# The Power of Prevention:

## Evidence-Based Guidelines for Self-Oral Care

### By Asia Pacific Dental Federation

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## Definition of Terms

- Antimicrobial mouthwash - a liquid oral rinse containing active ingredients clinically proven to reduce the total number of microorganisms in the oral cavity. Unlike a “cosmetic” mouthwash (which might just freshen breath with mint), an antimicrobial rinse is designed to kill or inhibit the growth of bacteria, viruses, and fungi.[1,2]
- Oral dysbiosis - an imbalance in the oral microbiome where instead of a healthy, harmonious state where “good” and “bad” microbes coexist without causing harm, dysbiosis occurs when this ecosystem shifts toward a state that promotes disease.[3]
  - *Eubiosis vs. Dysbiosis*
    - Eubiosis (Healthy State): A diverse community of over 700 species of bacteria, fungi, and viruses lives in balance. “Beneficial” bacteria keep “pathogenic” microbes in check.[3,4]
    - Dysbiosis (Diseased State): This balance is disrupted. Specific harmful species overgrow, or the overall diversity of the microbiome drops significantly.[3]

# Foreword

This white paper titled 'The Power of Prevention: Evidence-Based Guidelines for Self-Oral Care,' aims to simplify and disseminate evidence-based messages from literature and clinical practice guidelines on the role of antimicrobial and fluoride mouthwashes in driving optimal self-oral care practices.

The FDI World Dental Federation's 'Oral Health For All' mandate serves as a critical reminder of the fundamental principle that there is no health without oral health. Recent published literature increasingly defines the oral-systemic connection not just as a set of correlations, but as a complex, bidirectional relationship.[5,6] Research suggests that the oral cavity acts as a "biological hub" where local dysbiosis can trigger or exacerbate chronic inflammatory conditions throughout the body.[6]

Despite advances in oral health care, dental caries, periodontal diseases and tooth loss persist as leading public health challenges in many parts of the world including the Asia Pacific region, where access to basic dental care remains a significant struggle for many.[7,8] Considering the unique real-world challenges in the region, we hope that this white paper can not only guide oral health professionals and patients on the role of daily self-oral care practices but also help health associations and policymakers develop public health guidelines to preserve oral health for all.

- Dr. Jose Angelo Militante, Chairman, Commission of General Dental Practice,
  Asia Pacific Dental Federation

# Executive Summary

The incidence of oral diseases is increasing across the Asia Pacific region, impacting not only oral health but also overall physical, mental, and economic well-being. Despite being largely preventable, dental caries, periodontal disease and associated complications continue to impose a growing financial burden on individuals, healthcare systems and global productivity. This trajectory is unsustainable without decisive system-level action. To change this, we must shift from a predominantly curative dental care model to one that prioritizes prevention as a cornerstone of public health. Prevention of oral diseases relies on consistent self-care practices with scientifically supported recommendations tailored to individual needs.

This report—developed by the Asia Pacific Dental Federation, in consultation with six additional oral health experts from Asia—examines the substantial research on antimicrobial mouthwashes and provides an essential update to existing protocols, offering a clear framework for future clinical guidelines. We believe that by adopting an evidence-based and patient-centered approach, preventive oral health strategies can lower disease burden, enhance long-term outcomes, and support more sustainable oral healthcare throughout the life course.

## Key Takeaways

1. While the most important tools for biofilm management are regular brushing and interdental cleaning, research shows that mechanical methods can often be insufficient for some patients. Additionally, mechanical cleaning primarily targets the tooth surfaces, which account for approximately 25% of the oral cavity. The remaining 75%—including the tongue, cheeks, and floor of the mouth—can serve as microbial reservoirs that facilitate rapid recolonization of dental surfaces.
2. Substantial clinical evidence supports the adjunctive use of antimicrobial mouthwashes in the management of biofilm and gingival inflammation. Mouthwashes containing essential oils (EO), chlorhexidine gluconate (CHX) and cetylpyridinium chloride (CPC) are most commonly used, with CHX and EOs demonstrating strong clinical efficacy. When used appropriately, fluoride mouthwash can be beneficial in preventing dental caries, especially in patients that are at high risk or those that do not have access to primary fluoride therapies.
3. Clinical evidence has demonstrated that rinsing with an antimicrobial mouthwash prior to treatment reduces the level of viable bacteria recovered from dental aerosols. This supports the routine inclusion of antimicrobial mouthwashes in the dental infection control regimen to enhance the safety of the operatory environment during aerosol-generating procedures.
4. Effective oral hygiene has been associated with improved surgical outcomes by minimizing the risk of postoperative complications. Research supports the appropriate use of antimicrobial mouthwashes for infection prevention, pre- and post-surgery. Additionally, The CDC also supports the appropriate inclusion of antimicrobial mouthwashes in patients' oral care routines to aid in the prevention of non-ventilator hospital-acquired pneumonia.
5. The safety, efficacy and suitability of mouthwashes vary depending on patient age, medical status and the specific active ingredient. For these reasons, it is important to identify those clinical situations in which patients would benefit the most from the adjunctive use of antimicrobial and fluoride mouthwashes.

## Current Evidence for Adjunctive Mouthwash Use

Substantial clinical evidence supports the efficacy and safety of using antimicrobial mouthwashes as adjuncts to mechanical oral hygiene practices. Mouthwashes containing essential oils (EO), chlorhexidine gluconate (CHX) and cetylpyridinium chloride (CPC) are most commonly used and have demonstrated significant reductions in plaque and gingival inflammation.

- **Essential Oils (EO):** In a randomized controlled trial (RCT), combining an EO mouthwash with mechanical cleaning (brushing and flossing) outperformed brushing alone, reducing interproximal plaque by 30.8%, gingivitis by 39%, and gingival bleeding by 67.8%.[9] Similarly, findings in systematic reviews and meta-analyses have found that EO mouthwashes are clinically efficacious in reducing gingival index, bleeding and overall plaque levels.[10] EOs penetrate deep into dental biofilms, disrupting bacteria by perforating cell membranes, denaturing proteins, and inactivating enzymes. Additionally, EO-based mouthwashes are more appropriate for long-term daily use than CHX due to their strong efficacy and lack of significant side effects (e.g., tooth staining, taste alteration and increased calculus formation).[11,12]

- **Chlorhexidine (CHX):** Formulations with concentrations greater than or equal to 0.12% are highly effective for oral biofilm control.[13] Systematic reviews report reductions in plaque index of up to 33–45% and reductions in gingival inflammation by 26–36% compared to placebo or control.[10,11] Evidence supports their use for prevention of gingivitis and as part of supportive periodontal therapy, though adverse effects (e.g., tooth staining in up to 50% of users and taste alteration in 5–15%) limit prolonged use.[13]

- **Cetylpyridinium Chloride (CPC):** Efficacy is notable at concentrations exceeding 0.05%.[10] Meta-analyses show that CPC mouthwashes (>0.05%) provide a moderate but statistically significant reduction in dental plaque (15–24%) and gingivitis (approximately 16%) compared to placebo.[10] While less potent than CHX, CPC is associated with a more favourable safety profile and can be recommended for long-term prevention of oral diseases, especially in individuals at risk of plaque accumulation.[10]

## Biofilm Control

Effective control of oral biofilm is a key factor in preventing oral diseases such as gingivitis and periodontitis, as well as managing certain systemic conditions.[14] The makeup of a biofilm's microbial population does not remain stable over time. Oral dysbiosis (an imbalance or disruption in this community) is associated with a shift from a eubiotic to a pathogenic microbial community. This pathogenic microbial shift triggers a localized inflammatory response that can contribute to low-grade systemic inflammation. This microbial shift and elevated inflammatory burden increases the risk of several systemic conditions like cardiovascular disease,[15] diabetes[16,17] and hospital-acquired pneumonia[18] (in addition to established oral diseases such as dental caries and periodontitis). This profound "oral–systemic axis" has catalyzed a surge in multidisciplinary research, shifting the clinical focus toward the oral microbiome as a predictive biomarker. As a result, the medical community is increasingly investigating "precision dentistry" and targeted antimicrobial therapies not just to save teeth and gums, but as a potential preventive strategy for life-threatening systemic pathologies.

The European Federation of Periodontology (EFP) clinical practice guideline states that biofilm control is critical because mature dental biofilms are highly resistant to mechanical removal and can quickly recolonize tooth surfaces after brushing.[19] While effective toothbrushing and interdental cleaning are essential to biofilm management, research shows that adding an antimicrobial mouthwash as an adjunct to mechanical cleaning provides statistically significant reductions in plaque and gingival inflammation vs. mechanical methods alone.[20-23] Studies demonstrate that when used appropriately, these mouthwashes can not only decrease plaque mass but also alter the composition of the biofilm, with an overall reduction in bacterial growth and species diversity, resulting in a microbial community that may be less conducive to disease.[24]

The ability of antimicrobial mouthwashes to significantly reduce plaque bacteria, including those specifically associated with gingivitis and periodontitis, provides a clinical benefit that mechanical cleaning alone may not achieve.[23] By establishing a healthier ecological balance in the oral cavity, antimicrobial mouthwashes can serve as an additional tool for maintaining optimum oral health, especially in patients that are unable to achieve this via mechanical methods alone.

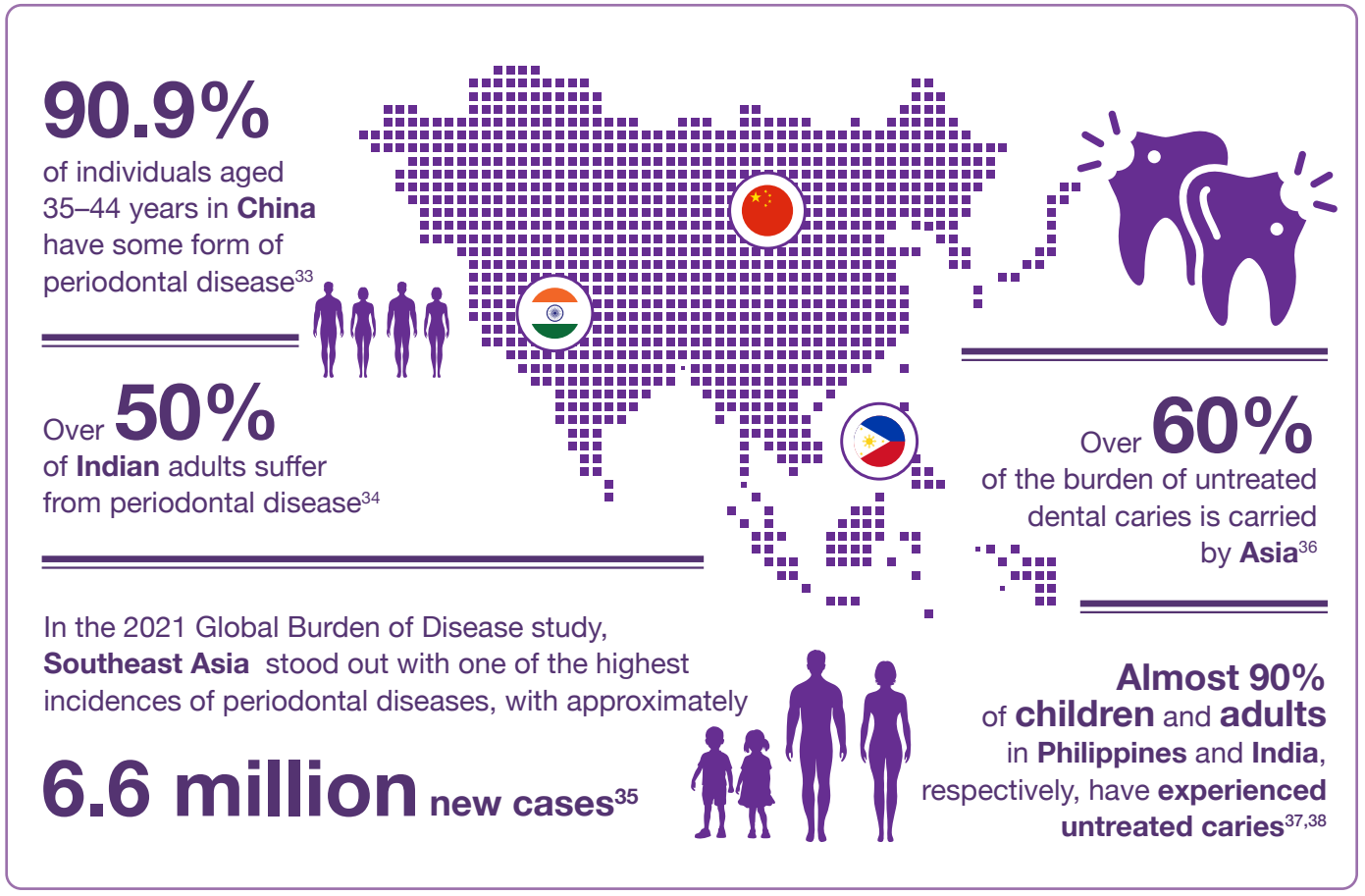
## Management of Gingivitis

In the management of gingivitis, scientific evidence supports combining mechanical plaque control with adjunctive chemotherapeutic agents.[25] While mechanical brushing and interdental cleaning are the gold standards, epidemiological data indicates that gingivitis remains prevalent in a significant majority of the global population. Research shows that these mechanical methods alone are often insufficient to prevent the onset or recurrence of gingivitis.[26]

Research shows that the adjunctive use of chemical antiplaque agents—delivered via mouthwashes or dentifrices—demonstrates statistically significant improvements in plaque indices, gingival inflammation and bleeding compared to mechanical methods alone, over a minimum of 6 months.[26-29]

## Management of Periodontitis

Management of periodontitis is an important aspect of maintaining oral and systemic health, with effective management involving a continuum of care that spans primary prevention, ongoing maintenance and professional intervention. The hallmark of primary prevention of periodontitis is the effective management of gingivitis to prevent its progression. Limited, but statistically significant and clinically relevant research has shown that the adjunctive use of antimicrobial mouthwashes can help to control gingival inflammation as part of periodontal maintenance.[19] Research has also shown that the adjunctive use of antimicrobial mouthwashes with subgingival instrumentation may help reduce probing depths and bleeding on probing.[26,30] Additionally, post-surgery, when patients struggle to brush the operative site appropriately, antimicrobial mouthwashes may be considered as adjuncts to help improve wound healing and treatment outcomes.[31,32]




*Across Asia Pacific, oral diseases—including periodontitis, gingivitis, and dental caries—continue to pose a significant public health burden. These data highlight the urgent need for stronger prevention, early detection, and sustained oral care interventions.*

## Prevention of Dental Caries

In the Asia Pacific region, the prevalence of dental caries is significantly higher than the global average, with reports indicating that Asia carries more than 60% of the global burden of untreated dental caries.[36] In many Asian nations, the prevalence of dental caries is estimated to be between 43.8% and 90%. For example, recent data from Philippines and India suggests that nearly 90% of children and adults, respectively, have experienced or currently have untreated cavities.[37,38]

A review of 37 studies[39] confirmed that regular, supervised application of fluoride mouthwash can effectively lower the incidence of dental caries among young populations. Aggregation of data from 35 of these studies indicates that use of fluoride mouthwash results in a 27% average decrease in the number of decayed, missing or filled surfaces compared to placebo or no mouthwash. This advantage is conferred, despite use of fluoride-enriched toothpaste or residing in areas with fluoridated water supply. The applications for fluoride mouthwashes are included in the WHO Essential Medicines list, further supporting their effectiveness and safety in preventing dental caries.[40]

These benefits are most pronounced when fluoride mouthwashes are used as an adjunct to regular toothbrushing, particularly in individuals at elevated risk of caries or in populations with limited access to fluoridated water.[17,38] In regions such as Asia Pacific, where the burden of untreated dental caries remains disproportionately high,[36] a broader application of fluoride mouthwashes may be justified as part of a comprehensive, population-based preventive strategy. However, their use should complement, not replace, established primary preventive measures such as fluoridated toothpaste, healthy eating habits and oral health education.[25,26] It is also important to highlight that to maximize the benefit of fluoride toothpaste, individuals should be advised to spit without rinsing with water immediately after brushing to maintain fluoride availability. To further improve fluoride availability, using a fluoride mouthwash has been shown to support the bioavailability of fluoride in the oral cavity.[41]

## Pre-procedural Rinsing (PPR) for Infection Control

PPR is a critical component of infection control in dental practice, specifically aimed at preventing infection by dental aerosols. It is widely recognized that oral bacteria are aerosolized during procedures involving high-speed devices, such as ultrasonic scalers and air turbine handpieces. These aerosols can facilitate cross-contamination in the dental office and pose a potential risk of infectious agent transmission to both patients and dental professionals.[42,43]

Clinical evidence has demonstrated that rinsing with an antimicrobial mouthwash prior to treatment significantly reduces the level of viable bacteria recovered from dental aerosols.[44] A variety of antimicrobial mouthwashes have been studied for their efficacy as pre-procedural mouthwashes, including EOs, CHX,[45] CPC and povidone-iodine (PVP-I).[46] The effectiveness of combining pre-procedural mouthwashes with other infection control strategies has also been investigated. Supporting this, a recent meta-analysis found that

pre-procedural antimicrobial mouthwashes reduced bacterial contamination in dental aerosols by an average of 64%, with CHX and EO mouthwashes demonstrating the highest efficacy.[43] In a double-blind, controlled clinical trial, pre-procedural rinsing with an EO mouthwash produced a 94.1% reduction in recoverable colony-forming units (CFUs) of bacteria during ultrasonic scaling compared to an unrinsed control. This reduction was statistically superior to a hydroalcohol control rinse—which provided only a 33.9% reduction—confirming that the effect is driven by the antimicrobial activity of the active ingredients rather than by mechanical rinsing. Furthermore, the antimicrobial benefit of PPR is sustained throughout the duration of a typical dental visit. Research using a simulated office visit model showed that the reduction in aerosolized bacteria remains remarkably consistent over time, with 92.1% immediately after rinsing and 91.3% 40 minutes post-rinsing.[47]

This long-lasting efficacy provides clinical support for the routine inclusion of antimicrobial mouthwashes in the dental infection control regimen to enhance the safety of the operatory environment during aerosol-generating procedures.

## Antiviral Efficacy of Antimicrobial Mouthwashes

In dental practice, managing viral load in saliva is a critical safety measure to reduce the risk of cross-contamination and airborne transmission of pathogens.[46] Research on the antiviral efficacy of mouthwashes has surged in recent years, particularly in response to the COVID-19 pandemic. Current clinical evidence suggests that while several active ingredients can significantly reduce the viral load in the mouth,[46,48] this effect is often transient and its impact on preventing person-to-person transmission is still being debated. The strongest consensus for pre-procedural antiviral mouthwash use is in dental clinics.[48,49] Research consistently highlights that mouthwashes are not a “cure” or a permanent shield. The reduction in viral load typically lasts between 30 minutes and a few hours. Because the body continuously produces new saliva and

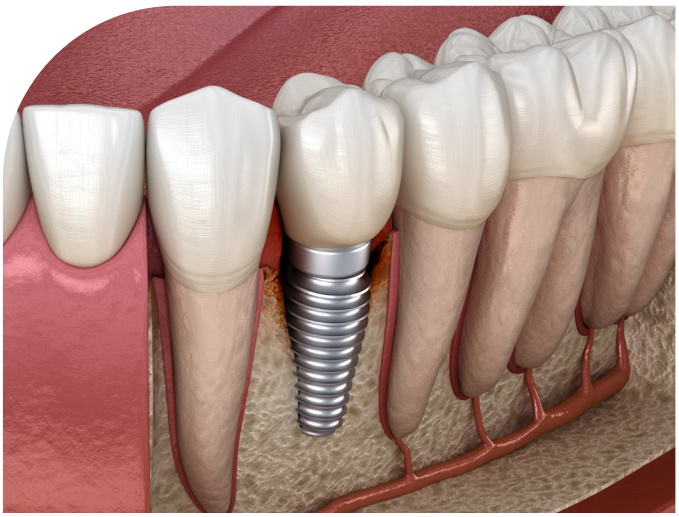
viruses are shed from the throat and lungs, the “clean” window is narrow.[50] However, systematic reviews confirm that pre-procedural rinsing significantly reduces the number of CFUs and viral RNA levels in aerosols generated during dental work, protecting healthcare workers.[43,49]

## Wound Healing – Soft Tissue and Bone

Effective oral hygiene has been associated with improved surgical outcomes by minimizing the risk of postoperative complications such as surgical site infection and delayed wound healing.[31,51] Studies have shown that the use of antimicrobials such as CHX mouthwashes can significantly reduce the incidence of postoperative complications including surgical site infections, and reduce the risk of alveolar osteitis and other infections after dental extractions.[51,52] However, multiple studies also show that CHX can be toxic to human fibroblasts. While an excellent antiseptic, CHX does not distinguish between bacterial cells and human cells (like fibroblasts and osteoblasts).[53-55] Cytotoxic effects were observed in higher concentrations, particularly after longer exposure times and it is advisable that clinicians should limit its use to carefully selected clinical situations to avoid impairing tissue healing.[54]
A study comparing the effects of EOs and CHX mouthwashes on gingival fibroblasts and migration found that while undiluted versions of both killed cells, diluted EOs did not reduce cell migration whereas similar dilutions of CHX significantly reduced both migration and long-term survival of human gingival fibroblasts.[31]

## Management of Mucositis and Peri-Implantitis

With the increase in use of dental implants, diseases such as mucositis and peri-implantitis likewise increased, requiring management strategies applied at different stages.[57] Across in vivo and clinical review evidence,[56-58] antimicrobial agents demonstrate a significant reduction in total bacterial load on the implant surface. Reducing biofilm is clinically significant because even partial reduction can limit the progression of peri-implant disease, helping to maintain implant health and thereby enhancing long-term treatment outcomes.[56]



A 3-month, double-blind, RCT involving 20 patients with at least two dental implants showed a statistically significant reduction in plaque of 53.7% among individuals who used an EO-based antimicrobial mouthwash compared to the placebo group.[57] Additionally, there was a 34.2% reduction in peri-mucositis compared to the control group. These findings support the conclusion that such antimicrobial agents can be considered as adjunctive tools for maintaining the health of peri-implant tissues.[57]

A consensus review concluded that CHX and EO-based mouthwashes have the strongest clinical evidence for efficacy against peri-implant biofilms when used as adjuncts to mechanical plaque control.[58] CHX has been shown to reduce biofilm buildup in approximately 60% of cases and decrease peri-mucositis severity in 50–80% of cases.[58] Essential oil rinses can delay formation of biofilms in nearly 45–56% of cases. These agents show a reduction of established biofilms

by 39–48% and can lower the incidence of peri-mucositis by up to 59%.[58]

It is important to note that while data shows that mouthwashes are effective at reducing peri-implant mucositis (reversible gum inflammation), there is insufficient evidence to show that this translates to the prevention of peri-implantitis (irreversible bone loss).[58] More long-term RCTs are specifically required to see if daily mouthwash use over 5–10 years actually reduces the incidence of bone loss.

## Safety

Research has shown that antimicrobial mouthwashes are generally safe and effective when used as recommended for appropriate indications.[59] However, prolonged use without a clear clinical indication is debatable due to limited evidence. Comprehensive reviews evaluated by the American Dental Association confirm the safety of approved antimicrobial mouthwashes, including CHX, CPC and essential oil formulations, when used according to labelled instructions.[59] Adverse effects are predictable, dose- and duration-dependent, and largely reversible upon discontinuation.[60] Antimicrobial mouthwashes are not recommended for children under 6 years of age due to the risk of accidental ingestion and immature swallowing reflexes.

CHX mouthwashes should be prescribed only for short-term use (generally 2–4 weeks) for clearly defined indications. Prolonged use may cause tooth staining, taste alterations[8] and cytotoxicity.[61]

Research shows that EO mouthwashes are safe for long-term daily use in the management of plaque and gingivitis.[20–22,59] Clinical evidence suggests that these mouthwashes can increase salivary flow levels and maintain a safe oral pH, with no evidence of mucosal drying or tissue abnormalities.[62] While earlier observational studies suggested a possible association between alcohol-containing mouthwashes and oral cancer, current evidence does not support a causal relationship between mouthwashes containing alcohol and oral cancer or mucosal disorders.[63]

In the case of PVP-I mouthwashes, caution is advised regarding potential systemic iodine absorption in patients with thyroid disorders.[61,64,65] In high concentrations, PVP-I can also exhibit cytotoxic effects on human fibroblasts and keratinocytes.[65]

Fluoride mouthwashes are safe for routine and long-term use in adolescents,[39,40] adults,[10] and elderly patients[66] when used at recommended concentrations.

## Recommendations by Age and Special Needs

The safety and suitability of antimicrobial mouthwash use varies depending on patient age, medical status and the specific active ingredient. The following table summarizes expert recommendations for the use of mouthwashes across different patient populations and clinical scenarios. It is important to note that recommendations should be guided primarily by clinical indication and individual risk assessment; the age-based categories below are provided for general orientation only.

**Legend:**
✓ low recommendation ✓✓ medium recommendation ✓✓✓ high recommendation

| | Necessary Self Care | Fluoride Mouthwash | Antibacterial Mouthwash | Moisturizing Mouthwash | Mouthwash that prevents bad breath | Mouthwash that prevents Calculus formation |
|---|---|---|---|---|---|---|
| School-Age (6+) | Caries prevention | ✓✓ | ✓ | | | |
| Adolescence | Caries prevention, periodontal health, halitosis prevention | ✓✓✓ | ✓✓ | ✓ | ✓✓ | ✓ |
| Middle-Age | Caries prevention, periodontal health | ✓✓ | ✓✓✓ | ✓✓ | ✓✓ | ✓✓ |
| Menopausal Women | Management of dry mouth, caries prevention, periodontal health | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓ | ✓✓ |
| Elderly individuals | Root caries prevention, periodontal health, management of dry mouth | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓ | ✓✓ |
| Pregnant Women | Tooth decay prevention, management of pregnancy gingivitis, periodontal health | ✓✓ | ✓✓✓ | ✓✓ | ✓✓ | ✓ |
| Care dependent individuals (Oral care given by a care giver) | Caries prevention, periodontal health, management of dry mouth | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ |
| Orthodontic Patients | Caries prevention, periodontal health | ✓✓✓ | ✓✓✓ | ✓ | ✓✓ | ✓✓ |
| Smokers | Periodontal health, delayed wound healing | ✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ |
| Patients with diabetes | Periodontal health, delayed wound healing, management of dry mouth | ✓✓ | ✓✓✓ | ✓✓✓ | ✓✓✓ | ✓✓ |
| Polypharmacy patients | Medication-induced xerostomia, periodontal health, caries prevention | ✓✓✓ | ✓✓ | ✓✓✓ | ✓✓✓ | ✓✓ |

All recommendations should be tailored based on individual assessment, professional guidance, and risk-benefit considerations.

# Global Health Authority Recommendations

## European Federation of Periodontology (EFP)[19]

- Emphasize personalized oral hygiene strategies and highlight the role of chemical plaque control in reducing inflammation and disease progression.
- Support the adjunctive use of antimicrobial mouthwashes, such as those containing EOs, CHX or CPC for the control of gingival inflammation in patients with periodontitis in supportive periodontal care.
- Mouthwashes are particularly recommended for patients with periodontitis or who have compromised manual dexterity or other barriers to ensure mechanical plaque control.

## American Academy of Periodontology (AAP)[67]

- Support the use of adjunctive chemotherapeutic agents as part of periodontal therapy to reduce, eliminate or change the quality of microbial pathogens.
- Recommend mechanical tooth cleaning to disrupt or remove dental plaque and biofilms, with local or systemic chemotherapeutic agents used as adjunctive treatment for recurrent or refractory disease.
- Emphasize the importance of integrating adjunctive mouthwashes into a structured periodontal treatment protocol, tailored to individual patient risk profiles and disease severity.

## American Dental Association (ADA)[68]

- Recommend twice-daily brushing with a fluoride toothpaste and daily interdental cleaning for all patients, and adjunctive mouthwash for patients who may be at elevated risk for caries and/or gingivitis.
- Specifically recognize the benefit of antimicrobial mouthwashes with EOs or CPC in reducing the risk of gingivitis and periodontal disease.
- Advocate using products with the ADA Seal of Acceptance as these products have undergone rigorous evaluation for safety and efficacy.

## International Diabetes Federation[17]

- It is recommended that patients with diabetes perform proper oral hygiene at home, which includes brushing with or without toothpaste, flossing and/or mouthwashes, to remove plaque.
- Patients with diabetes were also advised to attend a dental professional regularly for oral health check-ups.

## National Health Service (NHS)[69]

- The NHS recommends mouthwashes as a possible adjunct to daily oral hygiene routines, particularly for individuals at high risk of oral disease.
- The NHS advises that using a fluoride mouthwash can prevent dental caries. It is suggested to use a fluoride mouthwash at a different time of day from brushing to avoid rinsing away fluoride from toothpaste. It is additionally recommended to not eat or drink 30 minutes after using a fluoride mouthwash.
- The NHS provides guidance on the use of fluoride and antimicrobial mouthwashes for specific patient groups, such as those with periodontal disease or recurrent dental caries.

## US Centers for Disease Control and Prevention (CDC)[70,71]

- The CDC acknowledges the use of antimicrobial mouthwashes as part of PPR in dental offices, noting that rinsing can reduce oral microorganisms in aerosols generated during dental procedures, although there is no conclusive evidence that this practice alone prevents clinical infections among dental personnel or patients.
- The CDC advises health care professionals in their “Oral Health in Healthcare Settings to Prevent Pneumonia” toolkit to appropriately include alcohol-free mouthwashes in patients’ oral care routines for the prevention of non-ventilator healthcare-acquired pneumonia (NV-HAP).

## World Health Organization (WHO)[7]

- The WHO provides specific recommendations for mouthwashes, primarily focusing on their role as preventive adjuncts for high-risk populations rather than a replacement for mechanical brushing.
- The WHO’s stance is integrated into its Model List of Essential Medicines and the Global Oral Health Action Plan (2023–2030). Fluoride mouthwash is specifically highlighted in this list as a highly-effective caries-preventive agent and is recommended for use as part of self-care in the community and in clinical settings.

# Clinical Questions on the Use of Antimicrobial Mouthwashes

1. **Should antimicrobial mouthwashes be recommended as adjuncts to mechanical biofilm control for the general population?**

   The most important tools for biofilm management are regular brushing and interdental cleaning. However, research shows that mechanical methods are often insufficient to manage biofilm and reverse gingivitis,[20] which increases the risk for the development of oral diseases (periodontal diseases and caries), especially in susceptible populations.[10] While it can be argued that the general population may benefit from the use of antimicrobial mouthwash as adjuncts to mechanical biofilm removal (especially taking into account the limitations of self-performed mechanical oral hygiene in biofilm removal, and the high prevalence of caries and periodontal disease in Asia) it is important to keep individual patient, local and general factors in mind along with possible side effects like added cost and other individual needs. For these reasons, it is important to identify those clinical situations in which patients would benefit the most from the adjunctive use of antimicrobial mouthwashes.

2. **Do the preventive effects of biofilm formation and gingival inflammation increase by adding mouthwash to brushing and flossing? What are the benefits?**

   Large-scale meta-analyses[10,20,22,72] have shown that adding antimicrobial mouthwashes can lead to a 25–50% greater reduction in plaque scores over 6 months compared to brushing and flossing alone. Inflammation markers (bleeding on probing) typically show a 15–30% greater improvement when a therapeutic mouthwash is used as a third step. It is also important to note that brushing and flossing target only the teeth, which account for roughly 25% of the mouth's surface area.[73] The remaining 75% (tongue, cheeks and floor of the mouth) can act as a microbial reservoir facilitating the rapid recolonization of tooth surfaces following mechanical cleaning. As a liquid, mouthwashes can access hard-to-reach areas of the mouth such as the areas behind the last molars or deep fissures via hydraulic action, delivering antibacterial agents to sites that mechanical tools might miss.

3. **Are antimicrobial mouthwashes indicated in the management of periodontal diseases?**

   According to the European Federation of Periodontology S3-level Clinical Practice Guideline,[19] antimicrobial mouthwashes may be used as adjuncts in the management of periodontitis as part of active non-surgical periodontal therapy. In patients with a history of periodontitis, antimicrobial mouthwashes may contribute to secondary prevention by supporting plaque control and reducing gingival inflammation during the maintenance phase. However, the strength of recommendation and quality of evidence vary depending on the specific agent and clinical context. Identifying patients who require additional adjunctive care is critical and would be based on their capability, clinical signs and existing contextual risks. While guideline recommendations are not uniform, adjunctive use is suggested for additional inflammation control when combined with mechanical debridement and professional care. In regions such as the Asia Pacific, where the burden of periodontal disease is high, these adjunctive measures may have a broader role when applied judiciously within a comprehensive, risk-based treatment approach.

## 4. Can antimicrobial mouthwashes be used pre- and post-surgically/hospitalization for infection prevention, and have an impact on antibiotic use?

Antimicrobial mouthwashes, such as CHX, when used appropriately can be effective when used pre- and post-surgically for infection prevention. Studies demonstrate that use of CHX mouthwashes significantly reduces the risk of postoperative infections, such as alveolar osteitis and other complications following dental procedures.[74–77] By effectively lowering the oral bacterial load before and after surgery, these mouthwashes help create a cleaner surgical environment, which supports wound healing and reduces the likelihood of infection. This reduction in infection rates can, in turn, decrease the need for systemic antibiotics in the postoperative period, as fewer patients develop complications that would require antibiotic therapy. Additionally, the CDC advises health care professionals in their "Oral Health in Healthcare Settings to Prevent Pneumonia" toolkit to appropriately include alcohol-free mouthwashes in patients' oral care routines for the prevention of NV-HAP.[72] In a four-unit cluster randomized study of over 8,000 patients, improved oral care (including the use of antimicrobial mouthwash) was associated with NV-HAP reductions of 85% in the medical intervention unit and 56% in the surgical intervention unit.[78] This finding supports previous research that showed a positive relationship between increased frequency of daily oral care and NV-HAP incidence reduction.[79] Therefore, incorporating antimicrobial mouthwashes as part of pre- and postoperative protocols not only contributes to infection prevention but may also help limit antibiotic use and the associated risk of antibiotic resistance.[52,53]

## 5. What active ingredients are available in daily use mouthwashes, and are there differences in efficacy?

Several daily use mouthwashes are categorized as therapeutic because they contain active ingredients that provide specific clinical benefits beyond just freshening breath. The effectiveness of these ingredients depends heavily on the formulation and on the patient's needs.

a. EO mouthwashes - These are highly effective at penetrating the oral biofilm.[80,81] In long-term studies[82], EO mouthwashes have shown efficacy comparable to CHX for reducing gum inflammation, but without the staining side effects.

b. CPC mouthwashes - CPC works by rupturing bacterial cell walls. While it significantly reduces plaque compared to rinsing with water alone, some meta-analyses suggest it is less effective than EOs at reducing plaque and gingivitis.[83]

c. CHX mouthwashes - While one of the most potent antimicrobial mouthwash ingredients available, they are not indicated for daily/long-term use due to potential side effects[53-55] such as tooth staining, altered taste and increased calculus buildup.[11]

d. Fluoride mouthwashes - When used appropriately, fluoride mouthwash can be beneficial to help prevent dental caries[39] especially in patients that are at high risk or those that do not have access to primary fluoride therapies.

# Call to action

This white paper outlines actionable, evidence-based recommendations that health systems, policymakers, and clinicians can adopt to embed preventive oral health practices into national health strategies. These recommendations include:

**1.** Reinforcing evidence-based oral hygiene as the foundation of preventive care. National oral health guidelines should continue to prioritize effective toothbrushing with fluoride toothpaste, interdental cleaning and—where clinical indications exist—antimicrobial or fluoride mouthwashes as adjuncts, consistent with WHO, EFP and ADA positions.

**2.** Incentivizing preventive behaviours through school-based programs, employer health initiatives, and community outreach.

**3.** Aligning reimbursement and healthcare financing mechanisms to support preventive oral care.

**4.** Implementing population-level monitoring and evaluation frameworks to track oral health outcomes and economic impact.

It is important to mention that while the scope of this white paper is predominantly focused on the role of adjunctive mouthwashes, we must remember that a comprehensive preventive framework must address the full spectrum of self-care behaviors, including modifiable risk factors shared with other non-communicable diseases such as tobacco use, high sugar intake and unhealthy diet.

**1. Tobacco cessation.** Smoking and smokeless tobacco use are among the strongest modifiable risk factors for periodontal disease, oral cancer, impaired wound healing and implant failure. Oral health professionals must actively promote smoking cessation as part of in-clinic patient counselling.

**2. Dietary sugar reduction.** The WHO recommends limiting free sugar intake to below 10% of total energy intake, with further reduction to below 5% for additional health benefits.[84]

**3. Health literacy and life-course approach.** The Global Self-Care Federation[85] and WHO frameworks[7] both advocate a life-course approach to oral health that recognizes different needs at different life stages. Patient education and self-care recommendations should be modified according to the broader behavioral, environmental and age-related factors that determine oral health outcomes.

By adopting these measures, APAC health systems can meaningfully reduce the burden of oral diseases, improve population well-being, and realize long-term cost savings—while empowering individuals with the simple, proven behaviours needed to maintain lifelong oral health.

# Statement of Conflict of Interest

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As is common in oral care research, some of the clinical trials cited in this paper were funded by product manufacturers. This is disclosed for transparency and does not imply bias in the findings.

# Legal Disclaimer

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This publication is not issued for or on behalf of any other local or international organization, institution, or entity. APDF assumes sole responsibility for the contents, conclusions, and recommendations contained herein.

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