontal disease and chronic systemic conditions (T2DM, CVD), do integrated oral-systemic care models, compared to conventional siloed care, improve periodontal stability, systemic disease control, access to care, and health equity? [1,6]. The review is organized across six thematic sections that reflect the sequential translational pathway from biological mechanism to policy implementation, providing a foundation for interdisciplinary research, clinical practice reform, and equitable health system design (Figure 1), (Table 1). [11].

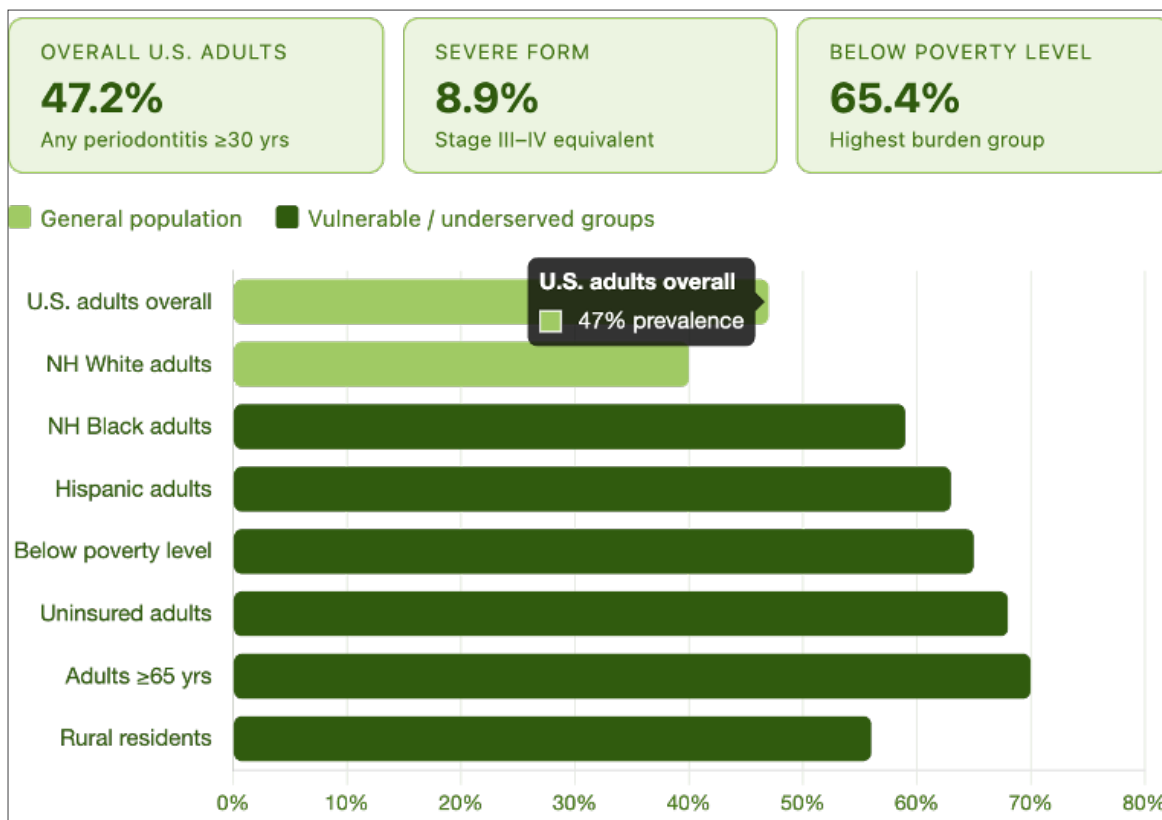


Figure 2. Prevalence of periodontitis by population group (NHANES 2009–2014). Green = general population; orange = vulnerable/underserved groups. Source: Eke et al. [1]; Borrell et al. [8].

HEALTH DISPARITIES AND BARRIERS TO INTEGRATED CARE IN UNDERSERVED POPULATIONS

Despite the well-established oral-systemic disease relationships described above, the translation of this evidence into equitable clinical care has been profoundly limited by structural, financial, and sociocultural barriers

that disproportionately affect low-income, minority, rural, and elderly populations in the United States [12]. Understanding the architecture of these barriers is prerequisite to designing effective integration models [13].

The most fundamental barrier is the historical and institutional separation of dental and medical care delivery systems in the United States [9]. Unlike most

high-income countries, the U.S. has maintained parallel and largely non-communicating systems of dental and medical education, licensure, insurance coverage, and clinical practice [10]. Adult dental benefits are excluded from traditional Medicare and are offered by only 39 states under Medicaid, leaving approximately 76 million adults without any dental insurance coverage [11]. This structural gap actively prevents the co-management of conditions such as periodontal disease and T2DM that share patients, pathophysiology, and treatment goals. The Affordable Care Act included provisions for pediatric oral health as an essential health benefit but did not mandate adult dental coverage, perpetuating the bifurcation between oral and systemic care financing [13].

Access barriers operate at multiple socioecological levels. At the individual level, out-of-pocket cost is consistently identified as the primary reason adults forgo dental care, with low-income adults reporting dental cost barriers at more than twice the rate of higher-income adults [10,11]. Limited English proficiency compounds this burden: patients with inadequate language concordance with their dental provider demonstrate lower rates of preventive dental utilization and reduced comprehension of treatment plans [12]. At the community level, rural dental workforce shortages leave approximately 49 million Americans in

designated dental health professional shortage areas (HPSAs) [13,14]. At the systemic level, cultural mistrust of healthcare institutions rooted in historical and ongoing experiences of discrimination creates a pervasive pattern of delayed care-seeking among Black, Hispanic, and American Indian/Alaska Native communities [15].

The cumulative effect of these barriers is a predictable and measurable concentration of untreated periodontal disease burden in the most vulnerable segments of the U.S. population [8,16]. Non-Hispanic Black adults experience severe periodontitis at rates approximately 1.8 times higher than non-Hispanic White adults after adjustment for age and smoking, a disparity that persists even within income strata, suggesting independent effects of structural racism on oral health [14]. Elderly residents of long-term care facilities represent a particularly underserved subgroup, with reported rates of untreated periodontal disease exceeding 70% in some surveys, and with documented associations between poor oral hygiene and aspiration pneumonia mortality [15]. These disparate outcomes reflect systemic failures rather than individual behaviors, and they demand systemic solutions, the integration models explored in the following section (Figure 3), (Table 1). [16].

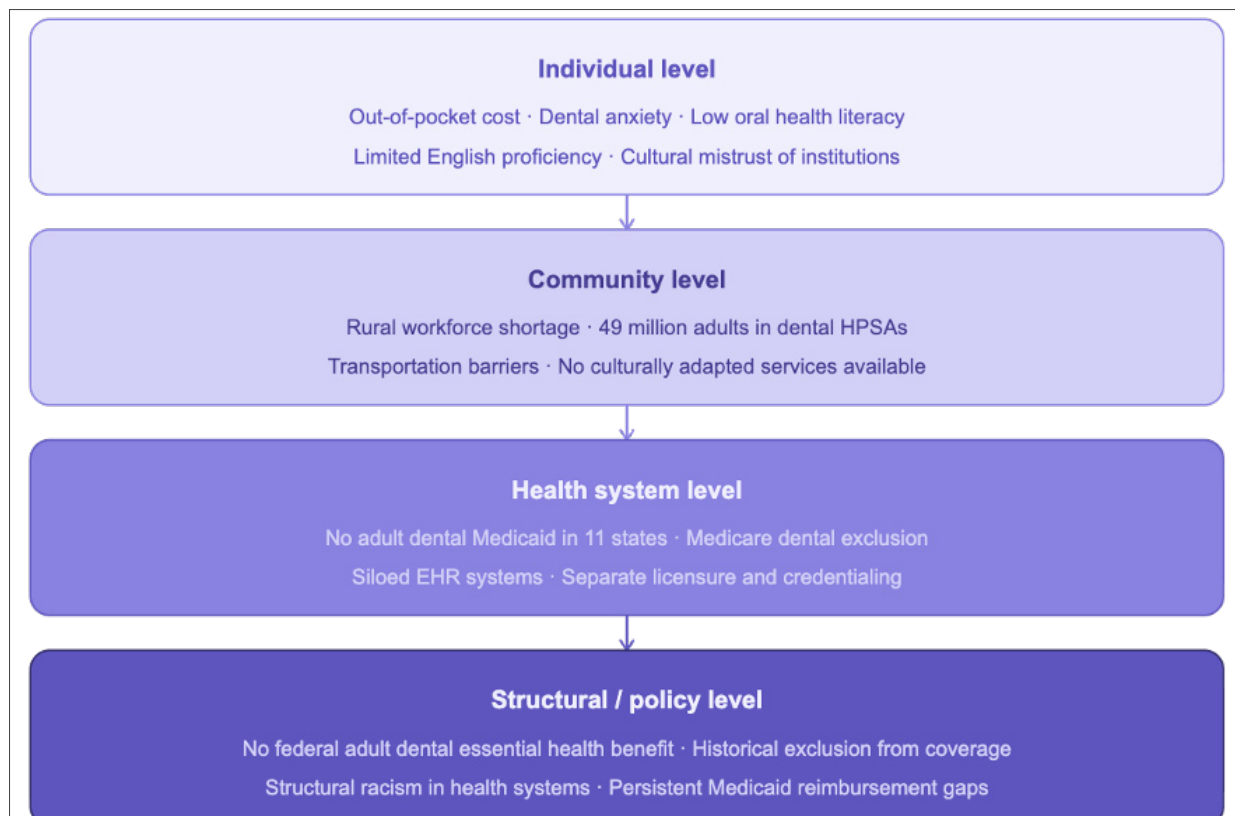


Figure 3. Socioecological model of barriers to periodontal care access in underserved U.S. populations across individual, community, health system, and structural/policy levels. HPSA = Health Professional Shortage Area. [9–15]

Table 1. Periodontal disease burden and key barriers by vulnerable population group [16]. LTC = long-term care facility; HPSA = health professional shortage area; IHS = Indian Health Service.

Population group	Prevalence	Burden	Primary barriers	Reference
Non-Hispanic Black adults	58.7%	High	Structural racism, insurance gap, cultural mistrust	Borrell et al. [8]
Hispanic adults	63.0%	High	Language barriers, uninsured rate, HPSA concentration	Eke et al. [1]
Adults below poverty level	65.4%	High	Cost, no adult Medicaid dental, transportation	Vujicic et al. [10]
Rural residents	~56%	High	Dental workforce shortage, 49M in HPSAs	Doescher et al. [13]
Adults ≥65 years (LTC)	>70% untreated	High	Mobility, LTC access, caregiver training gaps	Quinonez et al. [18]
American Indian / Alaska Native	~55%	High	IHS underfunding, geographic isolation, mistrust	Dye et al. [14]
Limited English proficiency	Data limited	Moderate–High	Language concordance, interpreter access	Flores [12]
Uninsured adults	68%	High	No coverage, cost as primary barrier	Wall et al. [11]

MODELS OF MEDICAL–DENTAL INTEGRATION: FQHCs AND COMMUNITY-BASED PROGRAMS

The disparities and structural barriers outlined above have catalyzed the development of medical–dental integration models that seek to deliver coordinated oral and systemic care within community-based settings.³⁵ Federally Qualified Health Centers (FQHCs), as the cornerstone of the U.S. safety-net health system, have emerged as the most studied and policy-relevant platforms for such integration [16].

FQHCs operate under a federal mandate to provide comprehensive primary care regardless of ability to pay, and dental services are explicitly included as a required service under the Health Center Program funded through Section 330 of the Public Health Service Act [16,17]. The National Association of Community Health Centers (NACHC) and the National Network for Oral Health Access (NNOHA) have described a continuum of integration levels ranging from co-location of independent dental and medical services (Level 1) to fully coordinated, team-based care with shared electronic health records, unified care plans, and population health management tools (Level 4) [17,18]. Published evaluations of FQHC dental programs document improvements in access to preventive periodontal services among Medicaid-enrolled and uninsured patients, though outcomes data on systemic disease comorbidities remain limited by heterogeneous reporting [19,20].

Bidirectional referral pathways constitute the operational core of medical–dental integration [18]. In effective models, primary care providers screen for periodontal disease indicators, gingival bleeding, tooth mobility, or patient-reported symptoms during medical encounters and initiate warm handoffs or formal referrals to co-located dental providers [19]. Conversely, dental providers screen for undiagnosed T2DM using chair-side HbA1c testing and for hypertension using blood pressure measurement, referring patients with abnormal results to medical colleagues [19,20]. A systematic review of bidirectional referral programs in community health settings found referral completion rates ranging from 28% to 71%, with the greatest success in models featuring embedded care coordinators, real-time EHR interoperability, and proactive patient follow-up protocols [20].

Implementation evidence identifies several recurring facilitators and barriers [21]. Successful programs consistently report strong institutional leadership commitment, co-location of services reducing transportation burden, Medicaid reimbursement under the FQHC prospective payment system (PPS) that partially supports dental service costs, and presence of clinical champions who bridge professional cultures [21,22]. Barriers include fragmented electronic health records systems that prevent dental and medical data sharing, a persistent shortage of dentists willing to practice in FQHC settings, and reimbursement rates that frequently fail to cover the full cost of complex periodontal services

[17]. The documented variability in integration depth and outcomes across FQHCs underscores the need for standardized implementation frameworks and adequately funded demonstration projects [23]. (Figure 4), (Table 2).

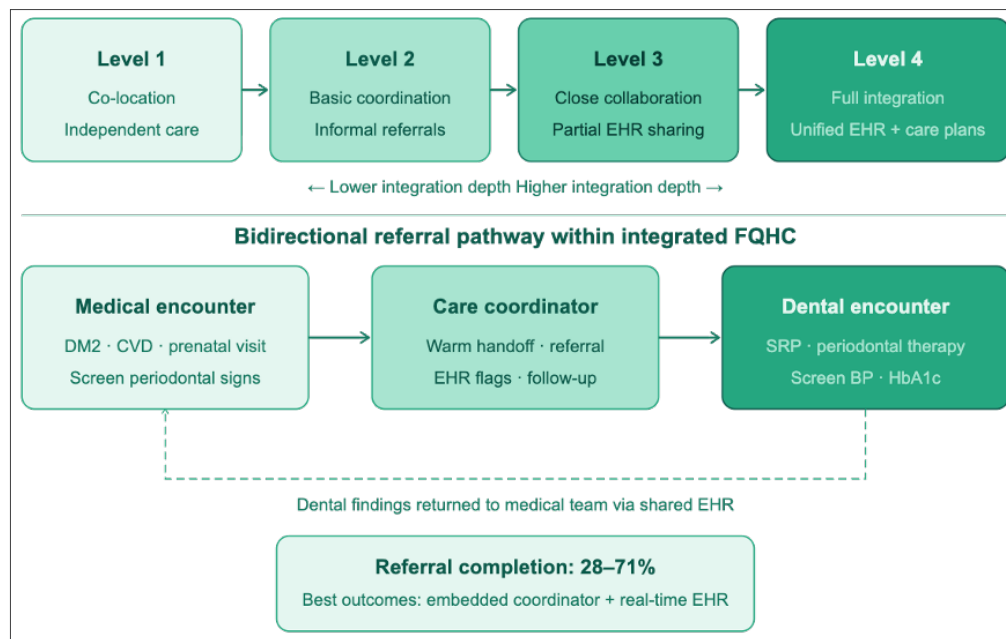


Figure 4. NNOHA medical-dental integration continuum (Levels 1–4) and bidirectional referral pathway within an integrated FQHC. EHR = electronic health record; SRP = scaling and root planing; BP = blood pressure. [16–22].

Table 2. Facilitators and barriers to medical-dental integration in FQHC and community-based settings. FQHC = Federally Qualified Health Center; PPS = prospective payment system; CHW = community health worker; EHR = electronic health record. [16–22]

Domain	Facilitators	Barriers
Leadership	Executive champion; shared vision for integration	Siloed culture; no designated integration champion
Financing	HRSA §330 funding; Medicaid FQHC PPS; grant support	Low Medicaid rates (40–60% of private fees); unsustainable grant cycles
Workforce	On-site dental staff; embedded care coordinators; CHWs	Dental provider shortage in safety-net settings; high staff turnover
Technology	Shared EHR (Epic, eClinicalWorks); real-time referral tracking	Separate EHR systems; no dental-medical interoperability
Referral system	Warm handoffs; proactive follow-up; completion tracking	Low completion rates (28–71%); patient no-show; unclear accountability
Policy	HRSA UDS mandate; ACA pediatric provisions; state pilots	No federal adult dental essential benefit; variable Medicaid dental coverage
Patient engagement	Co-location; culturally adapted outreach; CHW support	Linguistic barriers; low oral health literacy; institutional mistrust

NON-SURGICAL PERIODONTAL THERAPY AND PREVENTIVE PROTOCOLS IN HIGH-RISK PATIENTS

Once patients with comorbid periodontal and systemic disease are engaged within integrated care models, the specific clinical protocols delivered determine treatment outcomes. Non-surgical periodontal therapy (NSPT),

encompassing scaling and root planing (SRP), adjunctive antimicrobial agents, and structured periodontal maintenance, constitutes the evidence-based standard of care for moderate-to-severe periodontitis and has been evaluated extensively in patients with T2DM and CVD [23].

Scaling and root planing aims to mechanically disrupt

the subgingival biofilm and remove calculus-embedded bacterial endotoxins from root surfaces, reducing the periodontal inflammatory burden and its downstream systemic effects [23,24]. Full-mouth SRP completed within 24 hours has demonstrated non-inferiority to quadrant-by-quadrant approaches in reducing probing depth and clinical attachment loss, with the additional advantage of minimizing the risk of bacterial recolonization from untreated sites [25]. In patients with T2DM, NSPT has been associated with a mean HbA1c reduction of 0.36–0.40% at three months post-treatment in meta-analyses of randomized controlled trials, representing a clinically meaningful improvement in glycemic management [6]. For patients with established CVD, NSPT has been associated with significant reductions in serum CRP, IL-6, and fibrinogen levels, systemic inflammatory markers directly implicated in atherogenesis and plaque instability [26].

Adjunctive antimicrobial strategies have been evaluated to enhance the clinical efficacy of mechanical debridement in high-risk patients [25]. Locally delivered antimicrobials, including doxycycline hyclate gel and chlorhexidine chips applied to residual periodontal pockets following SRP, have demonstrated additive reductions in probing depth in patients with Stage III–IV periodontitis [26]. Systemic antibiotics, particularly the combination of amoxicillin

and metronidazole, have shown benefit in patients with aggressive presentations and specific pathogen profiles, though the risk of antimicrobial resistance and adverse effects necessitates selective rather than routine use [27]. Host-modulation therapy using sub-antimicrobial dose doxycycline (SDD) has been approved as an adjunct in the management of chronic periodontitis, with evidence of reduced matrix metalloproteinase activity and modest clinical attachment gain [3].

Risk-stratified preventive care protocols offer a more sustainable model than reactive treatment alone, particularly in resource-constrained FQHC settings [28]. The 2017 AAP/EFP classification system staging periodontitis by severity and complexity (Stages I–IV) and grading by rate of progression and systemic modifiers (Grades A–C), provides a standardized framework for allocating preventive resources [27]. Patients classified as Grade C, denoting rapid progression with confirmed systemic risk modifiers including uncontrolled T2DM or heavy smoking, should receive three-month supportive periodontal therapy (SPT) intervals, with systematic reassessment of systemic parameters at each visit [29]. This prevention-first approach, prioritizing early identification and maintenance over repeated active treatment cycles, is consistent with the chronic disease management models employed by medical primary care [30]. (Figure 5), (Table 3).

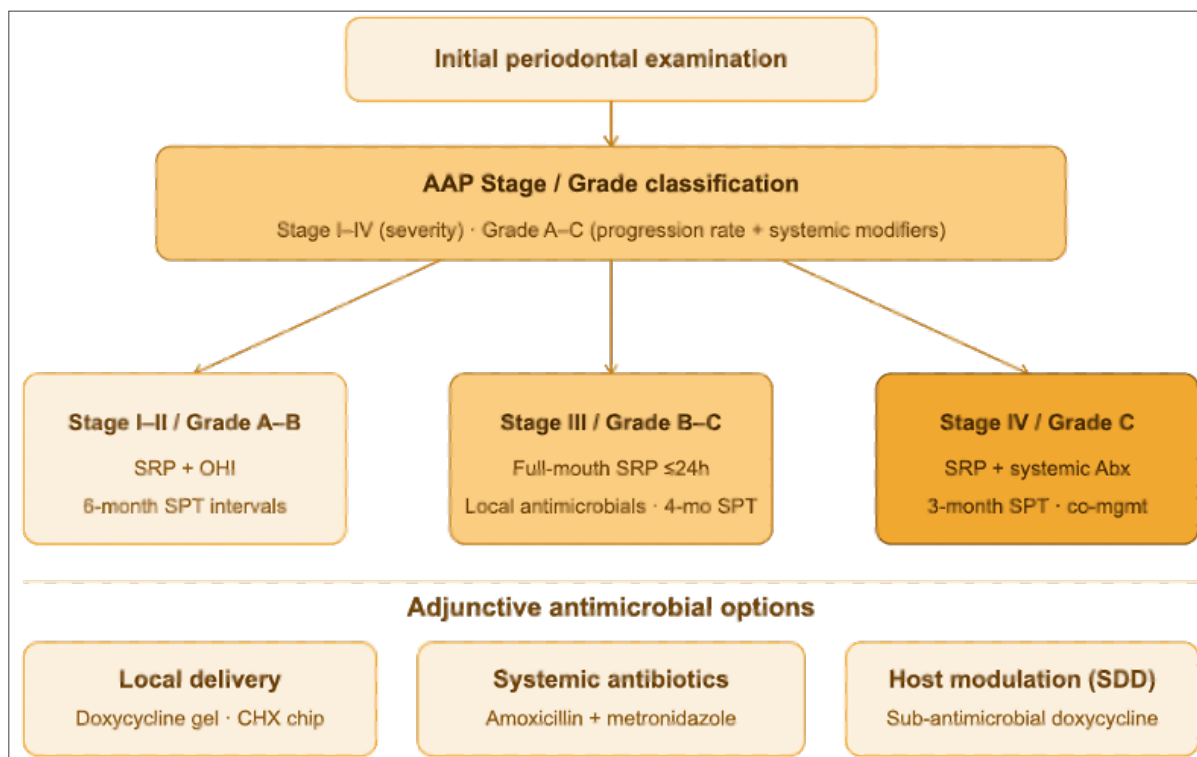


Figure 5. Risk-stratified NSPT protocol based on the AAP/EFP 2017 Stage/Grade classification. SRP = scaling and root planing; SPT = supportive periodontal therapy; CHX = chlorhexidine; OHI = oral hygiene instructions; SDD = sub-antimicrobial dose doxycycline. [23–27].

Table 3. Systemic outcomes of non-surgical periodontal therapy (NSPT) in patients with chronic disease comorbidities. HbA1c = glycated hemoglobin A1c; CRP = C-reactive protein; PD = probing depth; CAL = clinical attachment level; RCT = randomized controlled trial. Evidence levels based on GRADE criteria.

Systemic outcome	Effect of NSPT	Magnitude	Evidence	Study design
HbA1c (glycemic control)	Significant reduction at 3 months post-SRP	-0.36–0.40%	Moderate–High	Cochrane meta-analysis
C-reactive protein (CRP)	Significant reduction in serum CRP after full-mouth SRP	~20–30%	Moderate	Systematic review + RCTs
Interleukin-6 (IL-6)	Reduction in circulating IL-6 post-NSPT	Variable	Moderate	RCTs, observational
Fibrinogen	Reduction in plasma fibrinogen levels	Modest, short-term	Moderate	RCTs
Cardiovascular risk markers	Improved endothelial function; reduced atherosclerotic progression	Significant at 6 months	Moderate	PERIODONT trial
Probing depth	Mean PD reduction across Stage II–III sites	1.0–1.5 mm	High	Multiple RCTs, meta-analyses
Clinical attachment level	Mean CAL gain post-SRP with/without adjuncts	0.5–1.2 mm	High	RCTs, Cochrane reviews
Adverse pregnancy outcomes	Mixed evidence; some RCTs show reduced preterm birth	Inconclusive	Low–Moderate	RCTs (heterogeneous)

HEALTH LITERACY, CULTURALLY RESPONSIVE EDUCATION, AND COMMUNITY HEALTH WORKERS

Evidence-based periodontal protocols achieve optimal clinical outcomes only when patients possess sufficient health literacy to understand their disease, adhere to home care recommendations, and engage consistently with preventive maintenance schedules [28,39]. For underserved populations facing linguistic, educational, and cultural barriers, targeted health literacy interventions and culturally adapted educational strategies are not supplementary, they are clinically necessary [31].

Oral health literacy encompasses the capacity to obtain, process, and understand basic oral health information and services needed to make appropriate health decisions [32]. Validated instruments such as the Rapid Estimate of Adult Literacy in Dentistry (REALD-30) and the Test of Functional Health Literacy in Dentistry (TOFHLiD) have documented high rates of inadequate or marginal oral health literacy among low-income and minority patients attending safety-net dental clinics [29,33]. Low oral health literacy has been independently associated with higher prevalence of untreated periodontal disease, reduced frequency of dental visits, and lower self-efficacy for daily oral hygiene behaviors. Motivational interviewing

(MI), a patient-centered communication technique, has been adapted for dental settings and has demonstrated significant improvements in periodontal self-care adherence, plaque indices, and bleeding on probing scores compared to traditional didactic patient education in controlled trials [30,34].

Culturally adapted educational materials address the distinct health beliefs, communication preferences, and trust relationships of specific communities [35]. The U.S. Department of Health and Human Services' National Standards for Culturally and Linguistically Appropriate Services (CLAS) provide a federal framework for developing linguistically accessible and culturally respectful health communications [36]. Spanish-language periodontal education programs developed through community participatory research methods and validated with target populations have demonstrated superior comprehension and behavior change compared to translated-only materials [32,37]. Design principles for low-literacy visual materials, including locally relevant imagery, simple action-oriented language at a 6th-grade reading level, and avoidance of medical jargon, are associated with higher patient engagement in preventive behaviors [29].

Community health workers (CHWs) and promotores de salud serve as trusted lay intermediaries who extend

the preventive reach of dental and medical providers into communities where professional services are scarce or distrusted [33,38]. In oral health applications, CHWs have been trained to conduct basic oral health screenings, deliver standardized preventive counseling, provide toothbrush and toothpaste distribution, and facilitate referrals to dental care [33,34]. HRSA-funded CHW oral health programs in Hispanic, rural, and low-income urban communities have reported significant improvements in

dental care utilization rates and reductions in untreated caries and periodontal disease burden [39]. The integration of CHWs within FQHC dental teams, with clearly defined scopes of practice, structured supervision, and integration into electronic care coordination workflows, represents a cost-effective strategy for bridging the literacy, cultural, and access gaps that clinical protocols alone cannot overcome (Figure 6), (Table 4). [40].

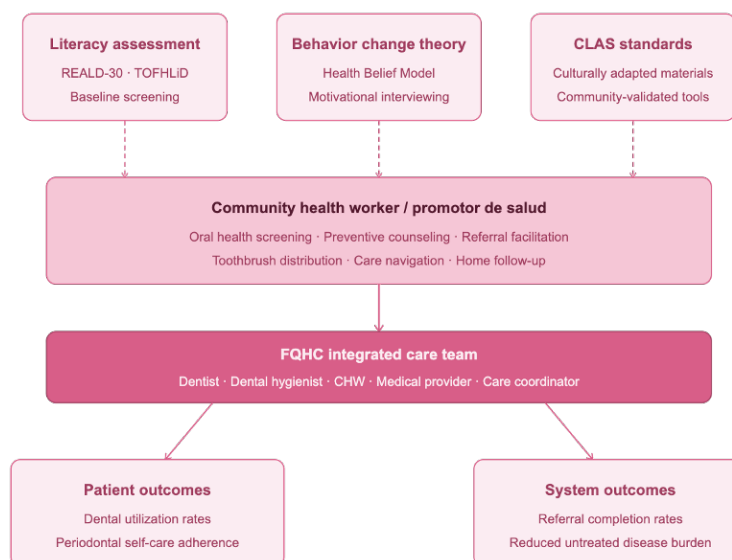


Figure 6. CHW-integrated oral health literacy model within FQHC team-based care. MI = motivational interviewing; CLAS = Culturally and Linguistically Appropriate Services; OHI = oral hygiene instructions. [28–34].

Table 4. Oral health literacy and culturally responsive education strategies by population group. OHI = oral hygiene instructions; SPT = supportive periodontal therapy; LTC = long-term care; CHW = community health worker; REALD-30 = Rapid Estimate of Adult Literacy in Dentistry. [28–34].

Population/literacy	Assessment tool	Strategy	Key components
Low literacy general underserved adults	REALD-30; TOFHLID	Visual-based materials; teach-back method	6th-grade level; pictograms; action-oriented language
Limited English — Hispanic/Latino adults	Language concordance screening	Spanish-language periodontal education; promotores de salud	Community-participatory; bilingual dental team; culturally validated
Moderate literacy — general adult patients	Brief oral health literacy screen	Motivational interviewing (MI); self-efficacy building	Open-ended questions; reflective listening; OHI goal-setting
High systemic risk — DM2/CVD patients	HbA1c + periodontal risk screen	Integrated oral-systemic counseling; CHW-delivered education	Link periodontal disease to glycemic control; reinforce 3-month SPT
Elderly / LTC residents	Caregiver screening protocols	Caregiver OHI training; facility-level preventive protocols	Daily OHI assistance; aspiration pneumonia prevention
Rural / geographically isolated	Telehealth screening	CHW home visits; telehealth triage; mobile dental unit referral	Asynchronous teleconsultation; CHW oral health scope; HRSA rural grants

EMERGING TOOLS AND FUTURE DIRECTIONS: AI-ASSISTED RISK STRATIFICATION AND WORKFORCE DEVELOPMENT

The convergence of human-centered preventive strategies with technology-enabled clinical decision support and policy reform represents the frontier of integrated periodontal and chronic disease care for underserved populations [35,40]. Artificial intelligence (AI), interprofessional workforce development, and innovative reimbursement models each offer pathways to scaling evidence-based integration beyond individual programs toward population-level impact [41].

AI applications in periodontology have advanced rapidly, with convolutional neural network (CNN) models demonstrating diagnostic accuracy for radiographic alveolar bone loss detection comparable to or exceeding that of general dentists, with area-under-curve (AUC) values ranging from 0.82 to 0.96 in recent validation studies [36]. AI-assisted periodontal risk stratification tools that integrate clinical parameters, probing depths, bleeding scores, bone loss patterns, smoking status, and systemic disease markers, into automated risk scores

compatible with the AAP Stage/Grade classification have been piloted in FQHC settings [37]. However, a critical limitation of current AI systems is the underrepresentation of racial and ethnic minority populations and low-income patients in the training datasets used to develop these models, raising concerns about algorithmic bias that could exacerbate rather than mitigate existing disparities [41,42]. Responsible deployment of AI in underserved settings requires prospective validation in demographically representative cohorts, transparent reporting of subgroup performance, and clinician oversight protocols that preserve the primacy of the dentist–patient relationship [43].

Workforce development for integrated, technology-supported care demands a fundamental reorientation of dental and medical education [44]. Interprofessional education (IPE) frameworks, endorsed by the Interprofessional Education Collaborative (IPEC) competency model, provide structured opportunities for dental, medical, nursing, and pharmacy students to develop collaborative practice skills through shared clinical experiences and simulation-based training

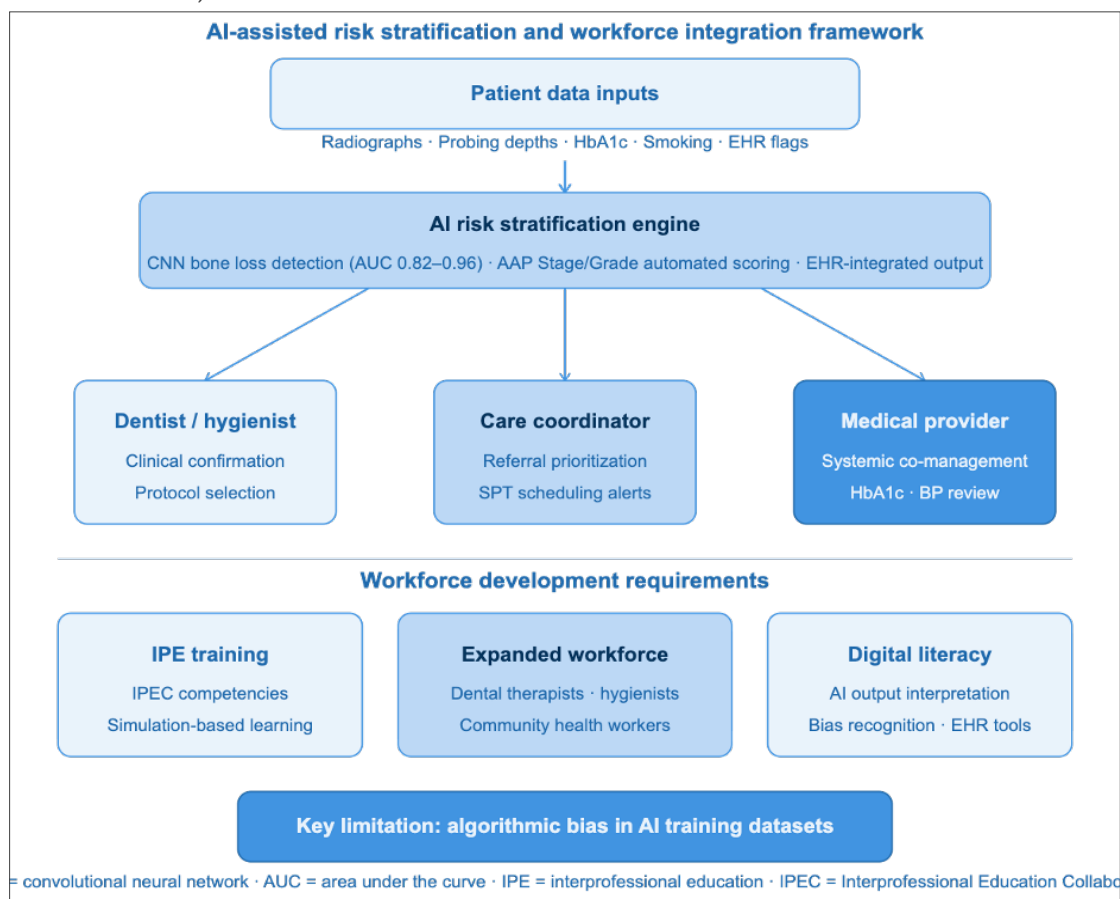


Figure 7. AI-assisted periodontal risk stratification and workforce integration framework. CNN = convolutional neural network; AUC = area under the curve; IPE = interprofessional education; IPEC = Interprofessional Education Collaborative. [35–41, 47]

[39,45]. Expanded-function dental therapists and advanced dental hygienists, operating under collaborative practice agreements in states that authorize these roles, have demonstrated effectiveness in delivering preventive periodontal services and systemic disease screening in community health settings, addressing workforce shortages that dentists alone cannot resolve [46]. Digital literacy training for AI-assisted diagnostic tools must be incorporated into both pre-doctoral and continuing education curricula, with particular emphasis on the ethical interpretation of algorithmic outputs, recognition of model limitations, and maintenance of clinical judgment [47].

Policy and reimbursement reform constitute the enabling infrastructure for sustainable integration at scale [48]. Current dental Medicaid reimbursement rates average 40–60% of private sector fees in most states, creating a persistent financial deterrent for dentist participation in safety-net programs [49]. Bundled payment models

that reimburse coordinated periodontal-medical care as a single episode of chronic disease management offer a promising alternative to fee-for-service structures that reward treatment volume over preventive effectiveness [50]. Value-based care arrangements that tie reimbursement to measurable outcomes, HbA1c reduction, hospitalization prevention, medication adherence, provide financial incentives aligned with the systemic health benefits of periodontal care demonstrated in this review [6,45]. Critical research gaps include the need for large-scale randomized trials evaluating integrated care models on hard cardiovascular and glycemic endpoints, implementation science studies examining FQHC integration program fidelity and scalability, and health economics analyses quantifying the downstream medical cost savings attributable to preventive periodontal care (Figure 7), (Table 5).[51].

Table 5. Critical research gaps and policy recommendations for integrated periodontal–systemic care. MACE = major adverse cardiovascular events; PCORI = Patient-Centered Outcomes Research Institute; CMS = Centers for Medicare & Medicaid Services; CODA = Commission on Dental Accreditation; ACA = Affordable Care Act. [35–41, 47]

Domain	Research gap	Policy recommendation	Priority
Clinical evidence	No large-scale RCTs with hard CV/ glycemic endpoints post-NSPT in integrated settings	Fund PCORI/NIH trials with diverse populations, hard endpoints (MACE, HbA1c ≤7%), ≥12-month follow-up	Critical
Reimbursement	No validated bundled payment for periodontal-medical co-management; Medicaid rates 40–60% of private	Pilot bundled Medicaid periodontal codes; tie reimbursement to systemic outcomes	Critical
AI equity	AI models trained on non-diverse datasets; minority/low-income patients underrepresented	Mandate prospective validation in diverse FQHC cohorts before clinical deployment	Critical
Implementation science	Limited fidelity/scalability data on FQHC integration; no standardized outcome reporting	National FQHC integration registry; UDS periodontal-systemic outcome metrics	High
Workforce policy	Dental therapist scope restricted in most states; IPE not mandated in CODA accreditation	Expand dental therapist licensure; integrate IPEC oral-systemic competencies into CODA	High
Health equity	Insufficient outcome data stratified by race, language, and income for AI and CHW interventions	Require race/ethnicity/language-stratified reporting in federally funded oral health integration grants	High
Health economics	Limited cost-effectiveness analyses of preventive periodontal care on downstream medical costs	Commission CMS cost-offset analyses for periodontal care savings in DM2/ CVD Medicaid populations	Moderate
Adult dental coverage	No federal mandate for adult dental as ACA essential health benefit	Amend ACA; expand Medicaid adult dental in all 50 states	Critical

CONCLUSION

This narrative review was guided by a qualitative PICO framework examining whether integrated oral–systemic care models encompassing preventive periodontal therapy, health literacy interventions, and interdisciplinary referral pathways, improve periodontal stability, systemic disease control, access to care, and health equity in underserved U.S. adults with periodontal disease and chronic systemic conditions, compared to conventional siloed dental and medical care

The evidence synthesized across all six sections converges on a consistent finding: integrated care models are superior to siloed approaches across all four outcome domains of the PICO question. With respect to periodontal stability, non-surgical periodontal therapy delivered within risk-stratified protocols achieves clinically significant reductions in probing depth, clinical attachment loss, and bleeding on probing, with Grade C patients maintained at three-month supportive periodontal therapy intervals demonstrating the greatest benefit. These periodontal outcomes are not achieved in isolation when dental and medical care remain structurally separated, as access barriers, low health literacy, and inadequate insurance coverage systematically prevent high-risk patients from receiving evidence-based care.

With respect to systemic disease control, the literature supports a modest but clinically meaningful effect of periodontal therapy on glycemic regulation, a mean HbA1c reduction of 0.36–0.40% and on cardiovascular inflammatory markers including CRP and IL-6. These effects are amplified when periodontal treatment is delivered within bidirectional referral systems that coordinate with primary care providers managing T2DM and CVD, enabling the co-management of shared inflammatory pathways that neither medical nor dental providers can address independently. The comparison outcome cannot replicate these systemic benefits because it lacks the structural mechanisms to identify, refer, and treat periodontal disease in medically complex patients before systemic inflammation escalates.

With respect to access and health equity, the evidence demonstrates that FQHC-based integration models, CHW-led outreach programs, and culturally adapted health literacy interventions collectively reduce the access gap experienced by low-income, minority, rural, and elderly populations. Community health workers and promotores de salud have been shown to increase dental utilization rates and reduce untreated disease burden in Hispanic and rural communities where professional services are geographically or culturally inaccessible. However, equity

in integrated care cannot be achieved without parallel policy reforms, including expansion of adult dental Medicaid coverage, standardization of adult dental as an essential health benefit, and equitable reimbursement rates that make FQHC dental participation financially sustainable.

Several critical limitations qualify these conclusions. The heterogeneity of integration models across FQHCs, the lack of standardized outcome reporting, and the paucity of large-scale randomized trials with hard cardiovascular and glycemic endpoints represent significant evidence gaps. AI-assisted risk stratification tools, while promising, have not yet been validated in the diverse, medically complex populations that stand to benefit most from their deployment, and algorithmic bias remains an unresolved equity concern. Future research must prioritize implementation science studies that measure integration fidelity and scalability, health economics analyses quantifying downstream medical cost offsets, and prospective AI validation studies using demographically representative cohorts

The answer to the PICO question is affirmative: integrated oral–systemic care models, when implemented with fidelity within community-based settings, demonstrate meaningful improvements in periodontal stability, systemic disease control, care access, and health equity compared to siloed conventional care. Realizing these benefits at population scale, however, requires a coordinated commitment to policy reform, workforce development, reimbursement innovation, and technology equity that extends well beyond the dental operatory into the broader architecture of U.S. health care.

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