LEADING THE WORLD TO OPTIMAL ORAL HEALTH

FDI World Dental Federation

FDI VISION 2030

MID-TERM SURVEY REPORT

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List of Abbreviations

Acronym	Full Term
AFT	Affordable Fluoride Toothpaste
AMR	Antimicrobial Resistance
ART	Atraumatic Restorative Treatment
AWaRe	Access, Watch, Reserve (WHO antibiotic classification system)
BPOC	Basic Package of Oral Care
CDO	Chief Dental Officer
CSO	Civil Society Organization
DALY	Disability-Adjusted Life Year
FDI	FDI World Dental Federation
GDP	Gross Domestic Product
GOHAP	Global Oral Health Action Plan
HPV	Human Papillomavirus
IA2030	Immunisation Agenda 2030
IVAC	International Vaccine Access Centre
NCD	Non-Communicable Disease
NDA	National Dental Association
NGO	Non-Governmental Organization
NHS	National Health Service
PHC	Primary Health Care
SDG	Sustainable Development Goal
SSB	Sugar-Sweetened Beverage
UHC	Universal Health Coverage
UCS	Universal Coverage Scheme
WHO	World Health Organization
WHA	World Health Assembly
WHA74.5	World Health Assembly Resolution 74.5 on Oral Health

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Executive Summary

This report consolidates the findings of the FDI Vision 2030 Mid-Term Survey to guide priorities for the remainder of the decade, assess progress since the 2021 baseline survey, and identify areas where conditions for implementation are still lacking or inconsistent across different regions.

The FDI Vision 2030 Mid-Term Survey collected data from National Dental Associations worldwide to benchmark progress on Vision 2030 goals. It covered various themes in alignment with the priorities set by World Health Organization such as governance, financing, service integration, risk factors, surveillance, and stewardship. The 2025 survey (conducted online in English/French/Spanish) received 88 responses and was analysed alongside data from Vision 2030 baseline survey and external evidence to offer a practical perspective rather than internal comparisons.

Key Findings

- **Strong interest, fragile execution.** 69.5% countries reported having a national Chief Dental Officer or equivalent, and 70.7% have a national oral health policy (up from 61.1% in 2021). However, only 61% say their policy is publicly available, and only 59.3% have integrated oral health into a broader health plan.
- **Financing lags: prevention underfunded.** Public schemes pay for dentistry in only ~50.6% of countries; 15.2% have no formal support. Even where schemes exist, they often target subgroups: 44% provide for selected groups vs. 42% universal. Regionally, Europe more often covers the whole population (58% report universal reimbursement) while 83% of African countries cover only selected groups. Preventive services are inconsistently funded.
- **Equity governance for vulnerable populations is the weak link.** Only about 50% countries have a policy for refugees/displaced persons, and 34.7% respondents were unaware if oral health is included. Asia-Pacific notably has only 27% policy coverage for displaced populations (and 53% “no”/“don’t know”), compared to Europe/Africa (~56–62%) and Latin America (56%).
- **PHC integration is high on services, low on policy.** 82.4% countries have publicly funded dental services available at primary care facilities, and ~90% report basic preventive/urgent services (hygiene advice, extractions) at PHC. Only 46.6% have national policies enabling non-dental providers to deliver oral health interventions (48.9% do not). Notably, Europe and Asia-Pacific are more likely to lack such policies, whereas Africa and Latin America more often have supportive task-sharing programmes. This suggests high-level policy inertia in some regions despite frontline service availability.
- **Workforce imbalances persist.** Three-quarters of dentists are in urban areas (67.9% on average), with only ~25.2% in rural areas. Dentist density ranges from ~5.91 per 10,000 in Europe to only ~0.44 per 10,000 in Africa. These stark disparities mean “integration into PHC” still largely benefits urban populations.
- **Robust risk factor policies, but uneven in nature.** Compared to 2021, far more countries report sugar reduction strategies (64.8% in 2025 vs. 33.3% at baseline). The

most common measures remain public education (66.1%), taxation of sugary drinks (50.8%), and warning labels (49.2%). Latin America shows particularly strong system-level action (69.2% have policies, 61.5% use front-of-pack warnings). Africa (53.3%) and Asia-Pacific (53.3%) lag Europe (71.8%) and North America (66.7%).

- **Clinical prevention growing but under-supported.** Tobacco cessation advice in dental settings now exists in 64.7% of countries (vs. 41.7% at baseline), but only 24.5% reimburse dentists for it. Alcohol/substance misuse interventions are much rarer (25.4% of countries, up from 18.3%), with just 18.8% reimbursing them. Regionally, Europe and Asia-Pacific countries reported to have most cessation programmes; Latin America and Africa report far fewer.
- **Fluoride debates are alive in policy.** 40.5% of respondents say fluoride safety is *contested* in their country. Among these, 51.9% report community water fluoridation is under discussion and 40.7% report topical fluorides under consideration. Regional differences are clear: Latin America sees higher public debate, Asia-Pacific is split, whereas North America mostly reports fluoride safety as *not* contested.
- **EU/Minamata drives are forcing action.** Most countries report moves to phase down amalgam (86.5% aware of Minamata rules, 79.7% moving away from amalgam). For example, EU Regulation 2024/1849 (effective Jan 2025) will ban most amalgam use; Minamata Annex A requires setting national targets to minimise caries (reducing need for fillings) and training on alternatives.
- **Data systems are nascent.** Stand-alone oral health surveys exist in only ~31% of countries. While 54.9% conduct national health surveys, only 63.8% of those include oral health indicators. Nearly half (47.9%) have *no* national electronic dental record system, and only ~10% have fully integrated medical–dental EHRs. Standalone health surveys are reported by 50% of African respondents vs. 20% in North America, and integration of oral health in surveys ranges from 56% in Europe to 83% in Latin America.
- **AMR stewardship in dentistry is weak.** Most countries have general antibiotic guidelines (71.4%) and dental infection treatment protocols (73.2%), but only 31.4% collect national data on dentists' antibiotic prescriptions. Europe/North America rate antimicrobial resistance higher than other regions, implying global AMR plans (WHO 2015) need stronger dental engagement.

Strategic Implications and Risks

- **Policy-to-implementation gap.** Global declarations have set high expectations, but leadership and accountability are stagnant. The flat trend in national oral health leadership suggests many countries are trying to integrate oral health *without building institutional capacity*. Without dedicated champions and funding, piecemeal adoption will persist rather than systemic reform.
- **Equity as a fault line.** Disparities in displaced-person and rural coverage mean "no one left behind" may become mere rhetoric. If NDAs and ministries do not explicitly prioritize migrants and underserved areas, oral health initiatives could exacerbate existing inequalities, undermining UHC credibility.

- **Financial protection shortfall.** Predominant funding of surgical/remedial care over prevention risks entrenched costs. Many patients still pay out-of-pocket or have limited coverage, making dentistry a potential driver of catastrophic spending. The Bangkok Declaration's call for "essential oral care" in UHC is thus only half-met if preventive services are patchy.
- **Missed opportunities for integrated prevention.** Poor uptake of tobacco/alcohol cessation and oral health in HPV programmes implies NDAs are not fully leveraging broader health initiatives. This disconnection hampers synergistic benefits of NCD control and cancer prevention strategies.
- **Sustainability and compliance pressures.** EU amalgam ban (2025) and Minamata obligations put transitioning to mercury-free dentistry on a strict deadline. Similarly, global AMR targets (e.g. UN political declarations) will demand better engagement from the fraternity.

Recommendations

- **Build accountability for delivery:** Establish simple performance dashboards (leadership presence, policy publication, UHC coverage, equity metrics) that can be measured periodically.
- **Advocate for embedding equity in every plan:** Develop model policies for vulnerable populations (entitlements, referral schemes).
- **Reorient financing toward prevention:** Advocate inclusion of core preventive services (fluoride, counselling) in benefit packages.
- **Scale up PHC task-sharing:** Where missing, enable nurses/community workers to provide screening/advice.
- **Invest in oral health data:** Work with Ministries to add dental modules to national surveys and implement basic electronic records.
- **Proactively manage AMR & amalgam:** Introduce dental antibiotic audit programmes (align with WHO AMR plan) and ensure timely training/equipment for mercury-free restorations.

Chapter 1

Introduction and Respondent Profile

Context and Purpose

FDI Vision 2030 provides a strategic policy roadmap to deliver “optimal oral health for all” by 2030, explicitly framed as a guide for translating ambition into policy architecture and action across the oral health community, including dental professionals, educators, professional bodies, policymakers and member organisations.[1]

Within the Vision 2030 period, FDI has established a survey programme using its membership network to generate practice-informed intelligence on progress, implementation conditions and areas requiring additional focus. The purpose of this mid-term report is to provide an analytical overview that supports prioritisation for the remainder of the Vision 2030 window, and to help the National Dental Associations (NDAs) focus effort where it can accelerate delivery and strengthen accountability.

Policy and strategic alignment

The policy basis for renewed action is clearly articulated in the World Health Assembly resolution on oral health (WHA74.5), which situates oral health within the 2030 Agenda, explicitly referencing SDG 3 and noting linkages with other SDGs and links oral health with the universal health coverage agenda.[2]

WHO’s consolidated global strategy and action plan on oral health (2023-2030) brings together the resolution and the subsequent strategy and action plan endorsed through WHO governance processes, defining a coherent global direction for the “renewed global oral health agenda towards 2030”.[3]

Vision 2030 aligns strongly with this direction. It positions oral health within UHC and wider health and development agendas and is explicitly organised around three pillars with overarching goals that, in summary, focus on: integrating essential oral health services within healthcare and improving availability/accessibility/affordability; integrating oral and general person-centred healthcare for more effective prevention/management; and building a resilient workforce fit for purpose.

This report therefore frames survey findings not as an end in themselves, but as evidence to support alignment between professional action, national policy reform and global commitments.

Survey programme overview

FDI has implemented two survey waves during the Vision 2030 period: a baseline survey in 2021 and a mid-term survey in 2025. Together, these surveys provide a structured way to observe changes over time and to test whether the enabling conditions for implementation are strengthening across the network. The 2021 baseline also provides a point of comparison for broad patterns, while recognising that classification approaches may differ between waves.

Methodology and transparency

The 2025 mid-term questionnaire were administered online and offered in multiple languages (English, French and Spanish). The questionnaires for both waves are provided in the Appendix 1 and 2 respectively, supporting clarity, comparability and potential reuse.

Findings are presented primarily as descriptive statistics, and interpreted alongside baseline findings and external evidence to support a “real-world” reading of progress rather than a purely internal benchmarking exercise.

Respondent Profile

The survey was distributed to FDI regular members and a total of 88 responses were received.

Across organisational roles and network functions, respondents most commonly reported work in continuing education for oral health professionals (93.2%, n=82), advocacy (86.4%, n=76), and media campaigns/public awareness (84.1%, n=74). A second tier of activity includes representing/convening professionals (79.5%, n=70), technical assistance to regulatory authorities (63.6%, n=56), curriculum support (58.0%, n=51) and contribution to national oral health indicator data (52.3%, n=46). By contrast, fewer respondents reported activity in patient support/engagement (46.6%, n=41), dental research/evidence generation (43.2%, n=38) and direct provision of oral healthcare services (39.8%, n=35) (Table 1 and Figure 1). Altogether, this suggests that the network’s strength lies in professional development, advocacy, and media/public programmes, whereas its reach is relatively limited in patient engagement, evidence generation, and direct service provision.

Table 1 – Areas of work covered by members’ organisations

Primary areas of work	N*	% of respondents
Continued education for oral health professionals	82	93.2
Advocacy at the national and/or regional level	76	86.4
Media campaigns and public awareness activities	74	84.1
Representation and convening of oral health professionals	70	79.5
Technical assistance to regulatory authorities for policy formulation and implementation	56	63.6
Support development of oral health professionals’ curricula	51	58.0

Contribution to national data on oral health indicators	46	52.3
Patient support and engagement activities	41	46.6
Dental research and evidence generation	38	43.2
Direct provision of oral healthcare services (including for prevention, e.g., tobacco cessation)	35	39.8
Other	7	8.0

*Respondents could select multiple areas of work

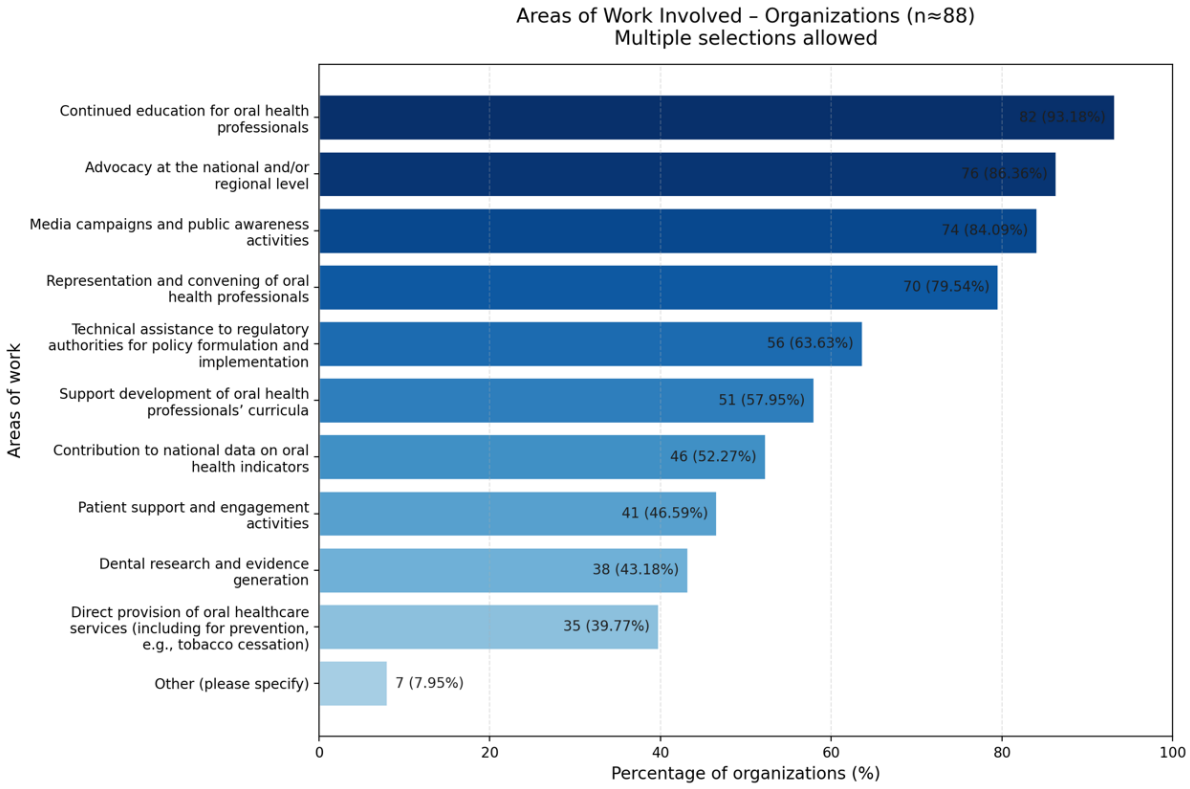


Figure 1 – Areas of work covered by members' organisations

Regional Representation and Distribution

Regionally, the responses were predominantly European. Nearly half the respondents were from Europe (44.3%), followed by Africa (17%) and the Asia Pacific (17%). There were 13 and 6 responses from Latin America and North America respectively (Table 2 and Figure 2). These findings are similar to those of the baseline survey, in which Europe was once again the most represented region (36.8%), although the baseline survey used the World Health Organisation (WHO) regional classification rather than the FDI regions used for this survey. This regional

disparity in representation is considerable; therefore, the findings should be interpreted cautiously, particularly when considering the overall narrative.

Table 2 – Regional distribution of countries with FDI regular members and survey respondents

Region	Total no. of countries with regular members in the region	Total no. of responding countries	Response rate
Africa	29	15	51.7%
Asia Pacific	36	15	41.7%
Europe	48	39	81.3%
Latin America	13	13	100.0%
North America	6	6	100.0%

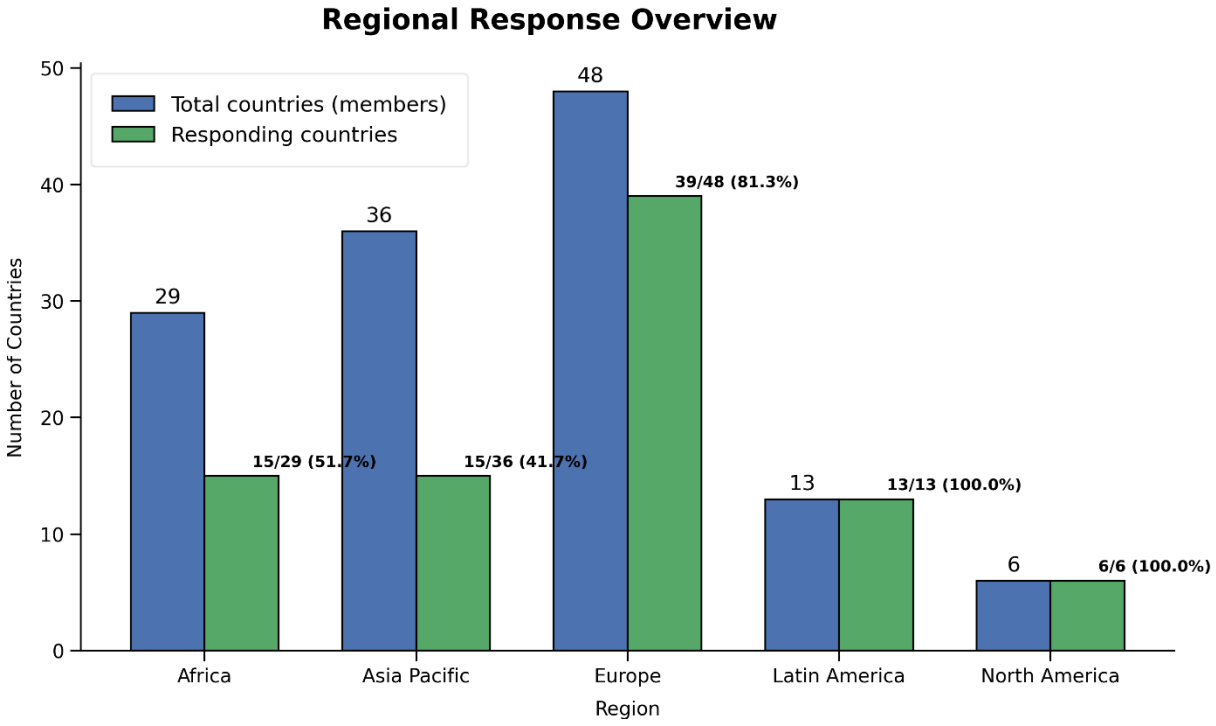


Figure 2 – Regional representation of responding countries

Chapter 2

Governance, Policy Architecture and Strategic Leadership

Key Highlights:

- 69.5% of respondents reported having a Chief Dental Officer (CDO) or equivalent national oral health leadership position, similar to the 70.8% reported at baseline.
- 70.7% of respondents reported having a national oral health policy, plan, or strategy, an increase from 61.1% at baseline.
- Among countries with national oral health leadership, 75.4% also reported having a national oral health policy, plan, or strategy.
- 61% of respondents reported that their national oral health policy, plan, or strategy is publicly available.
- 59.3% of respondents reported that oral health is addressed within a broader national health plan, policy, or strategy, compared with 56.8% at baseline.
- Half of respondents reported having a national policy or strategy for refugees and displaced persons, while 30% reported none and 20% were unsure.
- Among countries with refugee or displacement policies, over half reported that oral health services are included, while 34.7% were unsure and 8.2% reported no inclusion.
- Regionally, Europe accounted for the largest share of survey responses (44.3%), followed by Africa and Asia Pacific (17% each), Latin America (14.8%), and North America (6.8%).

FDI Vision 2030 positions integration, equity and system reform as central to delivering optimal oral health for all, with “no person left behind” as a guiding frame and explicit emphasis on integrating oral health into wider health and policy agendas.

The subsequent adoption of a global strategy and the development of the action plan culminated in WHO’s consolidated Global strategy and action plan on oral health 2023–2030, released in 2024, which WHO describes as translating global strategy into a series of 100 actions and 11 global targets for progress tracking.

This global momentum creates a governance stress test at country level. If national leadership, policy architecture, transparency, and mainstreaming are weak, then the “policy chain” (global → national → subnational → service delivery) breaks, and implementation becomes fragmented, underfunded, and inequitable.

National Oral Health Leadership and Strategic Commitment

Governance is foundational for strengthening oral health systems and for advancing toward global oral health targets. Within these targets, the WHO global strategy and action plan on oral health has mandated the establishment of a national oral health policy, strategy, and plan, as well as the appointment of dedicated oral health staff at the Ministry of Health or another national government agency.[4] It necessitates that there is a visible national oral health leadership, such as the Chief Dental Officer or an equivalent position, to help integrate oral health into national and sub-national priorities and facilitate integration in broader health agendas, such as universal health coverage and NCD prevention.[5] Within the context of FDI Vision 2030, governance findings will indicate whether oral health is institutionalised within national health priorities and whether it has its own policy architecture to improve oral health.

Visible national leadership e.g., presence of a Chief Dental Officer (CDO) or equivalent is a proxy for whether oral health is institutionally embedded within national decision-making and has a stable mechanism capable of convening cross-programme action. The mid-term survey shows that most countries have national leadership, although not universally. The majority of members (69.5%) reported having a Chief Dental Officer or equivalent position at the national level (Figure 3). A similar proportion (70.8%) reported this at baseline, suggesting that although the status of national oral health leadership has not expanded, most countries have retained oral health representation within their national leadership in recent years. Nevertheless, this is an extremely critical aspect of progressing towards the global oral health targets and requires continued effort to further establish national health leadership and to retain it where established.[5-7] Leadership presence comparison with baseline suggests stagnation rather than expansion. In a world where global oral health policy expectations have escalated since 2021, a flat leadership trend implies many countries are attempting integration and reform without strengthening the institutional platform needed to deliver it. This might lead to fragmented, underpowered implementation—especially where oral health competes with other urgent health priorities.

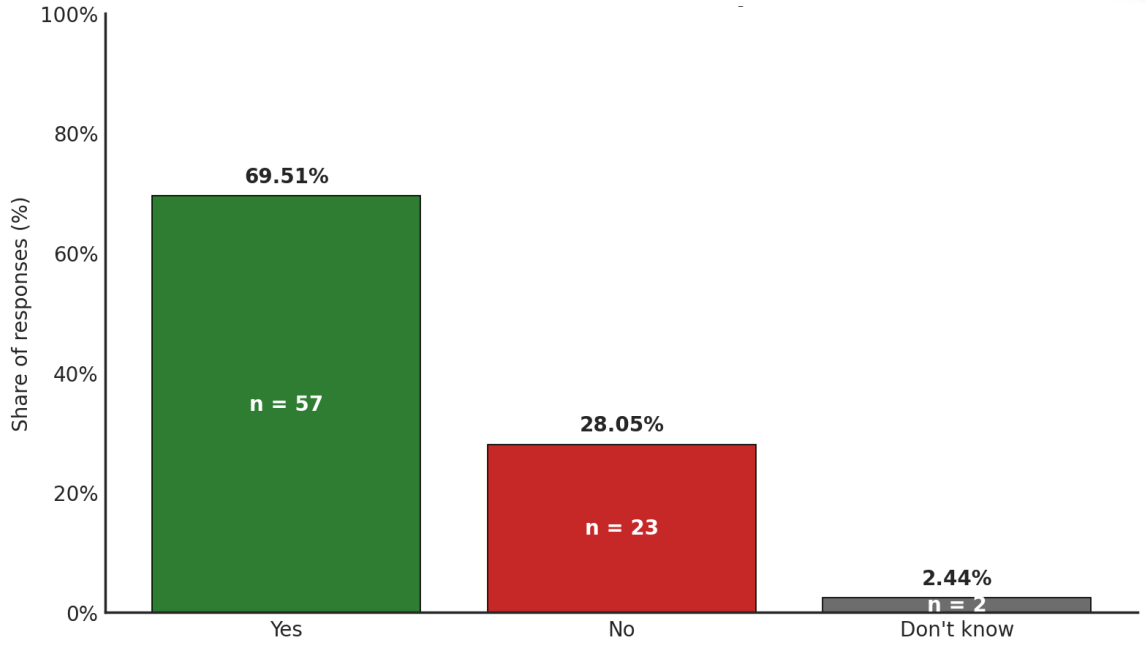


Figure 3 – Distribution of Responding Member Countries Reporting the Presence of Chief Dental Officer (CDO) or Equivalent

The significance of institutionalised oral health leadership is further reflected in the existing policy architecture; for example, having a national oral health policy, plan, or strategy. The FDI survey shows that the majority of respondents have a national oral health policy, plan, or strategy in place at mid-term (70.7%), which is up from 61.1% at baseline (Figure 4). Moreover, among countries reporting national leadership, 75.4% reported a national oral health policy, plan, or strategy. An example from Australia shows that a lack of oral health leadership is complemented by a weak policy architecture.[4] Regionally, the presence of national oral health policies is highest in North America (100%) and Europe (67%), while comparatively lower shares are observed in Latin America (58%) and Africa (69%), with some countries still lacking or uncertain about such frameworks (Figure 9). This variation highlights uneven policy development across regions, reinforcing evidence from countries such as India and Sierra Leone that leadership structures can play a critical role in advancing policy adoption.[8,9]

Nevertheless, it could also be due to momentum from the global oral health agenda, following the World Health Assembly 74.5 and the Global Strategy and Action Plan on Oral Health, which may have been further complemented by national leadership efforts.[3,9] In either case, existing policy architecture is crucial for facilitating the development of national or sub-national time-bound oral health targets that could serve as mandates for reducing national or sub-national oral disease burden.[10] A study from Kosovo highlights that a policy vacuum leads to inadequate planning and resource allocation, further contributing to oral health disparities.[11] However, existing policies do not imply effective implementation and are often affected by weak governance structures, systemic fragmentation, weak communication, and mismatched priorities.[11,12]

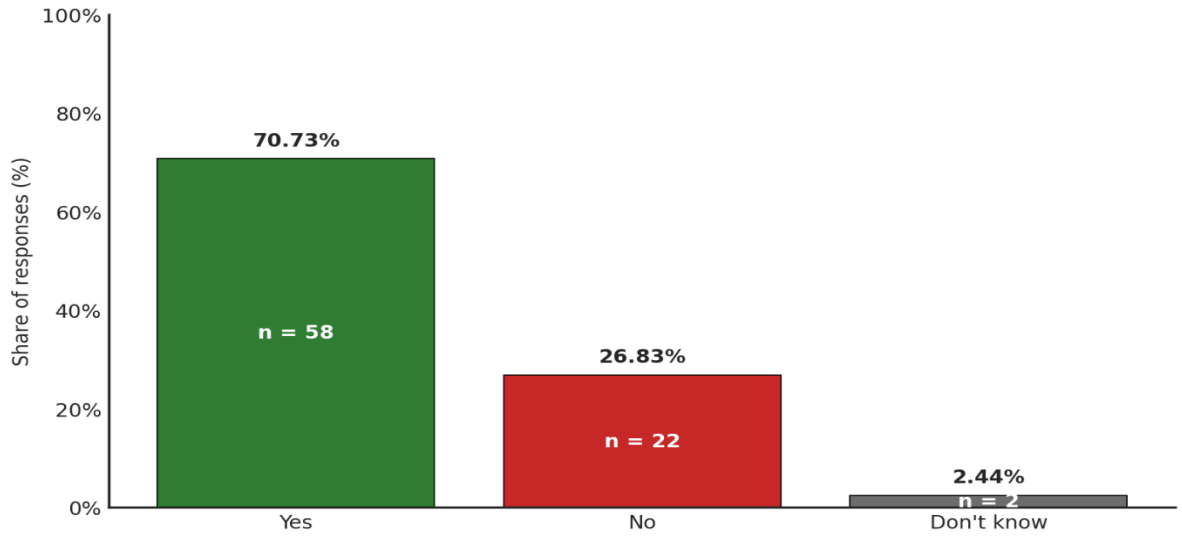


Figure 4 – Distribution of Responding Member Countries Reporting to Having a National Oral Health Policy, Plan or Strategy

At the same time, a publicly available national oral health policy, plan, or strategy can play an important role in enhancing visibility and transparency, and in enabling engagement with non-governmental organisations (NGOs), civil society organisations (CSOs), professional bodies, and researchers. However, visibility remains relatively weaker than the policy presence. The FDI survey findings show that 61% of respondents reported that their national oral health policy, plan, or strategy is publicly available (Figure 5). It suggests that in some countries, policies exist but are inaccessible, which may hinder implementation and undermine accountability.[13,14]

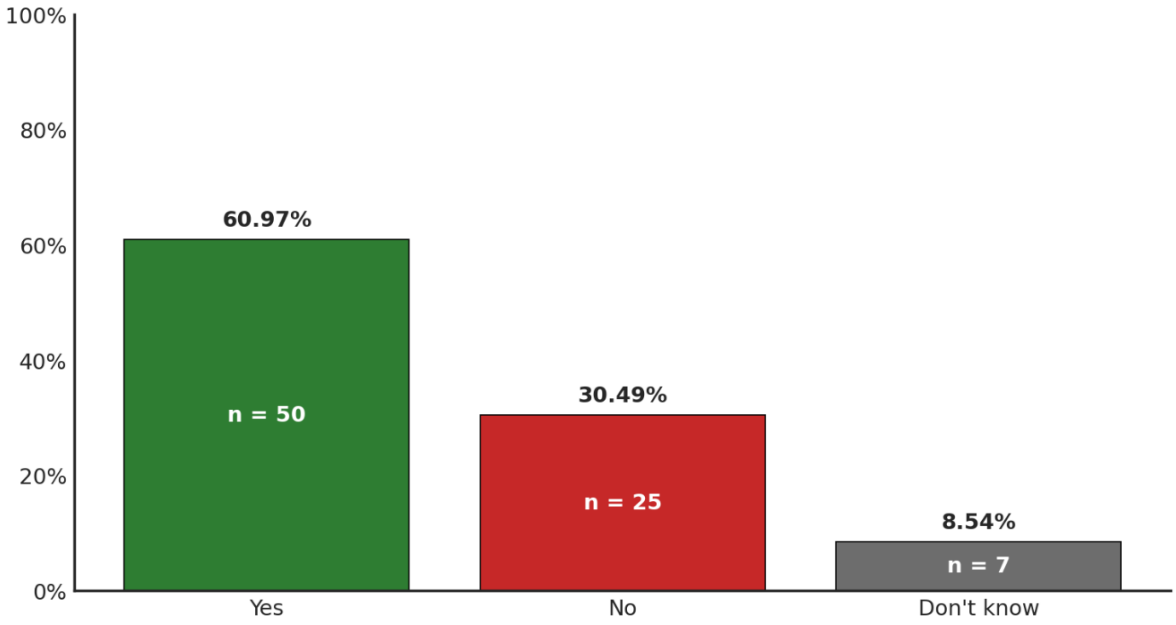


Figure 5 – Distribution of Responding Member Countries Reporting Having a National Oral Health Policy, Plan or Strategy publicly available

Integration into the national health policy, plan, or strategy generally indicates recognition of oral health within the NCD and UHC agendas, and of it as a fundamental human right.[15] Its

integration into the UHC package is also a key target in the Global Strategy and Action Plan on Oral Health, underscoring its significance.[3] The FDI survey shows that 59.3% of respondents reported that oral health was integrated into a broader national health plan, policy, or strategy (e.g., as part of NCD policies or within universal health coverage packages) (Figure 6). Compared with the baseline survey, integration is slightly improved from 56.8%. This suggests that countries are progressing towards horizontal integration; however, this is not universal and requires continued effort to embed it in mainstream health policies.

Moreover, the presence of any integration within the national oral health policy does not imply adequate integration. A scoping review shows that low-income settings have weakly integrated oral health within the key health policies. For example, only a few oral health services are covered within the national universal health package.[16] The findings, interpreted alongside such evidence, imply that although progress is visible in the integration of oral health within a robust policy architecture, implementation remains uneven.

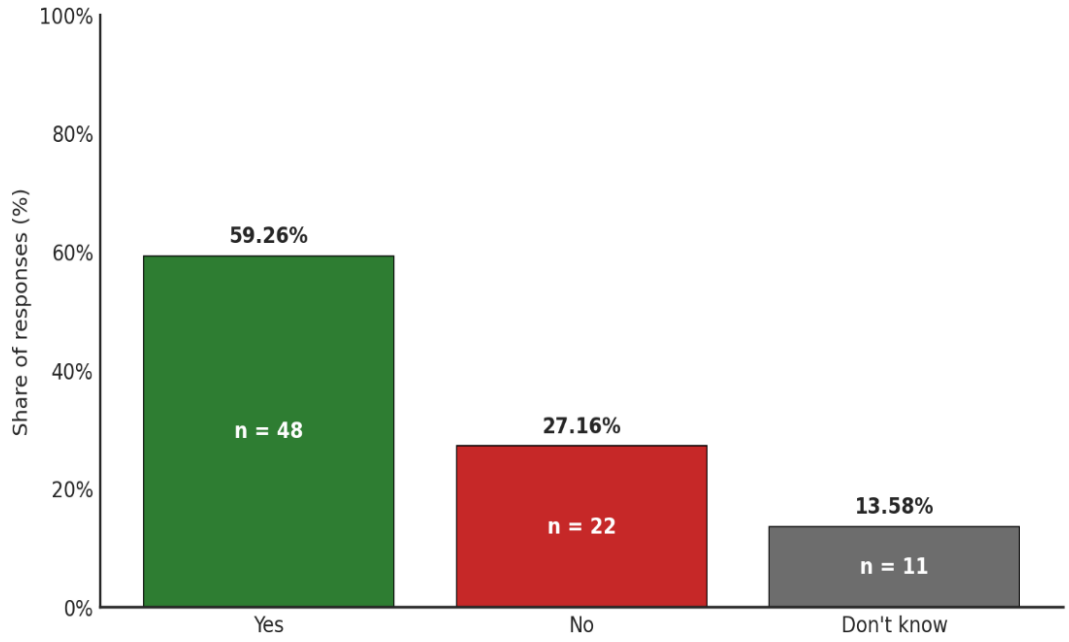


Figure 6 – Distribution of Responding Member Countries Reporting Having oral health addressed within a broader national health plan, policy, or strategy

Overall, these findings on oral health governance suggest progress towards the FDI Vision 2030 targets. They show strong institutional frameworks in several countries, with national leadership and policy architecture in place. Nevertheless, gaps persist in policy visibility and effective integration with broader health policies. Moreover, the implementation of policies remains uneven.

Responses concerning the ownership and oversight of national oral health policies indicate that responsibility is most commonly situated within Ministries of Health or equivalent government bodies, often supported by national dental associations or advisory committees. In some cases, governance structures are clearly defined, with designated leadership roles such as Chief Dental Officers providing strategic direction and coordination. However, several responses suggest variability in how responsibilities are distributed, with some countries reporting fragmented or shared governance arrangements across multiple institutions. This

can lead to challenges in accountability, coordination, and effective implementation, particularly where roles and mandates are not clearly delineated. The findings underscore the importance of strong institutional leadership and clearly defined governance frameworks to ensure that oral health policies are not only developed but effectively operationalised within broader health system agendas.

Equity governance: refugees and displaced persons

Forced displacement is at historically high levels. UNHCR reports 117.3 million people were forcibly displaced globally by the end of June 2025.[17]

In this context, absence of national policy/strategy for displaced populations is not a niche gap, it is a core equity failure in health-system governance, and it undermines UHCs “leave no one behind” commitments.

Oral health is also increasingly recognised as part of refugee and migrant health rights and humanitarian health practice yet commonly excluded from humanitarian standards and programming, an exclusion highlighted in recent peer-reviewed perspective work. The inclusion of refugees and displaced persons within the policy architecture is an indicator of equity, as they often experience a higher burden of unmet health needs due to disrupted care, administrative exclusion, and language barriers.[18] The FDI survey shows that half of the respondents report having a national policy or strategy for refugees and displaced persons, while the other half is split between not having (30%) and not knowing (20%) (Figure 7). This indicates a major policy gap, as the populations who may need care the most are not adequately protected. It also highlights weak awareness of existing policy frameworks, which, in turn, indicates weak policy visibility.

However, when such protective policies exist for refugees or displaced persons, oral health is often included. The FDI survey showed that over half of respondents reported that their policies included oral health services, while 34.7% were still unaware, and 8.2% had no provision (Figure 8). Overall, this shows a double inequity: many countries lack such protective policies, while others have considerable awareness gaps, indicating uneven inclusion and weaker institutions to promote equity. Literature presents a similar picture and highlights this persistent policy gap globally. It further shows that oral health governance remains limited and poorly operationalised in terms of equity.[19,20]

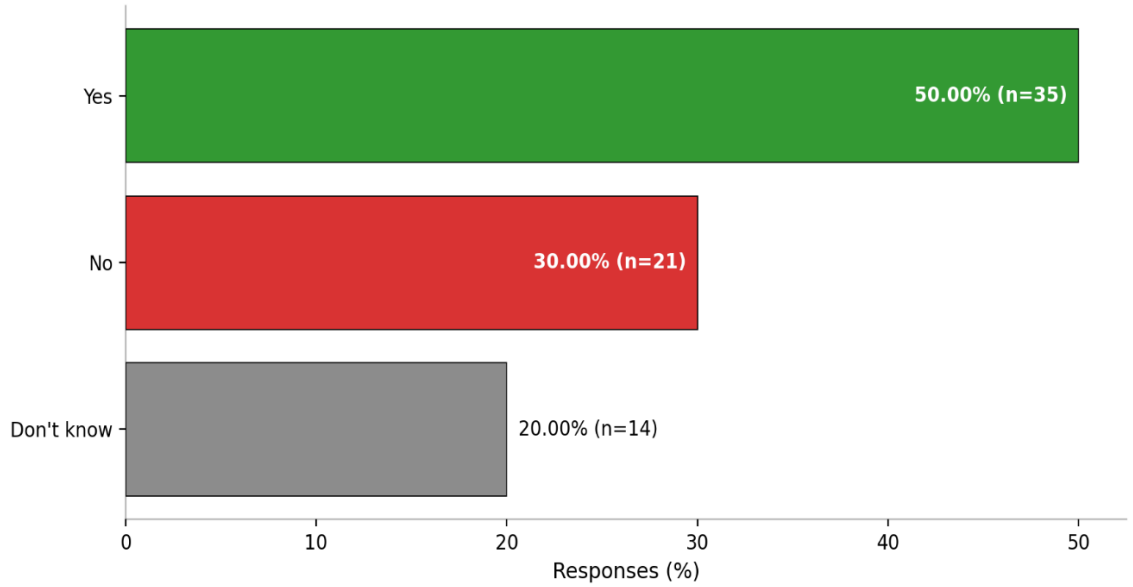


Figure 7 – Distribution of Responding Member Countries Reporting having a National policy or strategy for refugee or displaced persons (n=70)

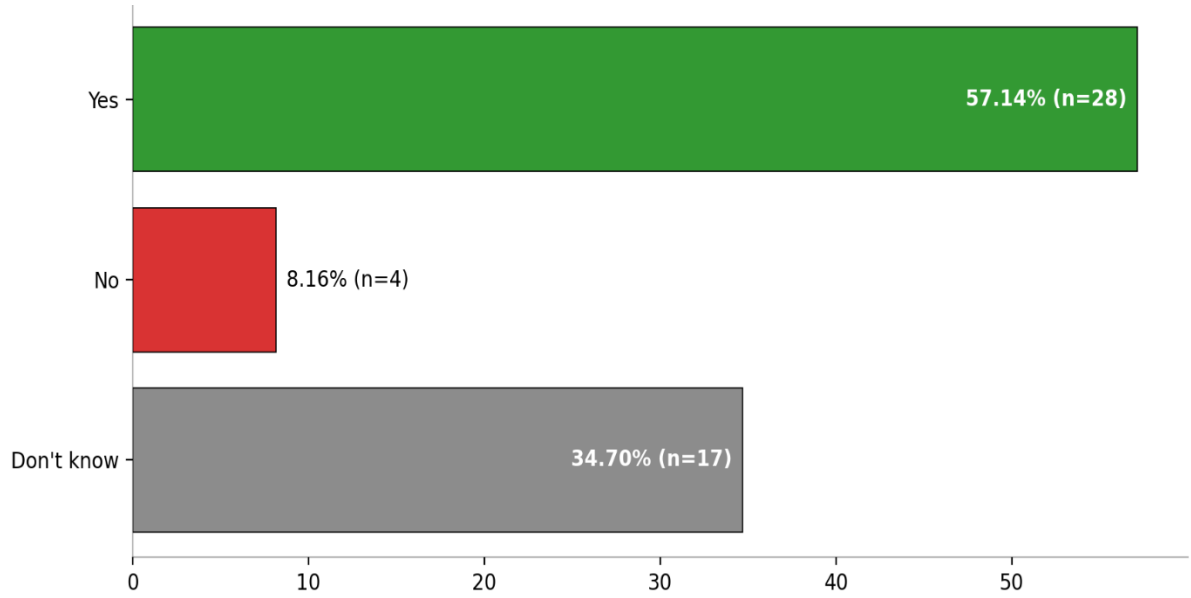


Figure 8 – Distribution of Member countries with the Provision of oral health within the policies or strategies for refugees or displaced persons(n=49)

FDI's policy statement on displaced persons emphasises non-discrimination and the requirement that displaced persons be able to access appropriate basic oral healthcare. Results showing 30% "no policy" and 20% "don't know" on displaced-person health strategies suggest a substantial distance remains between normative commitments and governance reality.

Regional comparisons and within-region patterns (Figures 9-13)

Latin American region demonstrates notable strength in formal policy architecture and mainstreaming, with 92% policy presence, 83% public availability of policy/ plans, and 83% inclusion in broader health plans, indicating robust rhetorical and planning integration. Nevertheless, governance concerning refugees and displacement is only at 56%, and oral health inclusion is at 50%, with small denominators, suggesting that equity governance is not assured even where general governance is robust.

The Asia Pacific region exhibits a classic "policy-equity disconnect," characterised by a high national oral health policy presence (87%) and reasonable public availability and integration (both 60%), yet the lowest refugee/displacement policy presence (27%) and the highest "No" share (53%) for that indicator. This appears to be less a technical gap and more a governance prioritisation issue, which is particularly concerning given global displacement and migration dynamics.

North American region displays perfect leadership presence (100% CDO) but only 50% policy presence, coupled with significant uncertainty regarding refugee/displacement governance (75% "don't know" for both refugee policy presence and oral health inclusion).

Europe and Africa exhibit broadly similar mid-range performance on core policy indicators, with policy presence at approximately 62-64%, public availability at 54-56%, and mainstreaming at 50-56%. However, both regions have substantial "don't know" shares concerning visibility and mainstreaming (particularly in Europe), indicating gaps in governance communication and policy dissemination.

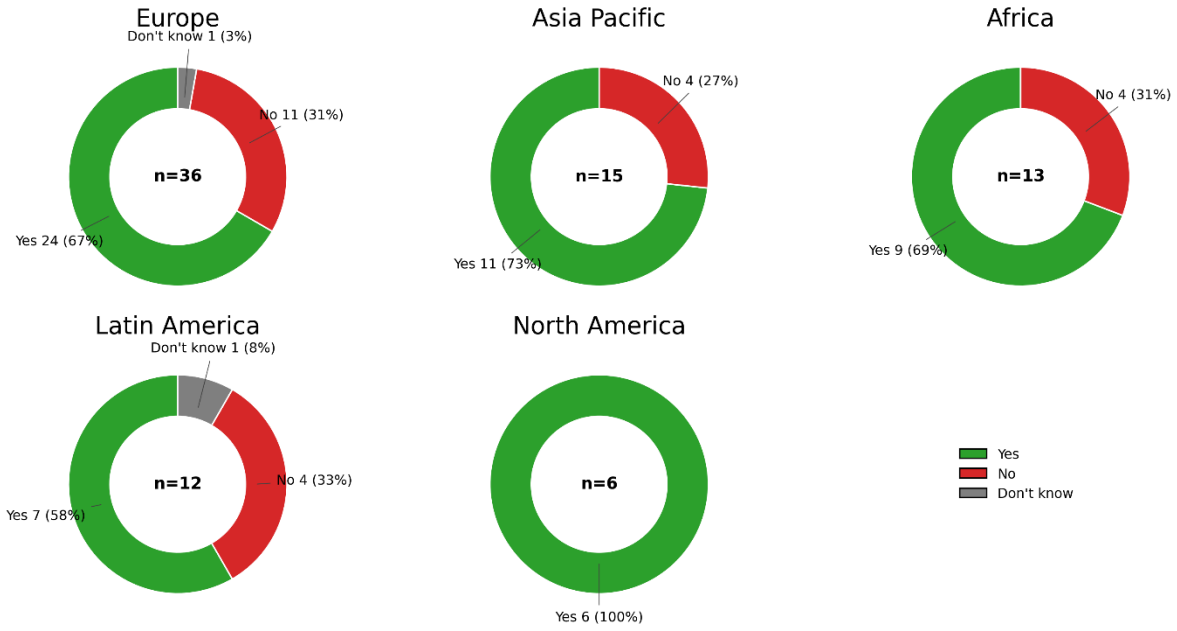


Figure 9 – Regional Distribution of Responding Member Countries Reporting the Presence of Chief Dental Officer (CDO) or Equivalent

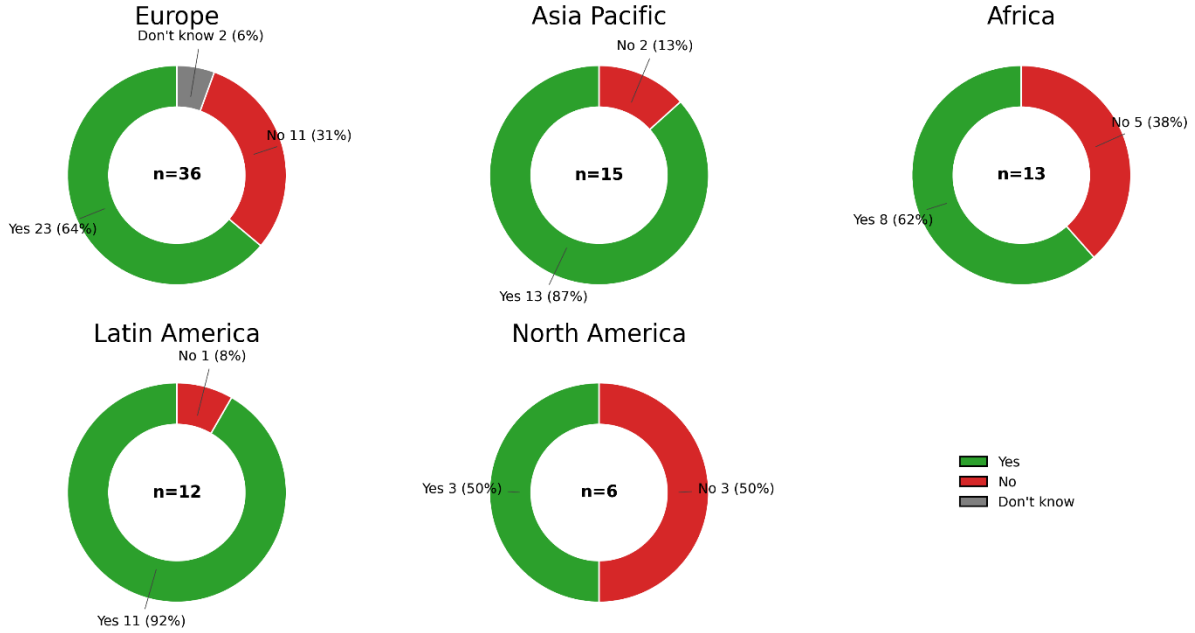


Figure 10 – Regional Distribution of Responding Member Countries Reporting Having National Oral Health Policy/ Plan/ Strategy

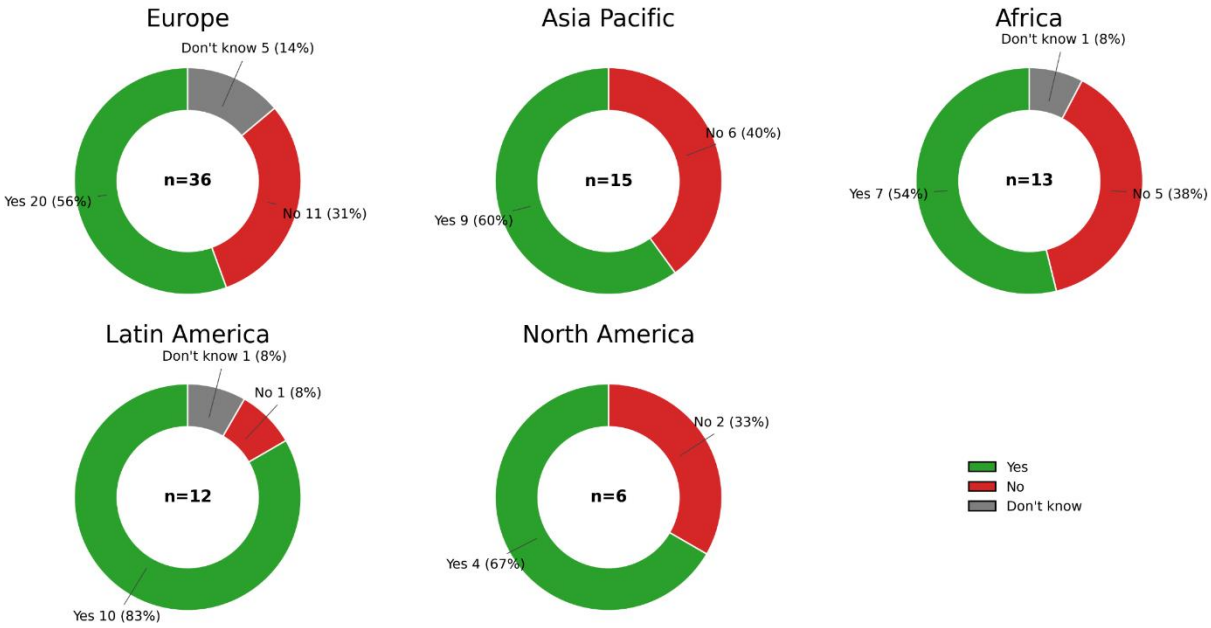


Figure 11 – Regional Distribution of Responding Member Countries Reporting Having Publicly Available National Plan/ Strategy

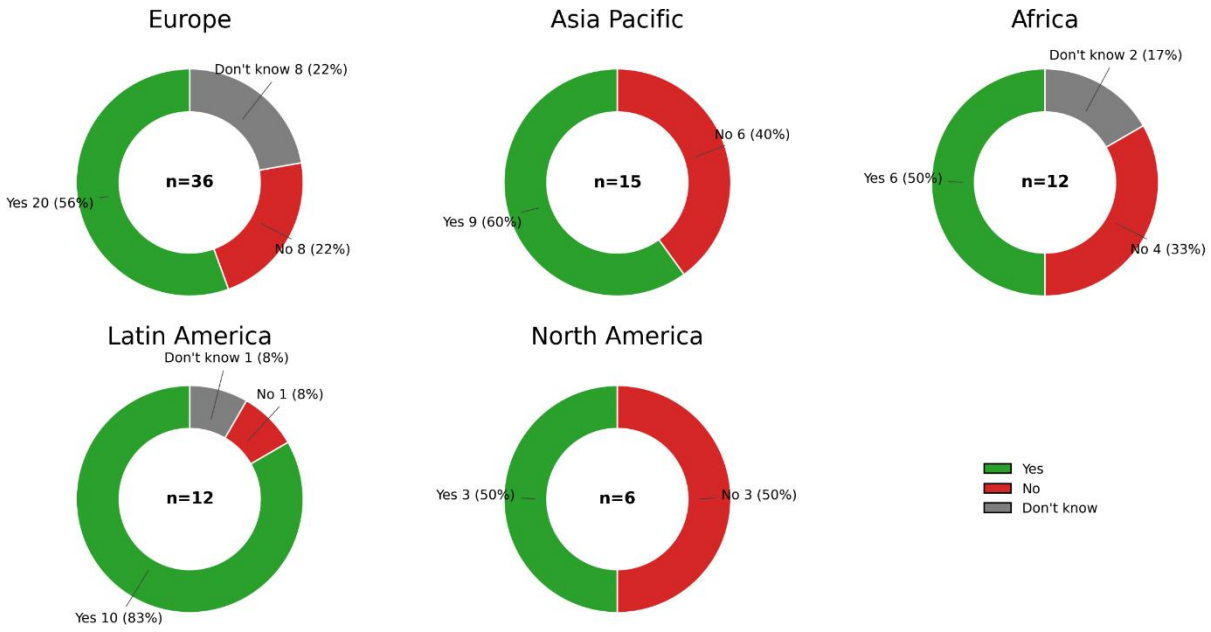


Figure 12 – Regional Distribution of Responding Member Countries Addressing Oral Health within Broader National Health Plans

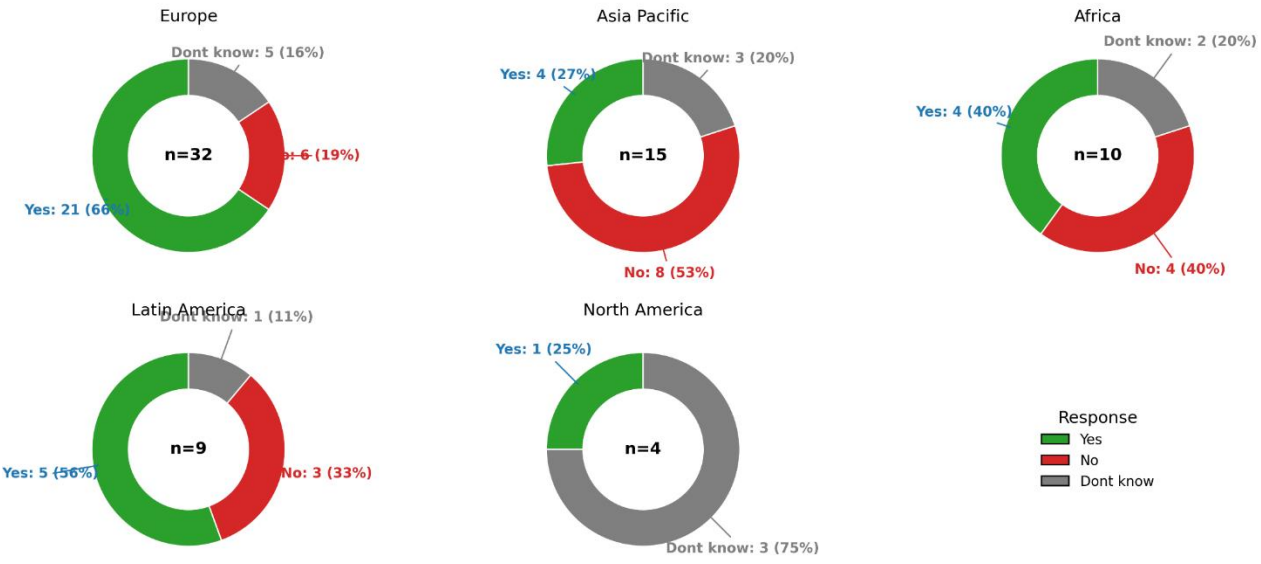


Figure 13 – Regional Distribution of Responding Member Countries Reporting having a National policy or strategy for refugee or displaced persons

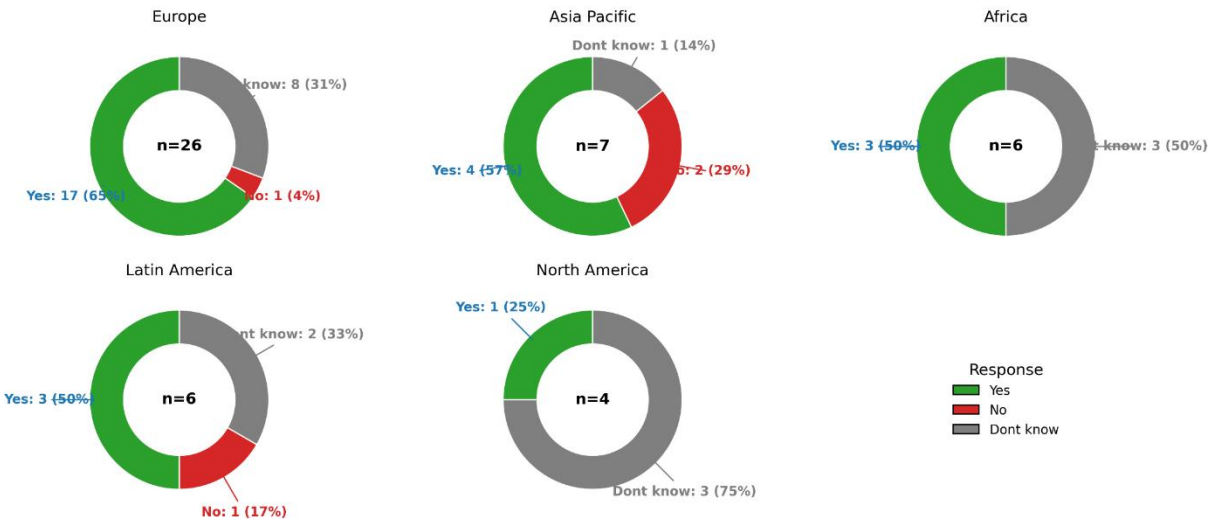


Figure 14 – Regional Distribution of Responding Member Countries with the Provision of oral health within the policies or strategies for refugees or displaced persons

Chapter 3

Moving Towards Universal Oral Health Coverage

Key Highlights:

- Public institutions are the main payer for dental care in 50.6% of responding countries, while 21.5% rely primarily on private insurance and 15.2% report no formal financial support.
- Oral health is included in national public insurance schemes in 66.7% of countries, while 11.1% report no inclusion and 18.5% report having no national scheme.
- Dental reimbursement is more often targeted than universal, with 44% covering selected groups, 42% covering the whole population, and 14% offering no reimbursement.
- Regional differences are substantial, with universal reimbursement reported by 58% of European respondents but limited to selected groups in 83% of African responses.
- Mixed reimbursement models dominate globally, reported by 56% of countries, while only 16% report full reimbursement.
- The most commonly reimbursed services are extractions (74%), clinical examinations (72%), and treatment of infection or pain (72%).
- Preventive services are less consistently covered, including oral hygiene counselling (64%), plaque removal (62%), and fluoride application (60%).
- Co-payment exemptions exist in 48% of countries, while 38% report no exemptions for dental services.

Background and Rationale

Universal health coverage (UHC) is defined as ensuring that all people have access to the full range of quality health services they need, when and where they need them, without suffering financial hardship.[21] UHC encompasses the entire continuum of care, including health promotion, disease prevention, treatment, rehabilitation and palliative care across the life course. As part of the Sustainable Development Goals (SDG 3.8), countries have committed to achieving UHC by expanding coverage of essential health services while reducing catastrophic health expenditure associated with accessing care.[21]

Financing arrangements are central to achieving these objectives. The design of health financing systems influences whether populations can access services equitably and whether healthcare costs impose financial burdens on individuals and households.[22] Financial protection mechanisms such as public insurance coverage, reimbursement schemes and co-payment policies therefore play a critical role in determining how effectively health systems deliver on the promise of universal health coverage.[21,22]

Despite its importance for overall health and well-being, oral health has historically remained marginal within many health system financing frameworks. In numerous countries, oral healthcare services are predominantly delivered through private providers and operate largely outside core public health financing systems. As a result, dental services often rely heavily on out-of-pocket payments by patients.[23] The relatively high cost of oral healthcare procedures and limited coverage within public health insurance schemes often result in substantial financial burdens for individuals and households. As highlighted in recent analyses of oral health financing, out-of-pocket expenditures for dental care can be sufficiently high enough to generate financial hardship for households and contribute to catastrophic health expenditure in some settings.[23]

Growing recognition of these challenges has led to increasing calls to integrate oral health more fully within universal health coverage frameworks. The WHO Global Oral Health Strategy affirms that achieving the highest attainable standard of oral health is a fundamental right of every human being and emphasises the importance of strengthening oral health systems within broader health system reforms.[22,24] This recognition reflects a broader consensus within global health policy that there can be no health without oral health, and consequently no universal health coverage without the inclusion of oral healthcare services.[24]

Momentum toward universal oral health coverage has been further reinforced by the adoption of the Bangkok Declaration on Universal Health Coverage for Oral Health at the 2024 World Health Organization Global Oral Health Meeting.[25] The declaration calls for the integration of oral health within UHC frameworks and emphasises the need for inclusive, high-quality and policy-relevant research to support health system transformation.[25] In this context, strengthening financing arrangements for oral healthcare, has emerged as a critical priority for advancing equitable access to care.

Evidence indicates that expanding oral healthcare coverage and strengthening financial protection mechanisms can influence both service utilisation and oral health outcomes. A study in Finland demonstrated that broader entitlement to publicly subsidised dental services was associated with higher utilisation of dental care and improved tooth retention compared with populations without similar coverage.[26] The study further showed that reduced out-of-

pocket payments through insurance coverage or public subsidisation were associated with increased use of dental services and improved access to care.[26]

Achieving universal health coverage requires not only policy commitments but also mechanisms to track progress and ensure accountability. Within the global UHC framework, accountability is recognised as a key pathway for change, requiring the monitoring of policies, programmes and health system performance to assess whether commitments translate into measurable improvements in access and financial protection.[21,27]

Against this backdrop, the FDI Vision 2030 mid-term survey contributes to this accountability agenda by examining key aspects of oral healthcare financing within member countries. The survey explored the primary sources of reimbursement for oral healthcare services, the inclusion of oral health within public insurance programmes and the financial protection mechanisms available to patients, including reimbursement levels and exemptions from dental co-payments. The findings presented in the following sections provide insight into how countries are structuring oral health financing and the extent to which these arrangements support progress toward universal oral health coverage.

A Global Snapshot of Oral Healthcare Financing and Coverage

To understand how oral healthcare services are financed across health systems, the Vision 2030 Mid-Term Survey asked responding member countries to identify the largest source of reimbursement for oral healthcare expenses in their national context. The responses provide a broad snapshot of how oral health services are funded globally and illustrate the diversity of financing models that currently exist.

Financing Structures and Sources of Reimbursement

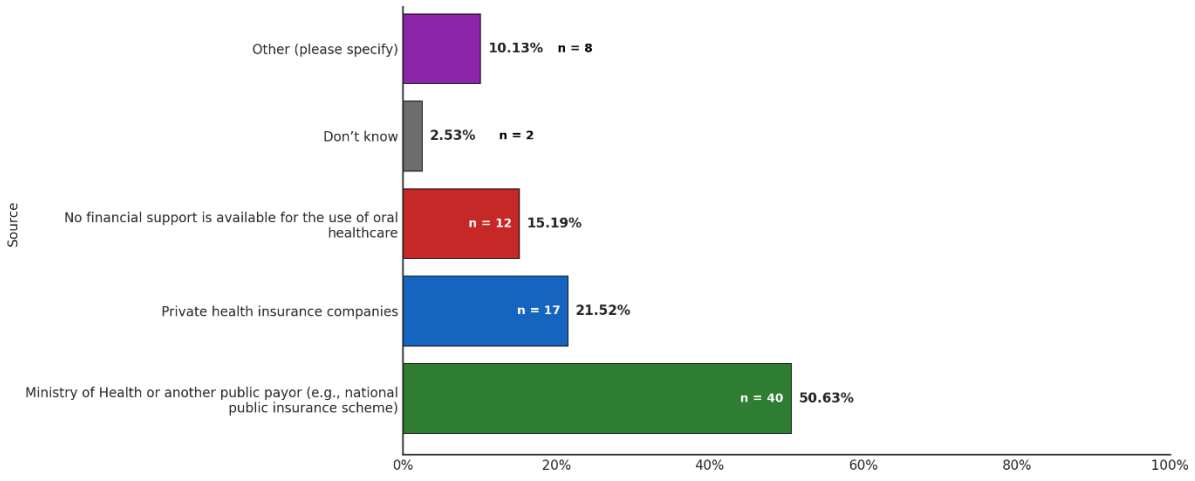


Figure 15- Distribution of primary reimbursement sources for oral healthcare expenditure among responding member countries (Ministry/public payer, private insurance, out-of-pocket, other; n = 79)

Among the 79 responding countries, public institutions remain the most frequently reported source of reimbursement for oral healthcare services. Just over half of respondents (50.6%,

n=40) indicated that the Ministry of Health or another public payer represents the primary source of financial support for oral healthcare. Private health insurance companies were identified by 21.5% (n=17) of respondents, while 15.2% (n=12) reported that no formal financial support mechanisms exist, meaning that patients must rely largely on out-of-pocket payments for dental care.

Figure 16- Regional distribution of primary reimbursement sources for oral healthcare expenditure among responding member countries

Regional responses illustrate substantial variation in how oral healthcare is financed. Public reimbursement was most commonly reported in Europe, where approximately two-thirds of respondents identified government or public insurance as the main payer. In contrast, responses from Asia-Pacific and Latin America suggest more fragmented financing structures, with a notable share of countries indicating that patients rely primarily on out-of-pocket payments. North America displayed a predominantly private financing model, with most respondents identifying private insurance as the principal source of reimbursement.

These findings reflect well-documented global patterns in oral health financing. In many countries, dental services operate largely outside publicly financed health systems and rely heavily on private markets and household expenditure. Evidence from low- and middle-income countries demonstrates that dental care spending can place significant financial strain on households and may contribute to catastrophic health expenditure and impoverishment.[28] Similar dynamics have been reported in the WHO South-East Asia Region, where dental services are frequently delivered through private fee-for-service markets and out-of-pocket payments remain the dominant financing mechanism in several countries.[29]

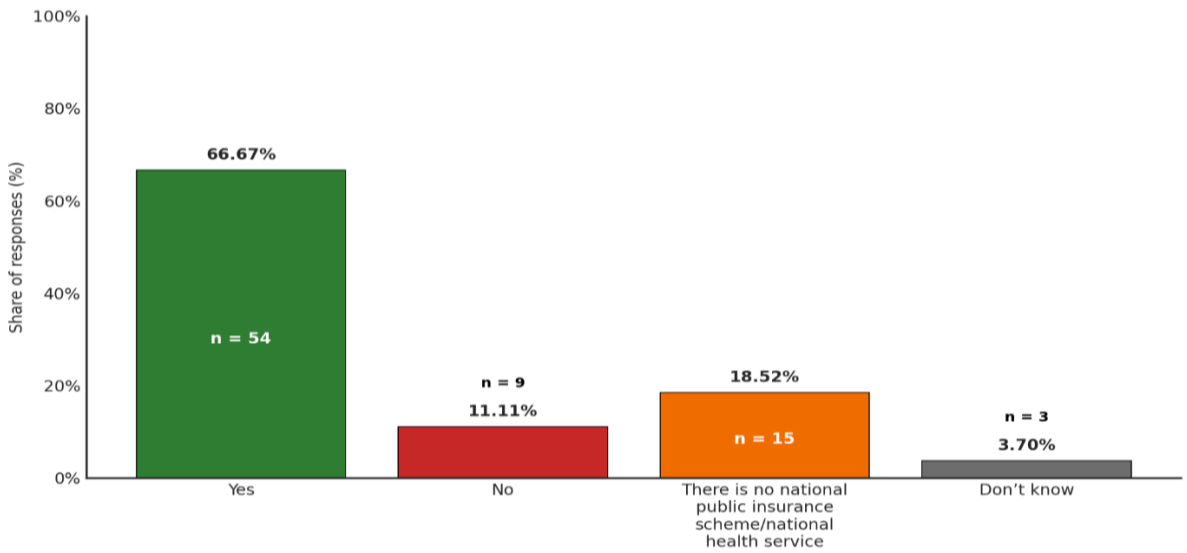


Figure 17- Proportion of responding member countries reporting inclusion of oral healthcare services within national public insurance schemes (yes, no, no national scheme, don't know; n = 81).

Building on this overview of financing structures, the survey also explored whether oral healthcare is included within national public insurance systems. Across the responding countries, a majority reported at least partial integration of oral healthcare within national insurance schemes. Overall, 66.7% (n=54) indicated that oral health services are included to some extent within the national public insurance framework. However, important gaps remain: 11.1% (n=9) reported that oral healthcare is not included, while 18.5% (n=15) indicated that their country does not operate a national public insurance scheme.

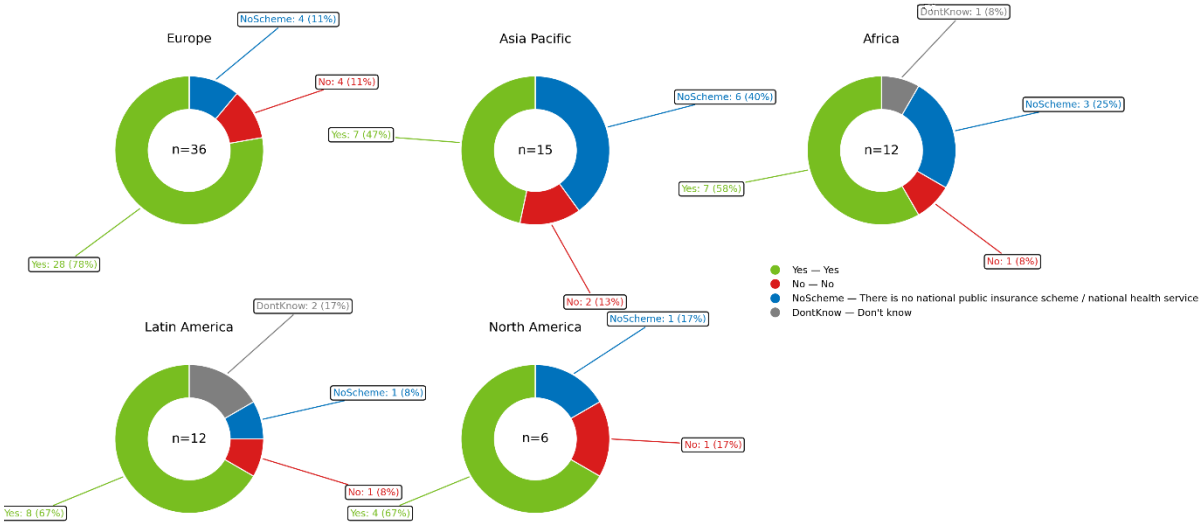


Figure 18- Regional variation in inclusion of oral healthcare services within national public insurance schemes among responding member countries

Regional responses again highlight the uneven integration of oral health within broader health financing systems. In Europe, inclusion within national insurance frameworks was widely reported, with approximately three-quarters of respondents indicating that oral healthcare forms part of the public insurance system. In contrast, several countries in the Asia-Pacific and African regions reported the absence of national insurance schemes altogether, suggesting that oral healthcare financing may depend more heavily on private provision or household expenditure in these settings.

However, inclusion within national insurance frameworks does not necessarily translate into comprehensive financial protection for oral healthcare. Comparative research demonstrates substantial variation in how countries design and finance dental coverage. A five-country analysis comparing Germany, Belgium, Denmark, the Netherlands and Spain found marked differences in the scope of public dental coverage. Public spending on oral healthcare ranged from 0.32% of GDP in the Netherlands to 1.1% in Greece, while per-capita spending varied considerably across countries.[30]

More broadly, international experience shows that oral healthcare coverage models span a wide spectrum, ranging from no public coverage to limited, partial or comprehensive arrangements.[24] These models differ in terms of which population groups are eligible for publicly financed care, which oral healthcare services are included within benefit packages, and the extent to which patients are required to share treatment costs.[24] The following survey questions further explore these aspects by exploring the populations groups which are covered, the specific services that are reimbursed and how the reimbursement or co-payment arrangements are structured across responding health systems.

Population Coverage and Financial Protection Mechanisms

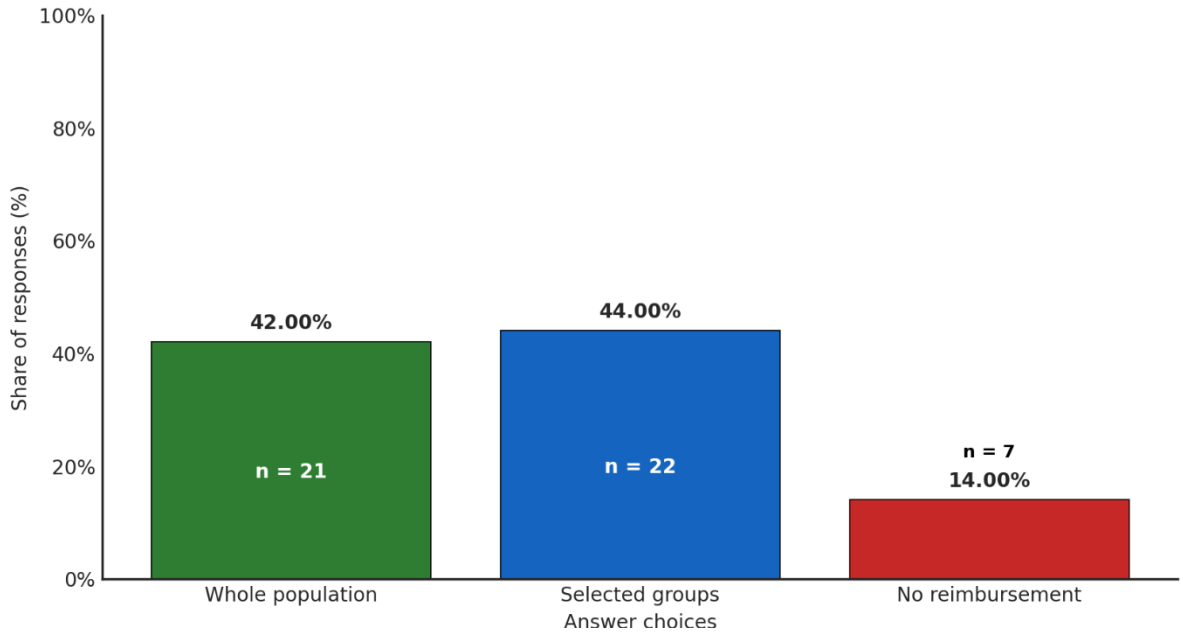


Figure 19- Distribution of eligibility models for publicly reimbursed oral healthcare services among responding member countries (whole population, selected population groups, no reimbursement; n = 50)

The survey further examined which population groups are eligible to receive reimbursement for oral healthcare services. Survey responses (Figure 19) suggest that many health systems rely on targeted eligibility models rather than universal coverage. Globally, 44% (n = 22) of respondents reported that reimbursement is available only for selected population groups, while 42% (n = 21) indicated that coverage extends to the whole population. A further 14% (n = 7) reported that no reimbursement mechanisms exist.

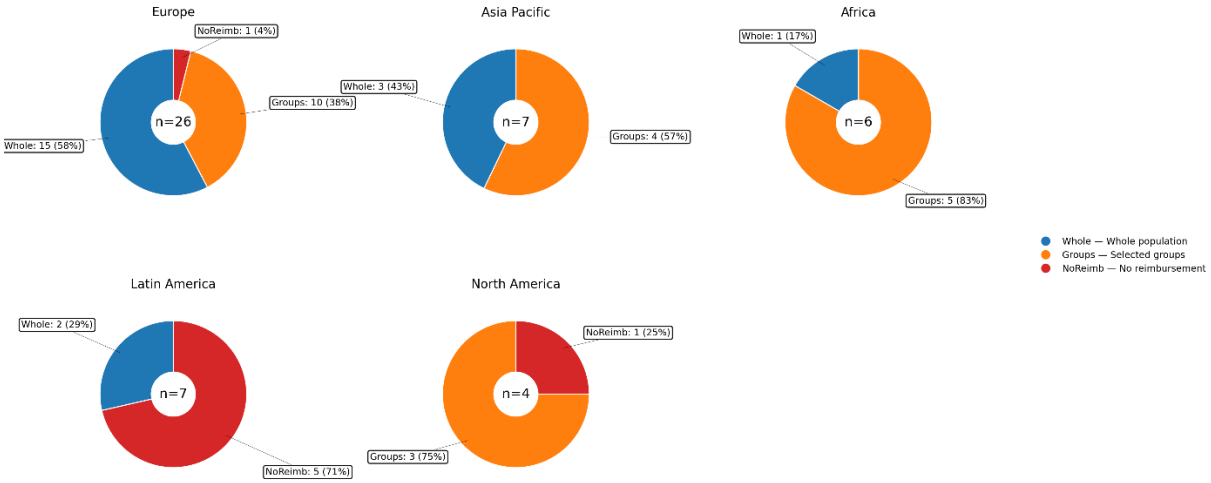


Figure 20- Regional distribution of eligibility models for publicly reimbursed oral healthcare services among responding member countries.

Regional responses reveal notable variation in how countries structure eligibility for publicly financed dental care (Figure 20). In Europe, reimbursement for the entire population was reported by 58% of respondents (15/26), although a substantial proportion (38%, 10/26) indicated that coverage remains limited to specific groups. In contrast, most respondents in Africa (83%, 5/6) reported reimbursement restricted to selected populations, while in Latin America a majority of respondents (71%, 5/7) indicated that no reimbursement mechanisms are currently in place. In North America, most respondents reported reimbursement limited to selected groups.

These patterns are consistent with international policy analyses showing that many national oral health systems prioritise financial protection for specific population groups rather than universal coverage. Coverage is often directed toward children, older adults or other vulnerable populations. A recent global scoping review of dental coverage across 24 countries found substantial disparities in financing and benefit design, reporting that while 89% of high-income countries provide preventive dental care coverage for children, only 34% extend comparable benefits to older adults.[31] A separate global review of oral health policies for ageing populations similarly highlights that coverage for geriatric dental services remains limited in many countries despite growing demographic demand.[32] Together, these findings suggest that although targeted coverage can help protect vulnerable groups, important gaps in population-wide access to oral healthcare persist.

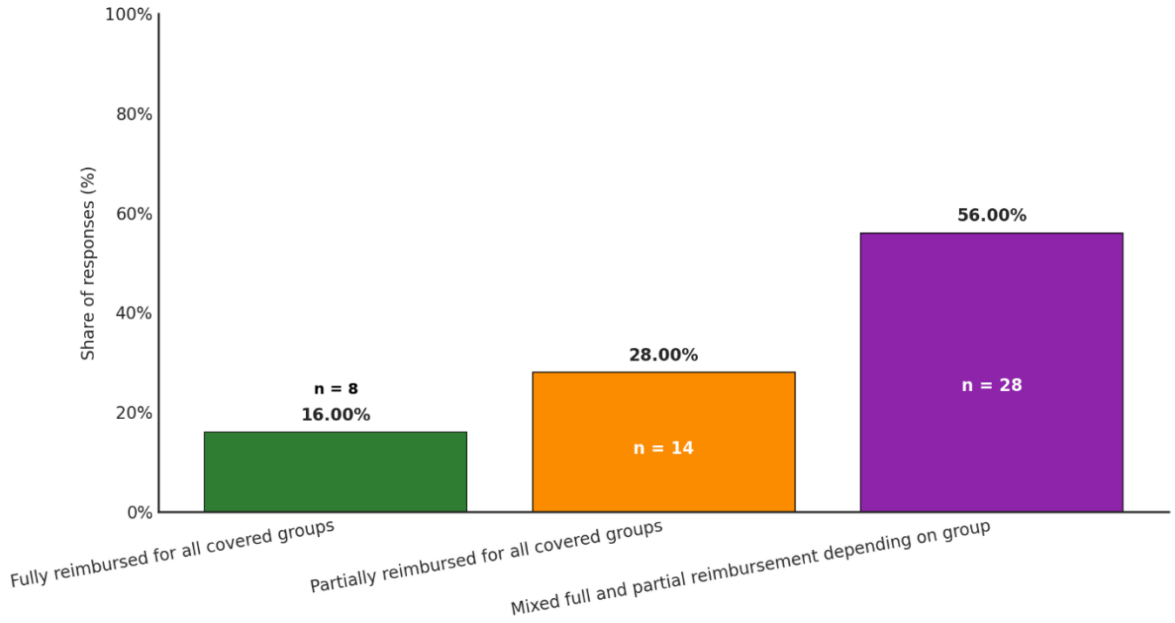


Figure 21- Extent of reimbursement for oral healthcare services among covered populations (full, partial, mixed reimbursement models; n = 50)

Beyond eligibility for coverage, the survey also explored the extent to which reimbursed services are fully covered or require patient contributions. Mixed reimbursement models appear to be the most common approach. Among respondents, 56% (n=28) reported arrangements where some services or population groups receive full coverage while others require co-payments. Partial reimbursement across all covered groups was reported by 28% (n=14), while only 16% (n=8) indicated that services are fully reimbursed.

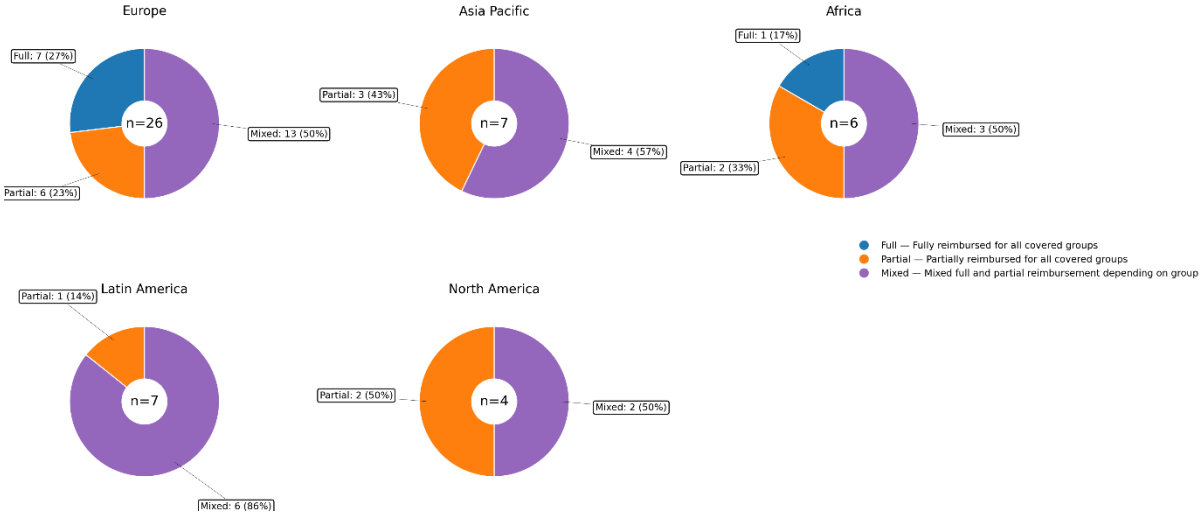


Figure 22- Regional variation in extent of reimbursement for oral healthcare services among covered populations.

Regional responses show broadly similar patterns. In Europe, mixed reimbursement arrangements were the most commonly reported model, while countries in Asia-Pacific and Latin America also reported a predominance of partial or mixed reimbursement systems. These findings suggest that although financial protection mechanisms exist in many settings, patients frequently remain responsible for at least part of the cost of dental care.

Research across European health systems illustrates how these differences in benefit design influence both financial protection and service utilisation. For example, Germany and Belgium provide relatively extensive dental reimbursement through social health insurance systems, whereas the Netherlands excludes most adult dental services from the public benefit package and Denmark restricts reimbursement for several preventive and restorative services.[30] Such variations demonstrate how national policy choices regarding benefit packages can shape patterns of access and equity in oral healthcare utilisation.

Scope of Services and Equity-Oriented Coverage Measures

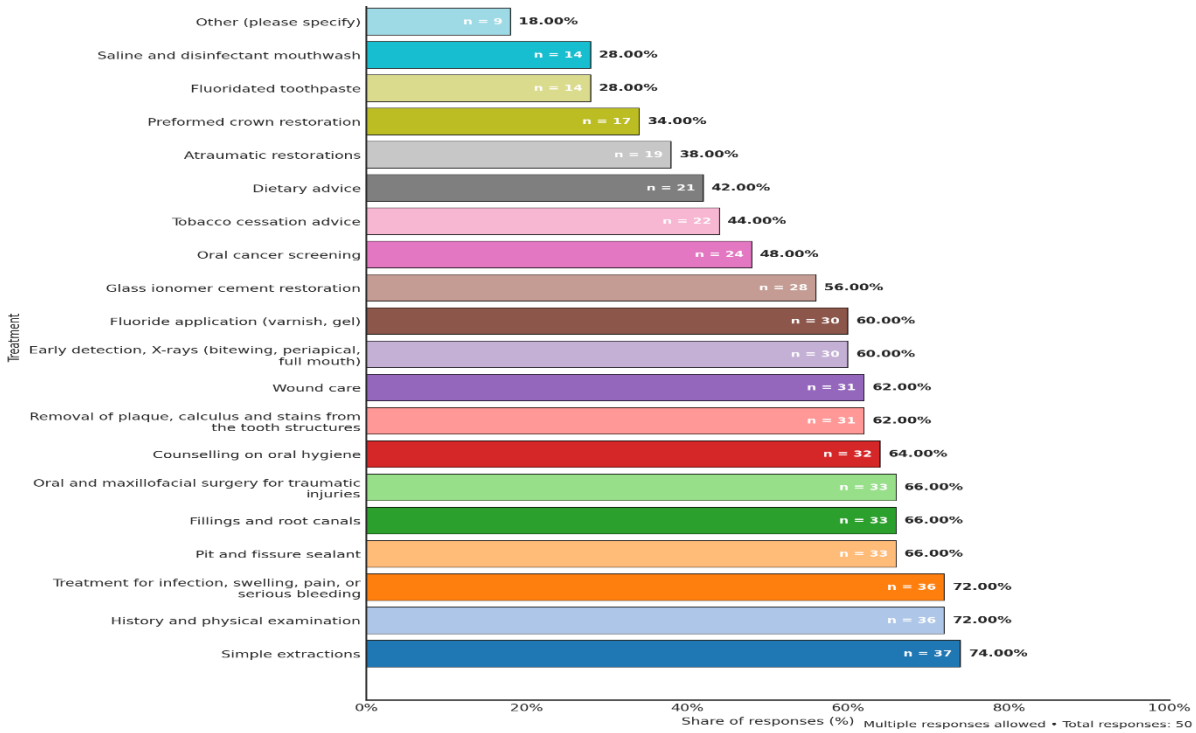


Figure 23- Types of oral healthcare services covered under government or compulsory insurance schemes among responding member countries (multiple responses allowed; n = 50).

To better understand the scope of publicly financed dental care, respondents were also asked which specific oral healthcare services are reimbursed through government programmes or compulsory insurance schemes. The results indicate that financing systems tend to prioritise essential and treatment-oriented services. The most commonly reimbursed services included simple tooth extractions (74%, n=37), clinical examinations (72%, n=36), and treatment of infection, swelling or acute pain (72%, n=36). Restorative procedures such as fillings and root canal treatments were also frequently included.

Preventive services were somewhat less consistently covered. While counselling on oral hygiene (64%), removal of plaque and calculus (62%) and fluoride applications (60%) were reported by a majority of respondents, services such as oral cancer screening (48%) and tobacco cessation advice (44%) were reimbursed less frequently.

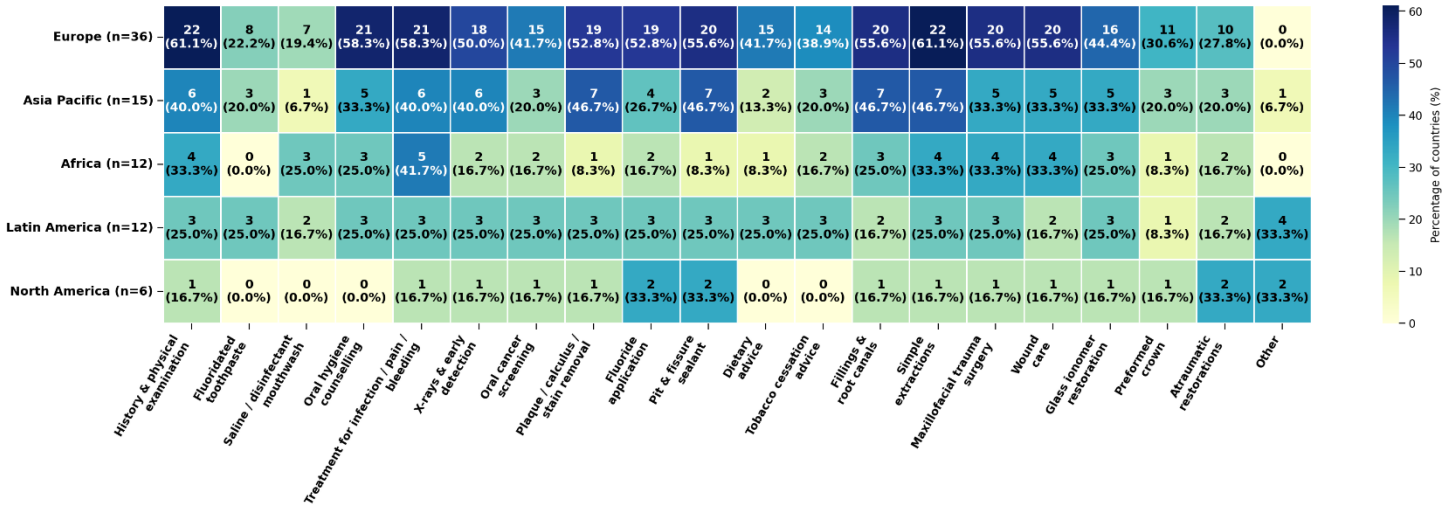


Figure 24- Regional distribution of oral healthcare services covered under government or compulsory insurance schemes.

Regional responses indicate that reimbursement coverage for dental services varies considerably across health systems. European respondents reported relatively broad coverage for examinations and extractions, whereas reimbursement across services appeared more limited in several African and Latin American countries. These patterns mirror findings from international studies showing that dental benefit packages often prioritise treatment services over prevention.[32] Such policy choices may have important long-term implications for population oral health, as preventive interventions are associated with lower long-term treatment costs and improved health outcomes.

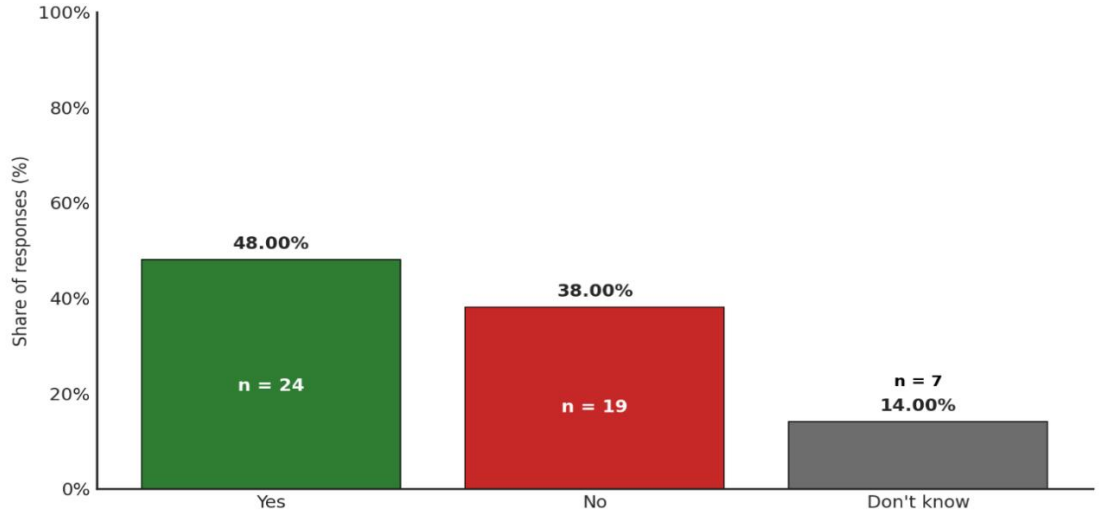


Figure 25- Proportion of responding member countries reporting exemptions from insurance contributions or co-payments for oral healthcare services (yes, no, don't know; n = 50).

Finally, the survey examined whether countries provide financial protection through exemptions from insurance contributions or co-payments for dental services. Overall, nearly

half of respondents (48%, n=24) reported that certain patient groups are exempt from dental co-payments, while 38% (n=19) indicated that no such exemptions exist.

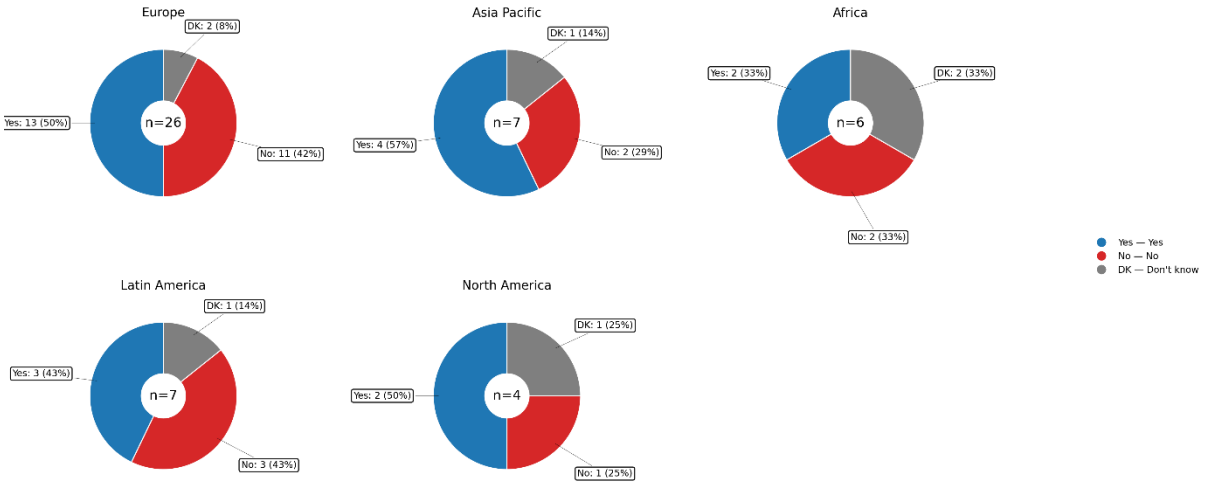


Figure 26- Regional variation in exemption policies for insurance contributions or co-payments for oral healthcare services.

Regional responses suggest that exemption policies are implemented in several health systems but remain unevenly distributed. Approximately half of European respondents reported exemptions for specific groups, while similar patterns were observed in Asia-Pacific and North America. In other regions, exemption mechanisms were less consistently reported.

Evidence from England's National Health Service illustrates how exemption policies can be used to support vulnerable populations. Fee-exempt adult patients account for 23.7% of all adult dental claims within the NHS, and these patients tend to present with significantly higher treatment needs than fee-paying individuals. This suggests that exemption policies often target populations experiencing greater oral disease burden and financial vulnerability.[33]

Across open-ended responses, countries consistently described exemption policies as a key mechanism for mitigating financial barriers to oral healthcare, particularly for vulnerable populations. The groups most frequently identified include children, pregnant women, older adults, individuals with disabilities, and those with low income or receiving social welfare support. In some settings, additional population groups such as war veterans or individuals covered under specific national protection schemes were also included. These responses suggest that while financial protection mechanisms are widely used, they are predominantly targeted rather than universal in design. This reinforces the broader finding that oral healthcare financing systems continue to rely on selective coverage models, which may reduce financial hardship for priority groups but leave significant segments of the population exposed to out-of-pocket costs. The variability in how exemption criteria are defined and implemented also indicates a lack of standardisation in equity-oriented financing approaches, potentially contributing to uneven access to care both within and across countries.

Financing Oral Health for Universal Coverage

The survey findings highlight the diversity of financing arrangements that shape access to oral healthcare across countries. While many responding health systems report some level of public reimbursement or insurance coverage for dental services, the extent and design of this coverage vary widely. In several countries, oral healthcare remains only partially integrated within national health financing systems, with mixed reimbursement arrangements, targeted eligibility criteria and varying levels of patient cost-sharing. Exemption mechanisms for specific groups such as children, pregnant women, older adults or socially disadvantaged populations further illustrate how many systems rely on selective financial protection rather than universal coverage.

Bulgaria provides an example of a mixed public-private dental financing model, where essential dental services are partially reimbursed through the National Health Insurance Fund while patients contribute through co-payments.[34] Public financing fully covers most paediatric dental services, reflecting preventive public health priorities, while adults typically face partial reimbursement and out-of-pocket contributions for examinations, restorations and extractions. Although public financing for dental services has increased in recent years, oral healthcare remains a relatively small component of total health spending, and out-of-pocket payments continue to represent a barrier to care for vulnerable populations.[34]

From a health economics perspective, these patterns reflect broader dynamics that characterise oral healthcare systems globally. Dental services are frequently delivered through private providers and financed through a combination of public subsidies, insurance schemes and direct household payments. Such financing structures can create challenges for equitable access, particularly when public investment is not balanced between both preventive services and treatment-oriented care.[35] Economic analyses further highlight that oral diseases generate substantial direct treatment costs as well as indirect costs related to productivity losses and reduced quality of life. At the same time, the economic benefits of preventive interventions, including fluoride use, oral health promotion and early treatment, are often underestimated in policy decisions. As a result, many health systems continue to allocate resources toward curative dental services rather than cost-effective prevention strategies.[35]

These findings underscore the importance of strengthening oral healthcare financing within universal health coverage frameworks. Expanding financial protection mechanisms, improving benefit design and increasing investment in preventive services will be essential for reducing financial barriers to care and supporting more equitable access to essential oral health services.

Chapter 4

Bringing Oral Health to the Frontline: Integration within Primary Healthcare Systems

Key Highlights:

- 46.6% of respondents reported national policies enabling non-dental primary healthcare providers to deliver oral health interventions, while 48.9% reported no such policies.
- 82.4% of respondents reported that publicly funded oral healthcare services are available within primary healthcare facilities.
- Approximately 90% of respondents reported that oral hygiene counselling and simple tooth extractions are available at the PHC level.
- Preventive services such as fluoride application, plaque removal, and pit and fissure sealants are widely available in PHC settings across many countries.
- 59.5% of respondents reported that their country collects data on the density or distribution of dentists working in primary healthcare.
- The oral health workforce remains unevenly distributed geographically, with an average of 67.9% located in urban areas and only 25.2% in rural areas.
- Global dentist density averages approximately 3.3 dentists per 10,000 population, ranging from 5.91 per 10,000 in Europe to 0.44 per 10,000 in Africa.

Background and Rationale

Primary health care (PHC) has long been recognised as the most effective and equitable platform for delivering essential health services and advancing universal health coverage (UHC). The World Health Organisation and UNICEF define PHC as a "whole-of-society approach to health that aims to maximize the level and equitable distribution of health and well-being through integrated health services, multisectoral action, and empowered communities".[36] Since the Alma-Ata Declaration and its reaffirmation through the Astana Declaration, strengthening PHC systems has been widely regarded as essential for improving health outcomes, addressing health inequities, and achieving the health-related Sustainable Development Goals.[36]

Within this broader agenda, the integration of oral health into PHC systems has emerged as a key global priority. The WHO Global Oral Health Action Plan (GOHAP) explicitly identifies the integration of essential oral health services within primary health care systems as a core strategic objective for achieving universal access to oral health care.[3] This objective emphasises strengthening workforce capacity within PHC teams, integrating oral health services across service delivery levels, and establishing referral pathways that connect PHC services with more specialized dental care.[27] The plan further encourages countries to adopt innovative workforce models that enable appropriately trained health workers, including physicians, nurses, pharmacists and community health workers, to deliver basic oral health promotion and preventive services within primary care settings.[3]

The concept of integration itself is well established within health systems research. Integration has been defined as "a variety of managerial or operational changes to health systems to bring together inputs, delivery, management and organisation of particular service functions in order to improve efficiency and quality and maximize the use of resources".[37] Within the context of oral health, integration may involve coordinating oral health promotion and prevention within primary care services, strengthening referral pathways between PHC providers and dental professionals, and embedding oral health competencies within the broader health workforce.[37] These approaches aim to improve access to essential services, enhance care coordination and optimise the use of resources across health systems.

The WHO Global Oral Health Status Report similarly highlights the central role of PHC in delivering essential oral health services. Oral health care is conceptualised through a primary oral health care pyramid, in which the majority of population needs are addressed through preventive, promotive and basic treatment services delivered at the primary care level, while more specialised and costly services are provided at higher levels of the health system.[27] This model reflects the principle that population demand for oral health services is greatest at the lower levels of care, where interventions are less resource-intensive and more accessible to communities.

Several factors further reinforce the rationale for integrating oral health services into PHC systems. One key justification lies in the shared determinants of oral diseases and other noncommunicable diseases. The common risk factor approach highlights that oral diseases share behavioural and environmental risk factors with major chronic conditions, including unhealthy diets high in sugars, tobacco use and harmful alcohol consumption.[37,38] Addressing these shared determinants through coordinated prevention and health promotion strategies within PHC systems can therefore generate benefits across multiple health conditions.

In addition, oral health conditions are closely linked with systemic diseases, further supporting the need for integrated care models. Evidence demonstrates a bidirectional relationship between oral diseases and several chronic conditions, including diabetes and periodontal disease.[37] Integrating oral health services into PHC therefore facilitates earlier detection of oral conditions, improves referral pathways, and promotes continuity of care for patients with complex health needs.

The health workforce plays a particularly important role in enabling such integration. Primary care providers often serve as the first point of contact within health systems and are therefore well positioned to identify oral health conditions, provide preventive counselling and refer patients for appropriate care. Evidence suggests that physicians working in primary care settings can contribute to early detection and prevention of oral diseases such as dental caries and oral cancer, thereby improving health outcomes and reducing disease progression.[39] In underserved areas where dental professionals may be limited, primary care providers can play an especially important role in addressing oral health needs and strengthening collaboration between medical and dental professionals.[39]

Despite this strong policy and theoretical foundation, evidence suggests that the integration of oral health within PHC systems remains incomplete in many countries. The role of primary care providers in oral health promotion, screening and early management has historically been limited, and studies examining the competencies of primary care physicians indicate that many providers report limited experience in key oral health tasks, including conducting oral examinations, identifying early signs of dental disease and delivering preventive interventions such as fluoride varnish application.[39] At the same time, targeted training initiatives and inter professional education programmes have demonstrated the potential to strengthen oral health competencies among primary care providers and support the delivery of basic preventive services within PHC settings.[39]

Understanding how countries are translating these global policy recommendations into practice is therefore increasingly important. Monitoring the presence of enabling policies, workforce capacity and service availability within PHC settings provides a practical way to assess progress toward integrating oral health within primary care systems.

In this context, the FDI Vision 2030 mid-term survey explored several dimensions of oral health integration within PHC systems. The survey examined whether national policies enable non-dental health professionals to deliver brief oral health interventions, the availability of oral healthcare services within primary care facilities, and the composition of the oral health workforce at the PHC level. Together, these questions provide insight into how health systems are operationalising the integration of oral health within primary health care and where opportunities remain to strengthen service delivery models that support equitable access to essential oral health services.

Oral Health in Primary Care: Global Patterns of Policy, Services and Workforce

The survey findings provide insight into how oral health is currently incorporated within primary health care systems across responding member countries. The results presented below examine policy frameworks that enable non-dental providers to contribute to oral health promotion, the availability of publicly funded oral health services within PHC facilities, the types of services delivered at the primary care level, and the availability of workforce data to support planning and service delivery.

Policy and Service Integration of Oral Health in Primary Care

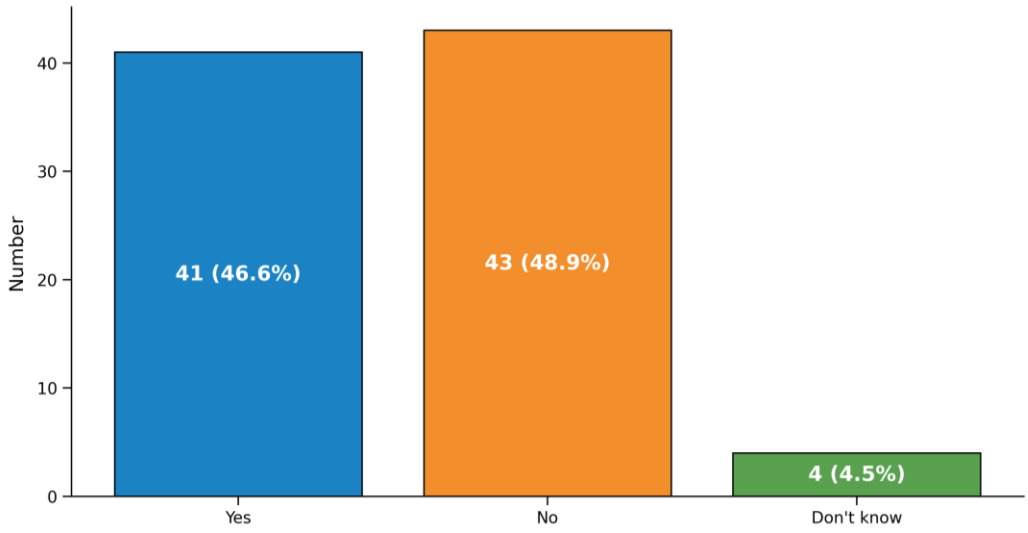


Figure 27- Proportion of responding member countries reporting the existence of national policies or programmes enabling non-dental primary healthcare providers to deliver basic oral health interventions (yes, no, don't know; n = 88)

Respondents were asked whether national policies or programmes exist that encourage non-dental primary healthcare providers to deliver brief oral health interventions, such as providing oral hygiene advice or preventive guidance during routine consultations. Responses from the mid-term survey indicate that such policies remain unevenly established across responding countries. Overall, 46.6% of respondents reported the presence of policy frameworks enabling non-dental providers to contribute to oral health promotion, while a similar proportion (48.9%) indicated that no such policies exist. These findings suggest that the integration of basic oral health promotion within routine primary care practice remains inconsistent across many health systems.

When compared with the baseline survey, where 59.7% of responding countries reported the existence of such policies, the mid-term findings appear somewhat lower. This difference may partly reflect changes in the number and composition of responding countries, as well as the refined wording of the mid-term question, which specifically referred to non-dental primary healthcare providers. These findings suggest that although task-sharing within PHC is increasingly recognised as an important strategy for improving access to preventive oral health services, formal policy support for such approaches remains uneven globally.

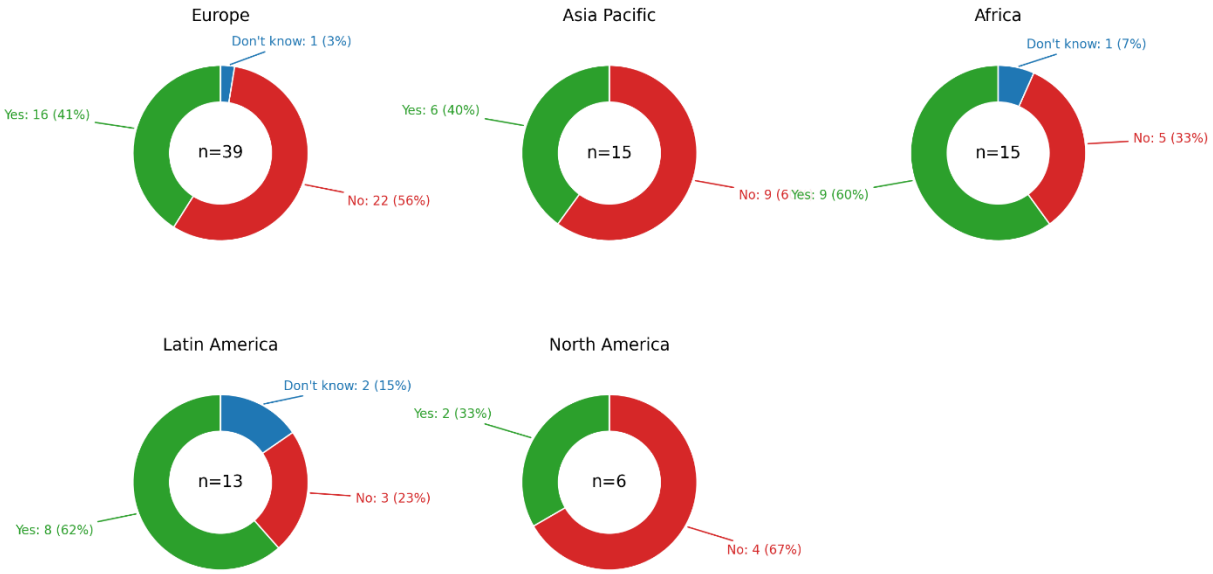


Figure 28- Regional distribution of national policies or programmes enabling non-dental primary healthcare providers to deliver oral health interventions

Regional responses reveal differing levels of policy adoption. In Europe and the Asia-Pacific region, a larger share of respondents reported that national policies enabling non-dental providers are not yet in place. For example, in Europe slightly more than half of respondents (56%) reported the absence of such policies. In contrast, respondents from Africa and Latin America more frequently reported the existence of supportive programmes, with approximately three-fifths of respondents in these regions indicating that national initiatives encourage non-dental providers to deliver oral health interventions.

Experiences from national programmes illustrate how such policies can strengthen oral health service delivery within PHC systems. Evidence from sub-Saharan Africa demonstrates that training community health workers, nurses and other primary care personnel can significantly improve oral health knowledge, enable basic oral examinations and facilitate referral pathways within routine primary care services.[39] Similarly, policy initiatives in the United States show how government programmes can support preventive oral health services delivered by medical providers. Several state Medicaid programmes reimburse primary care providers for delivering services such as oral screening, counselling, referrals and fluoride varnish application during routine medical visits. Over time, the adoption of these policies expanded considerably across states, reflecting growing recognition of the role of primary care providers in improving access to preventive oral health services for children.[40] Evidence further indicates that policies requiring oral health training for medical providers strengthen these programmes, with states implementing training requirements reporting higher rates of children receiving preventive oral health services during medical visits.[41]

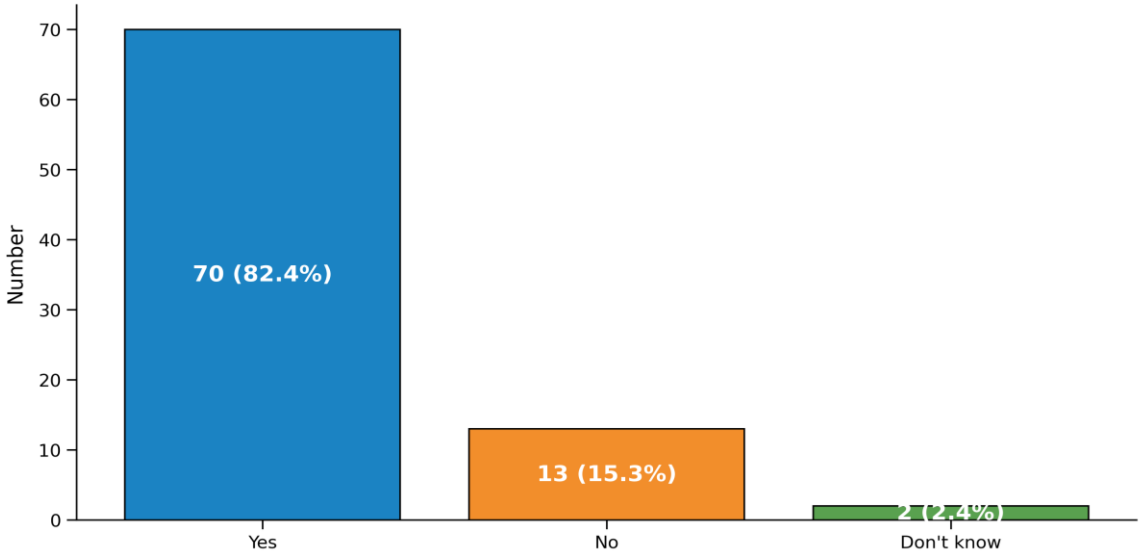


Figure 29- Distribution of responding member countries reporting the availability of publicly funded oral healthcare services at the primary healthcare level (yes, no, don't know; n = 85)

Building on the policy environment that enables non-dental providers to contribute to oral health promotion within primary care, the survey also explored whether publicly funded oral healthcare services are available within primary healthcare facilities, such as community clinics or walk-in primary care centres. Among the responding countries, the majority reported that publicly funded oral health services are available within PHC settings. Overall, 82.4% of respondents indicated that such services are provided through primary care facilities, suggesting that PHC platforms frequently serve as an entry point for preventive and basic curative oral healthcare.

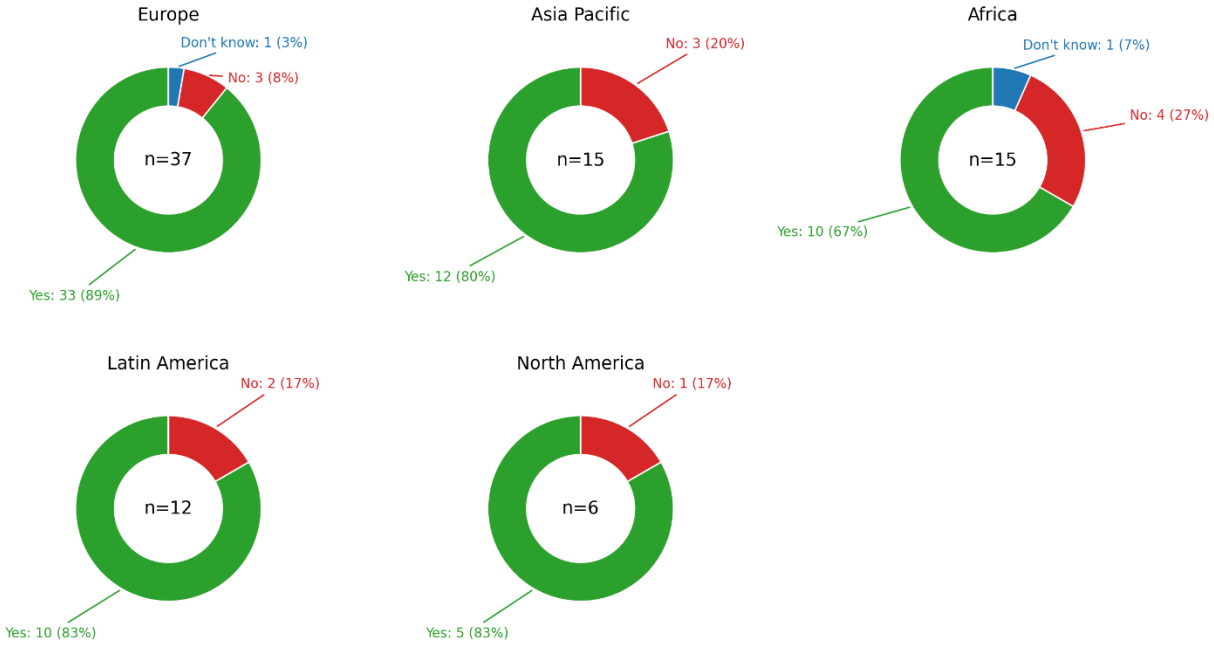


Figure 30- Regional distribution of responses on the availability of publicly funded oral healthcare services at the primary healthcare level

This pattern is broadly reflected across regions, although the extent of service availability varies. In Europe, a large majority of respondents (approximately 89%) reported that publicly funded oral health services are available within PHC facilities. Similarly, high proportions were reported in Latin America and North America. In the Asia-Pacific region, four out of five respondents indicated that such services are available. Although responses from Africa showed greater variation, most respondents from the region also reported the presence of publicly funded oral health services at the primary care level.

Experiences from national health systems illustrate how such service models operate in practice. In Brazil, the National Oral Health Policy "Smiling Brazil" (Brasil Sorridente) integrated oral health teams into the country's primary healthcare network through the Family Health Strategy. Under this model, dentists and oral health auxiliaries are embedded within primary health units to provide preventive care, oral health promotion, diagnosis and basic treatment services as part of publicly funded primary healthcare provision.[42] The programme significantly expanded access to dental services across Brazil's public health system and is widely cited as an example of how integrating oral health into primary care can improve population access to publicly financed services.

A comparable model exists in Thailand, where oral health services are included within the country's Universal Coverage Scheme (UCS), commonly referred to as the "Gold Card" system. Introduced in 2002, the scheme provides tax-funded health coverage for most of the population and includes a package of essential dental services delivered through government health facilities, including district hospitals and primary healthcare centres. Evidence suggests that integrating dental services within Thailand's universal health coverage framework has improved access to preventive and basic dental services through publicly funded facilities, particularly for populations that previously faced financial barriers to care.[43,44] At the same time, ongoing policy debates highlight the importance of ensuring that such coverage models remain financially sustainable as service demand increases.[45]

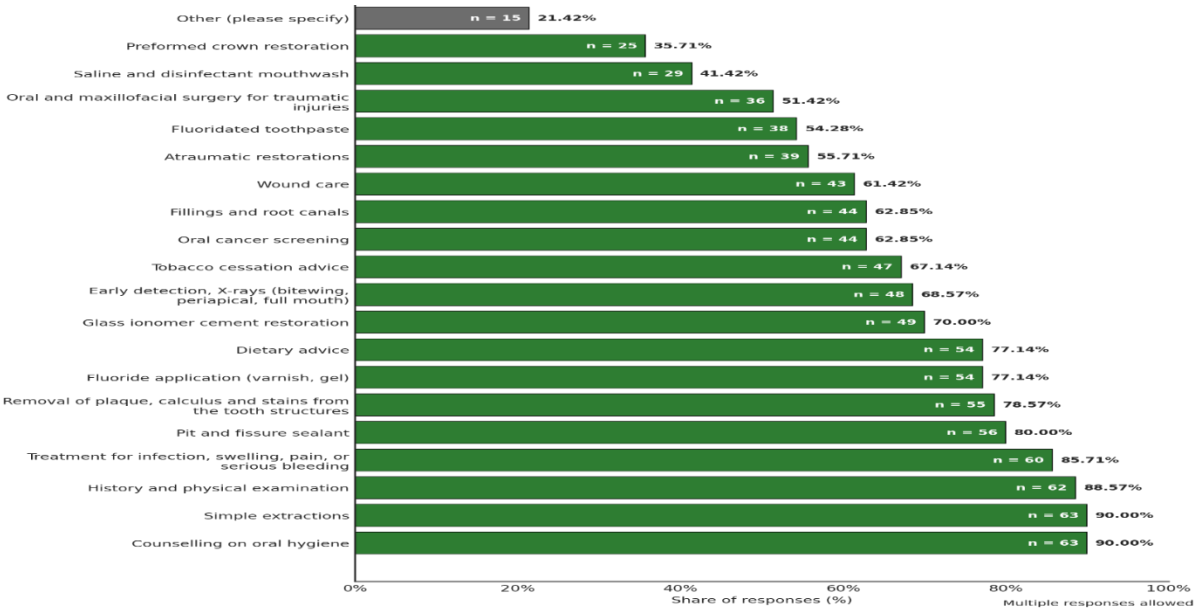


Figure 31- Distribution of oral health services available at the primary healthcare level as reported by responding member countries (multiple responses allowed)

Respondents were also asked which types of oral health services are typically available within PHC facilities. Across responding countries, preventive and basic curative services appear to form the core of oral health service delivery at the primary care level. Counselling on oral hygiene and simple tooth extractions were among the most frequently reported services, each reported by approximately 90% of respondents. Other commonly available services included clinical examination and management of infections or dental pain.

Preventive interventions were also widely reported, including pit and fissure sealants, removal of plaque and calculus, fluoride application and dietary advice. In contrast, more specialised restorative or surgical procedures were reported less frequently. For example, procedures such as atraumatic restorations, oral and maxillofacial surgery for traumatic injuries and preformed crown restorations were available in fewer responding countries. These findings broadly reflect the principle underlying primary oral health care models, in which preventive services, early diagnosis and basic treatment are delivered at community or primary care facilities, while more complex interventions are referred to higher levels of the health system.[46]

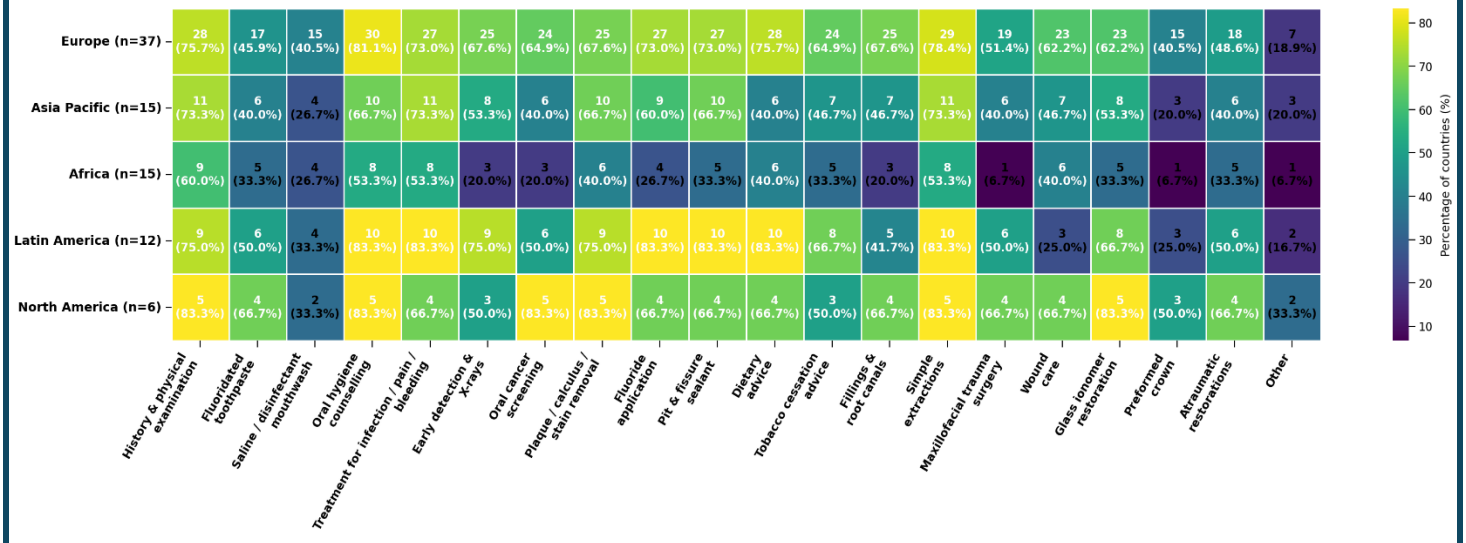


Figure 32- Regional distribution of oral health services available at the primary healthcare level as reported by responding member countries

Regional patterns indicate that core preventive services are widely reported across responding countries, although the breadth of services available varies. Counselling on oral hygiene, for instance, was reported by a majority of respondents in Europe, Latin America and North America, while responses from Africa indicated somewhat lower availability. Preventive services such as pit and fissure sealants also showed regional variation, appearing more frequently in some regions than others. These patterns reflect differences in health system capacity and workforce availability across countries, although regional comparisons should be interpreted as descriptive observations rather than direct statistical comparisons.

Country-level studies provide further insight into how these patterns may manifest within health systems. For example, an assessment of public sector dental services in Andhra Pradesh, India found that only 18 of 95 primary healthcare facilities surveyed provided dental services, and those services were largely limited to basic procedures such as extractions and

emergency care.[47] Similar findings have been reported in Pakistan, where oral healthcare provision within the primary care system is available in only a small proportion of facilities and tends to focus on basic curative services rather than comprehensive dental care.[44]

In the baseline survey, information on PHC oral health services was collected through open-ended responses, which revealed considerable variation in the services reported by countries. In contrast, the mid-term survey introduced structured response options, allowing for a more systematic assessment of preventive and basic treatment services delivered through PHC platforms across responding member countries.

Oral Health Workforce and Data for Primary Care Planning

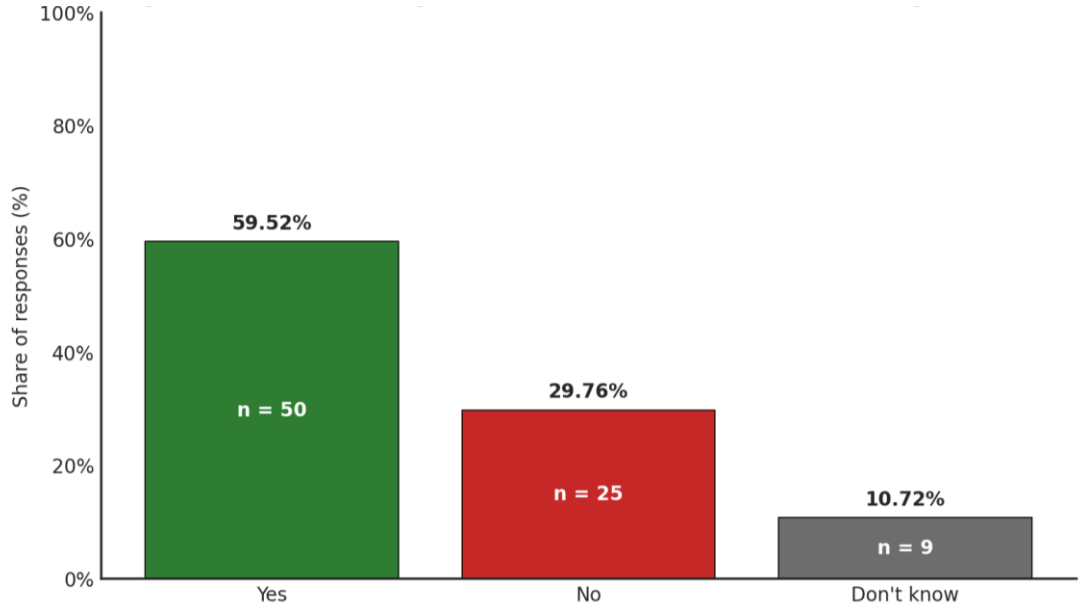


Figure 33- Distribution of responding member countries reporting availability of national data on the density or distribution of dentists working at the primary healthcare level (yes, no, don't know)

Effective integration of oral health within PHC systems also depends on the availability of workforce data to support planning and service delivery. Respondents were therefore asked whether their countries collect data on the density or distribution of dentists working at the PHC level. Overall, approximately six in ten respondents (59.5%) reported that such data are available. However, nearly one-third indicated that these data are not collected, while a smaller proportion were unsure, suggesting that workforce monitoring systems remain unevenly developed across countries.

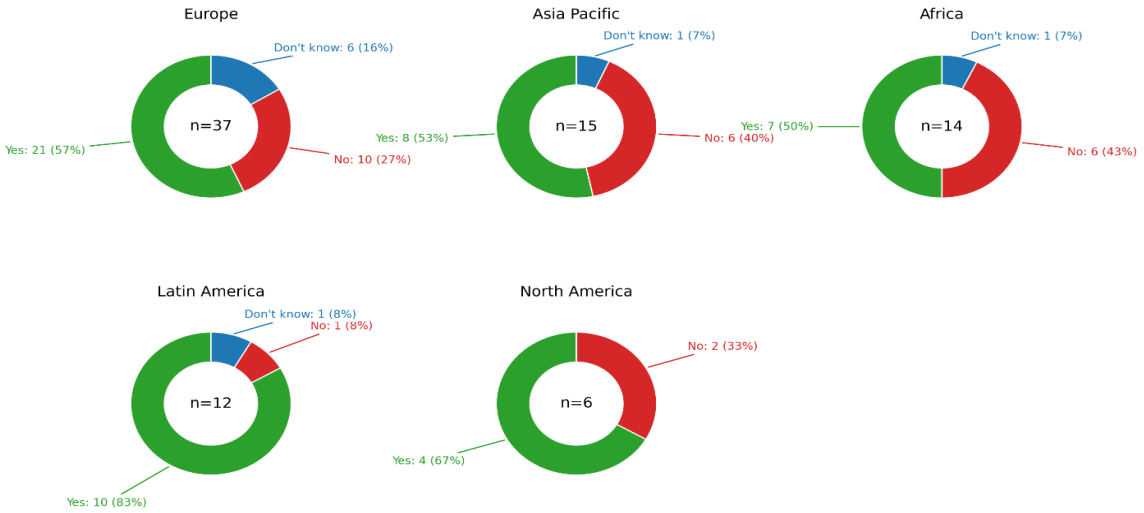


Figure 34- Regional Distribution of Responding Member Countries Reporting the Availability of data on dentists at the primary healthcare level

Regional responses illustrate some variation in data availability. Respondents from Latin America and North America most frequently reported having workforce data for dentists working within PHC facilities, whereas responses from Europe, Asia-Pacific and Africa indicated somewhat lower levels of data availability. Although these findings suggest growing recognition of the importance of workforce monitoring, they also highlight continuing gaps in information systems needed to support workforce planning.

Evidence from global workforce research underscores why such data are important. Analyses estimate that there are approximately 3.3 dentists per 10,000 population worldwide, but with substantial regional disparities. Dentist density ranges from around 5.91 per 10,000 population in the WHO European Region to only 0.44 per 10,000 in the African Region, illustrating significant inequalities in workforce availability.[48] Studies also consistently highlight the uneven distribution of dentists within countries, particularly the concentration of oral health professionals in urban areas, which can limit access to care in rural and underserved communities.[48]

Additional survey responses examined the coverage of oral healthcare services and the distribution of the oral health workforce across public and private sectors.

Population Coverage and Workforce Distribution

Population Coverage

Table 3: Percentage of population covered by Public Oral Healthcare and Private Oral Healthcare

Source of Oral healthcare coverage for population	Total number of responses (n value)	Average percentage of population covered (average of percentages recorded in open ended responses)
Public Oral Healthcare coverage	58	49%
Private Oral Healthcare coverage	52	44%

Survey responses suggest that public oral healthcare coverage varies widely across countries, with some health systems providing coverage to large segments of the population through publicly funded programmes, while others rely more heavily on private insurance or out-of-pocket payment. In many countries, public oral healthcare coverage focuses on specific population groups such as children or vulnerable populations, while private insurance schemes may cover additional services or population groups.

Workforce Distribution

Table 4: Percentage of practicing dentists working in the public and private sector across member countries

Percentage of practicing dentists working across sectors	Total number of responses (n value)	Average percentage of dentists working across sectors in the responding member countries
Public Sector	58	27%
Private Sector	59	69%

Responses also illustrate differences in how the oral health workforce is distributed between public and private sectors. In several responding countries, a substantial share of dentists practice within the private sector, reflecting broader global trends in oral healthcare delivery. Public sector employment of dentists, including within PHC facilities, remains essential for expanding access to services for populations that rely on publicly funded healthcare systems.

Global density and regional distribution of the oral health workforce

Table 5: Percentage of the oral health workforce (including dentists and non-dental oral health workers) based in rural areas vs urban areas across member countries

Percentage of the oral health workforce (including dentists and non-dental oral health workers)	Total number of responses (n value)	Average percentage of oral health workforce based in rural vs urban areas in the responding member countries
Rural Areas	65	25%
Urban Areas	65	68%

Finally, respondents provided estimates of the geographic distribution of the oral health workforce. On average, approximately 67.9% of oral health professionals were reported to be located in urban areas, compared with only 25.2% in rural areas. This pattern reflects a well-documented global challenge in oral health workforce distribution, whereby dental professionals are disproportionately concentrated in urban settings, contributing to reduced service availability in rural and underserved communities.[48]

Country-level studies further illustrate how workforce availability can influence service delivery within PHC systems. Evidence from India highlights both workforce and system-level constraints affecting oral healthcare provision at the primary care level. One study examining community health centres in South India found that although facilities often had a dentist and

basic equipment, the range of services remained limited due to infrastructural constraints, lack of dental X-ray facilities, shortages of supporting staff such as dental hygienists and assistants, and supply chain challenges for essential materials.[49] Another study examining primary health centres reported that only 18 of 65 facilities had a dedicated dental unit with a dentist, while most centres relied on medical officers to manage dental complaints or provide symptomatic treatment before referral.[50]

The open-ended responses further highlight that efforts to integrate oral health into primary healthcare systems are often driven by task-sharing approaches, where non-dental providers such as nurses, community health workers, and general practitioners are engaged in delivering basic oral health interventions. Respondents described programmes focused on oral health education, early detection, and referral pathways, reflecting a growing recognition of primary care as an entry point for preventive oral health services. However, these initiatives are frequently constrained by limited training, insufficient resources, and weak institutional support, particularly in settings where formal policies are absent or underdeveloped. In parallel, responses related to workforce data reveal significant gaps in the availability and quality of information on dentist distribution, especially at the primary care level. Where data do exist, they often point to pronounced urban-rural disparities, with a concentration of providers in urban areas and limited access in rural or underserved regions. Together, these findings suggest that while service-level integration is advancing in some contexts, it is not yet consistently supported by robust policy frameworks or workforce planning systems, limiting the scalability and sustainability of primary oral healthcare models.

Overall, these findings suggest that improving oral health service availability at the primary healthcare level requires not only sufficient numbers of dentists, but also stronger workforce data systems, supportive infrastructure, and broader oral health workforce capacity, including trained non-dental health personnel who can support prevention, early detection and referral within PHC settings.[51]

Strengthening Primary Oral Health Care: Insights and Future Directions

While the survey provides valuable insights into service availability and workforce distribution within primary healthcare (PHC) systems, two additional dimensions may further strengthen the understanding of how primary oral health care is implemented in practice.

First, workforce assessments increasingly recognise the importance of examining gender distribution within the oral health workforce. Although the proportion of women entering dentistry has grown in many regions, women remain underrepresented in leadership, academic and research positions within the profession.[52,53] Beyond representation, gender composition can also influence patterns of service delivery. Evidence suggests that gender diversification within the profession is reshaping dental practice models, with female dentists more likely to work in metropolitan settings, practice part-time, or provide care for publicly insured and paediatric populations, factors that can directly influence workforce distribution and access to services.[54] In this context, incorporating gender-sensitive workforce indicators within surveys could provide valuable insight into how workforce composition may shape service delivery and access to care.

Second, while the survey explored the range of oral health services available at the PHC level, it did not explicitly assess whether countries are implementing a structured Basic Package of Oral Care (BPOC). The BPOC framework was designed to support the delivery of essential oral health services in resource-constrained settings through three core components: Oral Urgent Treatment (OUT), Affordable Fluoride Toothpaste (AFT), and Atraumatic Restorative Treatment (ART).[55] Developed specifically to align with primary health care systems, this framework emphasises low-cost preventive and basic treatment interventions that can be delivered within community and PHC settings, including by appropriately trained non-dental personnel.[55,56]

Explicitly examining the adoption of BPOC or similar essential service packages could therefore provide additional insight into how countries operationalise primary oral health care within PHC systems. While the survey captures the availability of individual services, structured frameworks such as BPOC offer a clearer lens through which to assess whether those services form part of a coherent strategy for delivering essential oral health interventions.

To summarise, the findings of this chapter illustrate that many countries are making progress toward integrating oral health within primary healthcare systems, particularly through the availability of publicly funded services at the PHC level and the delivery of preventive and basic curative interventions within primary care facilities. At the same time, important variations remain across policy frameworks, workforce capacity and service availability between countries and regions. Strengthening policy support for task-sharing, improving workforce data systems and ensuring that essential preventive and treatment services are consistently available at the PHC level will be key to advancing the integration of oral health within primary health care.

As global health policy continues to emphasise PHC as the foundation for achieving universal health coverage, integrating essential oral health services within primary care platforms will remain a critical priority. Continued monitoring of policy implementation, service delivery models and workforce capacity, alongside emerging considerations such as gender dynamics within the profession and the adoption of structured essential service frameworks, can help support countries in translating global commitments on oral health into accessible, equitable and sustainable care at the primary healthcare level.

Chapter 5

Addressing common risk factors

Key Highlights

- 64.8% of responding countries reported national policies or regulations to limit sugar intake, compared with 33.3% at baseline in 2021.
- Public health education campaigns were the most commonly reported intervention (66.1%) among countries implementing sugar reduction policies.
- Taxes on sugar-sweetened beverages were reported by 50.8% of countries, while 49.2% reported front-of-pack nutrition labelling systems.
- Restrictions on marketing unhealthy foods to children were reported by 37.3% of countries, and 33.9% reported bans on sugar-sweetened beverages in schools.
- Mandatory reformulation policies to reduce sugar content were reported by 13.6% of countries, making them the least frequently reported measure.
- 59.3% of countries reported scientific studies evaluating the impact of sugar reduction strategies, while 15.3% reported none and 25.4% were unsure.
- 47.9% of countries reported programmes supporting oral health professionals to provide dietary advice on sugar reduction, while 36.6% reported none.
- 64.3% of responding countries reported needing additional capacity building to strengthen advocacy for sugar reduction policies.

5 A- Sugar Consumption and Oral Health: A Global Public Health Challenge

Background and Rationale

Excessive consumption of dietary sugars is widely recognised as a central driver of oral disease and a significant contributor to the broader burden of non-communicable diseases (NCDs). Among oral conditions, dental caries has consistently been identified as the disease most directly associated with sugar intake. A comprehensive systematic review conducted to inform the development of the World Health Organisation (WHO) guideline on sugar consumption concluded that the majority of available studies demonstrate a positive association between sugars intake and dental caries outcomes across both children and adults.[57]

This relationship is further characterised by evidence of a dose-response pattern, whereby higher levels of sugar consumption are associated with greater caries experience over time. Evidence underpinning the WHO guideline demonstrates a dose-response relationship between free sugars consumption and dental caries, with lower levels of disease observed in populations consuming less than 10% of total energy from free sugars.[57,58]

Within public health discourse, the significance of sugar consumption extends beyond oral health alone. The common risk factor approach recognises that several major chronic diseases share underlying behavioural determinants, including dietary practices, tobacco use and alcohol consumption. Excessive intake of free sugars occupies a particularly prominent position within this constellation of shared risks. High sugar consumption contributes not only to dental caries but also to obesity and related metabolic conditions, which in turn increase the risk of cardiovascular disease, type 2 diabetes and other non-communicable diseases.[58,59] In this context, dental caries may serve as an early and visible manifestation of dietary patterns that also predispose individuals and populations to broader systemic health outcomes.[58]

The scale of the global burden associated with dental caries underscores the importance of addressing these shared risk factors. According to the Global Burden of Disease Study, untreated caries of permanent teeth affected approximately 2 billion people worldwide, making it the most prevalent health condition globally, while caries of deciduous teeth affects hundreds of millions of children.[60] Despite modest reductions in age-standardised prevalence in some settings, the absolute number of cases continues to rise, largely driven by population growth and persistent inequalities in oral health determinants. The continued rise in absolute case numbers reflects the cumulative nature of dental caries across the life course, where prolonged exposure to dietary sugars contributes to increasing disease burden over time.[61]

The health consequences of sugar-related oral diseases also translate into significant economic costs. Global modelling analyses have estimated that oral diseases attributable to the consumption of free sugars account for approximately 4.1 million disability-adjusted life years (DALYs) worldwide and generate an estimated USD 172 billion in annual economic costs, reflecting both direct treatment expenditures and productivity losses.[62] These findings highlight the substantial economic implications of sugar-related oral diseases for health systems and national economies.

Recognition of the health risks associated with excessive sugar consumption has prompted the development of global dietary recommendations aimed at reducing population exposure to free sugars. The WHO guideline on sugars intake recommends that adults and children reduce their intake of free sugars to less than 10% of total energy intake, with a further reduction to below 5% of total energy intake suggested for additional health benefits, particularly for dental caries prevention.[27] Central to this guidance is the definition of 'free sugars,' which includes monosaccharides and disaccharides added to foods and beverages by manufacturers, cooks or consumers, as well as sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates. This definition explicitly excludes intrinsic sugars found in intact fruits and vegetables and lactose present in milk.[27]

The distinction between free sugars and intrinsic sugars is particularly important in contemporary food environments, where a substantial proportion of sugar intake occurs through processed foods and beverages in which sugars may be less visible to consumers. As a result, reducing sugar consumption cannot rely solely on individual behavioural change but requires broader policy measures that address structural determinants within food systems, including the availability, marketing and affordability of sugar-rich foods.[27,63]

Key Dimensions of National Responses to Sugar Consumption

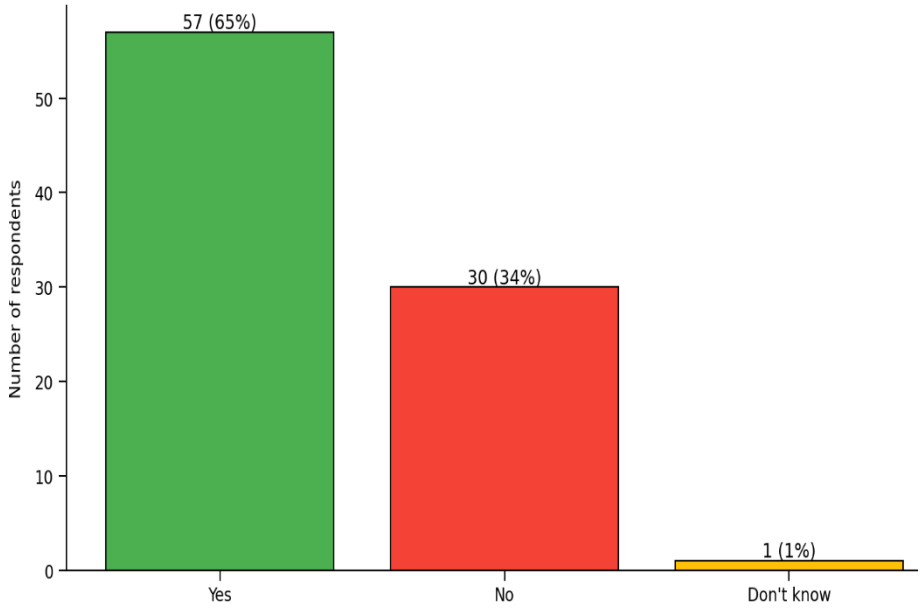
Translating scientific evidence on sugar consumption into effective public health action requires coordinated efforts across several domains. Governments may adopt national policy measures aimed at reducing sugar consumption at the population level, including fiscal policies such as taxes on sugar-sweetened beverages, front-of-pack nutrition labelling, marketing restrictions targeting children and reformulation initiatives within the food industry.[2] The effectiveness of such policies also depends on the availability of scientific evidence capable of monitoring and evaluating their impact on dietary behaviours and health outcomes.[2] In addition, sustained progress in reducing sugar consumption often requires advocacy and capacity building, including the engagement of healthcare professionals, professional organisations and civil society actors in promoting evidence-based policy approaches.

Dental organisations play an important role in supporting population-level strategies to reduce sugar consumption. Oral health professionals routinely observe the clinical consequences of sugar-related disease and are therefore well positioned to communicate the health implications of excessive sugar intake to both policymakers and the public. Their involvement in policy advocacy, professional education and public health initiatives can contribute to strengthening national responses to sugar consumption as a shared risk factor for oral and systemic disease.[64]

The FDI Vision 2030 mid-term survey provides valuable insights into how national dental organisations are engaging with sugar reduction as a public health priority. The survey explores several dimensions of this issue, including the presence of national sugar reduction policies, the availability of scientific studies evaluating the impact of such policies, and the advocacy priorities and capacity needs of dental organisations working to address excessive sugar consumption. The following sections present the findings of this survey and examine how they reflect broader patterns of policy adoption, evidence generation and advocacy engagement across regions.

From Awareness to Action: National Policy Responses to Sugar Consumption

The mid-term survey examined whether countries have adopted national policies or regulatory measures aimed at reducing population-level sugar consumption. Such policies represent an important component of public health strategies addressing dental caries and other diet-related non-communicable diseases. As highlighted in global health policy frameworks, excessive sugar consumption is shaped not only by individual dietary choices but also by the broader food environment, including product formulation, marketing practices and food pricing structures.[27,63] For this reason, population-level interventions such as taxation of sugar-sweetened beverages, front-of-pack nutrition labelling and restrictions on the marketing of unhealthy foods are increasingly recognised as important policy tools for reducing sugar intake across populations.



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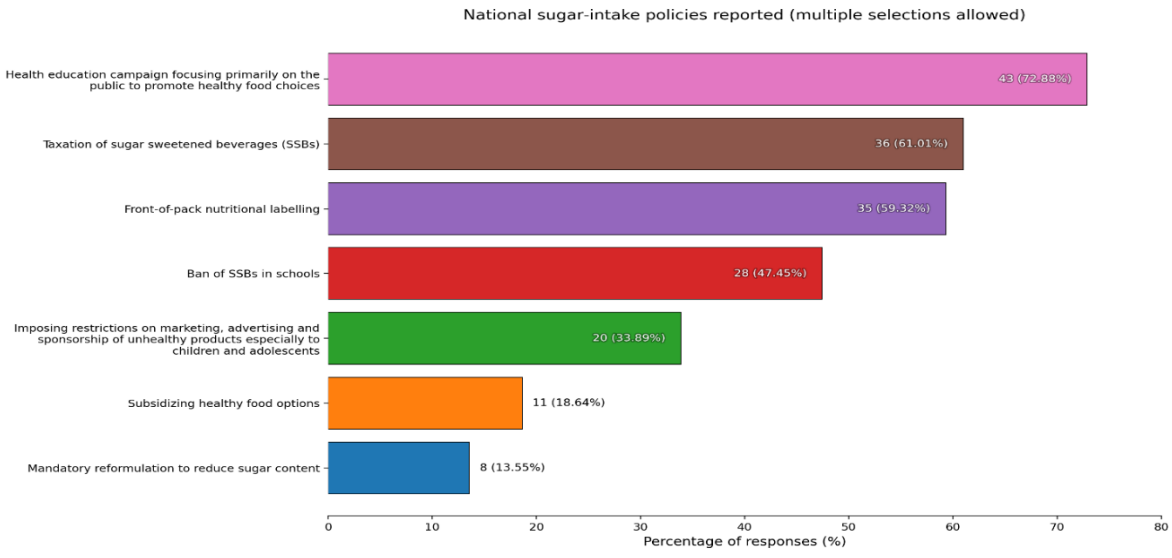

B)

Figure 35. A) Proportion of responding countries reporting the presence of national policies or regulations aimed at limiting sugar intake;

B) Types of national policy measures reported to reduce sugar intake, including education campaigns, taxation of sugar-sweetened beverages, front-of-pack nutrition labelling and marketing restrictions

Survey responses from 88 countries indicate that 64.8% reported the presence of national policies or regulations designed to limit sugar intake, while 34.1% reported that no such policies exist and a small proportion indicated uncertainty. This represents a substantial increase compared with the baseline survey conducted in 2021, where only 33.3% of countries reported established national policies aimed at limiting sugar consumption. The difference may partly reflect the larger number of responding member countries in the mid-term survey. However, it may also indicate growing policy engagement with sugar reduction measures, influenced by increased global attention to sugar as a shared risk factor for oral diseases and other non-communicable diseases.

Among countries reporting policy measures, public health education campaigns promoting healthier dietary choices were the most frequently cited intervention (66.1%). Fiscal measures such as taxation of sugar-sweetened beverages were reported by approximately half of respondents (50.8%), while front-of-pack nutrition labelling systems were reported by 49.2%. Additional policy measures included restrictions on the marketing of unhealthy foods to children (37.3%) and bans on sugar-sweetened beverages in schools (33.9%). Mandatory product reformulation policies aimed at reducing sugar content were reported less frequently (13.6%). The prominence of education-based interventions reflects a long-standing tendency in public health to focus on individual behaviour change. However, a growing body of research suggests that dietary behaviours are strongly influenced by broader social and environmental determinants rather than individual knowledge alone. Studies examining the social determinants of sugar consumption highlight the role of socioeconomic conditions, food environments and commercial practices in shaping patterns of sugar intake.[7] Similarly, behavioural research on sugar-sweetened beverage consumption among adolescents and young adults demonstrates that habits, social norms and perceived behavioural control strongly influence consumption behaviour.[65]

Survey findings also reveal important regional differences in the adoption and type of sugar reduction policies implemented across countries.

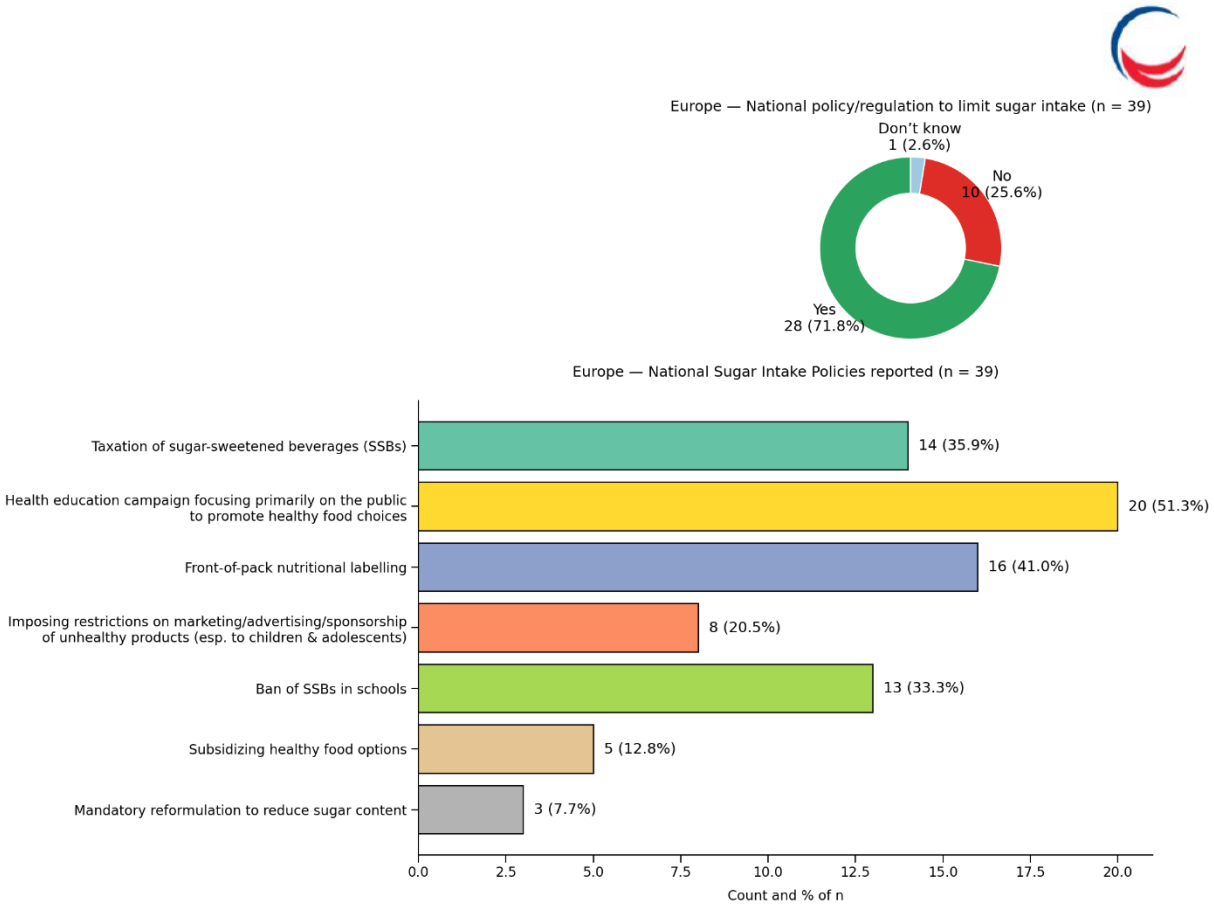

Figure 36- Sugar reduction policies in Europe, showing the proportion of countries reporting national policies to limit sugar intake and the distribution of policy measures implemented within the region

Europe reported the highest proportion of countries with national sugar reduction policies, with 71.8% of respondents indicating the presence of measures aimed at limiting sugar intake. Policy responses in the region most commonly combined public education campaigns with regulatory interventions, including front-of-pack nutrition labelling and taxation of sugar-sweetened beverages. Education campaigns remained the most frequently reported intervention, while labelling systems and fiscal measures were also widely implemented.

These findings suggest that many European countries have adopted multi-component strategies that combine public awareness efforts with regulatory tools aimed at influencing consumer behaviour and product formulation.

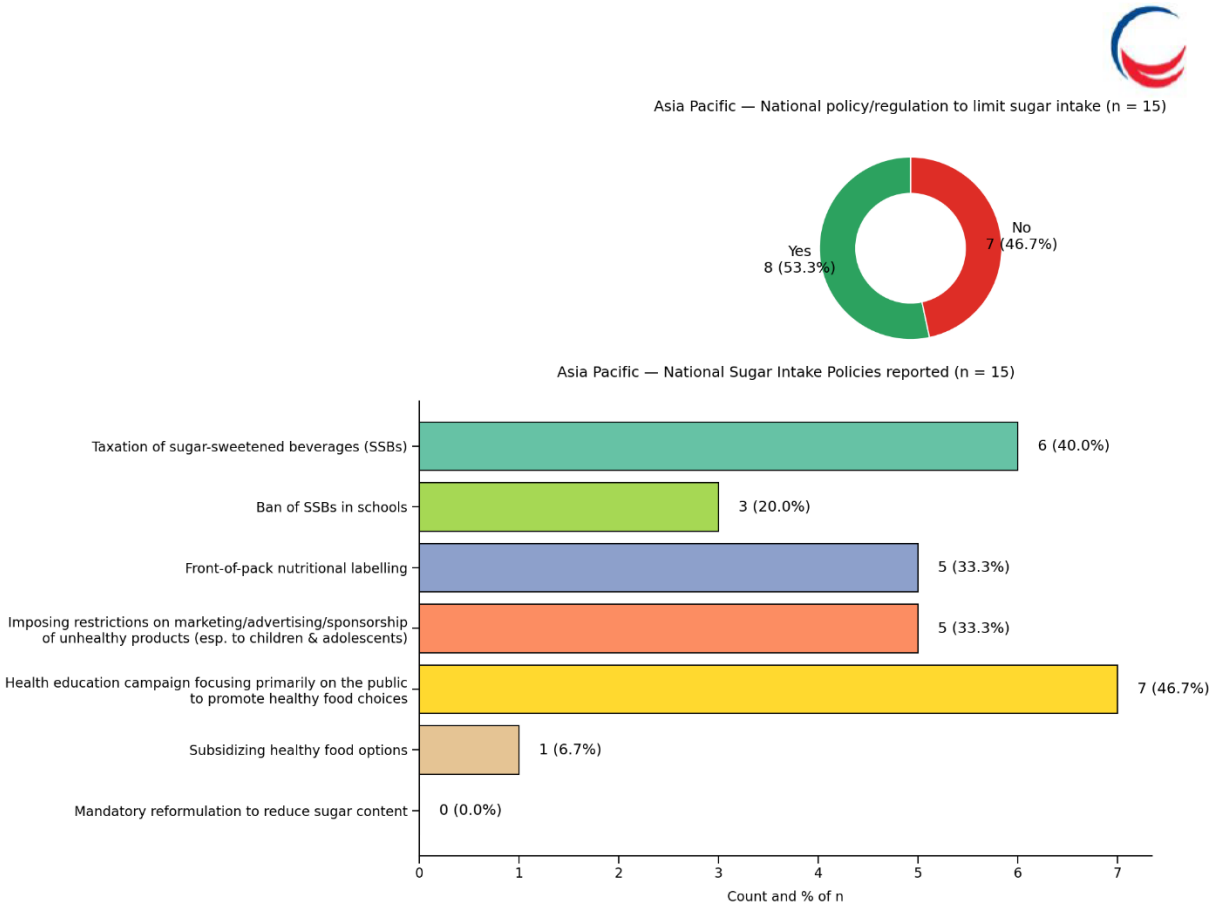

Figure 37- Sugar reduction policies in Asia Pacific, showing the proportion of countries reporting national policies to limit sugar intake and the distribution of policy measures implemented within the region

In the Asia-Pacific region, just over half of responding countries (53.3%) reported national policies aimed at reducing sugar intake. Among those implementing policy measures, education campaigns were again the most frequently reported intervention, often accompanied by taxation of sugar-sweetened beverages and front-of-pack nutrition labelling systems. This pattern reflects policy approaches that combine awareness-raising with selected regulatory interventions. However, the presence of a substantial proportion of countries without national policies suggests that sugar reduction strategies remain unevenly developed across the region.

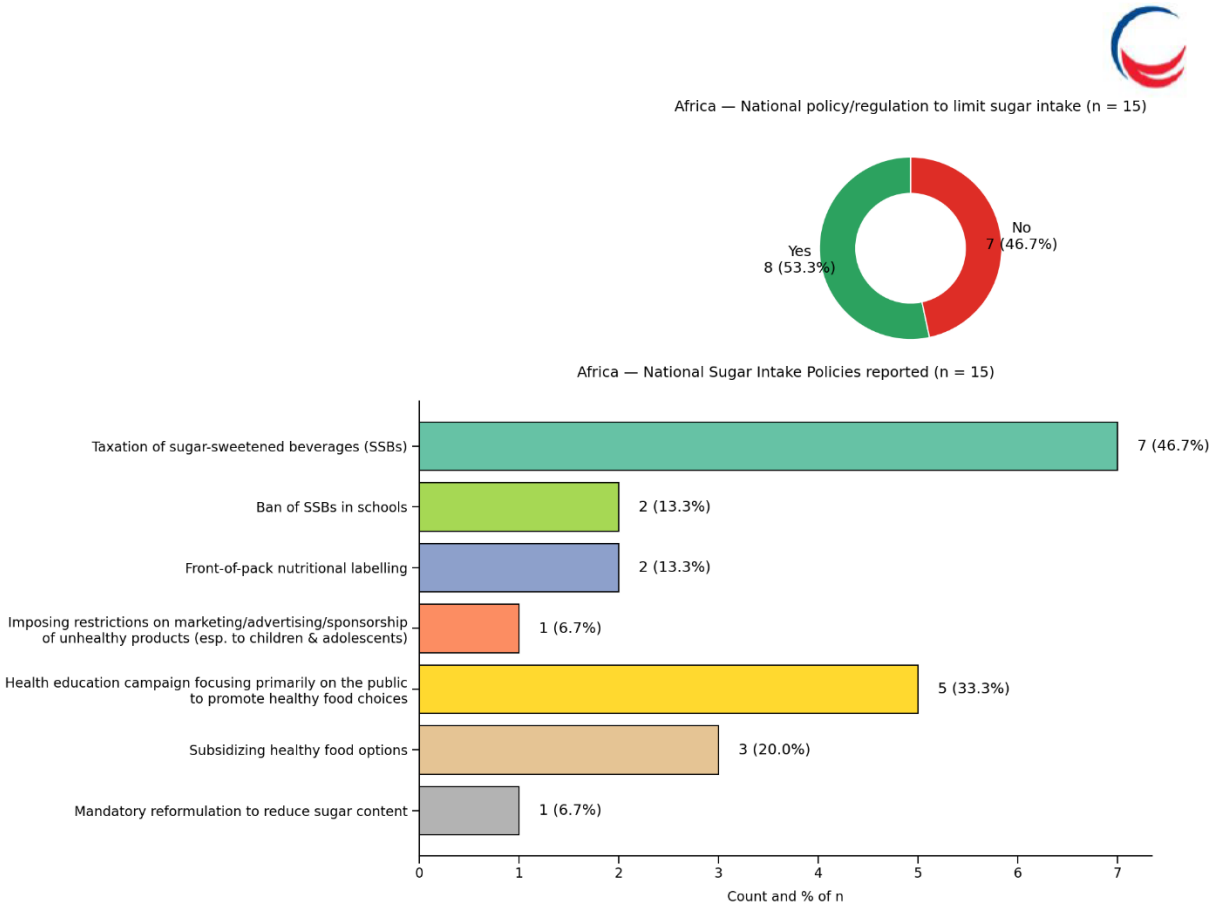

Figure 38- Sugar reduction policies in Africa, showing the proportion of countries reporting national policies to limit sugar intake and the distribution of policy measures implemented within the region

A similar proportion of responding countries in Africa reported national policies to limit sugar consumption (53.3%). However, the distribution of policy tools differed from that observed in other regions. In contrast to Europe and Asia-Pacific, taxation of sugar-sweetened beverages emerged as the most frequently reported policy instrument in African countries. Education campaigns were also reported but appeared less dominant within the regional policy mix. This emphasis on fiscal measures aligns with broader global trends in which sugar-sweetened beverage taxes are increasingly adopted as a policy tool to reduce consumption while generating revenue for public health initiatives.

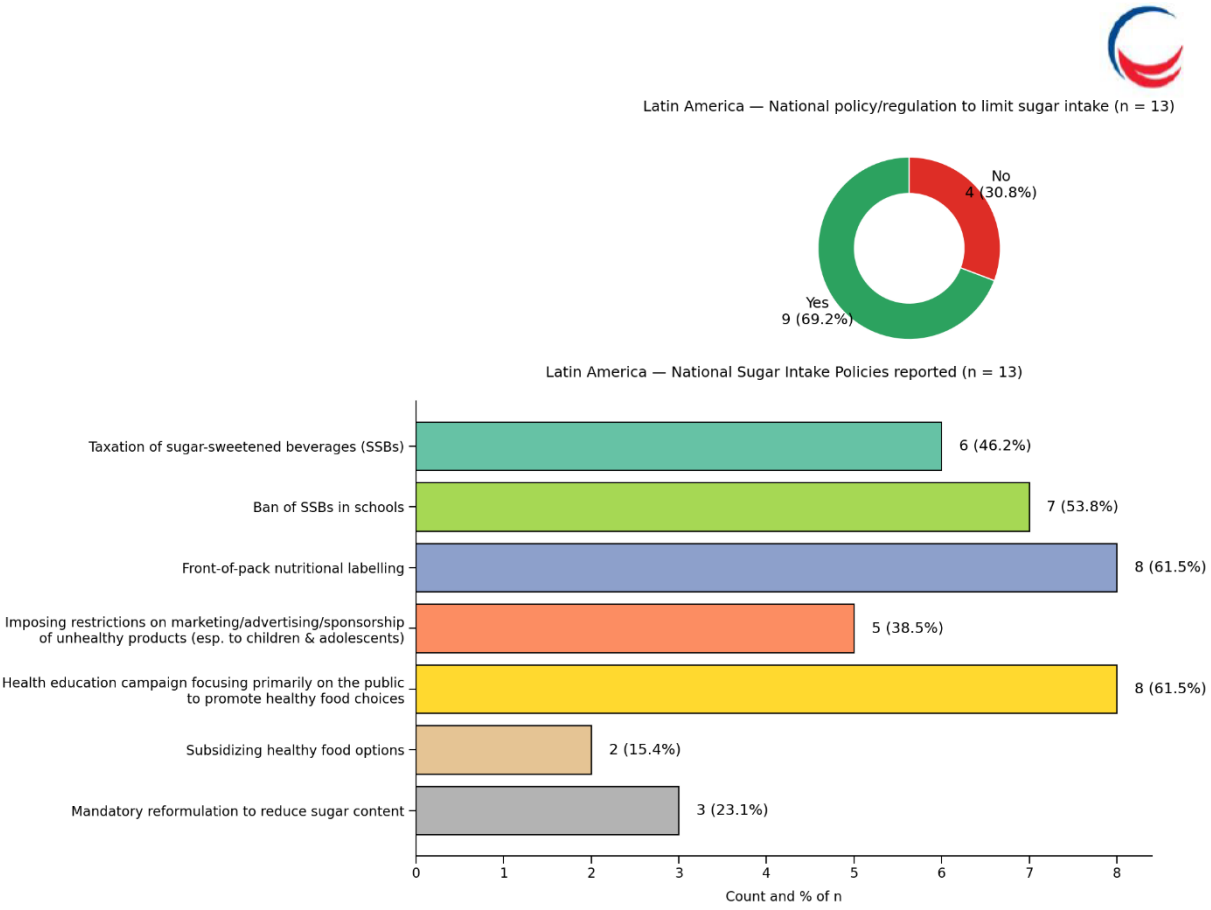

Figure 39- Sugar reduction policies in Latin America, showing the proportion of countries reporting national policies to limit sugar intake and the distribution of policy measures implemented within the region

Latin America demonstrated strong policy engagement, with 69.2% of responding countries reporting national measures aimed at reducing sugar consumption. Notably, front-of-pack nutrition labelling emerged as a particularly prominent policy instrument in the region, reported by 61.5% of responding countries. Education campaigns were also widely implemented, alongside school-based restrictions on sugar-sweetened beverages and taxation measures.

Evidence from Latin America suggests that the responding member countries have adopted system-level policy approaches aimed at reshaping food environments rather than focusing solely on individual behaviour change. Policy analyses examining the development of front-of-pack nutrition labelling across the Americas show that an increasing number of countries have introduced mandatory warning labels to identify products containing excessive levels of sugar, sodium or saturated fat.[66]

Country experiences further illustrate how these policies operate in practice. In Chile and Peru, national legislation introduced mandatory front-of-package warning labels for foods exceeding established nutrient thresholds while simultaneously restricting the marketing of unhealthy foods to children and limiting the sale of such products in school environments.[67] Early evaluations of Chile's food labelling law indicate that warning labels influenced consumer purchasing decisions and prompted reformulation of many processed food products in order to avoid the "high in" warnings required under the regulation. These findings highlight the potential for regulatory policies to influence both consumer behaviour and industry practices.

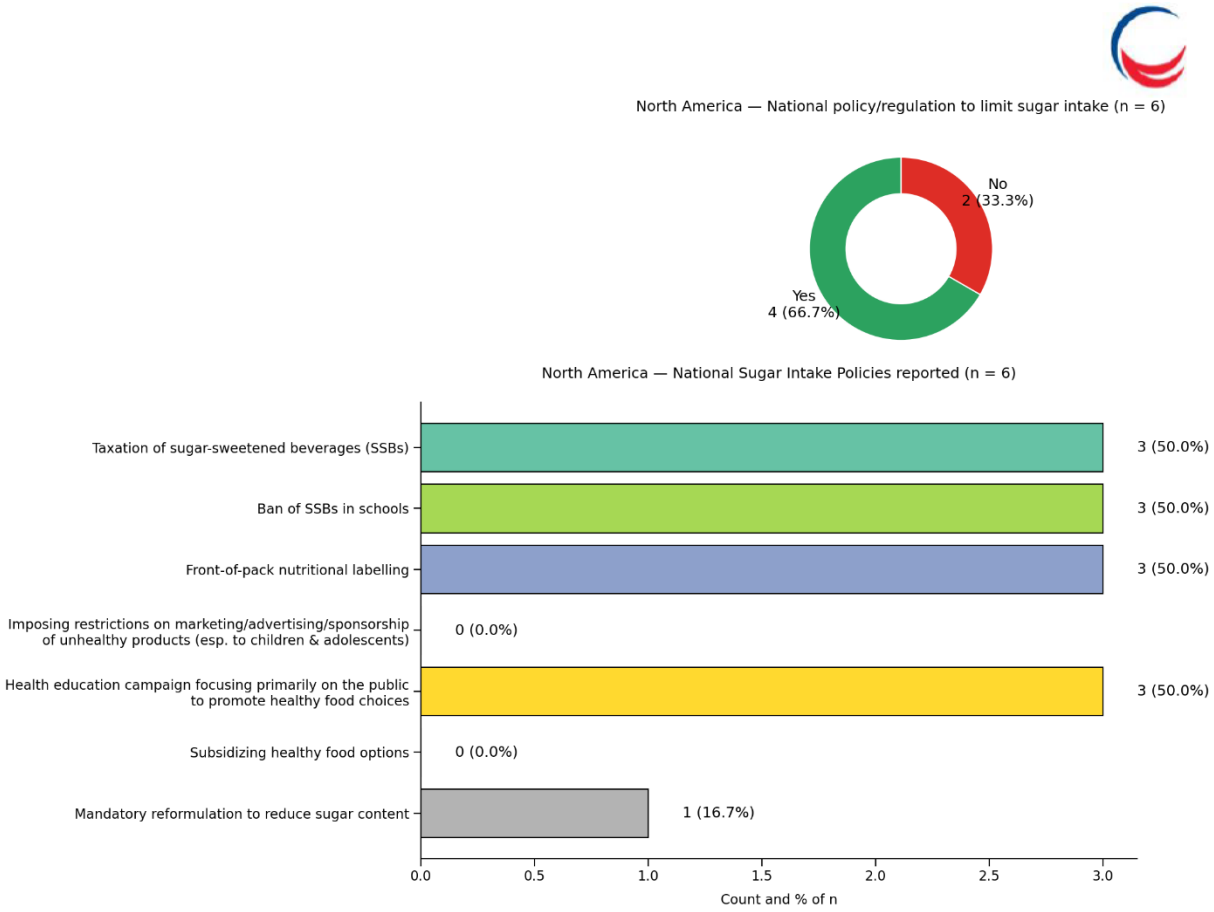

Figure 40- Sugar reduction policies in North America, showing the proportion of countries reporting national policies to limit sugar intake and the distribution of policy measures implemented within the region

In North America, two-thirds of responding countries (66.7%) reported the presence of national policies aimed at limiting sugar intake. Policy responses in the region combine both educational and regulatory approaches, including taxation of sugar-sweetened beverages, front-of-pack nutrition labelling and restrictions on sugary drinks in school environments. Mandatory product reformulation policies were reported less frequently, and no respondents indicated the use of subsidies for healthier foods or restrictions on marketing unhealthy foods to children.

The survey findings demonstrate that while a majority of responding member countries have begun to adopt policies aimed at reducing sugar consumption, the nature and intensity of these policy responses vary substantially across regions. In several regions, policy approaches remain centred on educational strategies designed to influence individual dietary behaviours.

For oral health stakeholders, these findings underscore the importance of continued engagement in policy advocacy aimed at strengthening population-level strategies to reduce sugar consumption. As evidence continues to demonstrate the central role of sugar intake in the development of dental caries and other chronic conditions, system-level interventions that address the commercial and environmental drivers of sugar consumption remain a critical component of global oral health promotion efforts.

Measuring Impact: Scientific Evidence on Sugar Reduction Strategies

Understanding whether sugar reduction policies translate into measurable improvements in oral health outcomes requires scientific studies capable of evaluating their real-world impact. Monitoring and evaluation research plays an essential role in determining whether policy interventions such as taxation, front-of-pack labelling and marketing restrictions lead to reductions in sugar consumption and improvements in oral health indicators.

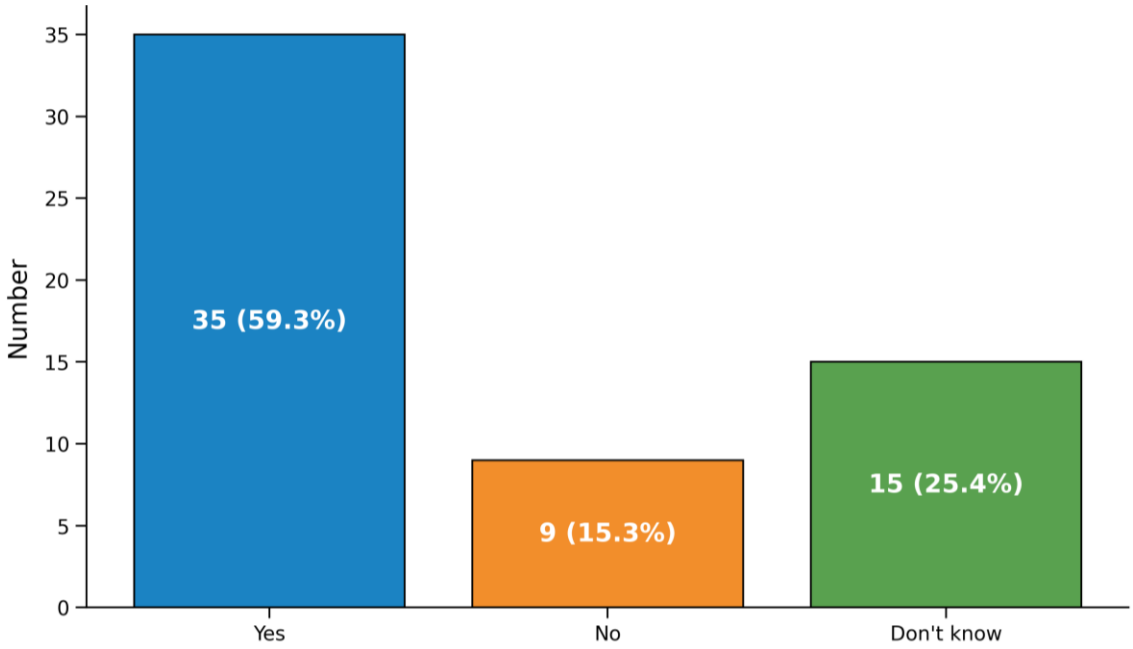

Figure 41- Proportion of responding countries reporting whether scientific studies have been conducted to assess the impact of sugar reduction strategies on oral health (n=59)

Figure 41 presents responses to the survey question on whether scientific studies have been conducted to assess the impact of sugar reduction strategies on oral health. Across responding countries, 59.3% reported that scientific studies have been conducted to assess the impact of sugar reduction strategies on oral health, while 15.3% reported that no such studies exist and 25.4% indicated uncertainty.

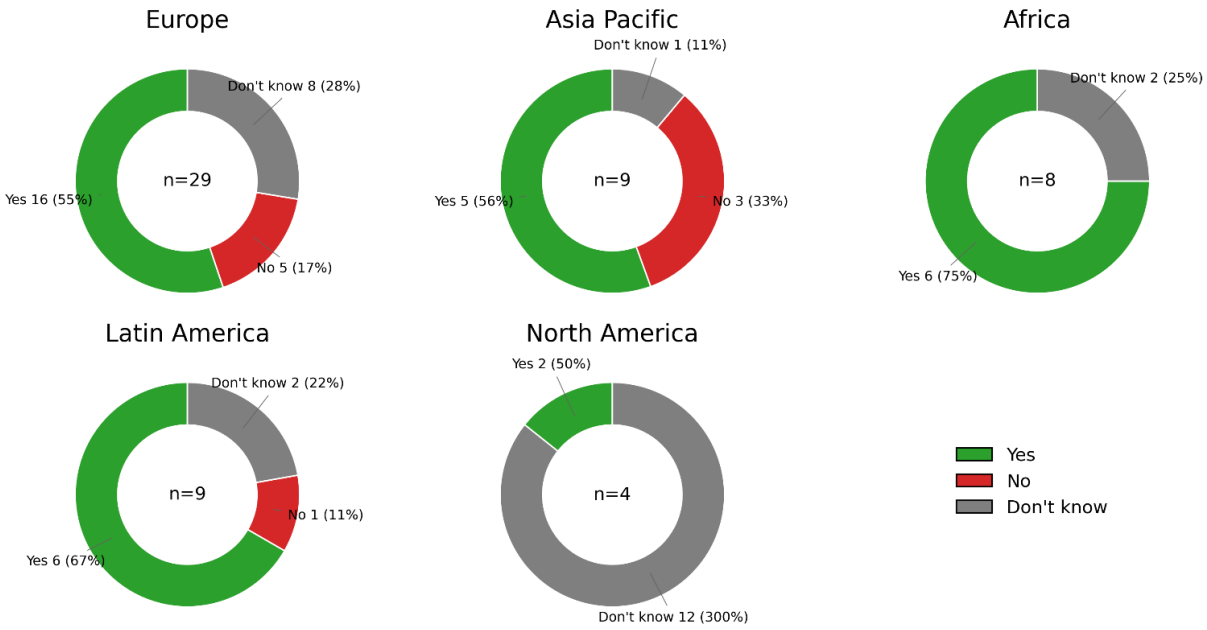

Figure 42- Regional distribution of responses regarding the existence of scientific studies assessing the impact of sugar reduction strategies on oral health

The availability of evaluation research varied across regions. In Europe and the Asia-Pacific region, just over half of responding countries reported the presence of scientific studies assessing sugar reduction strategies. Latin America and Africa reported somewhat higher proportions of evaluation activity.

Interestingly, these patterns correspond with the policy approaches identified earlier in the chapter. Regions reporting stronger engagement with structural policy measures such as taxation or front-of-pack labelling, also appear more likely to report the existence of evaluation studies examining the effectiveness of these interventions.

Although the survey data cannot establish causal relationships, this pattern highlights the importance of integrating research and monitoring systems into national policy strategies addressing excessive sugar consumption. Generating evidence on the effectiveness of sugar reduction policies plays an important role in supporting policy refinement and strengthening advocacy for continued action.

Advocating for Change: Capacity Needs and Strategic Priorities for Sugar Reduction Policies

In addition to regulatory and fiscal policy measures, the survey explored whether countries support programmes that enable oral health professionals to provide dietary advice, including counselling aimed at reducing sugar consumption. Such programmes represent an important component of preventive oral health strategies, as dietary counselling delivered during routine dental visits can play a key role in supporting behavioural change and reinforcing broader public health messages related to sugar intake.

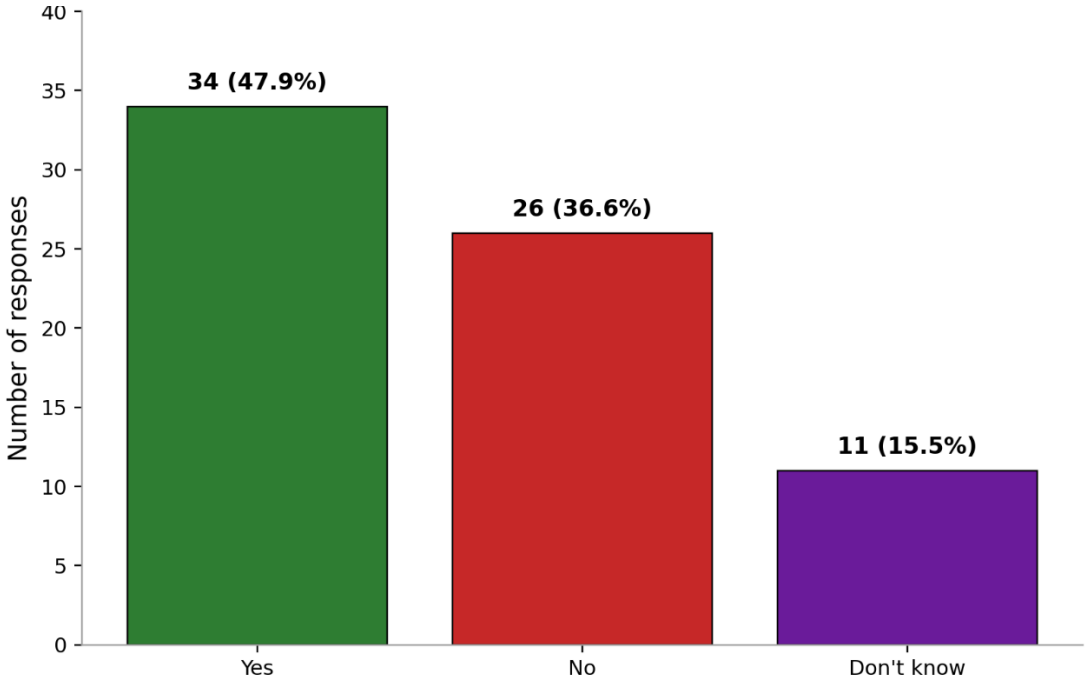

Figure 43- Availability of support or programmes enabling oral health professionals to provide dietary advice, including sugar reduction (n=71)

As shown in Figure 43, nearly half of responding countries (47.9%, n = 34) reported the presence of programmes or institutional support enabling oral health professionals to provide dietary advice related to sugar reduction. However, more than one-third of respondents (36.6%, n = 26) indicated that such programmes are not currently available, while 15.5% (n = 11) reported uncertainty regarding their existence.

These findings suggest that while many countries recognise the importance of integrating dietary counselling into oral health promotion efforts, support structures for delivering such advice remain unevenly distributed across health systems. Given the strong association between sugar consumption and dental caries, expanding programmes that support preventive dietary counselling within oral healthcare settings may represent an important opportunity for strengthening national strategies aimed at reducing sugar-related disease burden.

Figure 44- Regional distribution of support or programmes for dietary advice and sugar reduction within oral healthcare settings.

Regional responses highlight additional variation in the availability of such programmes (Figure 44). In Europe, responses were relatively mixed, with 44% of countries reporting support for dietary advice programmes and 34% indicating that such programmes are not available, alongside a notable proportion reporting uncertainty. In the Asia-Pacific region, almost half of respondents (47%) reported the presence of programmes supporting dietary counselling, while one-third reported their absence. In Africa, half of responding countries indicated the presence of such initiatives, although a substantial proportion reported that no programmes currently exist.

Responses from Latin America suggested more limited institutional support, with a majority of respondents indicating that dietary advice programmes are not available within oral healthcare settings. In contrast, respondents from North America more frequently reported the presence of such programmes, although the small number of responses from this region should be considered when interpreting the results.

Overall, these findings suggest that strengthening programmes that enable oral health professionals to provide dietary guidance may therefore represent an important avenue for reinforcing broader policy efforts aimed at reducing sugar consumption and preventing dental caries.

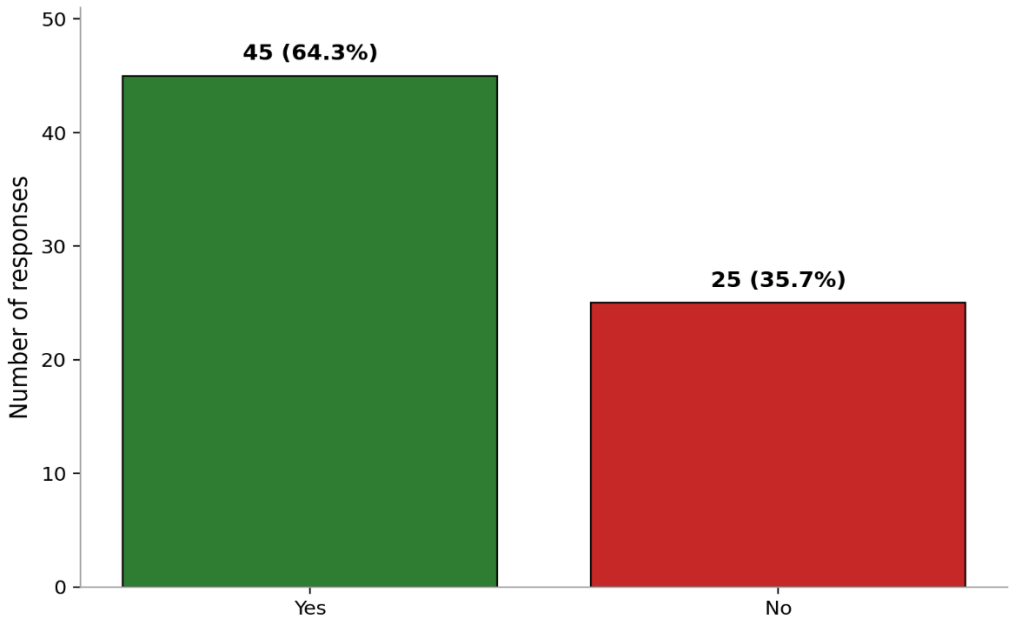

Figure 45- Proportion of responding countries reporting whether additional capacity building is needed to strengthen advocacy for policies addressing sugar use reduction (n=70)

When asked whether additional capacity building is needed to strengthen advocacy for sugar reduction policies, 64.3% of responding countries reported that additional support is required.

Figure 46- Regional distribution of responses indicating whether countries report capacity-building needs to strengthen advocacy for sugar reduction policies

Regional responses reveal variation in perceived needs. In Europe, just over half of responding countries indicated capacity-building needs, while higher proportions were reported in Asia-Pacific, Africa and North America. Latin America reported the highest proportion of countries indicating a need for additional advocacy capacity.

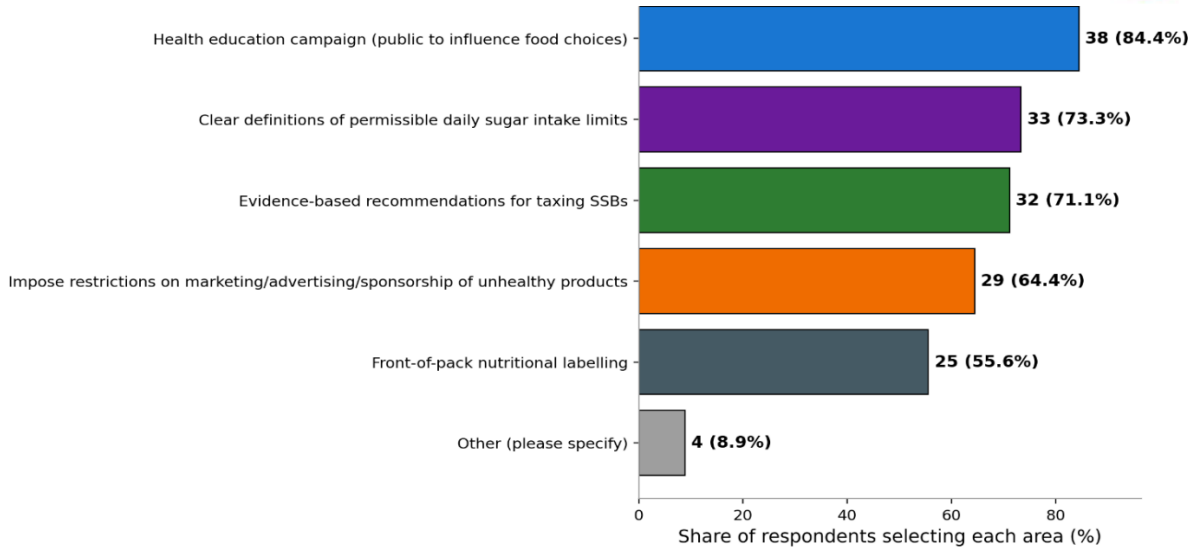

Figure 47- Priority areas identified by countries for strengthening advocacy on sugar reduction policies among respondents reporting capacity-building needs (n=45)

Countries reporting capacity needs were also asked to identify priority areas for strengthening sugar reduction advocacy. The most frequently identified priority was public health education campaigns aimed at influencing food choices, followed by the development of clear definitions of permissible daily sugar intake limits. Many countries also emphasised the importance of evidence supporting fiscal measures such as taxation of sugar-sweetened beverages, restrictions on the marketing of unhealthy foods and the introduction of front-of-pack nutrition labelling systems.

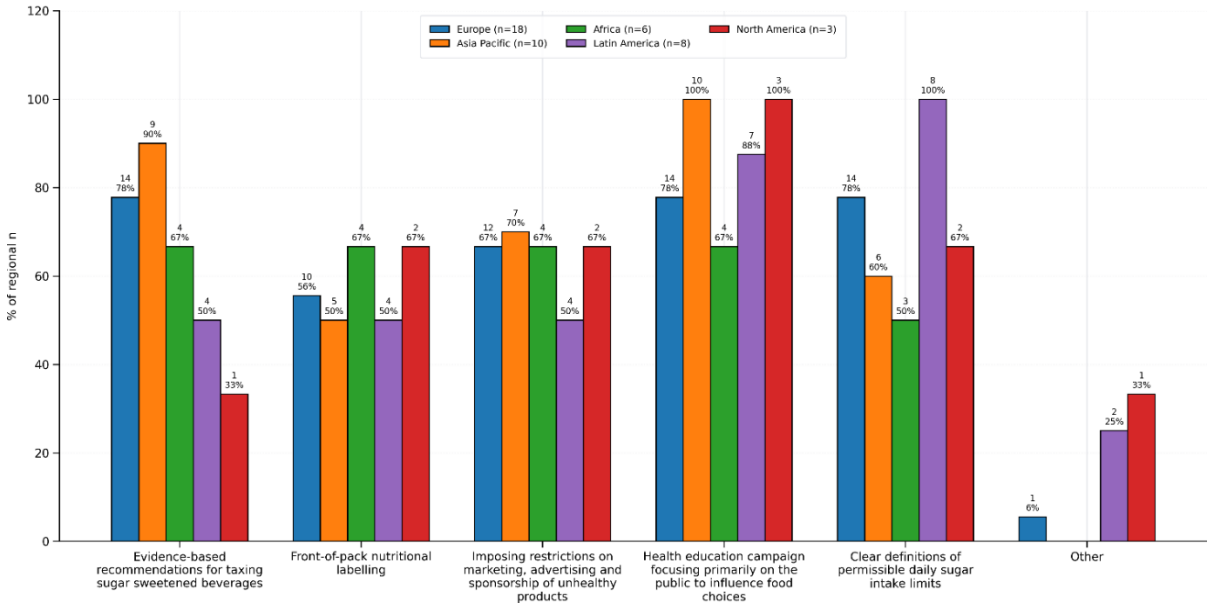

Figure 48- Regional variation in priority areas for sugar reduction advocacy, showing the proportion of countries within each region identifying specific policy and communication priorities

Regional patterns in advocacy priorities reveal both shared and context-specific approaches. In Europe, countries expressed strong interest in fiscal measures such as sugar-sweetened beverage taxes, reflecting the growing body of empirical evidence surrounding these policies. Evaluations of tiered soft drink taxes in countries such as the United Kingdom, Portugal and France have demonstrated reductions in the sugar content of beverages following policy implementation, largely driven by product reformulation and industry responses to tax incentives.[68]

In the Asia-Pacific region, countries placed particular emphasis on public health education campaigns. Evidence from systematic reviews of health literacy interventions in Asian populations indicates that education-based programmes can contribute to meaningful reductions in sugar-sweetened beverage consumption, particularly when combined with behavioural strategies such as goal-setting, self-monitoring and community engagement.[69]

Countries in Africa reported balanced interest across several policy approaches, including front-of-pack nutrition labelling, fiscal measures and marketing restrictions. In Latin America, countries highlighted the importance of clear definitions of permissible sugar intake limits, reflecting the regulatory frameworks underpinning many front-of-pack labelling systems implemented in the region.

Open-ended responses on sugar reduction policies and dietary advice programmes highlight a growing emphasis on preventive approaches within national oral health strategies. Countries described a range of policy measures, including taxation of sugar-sweetened beverages, front-of-pack labelling, and public awareness campaigns, often implemented as part of broader non-communicable disease strategies. At the service delivery level, respondents reported initiatives enabling oral health professionals to provide dietary counselling, particularly focused on reducing sugar intake. However, the extent and effectiveness of these interventions vary considerably, with some countries reporting well-established programmes and others indicating limited or emerging efforts. Common challenges include insufficient training, lack of integration into routine care, and limited coordination between policy and practice.

These findings suggest that while policy frameworks for sugar reduction are expanding, translating these into consistent clinical and community-level interventions remains an ongoing challenge. Countries are recognising the need for comprehensive strategies that combine structural policy interventions with public awareness initiatives. While earlier sections of this chapter highlighted the role of system-level measures such as taxation and food labelling, the advocacy priorities identified by countries underscore the continued importance of strengthening public understanding of the health risks associated with excessive sugar consumption

5 B- Behavioural Risk Factors for Oral Health: Tobacco, Alcohol and Substance Use

Key Highlights

- 64.7% of responding countries reported programmes supporting tobacco cessation advice within oral healthcare settings, while 28.2% reported none and 7.0% were unsure.
- Support for tobacco cessation programmes increased from 41.7% at baseline to 64.7% in the mid-term survey.
- Only 24.5% of countries reported reimbursement for tobacco cessation advice delivered by oral health professionals.
- 25.4% of responding countries reported programmes addressing alcohol or substance misuse within oral healthcare settings.
- Support for alcohol and substance misuse interventions increased from 18.3% at baseline to 25.4% in the mid-term survey.
- Only 18.8% of responding countries reported reimbursement for alcohol or substance misuse cessation services in dental settings.
- Most countries reported that alcohol and substance misuse interventions are not currently integrated into oral healthcare services.
- Across regions, tobacco cessation programmes were more commonly available than alcohol or substance misuse interventions.

Background and Rationale

The links between tobacco use and oral health outcomes are particularly well established. Tobacco consumption, including both smoked and smokeless forms, is a major risk factor for oral cancer, periodontal disease and other oral mucosal conditions. Analyses of the scientific literature examining tobacco and alcohol use in relation to oral health consistently identify oral cancer, leukoplakia, periodontal disease and other oral cavity disorders as key outcomes associated with these exposures.[70]

At the population level, global burden of disease analyses further highlights the magnitude of tobacco-related health impacts. Tobacco use remains one of the leading behavioural risk factors contributing to mortality and disability worldwide, accounting for an estimated 8.7 million deaths globally in 2019.[71] The World Health Organization similarly identifies tobacco use as a major modifiable risk factor for non-communicable diseases, including several oral conditions, and emphasises its substantial contribution to the global burden of preventable disease.[27]

In addition to smoking, smokeless tobacco products are widely used across many regions of the world and represent an important but often under-recognised contributor to disease burden. More than 300 million people globally are estimated to consume smokeless tobacco products, with the highest prevalence observed in South and Southeast Asia.[72] Epidemiological analyses indicate that smokeless tobacco use is associated with substantially increased risks of oral, pharyngeal and oesophageal cancers, as well as cardiovascular disease, and contributes to millions of disability-adjusted life years (DALYs) and tens of thousands of deaths worldwide each year.[72] These findings illustrate the considerable global health impact of tobacco use across different forms of consumption.

Harmful alcohol consumption also contributes to a range of adverse oral health outcomes. Evidence indicates that long-term alcohol use is associated with poorer oral hygiene, increased prevalence of dental caries, periodontal disease, tooth loss and a higher incidence of oral and oropharyngeal cancers.[73] Alcohol can influence oral disease development through both direct and indirect mechanisms. Local exposure to ethanol and its metabolites may damage oral mucosal tissues and impair immune responses, while alcohol-related changes in salivary gland function, oral microbiota and dietary behaviours may further increase susceptibility to oral disease.[73] Importantly, alcohol consumption frequently co-occurs with tobacco use, and combined exposure to these substances substantially increases the risk of oral malignancies.[70]

Within this context, oral health professionals are increasingly recognised as important contributors to tobacco cessation and broader health promotion efforts. Dental settings provide regular opportunities for patient contact, enabling clinicians to identify tobacco use, provide brief behavioural counselling and support cessation attempts. Evidence from systematic reviews indicates that tobacco cessation interventions delivered by dental professionals can increase the likelihood of long-term tobacco abstinence, particularly when behavioural counselling is combined with pharmacological support such as nicotine replacement therapy.[74]

Substance use disorders are also associated with substantial oral health consequences. A systematic review and meta-analysis comparing individuals with substance use disorders and non-using populations found significantly higher levels of dental caries and periodontal

disease among individuals with substance use disorders, with substantially greater numbers of decayed, missing and filled teeth as well as increased tooth loss and periodontal destruction. Importantly, the same analysis also found that individuals with substance use disorders were less likely to have received restorative dental care, indicating substantial barriers to accessing oral health services in this population.[75]

Rationale for Survey Questions

Given the strong evidence linking tobacco use, alcohol consumption and substance abuse with oral diseases, integrating preventive interventions within oral health services represents an important strategy for improving population health outcomes. Oral health professionals are uniquely positioned to provide advice and support for behaviour change, including tobacco cessation counselling and referral to specialised services.

Understanding the extent to which such interventions are implemented within national contexts is therefore important for assessing the integration of oral health within broader NCD prevention strategies. The FDI Vision 2030 mid-term survey explored several dimensions of this issue, including the availability of tobacco cessation advice programmes, the reimbursement of such services, and the presence of interventions addressing alcohol and substance misuse. The following sections present the findings of this survey and examine how countries are incorporating behavioural risk factor interventions into oral health practice and broader health promotion efforts.

Integration of Tobacco, Alcohol and Substance Use Interventions in Oral Health Systems

The survey first examined whether tobacco cessation advice programmes are supported within oral healthcare settings.

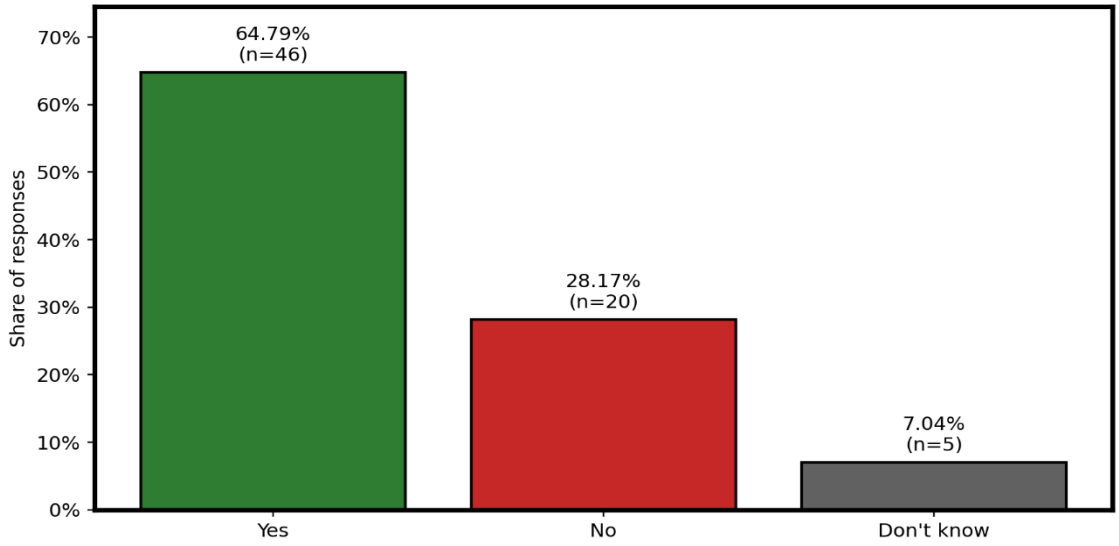

Figure 49- Support for tobacco cessation advice programmes within oral healthcare settings among responding member countries (n = 71).

Across responding countries, 64.7% reported the presence of tobacco cessation advice programmes within oral healthcare settings, while 28.2% indicated that such programmes are not available and 7.0% were uncertain (Figure 49).

Compared with the baseline survey, this represents a notable increase. In the 2021 baseline survey, 41.7% of countries reported support or programmes enabling oral healthcare providers to deliver tobacco cessation advice. Although differences in the number and composition of responding countries between surveys may partly explain this change, the findings nonetheless suggest growing recognition of the role oral healthcare providers can play in supporting tobacco cessation within broader non-communicable disease prevention strategies.

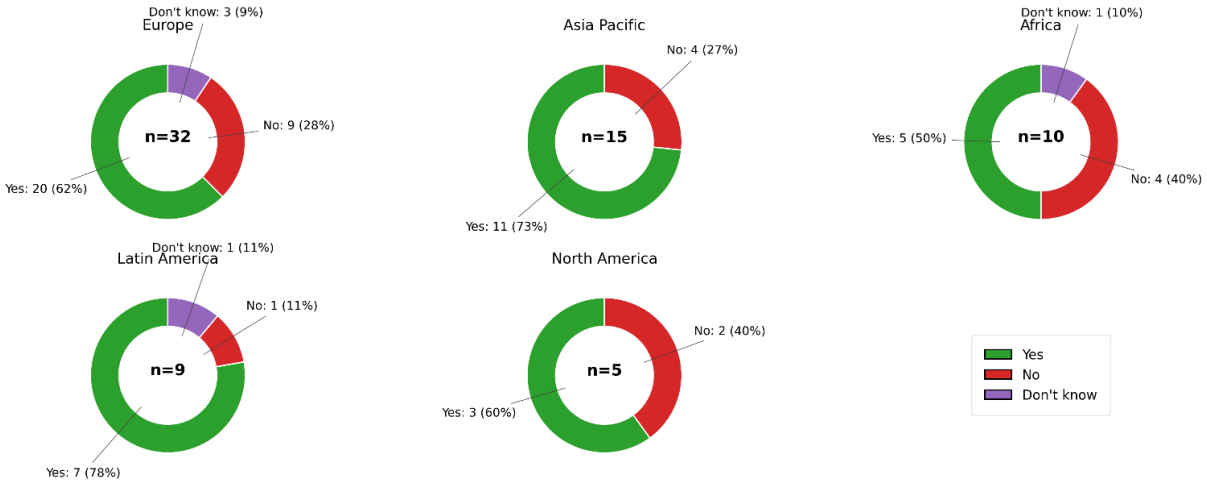

Figure 50- Support for tobacco cessation advice programmes within oral healthcare settings, by region.

Regional responses reveal variation in the integration of cessation programmes. In Europe, around two-thirds of responding countries reported the presence of tobacco cessation advice programmes, while similar or slightly higher levels of programme availability were reported in the Asia-Pacific region and Latin America. In contrast, responses from Africa were more evenly distributed, with roughly half of countries reporting programme availability. North America also reported the presence of cessation programmes in several responding countries, although the small number of responses limits interpretation (Figure 49).

The presence of tobacco cessation programmes within oral healthcare settings aligns with evidence highlighting the potential role of oral healthcare providers in tobacco control. Dental practices represent an important opportunity for delivering cessation interventions, as a substantial proportion of tobacco users attend dental visits annually and dental teams interact with large numbers of patients on a routine basis.[76]

However, research also suggests that this potential remains underutilised. While dental professionals frequently document tobacco use during consultations, they are less likely to actively assist patients with cessation attempts, highlighting the need for strengthened training, guidance and system-level support for integrating cessation interventions into routine dental care.[21] Evidence from European countries similarly indicates that many smokers

attempt to quit without formal assistance and that the use of cessation counselling services remains relatively low, underscoring the importance of increasing healthcare provider engagement in cessation support.[77]

Although cessation advice programmes are reported in many countries, the survey findings suggest that financial support mechanisms remain limited.

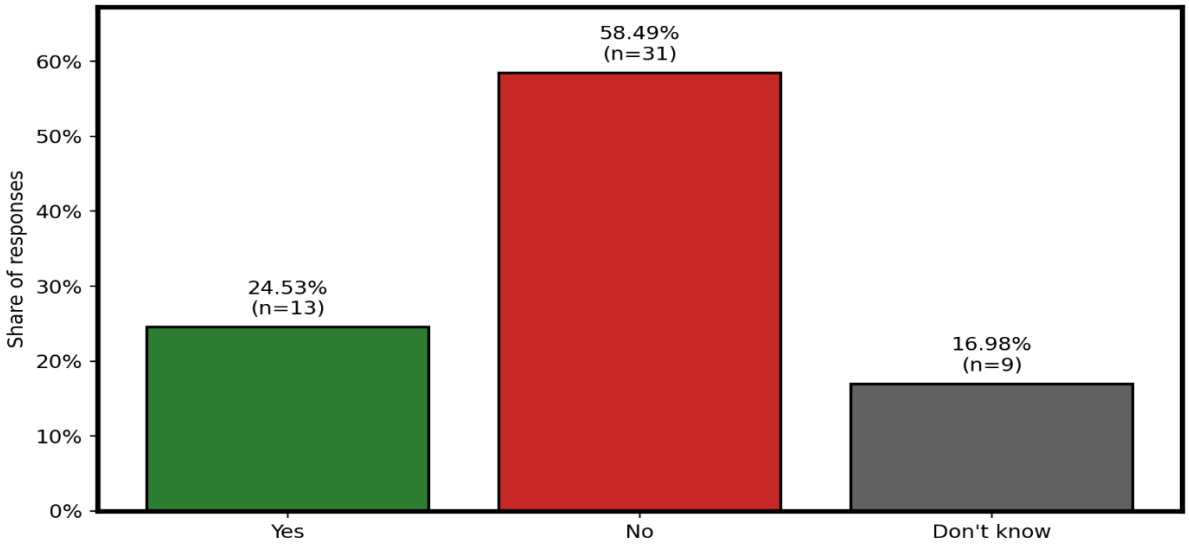

Figure 51- Reimbursement for tobacco cessation advice delivered within oral healthcare settings across responding member countries (n = 53)

Among responding countries, only 24.5% reported that tobacco cessation advice delivered by oral healthcare providers is reimbursed, while a majority indicated that such services are not reimbursed and a smaller proportion were uncertain (Figure 51).

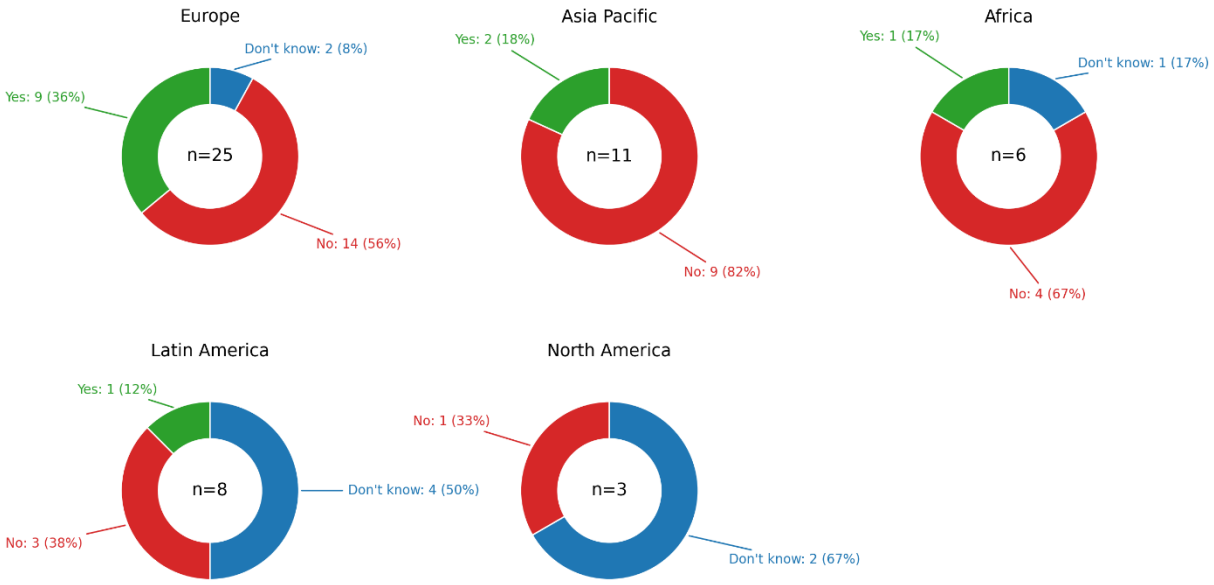

Figure 52- Reimbursement for tobacco cessation advice delivered within oral healthcare settings, by region.

Regional patterns reinforce this finding. In Europe, just over one-third of responding countries reported reimbursement for cessation advice, while most countries indicated that these services are not financially supported. Reimbursement was even less common in the Asia-Pacific region and Africa, and none of the responding countries in Latin America reported reimbursement for cessation advice delivered within dental settings (Figure 52).

This gap between programme availability and reimbursement reflects challenges widely discussed in the literature. Appropriate financial compensation has been identified as an important incentive for oral health professionals to deliver tobacco cessation interventions as part of routine care.[78] Earlier research examining insurer perspectives has also identified several barriers to reimbursement, including uncertainty regarding cost-effectiveness, the separation of medical and dental insurance systems and limited financial margins within dental insurance coverage.[79]

Beyond tobacco use, the survey also explored whether oral healthcare systems support programmes addressing alcohol or substance misuse within dental settings.

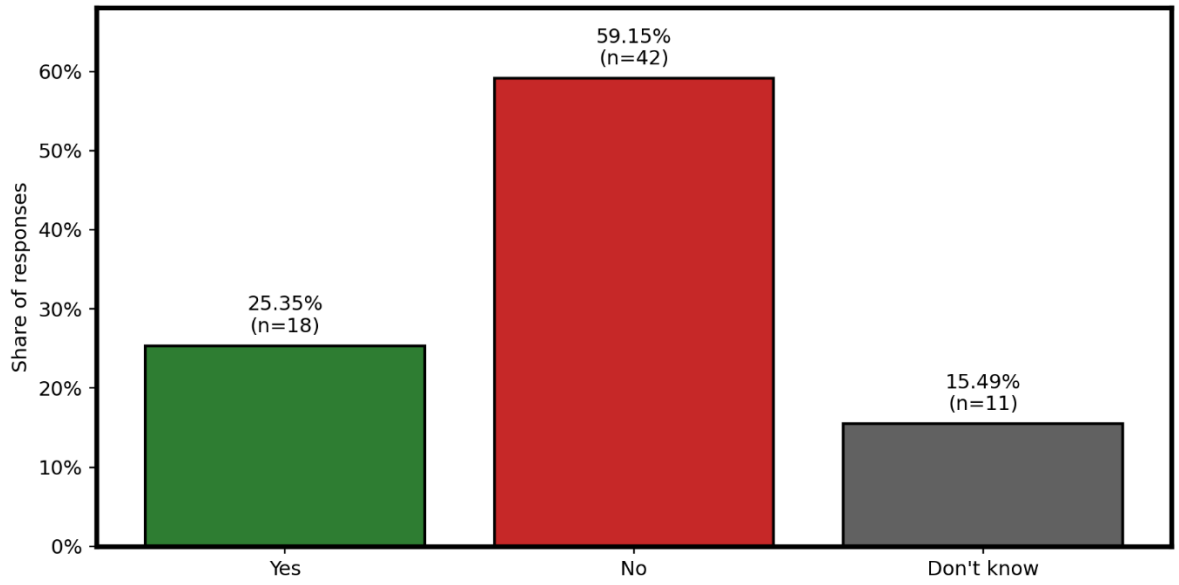

Figure 53- Support for alcohol and substance abuse interventions within oral healthcare settings across responding member countries (n = 71).

Overall, 25.4% of responding countries reported the presence of such interventions, while 59% responses indicated that no programmes currently exist (Figure 53). Compared with tobacco cessation programmes, these findings suggest that interventions addressing alcohol and substance misuse remain far less integrated within oral healthcare services.

Figure 54- Support for alcohol and substance abuse interventions within oral healthcare settings, by region.

Regional responses broadly reflect this pattern. In Europe, just over a quarter of responding countries reported support for alcohol or substance abuse interventions within oral healthcare services. Responses from the Asia-Pacific region indicated particularly limited availability, while some countries in Africa reported slightly higher levels of programme presence. Despite these differences, most responding countries across regions indicated that such programmes are not currently available (Figure 54).

Open ended responses indicate that programmes supporting oral healthcare providers in delivering tobacco cessation and alcohol or substance use interventions are present in some countries but remain unevenly developed. Where such programmes exist, they often include training initiatives, clinical guidelines, and integration of behavioural counselling into routine dental care. However, respondents frequently highlighted limitations related to funding, lack of reimbursement mechanisms, and insufficient institutional support, which can restrict the scale and sustainability of these interventions. In many cases, prevention activities rely on individual provider initiative rather than being embedded within formal health system structures. These findings suggest that while there is increasing recognition of the role of oral health professionals in addressing alcohol and substance misuse, stronger policy support and financial incentives are needed to fully integrate these services into standard practice.

The survey further examined whether alcohol or substance abuse cessation services delivered within oral healthcare settings are reimbursed within national health systems (Figure 55).

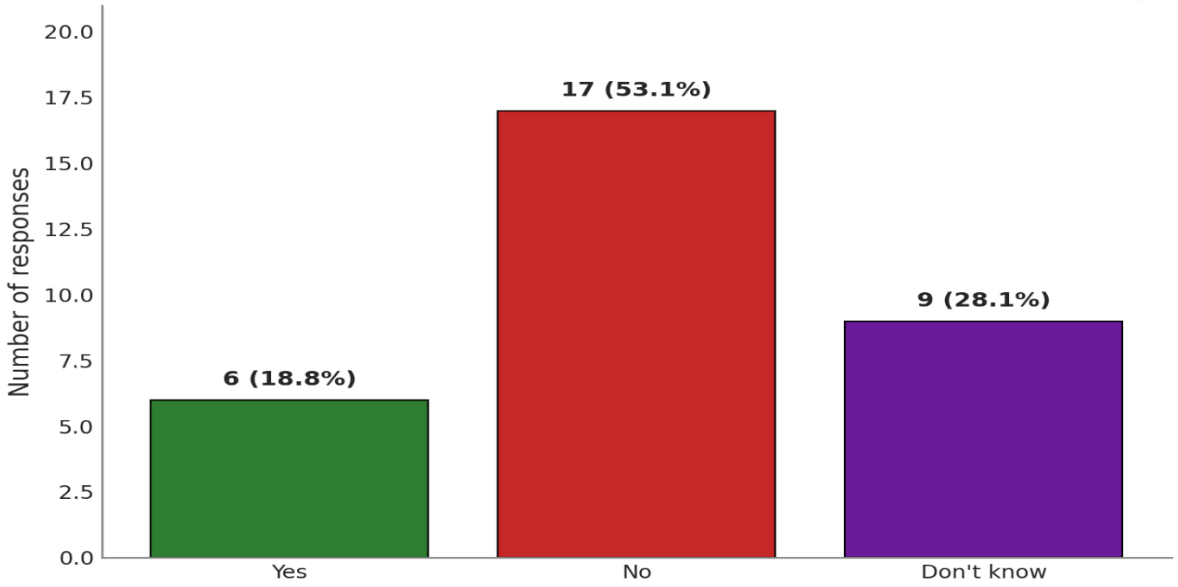

Figure 55- Reimbursement for alcohol and substance abuse cessation services delivered within oral healthcare settings across responding member countries (n = 32).

Responses indicate that financial support mechanisms for these services are extremely limited. Fewer than one in five responding countries reported reimbursement for alcohol or substance abuse cessation services delivered within dental settings (18.8%) (Figure 55).

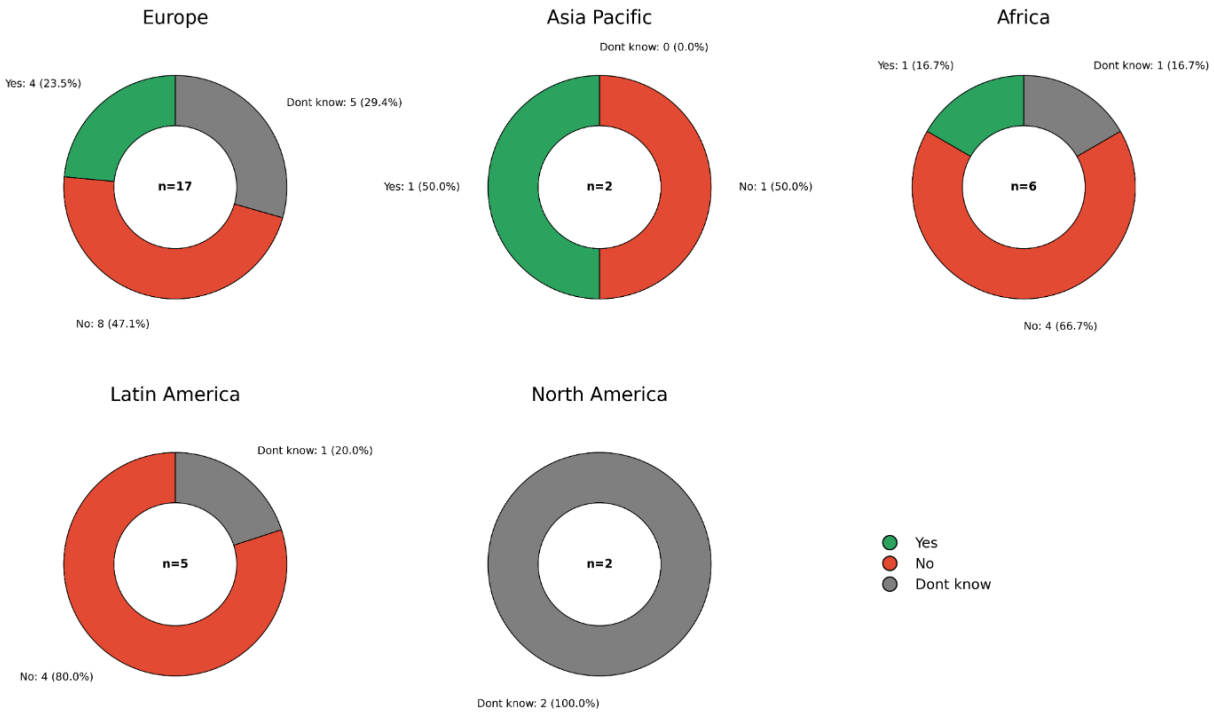

Figure 56- Reimbursement for alcohol and substance abuse cessation services delivered within oral healthcare settings, by region.

Regional responses again demonstrate similar patterns. In Europe, only a minority of countries reported reimbursement, while several respondents indicated uncertainty regarding existing funding mechanisms. Reimbursement was also rare in Africa and Latin America, and responses from North America were largely uncertain. In the Asia-Pacific region, the small number of responses resulted in evenly split findings between reimbursement and non-reimbursement (Figure 56).

Comparison with baseline survey results

When considered alongside the baseline survey, the findings suggest some increase in the availability of programmes addressing alcohol or substance abuse within oral healthcare settings. The baseline survey reported that only 18.3% of countries provided support or programmes enabling oral healthcare providers to deliver prevention interventions addressing alcohol or substance misuse, whereas the mid-term survey indicates a somewhat higher proportion of countries reporting such interventions (25.4%). While this change may partly reflect differences in the number and composition of responding countries, the results nonetheless point to a gradual expansion of attention to alcohol and substance misuse as shared behavioural risk factors within oral health programmes. It is important to note that unlike the baseline survey, the mid-term survey explored whether alcohol and substance abuse interventions delivered within oral healthcare settings are reimbursed within national health systems. This is important because reimbursement mechanisms support the implementation of such measures at a system level.

These findings highlight a substantial policy and implementation gap. While the health impacts of alcohol and substance misuse are well recognised, the role of oral healthcare systems in addressing these risk factors appears to remain relatively underdeveloped. Compared with tobacco cessation, where a growing body of research has examined the role of oral healthcare providers, there is comparatively limited research and policy attention addressing alcohol and substance misuse interventions within dental settings. The low levels of programme availability and reimbursement reported in this survey suggest that these areas remain an underexplored component of integrated oral health and non-communicable disease prevention strategies.

Summary: Addressing Common Risk Factors for Oral Health

The findings presented in this chapter highlight the central role of shared behavioural and environmental determinants in shaping the global burden of oral diseases. Excessive sugar consumption, tobacco use, and harmful alcohol consumption collectively contribute to a substantial proportion of oral disease worldwide. Addressing these determinants therefore requires integrated strategies that extend beyond clinical care and engage broader public health, regulatory and health system responses.

Across the areas examined in this chapter, a recurring theme emerges: effective prevention of oral diseases increasingly depends on policy environments that influence population behaviours and exposures. National strategies to reduce sugar consumption illustrate how regulatory measures, public health advocacy and scientific evaluation can work together to address diet-related risk factors. Similarly, the integration of behavioural interventions such as tobacco cessation within oral healthcare settings reflects a growing recognition of the role that dental professionals can play in broader non-communicable disease prevention efforts. At the same time, the limited incorporation of alcohol and substance misuse interventions, along with gaps in reimbursement mechanisms, suggests that important opportunities remain for strengthening preventive services within oral health systems.

Viewed collectively, these findings reinforce the importance of approaching oral health within the broader framework of non-communicable disease prevention. Policies that reduce exposure to shared risk factors such as sugar consumption, tobacco use and harmful alcohol intake can generate health benefits that extend far beyond oral health alone. Strengthening collaboration between oral health professionals, public health authorities and policymakers will therefore remain essential for advancing integrated prevention strategies capable of reducing the global burden of oral diseases and supporting wider efforts to improve population health.

Chapter 6

Fluoride as a Preventive Intervention: Safety Perceptions and Community Interventions

Key Highlights

- 45.95% of respondents reported that fluoride safety is not contested in their country, while 40.54% reported that it is contested and 13.51% were unsure.
- Among respondents reporting fluoride safety concerns, community water fluoridation was the most frequently cited intervention under policy consideration (51.85%, n=14).
- Topical fluoride applications were reported as under consideration in 40.74% of cases (n=11) where fluoride safety debates were present.
- Salt fluoridation was identified as under consideration in 29.63% of responses (n=8).
- A total of 27 respondents reported fluoride safety debates and selected 33 interventions under policy consideration.
- Regional responses indicated differing debates, with water fluoridation most frequently discussed in Africa and North America.
- Topical fluoride applications were most commonly discussed in the Asia-Pacific region, while salt fluoridation was more frequently referenced in Latin America.
- Overall, the number of respondents reporting legislative consideration to limit fluoride interventions remained relatively small.

Background and Rationale

Fluoride has long been recognised as one of the most effective and widely implemented public health interventions for the prevention of dental caries. Its preventive effect operates through the remineralisation of enamel and the inhibition of demineralisation processes in the tooth structure. As a result, fluoride delivery, through both topical and systemic mechanisms, forms a central pillar of modern oral health prevention strategies. The importance of fluoride is reflected in global oral health policy frameworks, including the World Health Organization's Global Oral Health Action Plan, which identifies optimal fluoride delivery as a key component of population-level caries prevention.[3]

The WHO Global Oral Health Action Plan establishes a global target that 50% of countries should have national guidance on optimal fluoride delivery by 2030, highlighting the importance of coordinated national policies governing fluoride use in oral health programmes. These strategies include both systemic and topical fluoride delivery methods, such as community water fluoridation, salt fluoridation, fluoride toothpaste and professionally applied topical fluorides. In particular, the routine use of fluoride toothpaste remains a cornerstone of individual oral hygiene practices, with WHO recommending fluoride concentrations between 1000 and 1500 ppm for daily use across age groups.[3]

Fluoride-based dental preparations are also included in the WHO Model List of Essential Medicines, which recognises fluoride toothpaste, glass ionomer cement and silver diamine fluoride as essential components of basic oral health care.[3] The inclusion of these products underscores the global health community's recognition that fluoride interventions play a critical role in reducing the burden of dental caries, particularly in settings where access to restorative dental services may be limited.

Beyond individual preventive practices, community-level fluoride delivery programmes have demonstrated substantial public health benefits. Evidence from systematic reviews indicates that community water fluoridation remains effective in reducing dental caries even in populations with widespread access to fluoridated toothpaste, with fluoridated areas showing significantly lower caries prevalence among children compared with non-fluoridated areas.[80] Similarly, salt fluoridation programmes implemented in several European and Latin American countries, have demonstrated strong caries-preventive effects and offer a cost-effective alternative in settings where water fluoridation infrastructure is not feasible.[81]

While fluoride is widely recognised as safe and effective when used within recommended levels, excessive fluoride exposure during early childhood may lead to dental fluorosis, a condition affecting enamel development that can result in aesthetic changes ranging from mild discoloration to more visible enamel alterations. The risk of fluorosis is particularly associated with fluoride intake during the years when permanent teeth are developing, especially when children ingest excessive amounts of fluoride toothpaste or when fluoride concentrations in drinking water exceed recommended levels. Appropriate dosing and supervision of fluoride use in young children are therefore essential to minimise fluorosis risk while preserving the caries-preventive benefits of fluoride.[82]

Despite decades of scientific evidence demonstrating its effectiveness in preventing dental caries, fluoridation policies continue to generate debate in some countries, often driven by concerns regarding potential health risks and public perceptions of safety.[83] In recent years, discussions surrounding potential health risks, including concerns about neurodevelopmental

outcomes and fluoride exposure from multiple sources, have re-emerged in public and policy discourse. At the same time, major public health organisations such as the World Health Organization, the Centres for Disease Control and Prevention and the FDI World Dental Federation continue to recognise community fluoridation as one of the most effective population-level strategies for preventing dental caries.

These debates illustrate how perceptions of fluoride safety may influence public health decision-making even in the presence of a substantial body of scientific evidence supporting its benefits. Understanding the extent to which fluoride safety remains a subject of contention within national policy discussions is therefore important for assessing the stability of population-level prevention strategies.

In this context, the Vision 2030 Mid-Term Survey included two questions examining whether fluoride safety is a subject of contention within countries and whether such debates have led to policy considerations regarding the limitation or elimination of fluoride-based interventions. These questions aim to provide insight into how perceptions of fluoride safety may influence public health policy decisions and the continued implementation of community-level caries prevention programmes**.**

Contention on the safety of fluoride

Although fluoride is widely recognised within the scientific community as a safe and effective intervention for the prevention of dental caries when used at recommended levels, public and policy debates surrounding fluoride safety continue to arise in some settings. To better understand how these discussions are reflected at the national level, the survey asked respondents whether fluoride safety is a subject of contention within their countries.

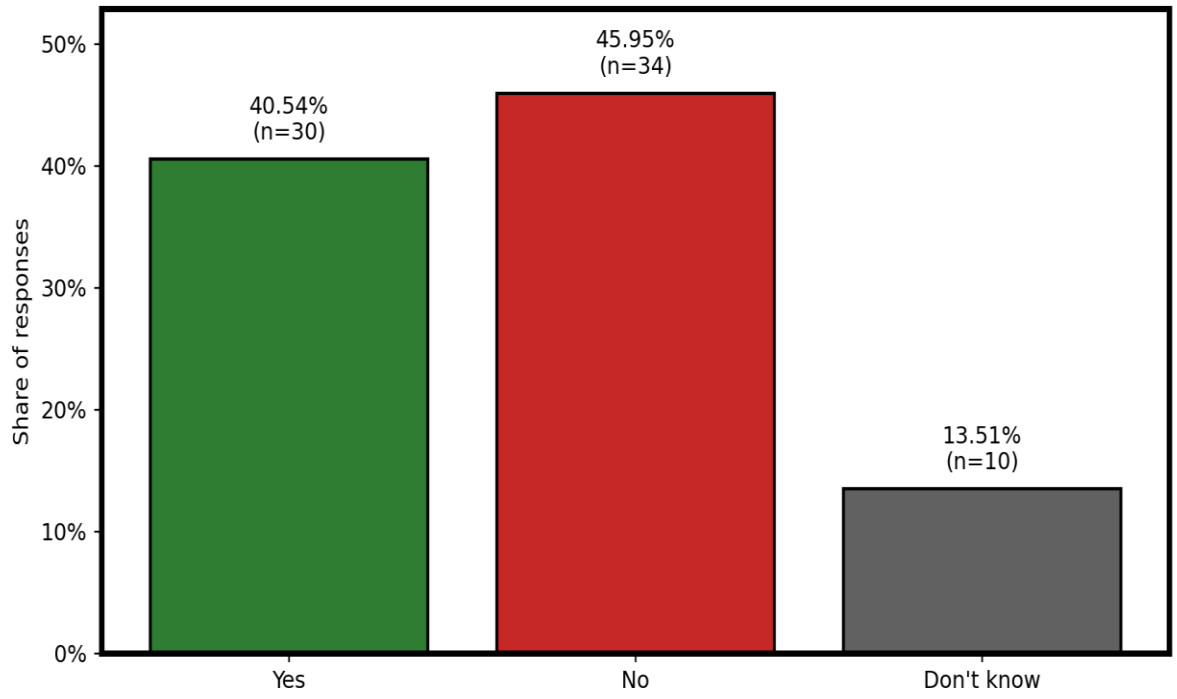

Figure 57- Reported contention regarding the safety of fluoride across responding countries (n=74).

Survey responses indicate a relatively divided landscape (Figure 57). Nearly half of respondents (45.95%, n = 34) reported that fluoride safety is not contested within their national context. However, a similarly large proportion (40.54%, n = 30) indicated that contention does exist, while 13.51% (n = 10) reported that they were unsure.

These findings suggest that although the scientific evidence supporting fluoride as a preventive intervention is well established, debates around fluoride safety continue to emerge in some national contexts and may shape public discourse or policy discussions related to fluoridation programmes.

Beyond public debate, practical considerations within oral health systems may also influence how fluoride-based preventive interventions are implemented. Research examining preventive dental practices has identified several barriers that may limit the adoption of preventive measures by dental professionals, including time constraints in clinical practice, limited financial incentives for preventive services and variations in professional training and experience. Conversely, continuing professional education, interdisciplinary collaboration and greater awareness of preventive dentistry have been associated with higher uptake of fluoride-based preventive interventions.[82]

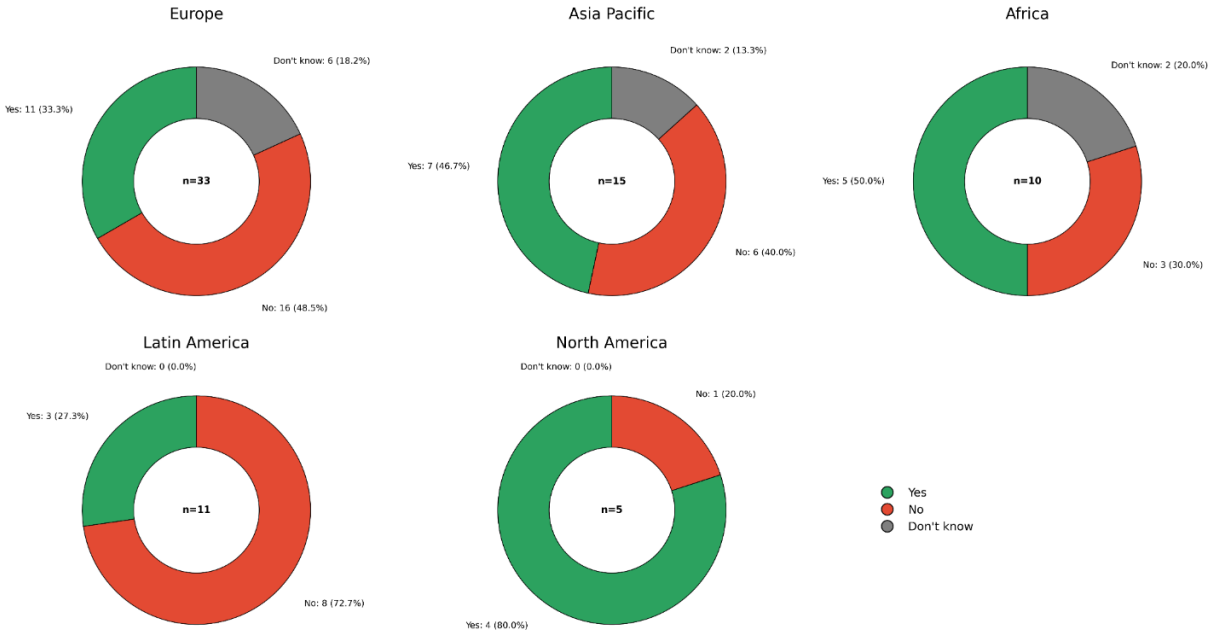

Figure 58- Regional distribution of responses on the contention around fluoride safety

Regional responses provide additional insight into how perceptions of fluoride safety vary across contexts (Figure 58). In Europe, responses were relatively balanced, with just under half of respondents reporting no contention and around one-third indicating that debate exists. Similar divisions were observed in the Asia-Pacific region, where views were also split between those reporting contention and those reporting none. In Africa, responses were evenly distributed between these two positions. In contrast, Latin America reported higher levels of perceived debate surrounding fluoride safety, while respondents in North America generally indicated that fluoride safety is not a contested issue within their national contexts.

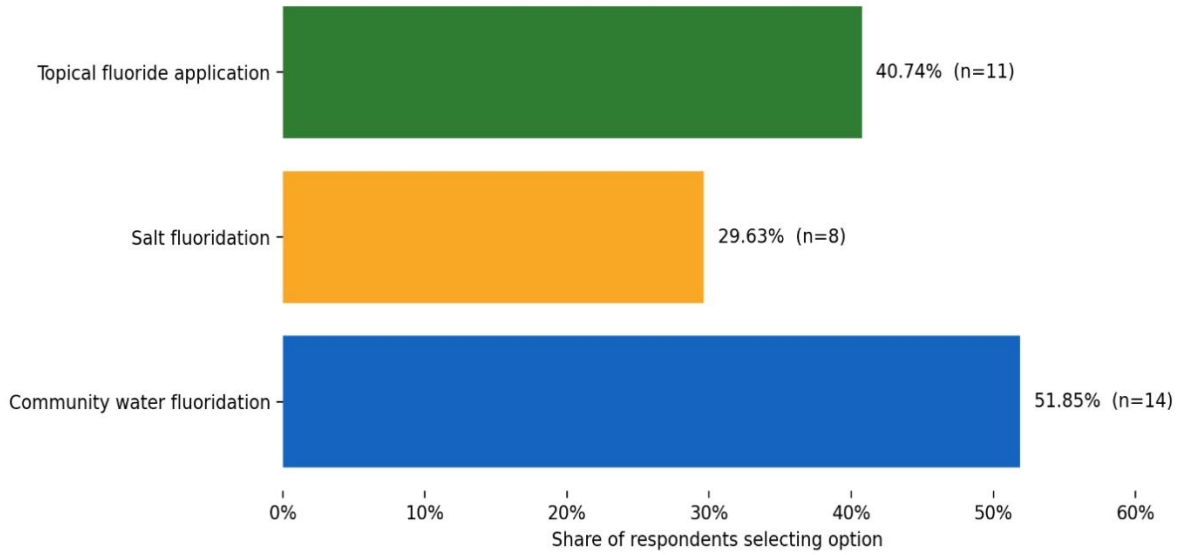

Figure 59- Fluoride interventions under consideration across responding member countries for limitation or elimination where safety concerns are reported.

Among respondents who reported that fluoride safety is contentious within their countries, the survey further explored whether these debates have translated into legislative or policy discussions concerning specific fluoride interventions. A total of 27 respondents answered this follow-up question, generating 33 selections across the available options (Figure 59).

Among the interventions identified, community water fluoridation was the most frequently cited measure under consideration, reported by 51.85% of respondents (n = 14). Topical fluoride applications were the second most commonly mentioned intervention, reported by 40.74% (n = 11), while salt fluoridation was referenced less frequently (29.63%, n = 8).

Figure 60- Regional distribution of fluoride interventions reportedly under policy consideration.

Regional responses indicate that the specific interventions under discussion vary across contexts (Figure 60). In Europe, considerations were distributed across community water fluoridation, salt fluoridation and topical fluoride applications. In the Asia-Pacific region, topical fluoride applications were most frequently referenced. In Africa, community water fluoridation appeared to be the primary intervention under discussion. In North America, responses focused primarily on community water fluoridation.

In Latin America, salt fluoridation was the most commonly mentioned intervention, reflecting the structural realities of fluoridation in the region. Rapid and often unplanned urban growth across much of Latin America has made centralised water fluoridation infrastructure difficult to implement at scale; as a result, salt fluoridation has emerged as a pragmatic alternative in several countries, with community water fluoridation remaining largely confined to Brazil and select cities in Chile. Notably, public debate surrounding fluoride safety was also more pronounced among Latin American respondents than in other regions, underscoring the importance of clear, evidence-based communication in sustaining population-level prevention programmes. At the same time, there remains a notable absence of robust data to monitor the impact of fluoridation interventions across the region. This gap in fluoridation impact monitoring is a significant limitation for evidence-informed policy development and will need to be addressed if future policy cycles are to accurately assess coverage, equity, and effectiveness of fluoride delivery strategies in the Latin American context.

Comparison with baseline survey results

The baseline survey primarily examined the implementation of fluoride-based prevention strategies, including the existence of community fluoridation programmes and policies facilitating access to fluoridated toothpaste. In contrast, the mid-term survey introduced questions exploring whether fluoride safety is a subject of debate within countries and whether such discussions have prompted considerations of legislative action to limit fluoride-based interventions. This addition reflects the increasing prominence of public and policy discussions surrounding fluoride exposure. While extensive evidence supports the effectiveness and safety of fluoride for caries prevention when used within recommended levels, scientific literature has also examined potential adverse effects associated with excessive exposure, particularly during early childhood. By capturing whether fluoride safety is a point of contention within national contexts, the mid-term survey provides insight into how these debates may influence the implementation and sustainability of population-level fluoride interventions.

Chapter 7

HPV Prevention and Immunisation Alignment

Key Highlights

- 80.3% of responding countries reported having an HPV prevention policy.
- HPV vaccination is included in 82.3% of national HPV prevention programmes, making it the most common policy component.
- Public education initiatives are included in 58.1% of programmes, while screening components are reported by 40.3%.
- Only 12.9% of countries reported integration of oral health services within HPV prevention programmes.
- Globally, 165 countries have introduced HPV vaccination nationally or sub-nationally, while around 29 countries have not yet introduced the vaccine.
- 74.7% of responding countries reported providing routine HPV vaccination.
- Routine vaccination was reported by 83.3% of North American respondents and 73.3% in Asia-Pacific, compared with 59.0% in Europe and 40.0% in Africa.
- Among countries reporting routine vaccination, 51.9% indicated gender-neutral programmes and 51.9% reported girls-only programmes (multiple responses permitted).

Background and Rationale

Human Papillomavirus (HPV) is one of the most common viral infections globally and a well-established cause of multiple malignancies. It is most prominently recognised for its causal role in cervical cancer, which remains one of the most common cancers among women worldwide and a leading cause of cancer-related mortality, particularly in low- and middle-income countries.[84] HPV is associated with approximately 83% of cervical cancers and is therefore regarded as a major public health problem.[85] Consequently, global HPV prevention strategies have historically centred on cervical cancer elimination through vaccination, screening, and treatment initiatives.

However, the epidemiological burden of HPV extends beyond the reproductive tract. Certain high-risk HPV types, particularly HPV-16 and HPV-18, are strongly implicated in the development of head and neck malignancies, especially oropharyngeal squamous cell carcinoma (OPSCC).[86] Oral and oropharyngeal cancers account for an estimated 300,000 new cases annually worldwide, and HPV has emerged as a substantial etiological contributor.[87] Pooled analyses indicate that HPV is detected in up to 72.8% of oropharyngeal cancer cases, underscoring its significant and growing role in oral carcinogenesis.[87] In several high-income countries, the incidence of HPV-associated OPSCC has increased considerably over recent decades, even as tobacco-related head and neck cancers have declined.[86] Moreover, HPV-positive tumours demonstrate distinct epidemiological and clinical profiles compared with HPV-negative cancers, reinforcing their relevance as a distinct and expanding public health concern.[87]

Beyond malignant transformation, emerging evidence suggests that the condition of the oral cavity itself may influence susceptibility to oral HPV infection. While tobacco use and sexual behaviour are recognised risk factors, objective clinical investigations have demonstrated significant associations between poor oral hygiene and oral HPV positivity.[88] Higher levels of dental plaque accumulation, gingival inflammation, and greater lifetime tooth loss have been correlated with increased odds of both high-risk and overall oral HPV infection.[88] These findings support a biologically plausible pathway in which gingival inflammation and epithelial micro lesions may facilitate viral entry and persistence.[88] Collectively, this evidence positions oral health not merely as a site of disease manifestation, but as a potentially modifiable factor within HPV transmission and persistence pathways.

Despite these epidemiological developments and the increasing recognition of HPV's role in oropharyngeal carcinogenesis, global HPV prevention frameworks remain predominantly anchored in cervical cancer strategies. There are currently no universally adopted global policies recommending routine screening for HPV-related oral conditions, nor systematic integration of oral health services within HPV vaccination and prevention programmes. This disconnect between evolving disease patterns and established policy architecture highlights a critical gap in the global response.

Against this backdrop, analysing how HPV prevention is structured within national health systems and whether oral health is meaningfully integrated, becomes essential. Drawing on findings from the FDI Vision 2030 mid-term survey and complementary international data sources, the following sections examine the global policy landscape, assess the extent of integration with oral health services, and identify persisting gaps and opportunities for strengthening cross-sectoral HPV prevention strategies.

Overview of National HPV Prevention Policies Globally

The global policy architecture for HPV prevention has undergone significant consolidation over the past decade. In November 2020, the World Health Organisation launched the Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem, articulating the 90-70-90 targets to be achieved by 2030: 90% of girls fully vaccinated against HPV by age 15, 70% of women screened using high-performance tests at least twice in their lifetime, and 90% of women identified with cervical disease receiving appropriate treatment.[84] This strategy, aligned with the Immunisation Agenda 2030 (IA2030), positions HPV vaccination as a foundational intervention within broader universal health coverage and non-communicable disease (NCD) frameworks.[89,90] In doing so, it moves HPV prevention beyond a clinical intervention and embeds it within the normative architecture of global health governance. The institutionalisation of HPV vaccination within national immunisation schedules has therefore become a visible marker of health system alignment with global priorities. Globally, HPV prevention has been promoted, directly and indirectly, through recommendations and targets set by the World Health Organisation (WHO), with HPV vaccination positioned as a foundational pillar of cervical cancer prevention.[91]

Evidence suggests substantial uptake of these commitments at the policy level. According to the FDI Vision 2030 mid-term survey, 80.3% of responding countries report the existence of an HPV prevention policy (Figure 60). However, closer examination of policy components reveals marked variation in the depth and scope of integration. Vaccination is incorporated in 82.3% of reported programmes, public education initiatives in 58.1%, and screening components in 40.3%. In contrast, only 12.9% of respondents indicate integration of oral health services within HPV prevention efforts. These data reveal a clear hierarchy of integration: HPV prevention is most strongly embedded within immunisation platforms, moderately reflected in awareness and screening strategies, and minimally connected to oral health systems. In other words, the policy architecture demonstrates robust vertical institutionalisation within vaccination frameworks, but limited horizontal integration across broader primary care domains.

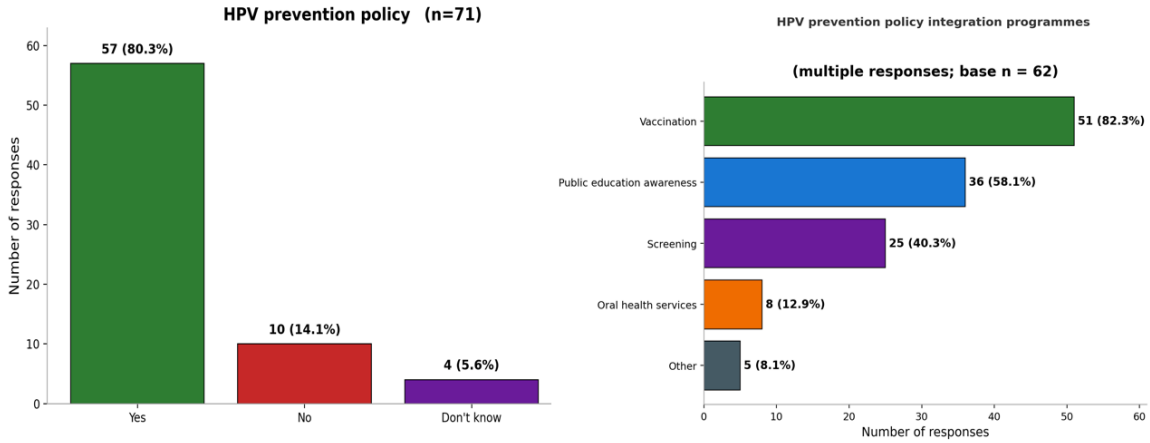

Figure 61 – FDI Vision 2030 mid-term survey findings: HPV prevention policy

Global vaccine introduction data further reinforce this pattern. The International Vaccine Access Centre (IVAC) reports that 165 countries have introduced HPV vaccination nationally (160) or sub nationally (5) (Figure 62).[92] Nevertheless, approximately 29 countries still lack HPV vaccine introduction in national or sub-national programmes, although some are piloting implementation.[92] While this diffusion reflects significant global momentum, it also signals persistent geographic and economic disparities in adoption.

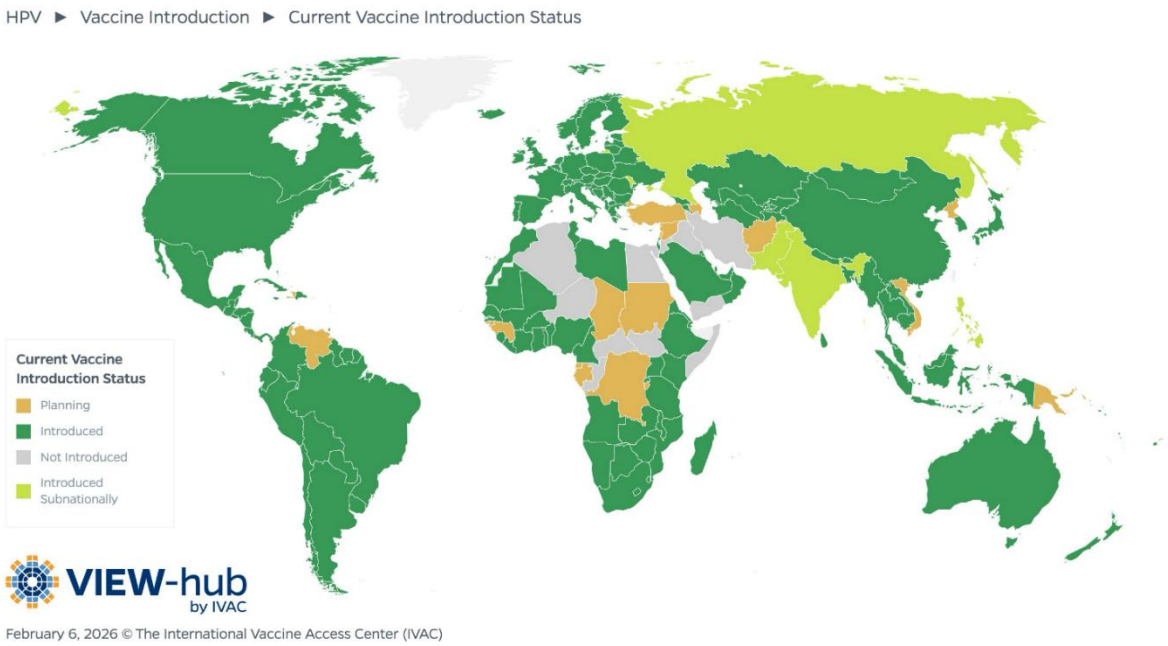

Figure 62 – HPV vaccine introduction worldwide; Source: International Vaccine Access Center (IVAC)[92]

Importantly, formal introduction does not equate to effective population-level protection. Analysis of WHO/UNICEF coverage estimates demonstrates that, despite increasing policy adoption, global vaccination coverage remains uneven and in many settings substantially below the WHO target.[93] Spayne and Hesketh's examination of WHO/UNICEF data showed that fewer than half of WHO member states reported HPV vaccination coverage data in 2018, and estimated global coverage for a single cohort of adolescent girls remained low.[93] Coverage varied considerably across income groups, with affordability, funding mechanisms, and reporting capacity shaping national performance. In some low-income countries, high coverage was achieved through externally supported initiatives, particularly Gavi-funded programmes, whereas non-Gavi-eligible countries often faced economic barriers to introduction and scale-up.[93]

Regional disaggregation of the FDI survey responses further underscores uneven diffusion and integration across WHO regions (Figures 63-67). Policy adoption is highest among European respondents (94%), followed by North America (80%) and Latin America (78%), Africa (70%) and Asia Pacific (60%). Patterns of integration mirror this variation: although vaccination is widely embedded across regions, incorporation of oral health services remains minimal, reported only in Europe (22%) and Latin America (11%), and absent among responding countries in Africa, Asia-Pacific, and North America. These patterns suggest that both policy institutionalisation and the depth of cross-sectoral integration remain unevenly distributed, rather than uniformly consolidated across regions.

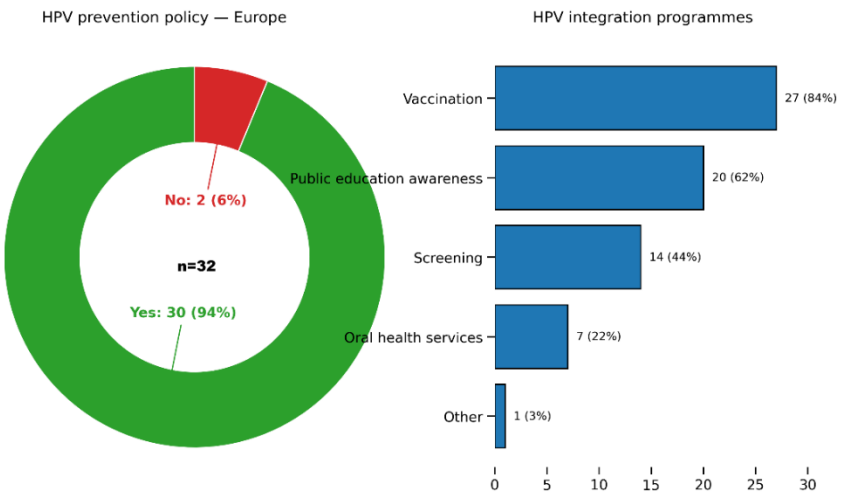

Figure 63- HPV prevention policy in Europe (n=32)

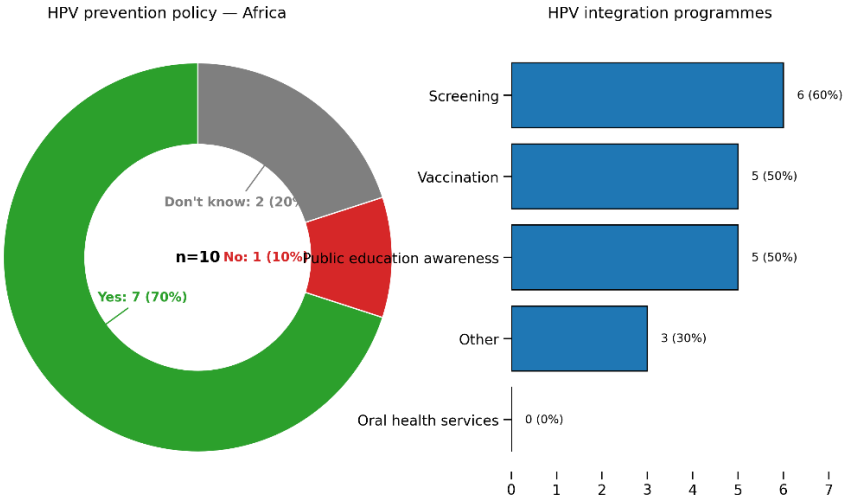

Figure 64- HPV prevention policy in Africa (n=10)

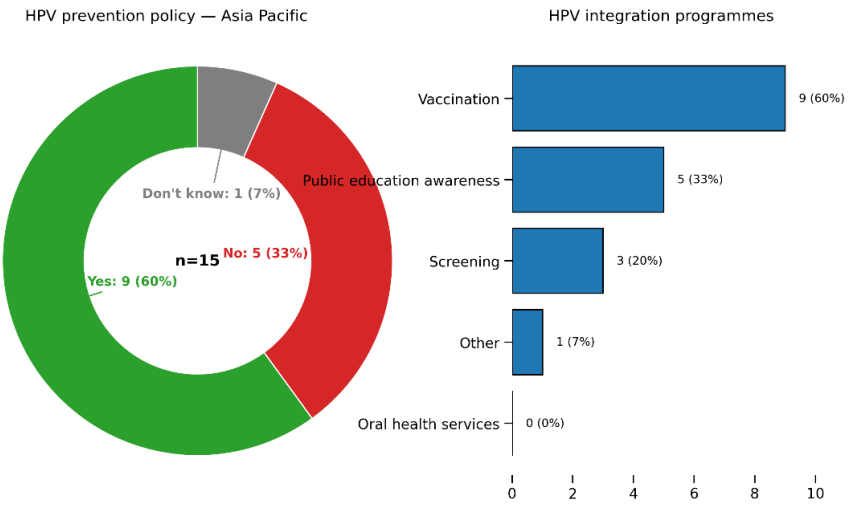

Figure 65- HPV prevention policy in Asia Pacific (n=15)

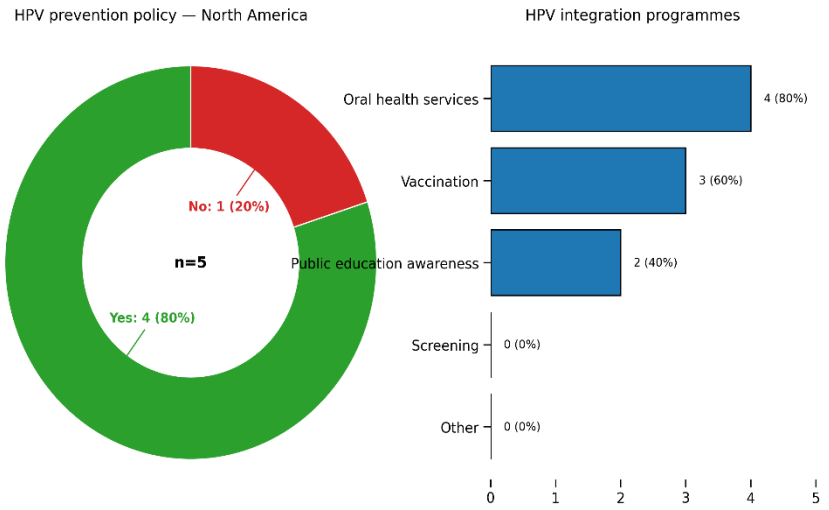

Figure 66- HPV prevention policy in North America (n=5)

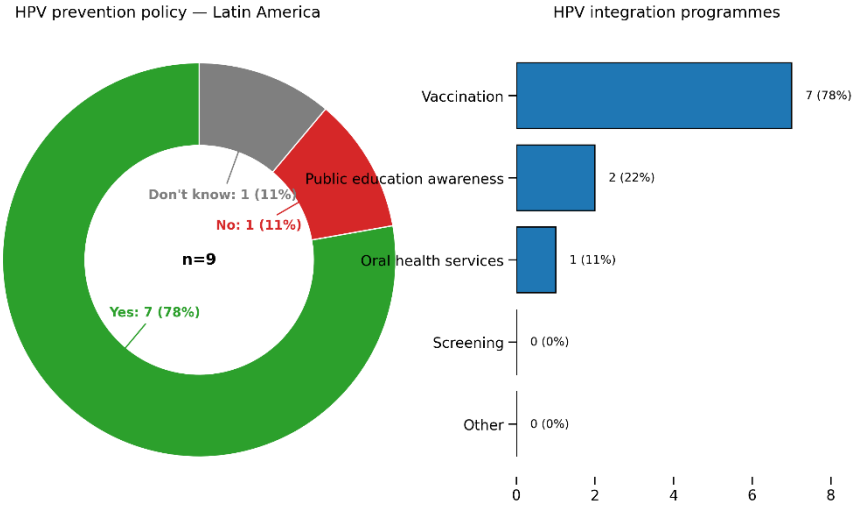

Figure 67- HPV prevention policy in Latin America (n=9)

Taken together, these findings illustrate a layered policy landscape. At the global level, HPV vaccination has been normatively consolidated as a central cancer prevention strategy. At the national level, most countries report formal policy adoption. Yet beneath this surface of institutionalisation lie significant disparities in introduction, coverage, and integration depth. The architecture remains strongly oriented around vaccination delivery, with comparatively limited and regionally uneven engagement of other sectors, including oral health, despite the expanding epidemiological relevance of HPV-associated disease beyond the cervix.

Understanding how vaccination is operationalised across delivery platforms, and how these models shape opportunities for broader integration, is therefore essential. The following section examines the extent and models of HPV vaccination provision globally, exploring how programme design influences cross-sectoral collaboration and the potential for more horizontally integrated prevention strategies.

Extent and Models of HPV Vaccination Provision

Although HPV vaccination has been adopted in a growing number of countries, implementation approaches vary considerably across settings. Experiences from low- and middle-income countries demonstrate that vaccination is most commonly delivered through school-based programmes, often complemented by health facility provision and community outreach strategies.[94]

In many LMICs, schools have been selected as the primary vaccination site, either through dedicated outreach campaigns or integration within existing school health programmes.[94] Countries such as Malaysia, South Africa, and Sri Lanka have incorporated HPV vaccination into established school health platforms, while others have relied on temporary outreach visits to schools coordinated by immunisation teams.[94] These school-based approaches are frequently supplemented by facility-based vaccination and community outreach services to reach out-of-school girls or those who missed scheduled doses.[94]

Facility-based delivery constitutes an alternative or complementary strategy, situating HPV vaccination within routine primary health care services.[94] Tanzania's "HPV-Plus" initiative illustrates a hybrid approach in which vaccination is delivered through both schools and health facilities, alongside selected adolescent health interventions.[95] This model demonstrates how HPV vaccination platforms can be used to link additional services, though stakeholders have noted concerns regarding staff time and feasibility when combining activities within vaccination visits.[11]

Community outreach-based delivery has been used to extend coverage to hard-to-reach populations and non-school-going girls. In some settings, including Malawi, multifunctional outreach teams have been mobilised to support vaccine delivery beyond fixed facilities.[96] These outreach strategies aim to improve equity in access but require careful coordination and planning within national immunisation programmes.[94]

Beyond delivery platforms, attention has increasingly turned to how HPV vaccination may be integrated with other services across the cervical cancer prevention continuum. A systematic review of integration efforts in low- and middle-income countries identified four typologies linking HPV vaccination and cervical cancer screening.[97] These typologies included leveraging vaccination encounters to promote screening among caregivers, embedding screening within primary care settings alongside vaccination, recruiting adolescent girls and adult women concurrently for parallel services, and coordinated outreach models delivering both interventions within shared campaigns.[97] Across these experiences, integration was more frequently associated with improvements in screening participation than with demonstrated increases in vaccination uptake.[97]

Complementing this typological framework, broader analyses of service integration have distinguished between models in which vaccination providers assume multiple tasks, secondary activities are added to vaccination encounters, or services are co-located but delivered by different personnel.[95] These models underscore that integration represents a spectrum of organisational arrangements rather than a single intervention, and that operational design varies depending on platform and context.

Collectively, the evidence demonstrates that HPV vaccination programmes are typically embedded within immunisation and adolescent health delivery systems, often relying on

school platforms and established outreach mechanisms.[94] While integration with closely related services such as cervical cancer screening has been explored through identifiable typologies, extension beyond these established pathways remains limited. This operational architecture provides essential context for interpreting the FDI survey findings, particularly the marginal incorporation of oral health services within national HPV prevention strategies.

Evidence of Limited Integration of Oral Health into HPV Prevention Strategies

The WHO Global Strategy to Accelerate the Elimination of Cervical Cancer emphasises integration of screening and treatment services within primary care, expansion of single-visit "screen-and-treat" approaches, and strengthening of referral pathways through a people-centred continuum of care.[84] Similarly, the Immunisation Agenda 2030 (IA2030) calls for closer alignment of immunisation programmes with primary health care (PHC) platforms, while the WHO Global Strategy and Action Plan on Oral Health advocates for the integration of oral health into primary care systems.[89,98] Collectively, these frameworks articulate a shared vision of strengthened, coordinated service delivery across health sectors.

Despite this policy alignment, cross-sectoral integration of HPV prevention into oral health services remains limited. According to the FDI Vision 2030 survey, only 13% of responding countries report incorporation of oral health services within HPV prevention programmes. This low level of integration highlights a significant gap between normative global strategy and operational practice.

Empirical studies examining the role of oral health professionals (OHPs) provide insight into this disconnect. Qualitative research exploring dentists' and dental hygienists' knowledge, attitudes, and perceived roles in relation to HPV-associated oral cancers identified substantial variability in awareness of the HPV-oropharyngeal cancer link and uncertainty regarding professional responsibility for discussing HPV with patients.[99] Participants reported discomfort initiating conversations about sexually transmitted infections, concerns regarding patient receptivity, and ambiguity about whether HPV counselling fell within the scope of dental practice. These findings suggest that limited integration is not solely a policy omission, but also reflects professional role ambiguity and communication barriers within dental settings.

Complementing these findings, a large survey of dental professionals assessing willingness to recommend and administer the HPV vaccine found that although a majority expressed support for vaccination in principle, confidence in discussing HPV and perceived scope-of-practice constraints significantly influenced willingness to act.[100] Respondents who reported stronger beliefs in vaccine efficacy and greater confidence in discussing HPV were more likely to express willingness to administer the vaccine if legally permitted. Conversely, barriers included lack of knowledge, liability concerns, and personal beliefs. These findings indicate that regulatory frameworks, professional training, and institutional guidance play critical roles in shaping the feasibility of integrating vaccination into dental practice.

Importantly, evidence from broader vaccination research demonstrates that provider recommendation is one of the strongest predictors of HPV vaccine uptake, with receipt of a recommendation associated with substantially higher initiation rates.[101] In this context, the

limited engagement of dental professionals in HPV-related counselling or vaccination represents a missed opportunity within the health workforce. Dental professionals constitute a substantial proportion of the global health workforce and routinely engage adolescents and young adults, age groups targeted for HPV vaccination.[102] Strengthening their role could contribute to IA2030 goals, including reduction of zero-dose populations and achievement of 90% vaccination coverage by 2030.[103]

At the same time, integration must be understood within broader system constraints. The absence of clear policy mandates, inconsistent scope-of-practice regulations, and limited inclusion of HPV content in dental curricula create structural barriers to cross-sectoral collaboration. Thus, while global strategies advocate integration across primary care domains, operationalisation within oral health systems remains fragmented and uneven.

Taken together, the FDI survey findings and existing empirical literature indicate that limited integration of oral health into HPV prevention strategies reflects a combination of policy prioritisation, professional role uncertainty, regulatory constraints, and training gaps. Addressing these barriers will require not only normative endorsement of integration but also targeted professional education, clarification of scope, and alignment of regulatory frameworks to support expanded engagement of oral health services in HPV prevention.

Regional Patterns, Disparities, and Equity Implications

Although HPV vaccination has been progressively incorporated into national immunisation schedules worldwide, its integration and performance remain uneven across regions and income groups. In 2020, inclusion of the HPV vaccine within national immunisation programmes was substantially lower in low- and lower-middle-income countries compared to high- and upper-middle-income countries.[84] A similar gradient was observed in the implementation of organised national screening programmes.[84] These structural disparities continue to shape the contemporary landscape of HPV prevention.

Globally, HPV vaccination coverage remains below 50% and demonstrates marked regional variation.[21] Coverage has been particularly low in the WHO Eastern Mediterranean Region.[104] Concurrently, the burden of cervical cancer remains disproportionately concentrated in sub-Saharan Africa and South Asia and lowest in North Africa, the Middle East, Europe, and North America.[105] These patterns align with socio-demographic index gradients, with higher incidence and mortality observed in low-SDI countries.[105] Thus, regions experiencing the highest disease burden frequently coincide with weaker health system capacity for sustained vaccination and screening implementation.

Data from the FDI Vision 2030 mid-term survey reinforce this uneven institutional landscape. At the aggregate level, 74.7% of responding countries report providing routine HPV vaccination (Figure 68). However, regional disaggregation of routine vaccination status reveals substantial variation. Routine provision is reported by 100% of North American respondents and 89% of Latin America respondents, compared with 72% in Europe and only 60% in Africa (Figures 69-73). In Africa, 30% of respondents indicated uncertainty regarding routine provision, suggesting gaps in institutional clarity, reporting, or system communication.

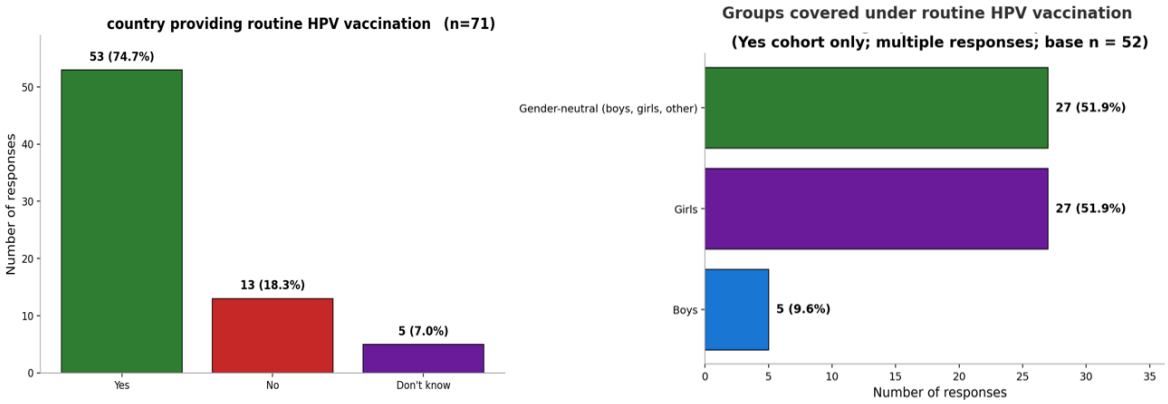

Figure 68 - FDI Vision 2030 mid-term survey findings: HPV vaccination

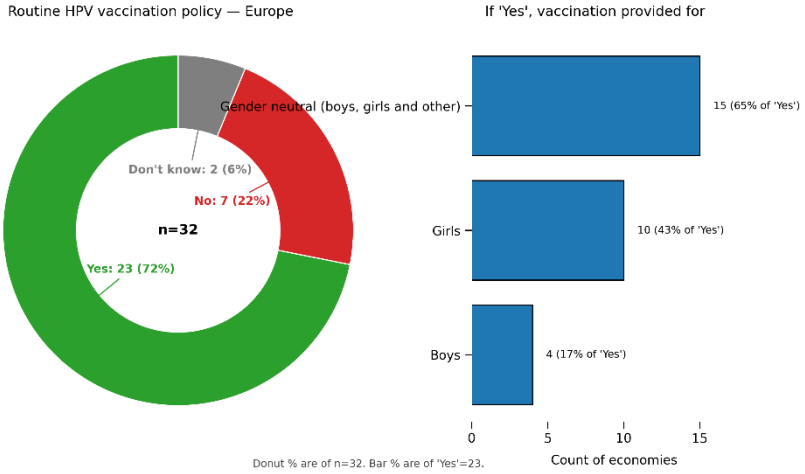

Figure 69- Routine HPV vaccination status in Europe (n=32)

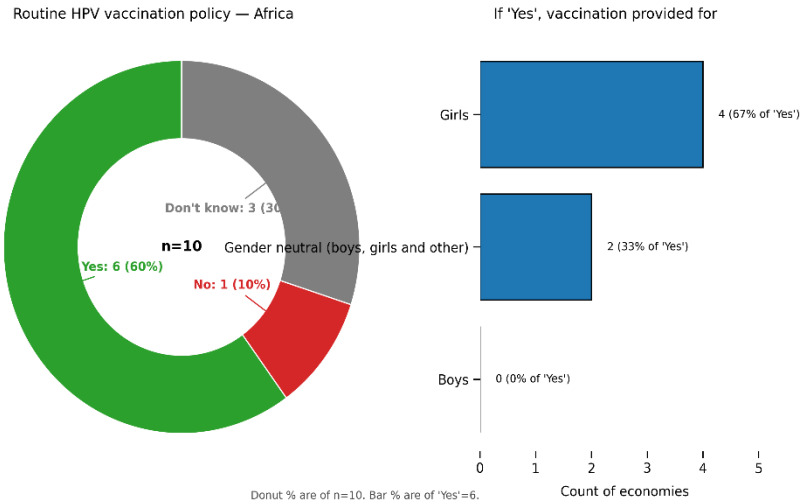

Figure 70- Routine HPV vaccination status in Africa (n=10)

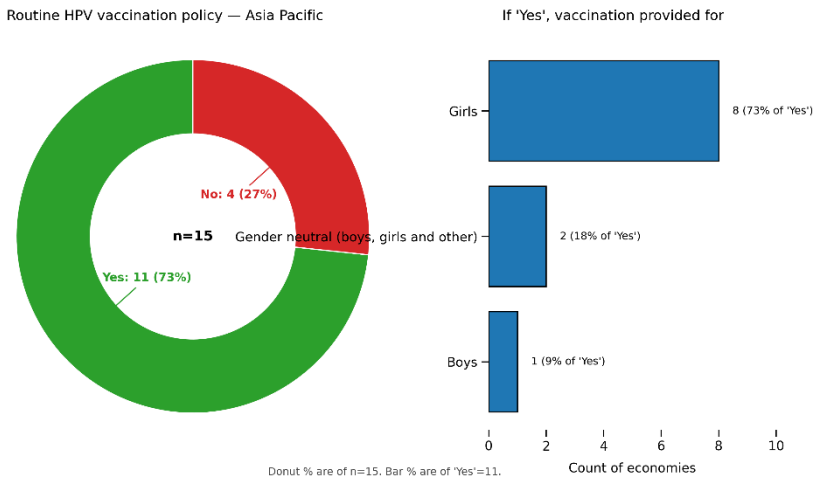

Figure 71- Routine HPV vaccination status in Asia Pacific (n=15)

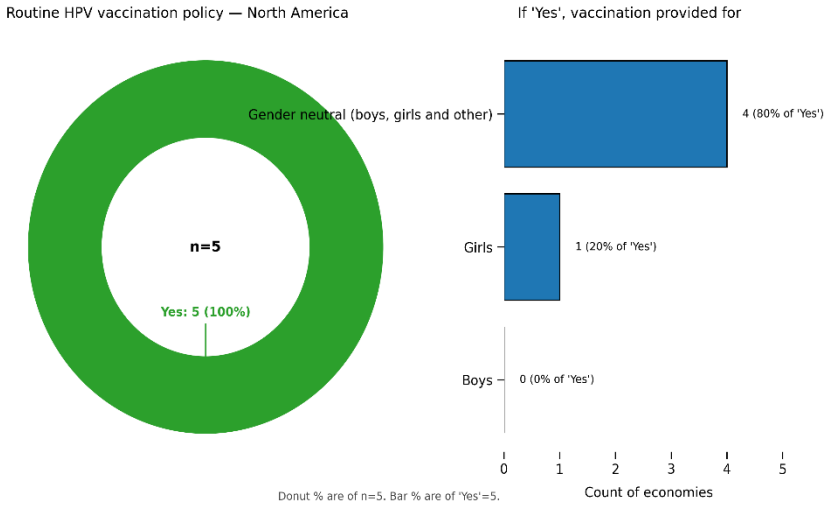

Figure 72- Routine HPV vaccination status in North America (n=5)

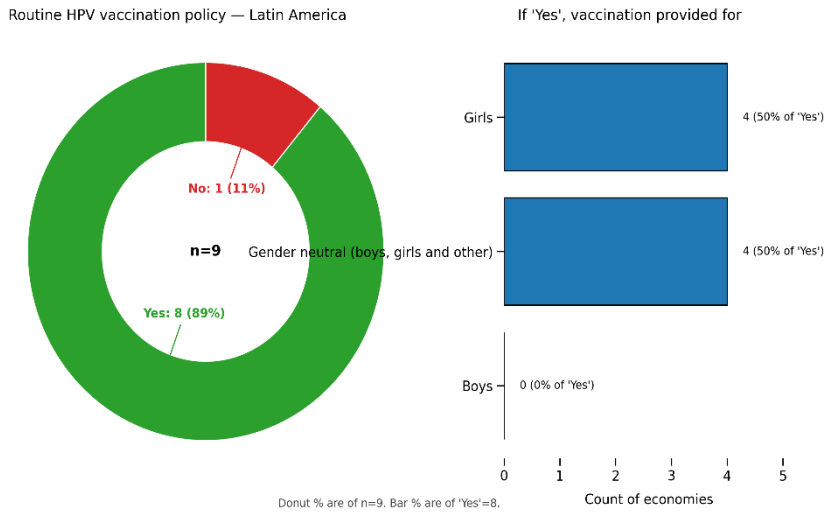

Figure 73- Routine HPV vaccination status in Latin America (n=9)

Analysis of regional reports of HPV prevention policy alongside routine vaccination status indicates that formal policy adoption does not uniformly translate into sustained routine implementation. In several regions, the proportion of countries reporting the existence of an HPV prevention policy exceeds the proportion reporting routine vaccination delivery. This divergence reflects an implementation gap between normative commitment and operational institutionalisation, underscoring that policy presence alone is an insufficient indicator of programme maturity.

Gender configuration of vaccination strategies adds an additional layer of disparity. Globally, approximately half of HPV vaccination programmes remain female-only, while the remainder have adopted gender-neutral approaches.[106] Within the FDI survey cohort, 51.9% of countries reporting routine vaccination indicate gender-neutral programmes and 51.9% indicate girls-only programmes (multiple responses permitted) (Figure 68). International Vaccine Access Centre data demonstrate comparable global distribution: among 165 countries with HPV vaccination programmes, 80 operate female-only programmes and 85 include both males and females (Figure 74).[107]

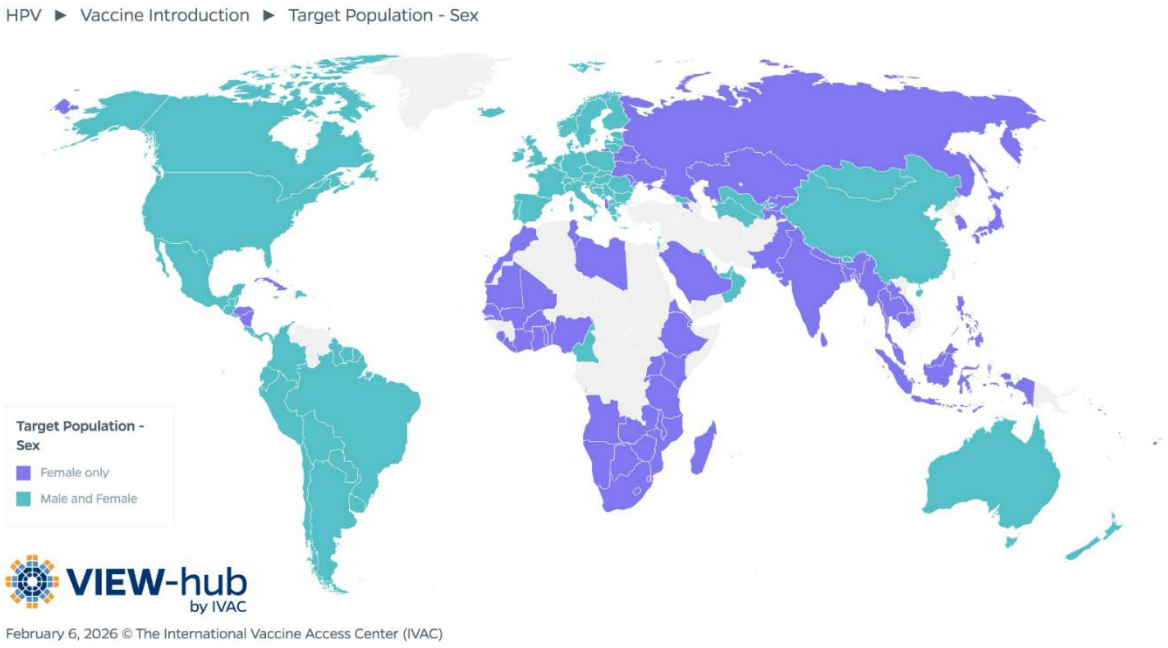

Figure 74 - Introduced HPV vaccination programmes by sex; Source: International Vaccine Access Center (IVAC)[107]

However, programme design does not necessarily equate to equitable uptake. Even in settings with gender-neutral policies, coverage among boys remains typically lower than that of girls.[23] High-income countries are more likely to implement gender-neutral strategies, whereas low-income countries more frequently prioritise girls, reflecting constrained resources and initial framing of HPV vaccination as a cervical cancer prevention intervention.[108] Such prioritisation may be rational within limited-resource settings, yet it also perpetuates gendered access differentials.

Epidemiological trends increasingly challenge a strictly cervical-centric policy orientation. Rates of HPV-associated oropharyngeal cancers are substantially higher among males (7.6 per 100,000) than females (1.7 per 100,000).[109] Furthermore, evidence demonstrates a significant rise in HPV-positive oropharyngeal squamous cell carcinoma, particularly in high-income countries, with marked male predominance.[87] These trends provide strong epidemiological justification for gender-neutral vaccination strategies and highlight the limitations of female-only frameworks in addressing the evolving HPV-related disease burden.

Disparities have widened in the aftermath of the COVID-19 pandemic. Vaccination coverage declined in many low- and middle-income countries, while several high-income countries experienced recovery or stabilisation.[108] Consequently, many lower-income settings now face a dual challenge: restoring routine immunisation performance while addressing cohorts who missed vaccination during pandemic-related disruptions.

Behavioural and structural determinants further mediate these regional inequities. The Behavioural and Social Drivers (BeSD) framework conceptualises vaccination uptake as shaped by interacting domains including practical constraints, social processes, motivation, and perceptions of risk. In lower-income settings, practical barriers such as financing limitations, delivery infrastructure, and workforce capacity, may constrain routine institutionalisation.[110] Evidence indicates that even in settings with gender-neutral vaccination policies, provider recommendation patterns may continue to align with sex assigned at birth, with individuals assigned male at birth less likely to receive strong recommendations.[111]

Taken together, regional variation in HPV prevention reflects the intersection of health system capacity, resource allocation, epidemiological transition, and gendered policy legacy. While global introduction has expanded considerably, routine institutionalisation, equitable coverage, and gender-inclusive implementation remain uneven. Regions bearing the highest cervical cancer burden continue to experience structural constraints that limit full realisation of vaccination potential, underscoring the need for sustained investment, strengthened delivery systems, gender-inclusive policy alignment, and post-pandemic recovery strategies that prioritise equity.

Key insights from countries showing early or partial integration

Emerging experiences from early and partial integration efforts suggest that incorporating oral health professionals into HPV prevention is both conceptually aligned with primary care strengthening and operationally feasible, yet constrained by a combination of clinical, professional, and system-level factors.

Dental professionals are well integrated within primary care systems and routinely conduct oral cancer screenings during recall appointments.[86] This repeated contact with adolescent and adult populations positions oral health providers uniquely within the prevention pathway for HPV-associated oropharyngeal cancers. Screening approaches, including visual-tactile examination and potential adjunctive salivary HPV testing, could in principle be incorporated into routine dental practice.[86] Moreover, preventive counselling regarding HPV transmission and vaccination could be delivered during these encounters. However, despite this clinical

alignment, integration of HPV prevention into oral health services remains limited globally, as reflected in the FDI survey findings and broader policy analyses.

Case-based evidence from African countries demonstrates that HPV vaccination can be successfully embedded within broader health delivery platforms.[112] In Lesotho, for example, HPV vaccination was integrated into the national school health programme, which also included dental screening services.[112] Other programmes have combined HPV vaccination with adolescent health services addressing puberty, menstrual hygiene, nutrition, deworming, and sexual health education.[112] While not all such initiatives have been scaled nationally, these experiences illustrate that cross-sectoral delivery is feasible when HPV prevention is embedded within existing service platforms rather than delivered as a stand-alone vertical intervention. School-based delivery models in particular have been associated with improved vaccine uptake and coverage.[113] These examples underscore the potential for oral health services, especially where linked to school health or community outreach platforms, to function as complementary entry points within integrated HPV prevention strategies.

Empirical studies consistently show that the principal constraints to integration lie not only in questions of clinical scope but also in professional preparedness, role clarity, and infrastructure. Qualitative research conducted among dental clinic directors and staff found that while oral cancer screening is routinely performed, discussions of HPV or vaccination rarely occur during dental visits.[31] Participants reported openness to engaging in HPV-related conversations but identified multiple barriers, including limited appointment time, open operatory layouts that restrict privacy, discomfort discussing sexually transmitted infections with adolescents or parents present, and heightened vaccine hesitancy in the post-COVID context.[113,114]

Qualitative investigations of oral health providers further illuminate the nature of these constraints. In focus group research, participants acknowledged the growing link between HPV and oropharyngeal cancer and recognised education and screening as falling within their professional remit.[99] However, they reported limited knowledge regarding vaccination protocols, uncertainty about how to initiate sensitive conversations, and discomfort discussing sexually transmitted infections in open clinical settings where confidentiality could not be ensured. Providers distinguished between routine oral cancer screening, which they perceived as clearly within scope and proactive HPV vaccine discussion or administration, which some regarded as extending beyond traditional dental practice. Several participants indicated that clearer endorsement and guidance from professional organisations would increase their confidence and engagement.[99]

Importantly, willingness to contribute to HPV prevention appears substantially higher than actual engagement. In a state-wide survey of dental professionals, a majority indicated willingness to administer the HPV vaccine if permitted by law, with willingness notably higher among dental and hygiene students than among practicing clinicians.[100] This generational gradient suggests that professional norms may be shifting, and that integration capacity could expand over time with appropriate regulatory and educational support. Across studies, providers expressed interest in recommending vaccination and referring patients, particularly when supported by structured training and professional guidance.[100,113,114,115]

Evidence also indicates that educational exposure influences preparedness. In survey data, respondents who had completed prior coursework or training on HPV reported greater confidence in discussing HPV infection and vaccination compared to those without such

training.[100] Additional intervention studies demonstrate that targeted educational programmes increase dental providers' perceived self-efficacy and readiness to engage in HPV-related prevention discussions.[116,117] These findings reinforce the importance of structured continuing education and curricular integration within dental training institutions.

Several other significant barriers identified include logistical and regulatory constraints rather than ideological opposition.[116,117] Frequently cited concerns include lack of formal training to administer vaccines and monitor side effects, liability considerations, vaccine storage requirements, billing and reimbursement complexities, and uncertainty regarding scope-of-practice regulations.[116,117] In many cases, providers indicated they would be willing to vaccinate if training, certification pathways, and legislative clarity were established.

Legislative feasibility is supported by existing policy models. In several U.S. states, dentists are authorised to administer influenza vaccines, and in jurisdictions such as Oregon broader vaccine authority has been extended to include additional immunisations, including HPV.[100] These precedents demonstrate that vaccine administration within dental settings is not structurally implausible but contingent on regulatory design, professional training frameworks, and reimbursement mechanisms.

Perceived patient discomfort, often cited by providers as a barrier, appears to be less pronounced than anticipated. Survey evidence indicates that approximately two-thirds of parents consider dentists qualified to counsel about HPV, and over 70% report comfort receiving HPV vaccination information from dental professionals.[100] This contrasts with providers' concerns regarding stigma and patient offence, suggesting a misalignment between perceived and actual patient receptivity.[114,115] Addressing this perception gap through communication training and dissemination of patient acceptance data may reduce professional hesitation.

At the systems level, limited interoperability between dental and medical records and absence of formal referral pathways further constrain integration.[114] Dental and community clinics frequently lack shared electronic health record systems, immunisation registry access, and standardised referral protocols. However, both sectors have expressed openness to collaboration under formal agreements and structured referral models.[114] Establishing shared infrastructure, consultation forms, and communication channels would represent a pragmatic step toward horizontal integration of oral health within HPV prevention strategies.

Taken together, these findings reveal a consistent pattern: the oral health workforce possesses substantial latent capacity to contribute to HPV prevention, yet this capacity remains under-realised due to fragmented guidance, limited training, regulatory uncertainty, and infrastructure gaps. Where integration has occurred through school-based platforms, collaborative referral models, or expanded legislative authority, it has demonstrated feasibility and acceptability. Strengthening professional education, clarifying scope-of-practice policies, and aligning reimbursement and referral systems would not only support HPV-related cancer prevention but also advance broader objectives of primary care integration envisioned within global health strategies. In this regard, oral health integration represents not merely an adjunct intervention, but a strategic opportunity to reinforce system resilience and equity in cancer prevention.

Chapter 8

Environmental Sustainability and the Amalgam Transition

Key Highlights

- 86.5% of responding organisations reported awareness of the Minamata Convention on Mercury and its implications for dental amalgam use.
- 79.7% of respondents reported that their countries are moving away from dental amalgam, including 48.7% pursuing phase-down strategies and 31.1% pursuing phase-out approaches.
- Training dental professionals in mercury-free restorative alternatives was reported by 63.9% of respondents as a key implementation measure.
- 65.6% of countries reported promoting the use of cost-effective mercury-free restorative materials.
- 62.3% of respondents reported setting national objectives for caries prevention and health promotion to reduce the need for restorative treatment.
- Awareness of the European Union dental amalgam ban effective January 2025 was reported by 81.1% of responding organisations.
- Among EU respondents, 72.3% considered a complete phase-out of dental amalgam feasible, while 27.7% anticipated challenges.
- More than half of respondents (51.35%) reported uncertainty about when dental amalgam will be fully phased out in their countries.

Background and Rationale

Oral diseases remain among the most prevalent health conditions worldwide, with untreated dental caries ranking as the most common condition assessed in the Global Burden of Disease study. Despite advances in preventive care, the management of dental caries has historically relied on restorative interventions, with dental amalgam serving as one of the most widely used restorative materials for more than a century. Dental amalgam, an alloy composed primarily of silver, tin and copper combined with approximately 50% elemental mercury, has long been valued in dentistry for its durability, ease of manipulation and relatively low cost, particularly in settings with limited clinical infrastructure.[118]

These characteristics have enabled amalgam to become a cornerstone of restorative dentistry in many health systems, especially in contexts where resource constraints limit access to more technically demanding materials. In low- and middle-income countries, where oral health services may be under-resourced and restorative dentistry remains limited, dental amalgam has historically played an important role in maintaining access to affordable treatment for dental caries.[119]

At the same time, increasing global attention has been directed toward the environmental and health implications of mercury use. Mercury is a persistent environmental pollutant with well-documented toxicological effects, including neurological and renal toxicity. Human exposure may occur through inhalation or ingestion, and mercury released into the environment can travel long distances through atmospheric circulation before bio accumulating in ecosystems and food chains.[120]

Within dentistry, mercury exposure can arise through several pathways. Dental amalgam restorations represent a source of chronic exposure to elemental mercury for both patients and dental personnel, while occupational exposure may occur during the preparation, placement or removal of amalgam restorations. Studies examining mercury exposure among dental professionals have reported higher mercury concentrations in biological samples compared with control groups, although measured levels in modern dental practice generally remain within recommended occupational safety limits.[121]

Beyond direct human exposure, growing concern has focused on the environmental pathways through which mercury from dental amalgam enters the wider ecosystem. Mercury released during the placement, removal and disposal of dental restorations may enter wastewater systems, landfills or the atmosphere. Additional pathways include emissions during cremation, contamination of sewage sludge and the potential diversion of dental mercury into other industrial activities such as artisanal gold mining.[120]

Environmental analyses further highlight that dental restorative materials more broadly including both amalgam and alternative materials, may have measurable environmental impacts across their lifecycle, from production to disposal. While concerns regarding mercury have accelerated the transition away from amalgam, emerging evidence suggests that alternative restorative materials also require careful environmental evaluation.[122]

The Minamata Convention on Mercury

The above stated concerns formed part of the broader international momentum that culminated in the adoption of the Minamata Convention on Mercury in 2013. Named after the site of a devastating mercury poisoning incident in Japan, the Convention represents the first legally binding global treaty aimed at protecting human health and the environment from anthropogenic emissions and releases of mercury. Governments across the world recognised that mercury pollution is a transboundary environmental issue requiring coordinated international action, given the ability of mercury to circulate globally through atmospheric transport and ecological processes.[123]

The Convention addresses mercury use across a wide range of sectors, including industrial processes, mining activities and mercury-added products such as dental amalgam. Rather than mandating an immediate prohibition of dental amalgam, the Convention adopts a phase-down approach, recognising the continued role of amalgam in maintaining access to essential dental care in many parts of the world. Annex A of the Convention outlines a series of policy measures that Parties are encouraged to implement to progressively reduce reliance on dental amalgam. These measures include strengthening caries prevention strategies, promoting the development and use of mercury-free restorative materials, improving waste management practices and reforming insurance policies that incentivise the use of amalgam over alternative materials.[118]

Importantly, the Convention also highlights the interconnected nature of oral health policy, environmental sustainability and health system strengthening. The gradual transition away from dental amalgam has the potential to catalyse broader changes in oral health care delivery, including greater emphasis on prevention, minimal intervention dentistry and integrated models of primary health care. At the same time, the transition raises complex challenges for many health systems, particularly in low-resource settings where alternatives to amalgam may require greater technical expertise, infrastructure or financial investment.[119]

Recognising the importance of aligning oral health policy with environmental sustainability, the Global Oral Health Action Plan (2023-2030) identifies environmentally responsible oral health care as a strategic priority. The plan calls for countries to promote safe and environmentally sound oral health practices, support the adoption of mercury-free restorative materials and strengthen national capacity for managing mercury waste associated with dental care. Within this framework, a key global target aims for 90% of countries to implement measures to phase down the use of dental amalgam in accordance with the Minamata Convention, or to have phased it out entirely, by 2030.[3]

These developments highlight a critical transition underway within global oral health systems. The move toward environmentally sustainable dentistry reflects the intersection of environmental governance, health system strengthening and oral disease prevention. Understanding how countries are responding to this transition through policy development, regulatory action and health system adaptation, has therefore become an important priority within the evolving global oral health agenda.

Dental Amalgam in Transition: Global Perspectives

The global movement to reduce mercury use has brought renewed attention to the role of dental amalgam in oral healthcare systems. To better understand how these policy developments are reflected across member countries, the Vision 2030 Mid-Term Survey included a set of questions examining awareness of the Minamata Convention and the evolving status of dental amalgam use worldwide.

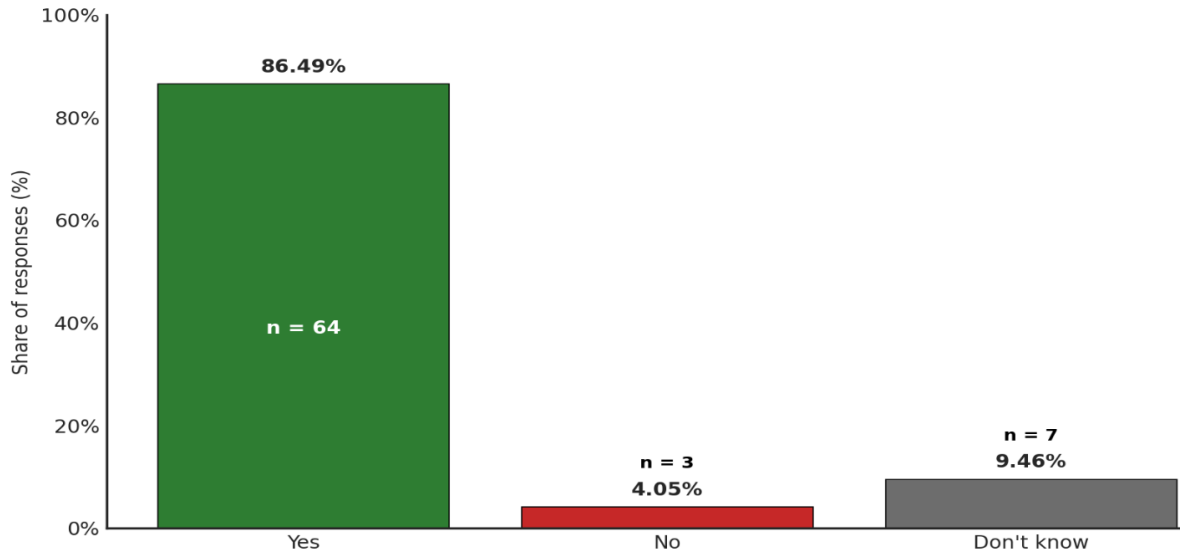

Figure 75- Awareness of the Minamata convention on dental amalgam use among responding countries

A strong majority of responding organisations reported awareness of the implications of the Minamata Convention on Mercury for dental amalgam use (Figure 75). Overall, 86.5% of respondents (64 out of 74) indicated that their organisations are aware of the Convention and its provisions related to the phase-down of dental amalgam. Only 4.1% reported not being aware, while 9.5% indicated uncertainty

This high level of awareness likely reflects the profile of respondents participating in the survey, primarily national dental associations and professional organisations that are engaged in policy dialogue and international collaboration on oral health. Since the adoption of the Minamata Convention in 2013, global professional and policy networks have played an important role in disseminating information regarding its provisions and implications for dentistry.[118]

Global attention to dental mercury has intensified in recent decades.[120] The dental sector has historically been a significant user of mercury with estimates suggesting that 270-341 metric tonnes of mercury were used annually in dentistry worldwide, with a portion ultimately entering waste streams through wastewater, solid waste, or atmospheric emissions.[118]

Against this global environmental backdrop, the Convention established a coordinated international framework to reduce mercury use across sectors. High awareness among professional dental organisations is therefore a critical enabling condition for policy implementation, as these organisations play an important role in translating international commitments into national professional guidance and clinical practice.

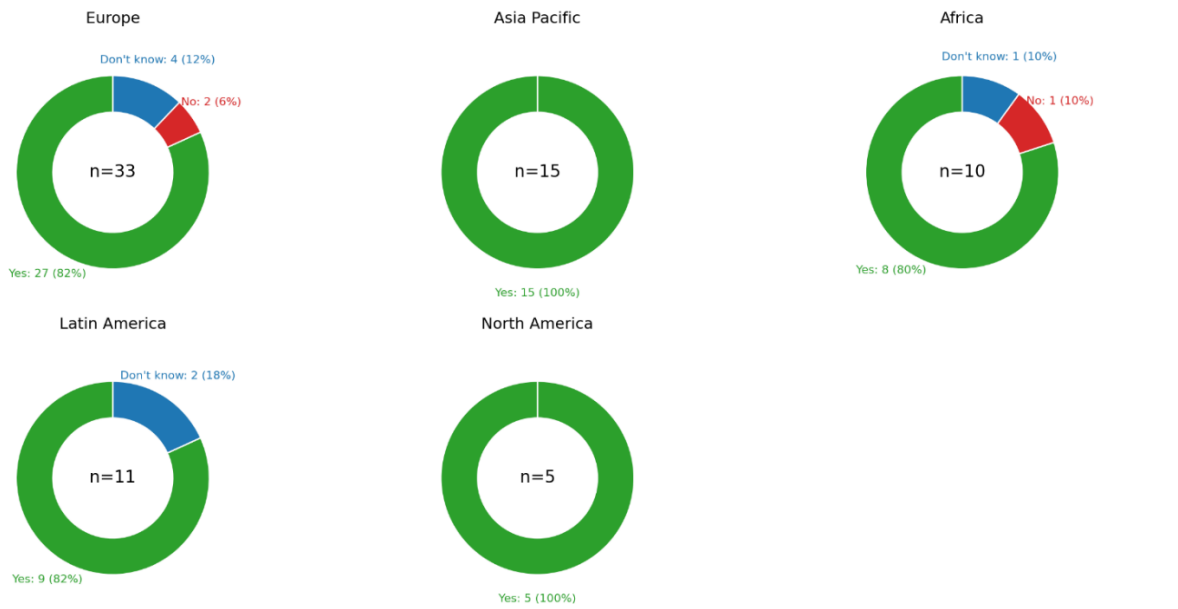

Figure 76- Regional distribution of awareness of the Minamata convention on dental amalgam use

Regional breakdowns show consistently high awareness across most regions. Awareness exceeded 80% in Europe and Latin America, while respondents from the Asia-Pacific and North America reported universal awareness among participating organisations. However, these regional results should be interpreted cautiously, as the number of responses varies substantially between regions. In particular, responses from North America and Africa represent smaller samples, meaning that regional percentages may not necessarily reflect broader regional trends.

Overall, the findings indicate that awareness of the Minamata Convention among member organisations is widespread, suggesting that the global dental policy community is well informed about international efforts to reduce mercury use in dentistry.

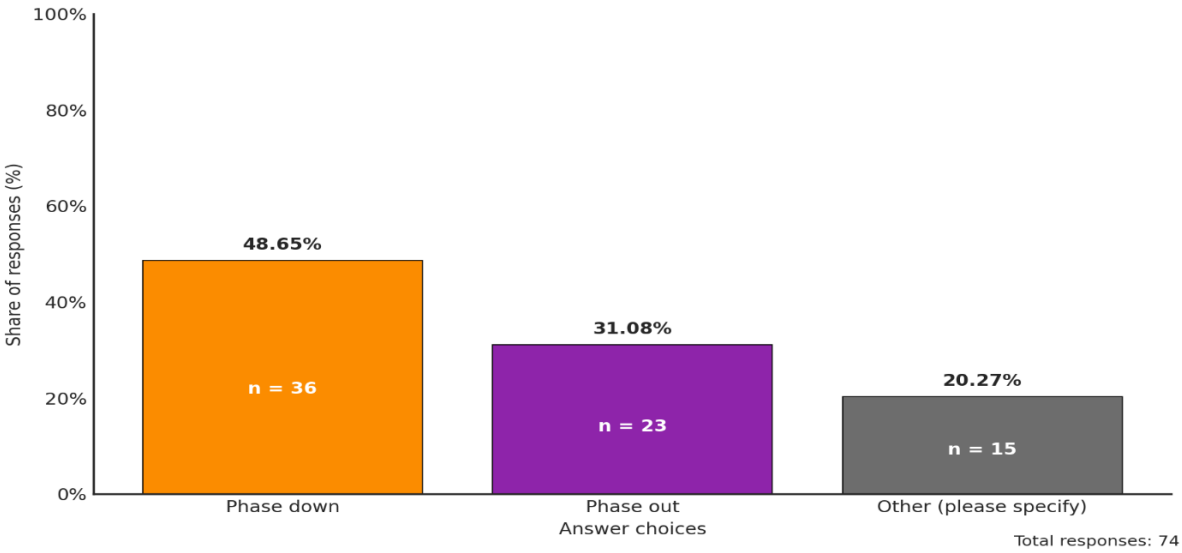

Figure 77- Reported national status of dental amalgam use (phase-down, phase-out or other approaches)

Respondents were also asked about the current status of dental amalgam use within their national contexts (Figure 77). The results indicate that a transition away from dental amalgam is underway in many countries. Overall, 79.7% of respondents reported that their countries are moving away from amalgam use, either through a phase-down approach (48.7%) or a complete phase-out (31.1%), while 20.3% selected “other”, suggesting mixed, transitional or context-specific policy arrangements.

The predominance of phase-down strategies reflects the policy framework established under the Minamata Convention itself. Rather than mandating an immediate global ban on dental amalgam, the Convention promotes a gradual reduction in its use through a range of policy measures, including strengthening caries prevention strategies, promoting mercury-free restorative materials and improving environmental waste management practices.[118]

Additionally, the prominence of phase-down approaches in the survey responses further reflects the broader international consensus that the transition away from mercury in dentistry must occur progressively and in ways that maintain access to essential oral health services. At the same time, the balance between phase-down and phase-out approaches reflects ongoing debate within the dental community regarding the pace and feasibility of eliminating dental amalgam. Dental amalgam has historically been valued for its durability, relatively low cost and ease of use, characteristics that have made it particularly important in settings where dental infrastructure and resources may be limited.[119]

Concerns have therefore been raised that a rapid transition away from amalgam could have unintended consequences for access to care. Alternative restorative materials, while widely used, may require greater technical precision, improved moisture control during placement and higher material costs. In some clinical situations, particularly large posterior restorations, available alternatives may also require more time to place and may have shorter longevity than amalgam restorations.[124]

These concerns are not limited to low-resource settings. Even in high-income countries, professional organisations and researchers have highlighted the risk that removing amalgam too quickly could increase treatment costs, potentially leading to greater reliance on more complex procedures such as crowns or extractions and exacerbating existing oral health inequalities.[124]

Beyond the above concerns, the environmental considerations with amalgam usage nevertheless remain a central driver of policy change. In response, many governments and professional organisations have introduced regulatory measures aimed at reducing mercury releases from dental practices, including restrictions on bulk mercury use and the promotion of encapsulated amalgam.

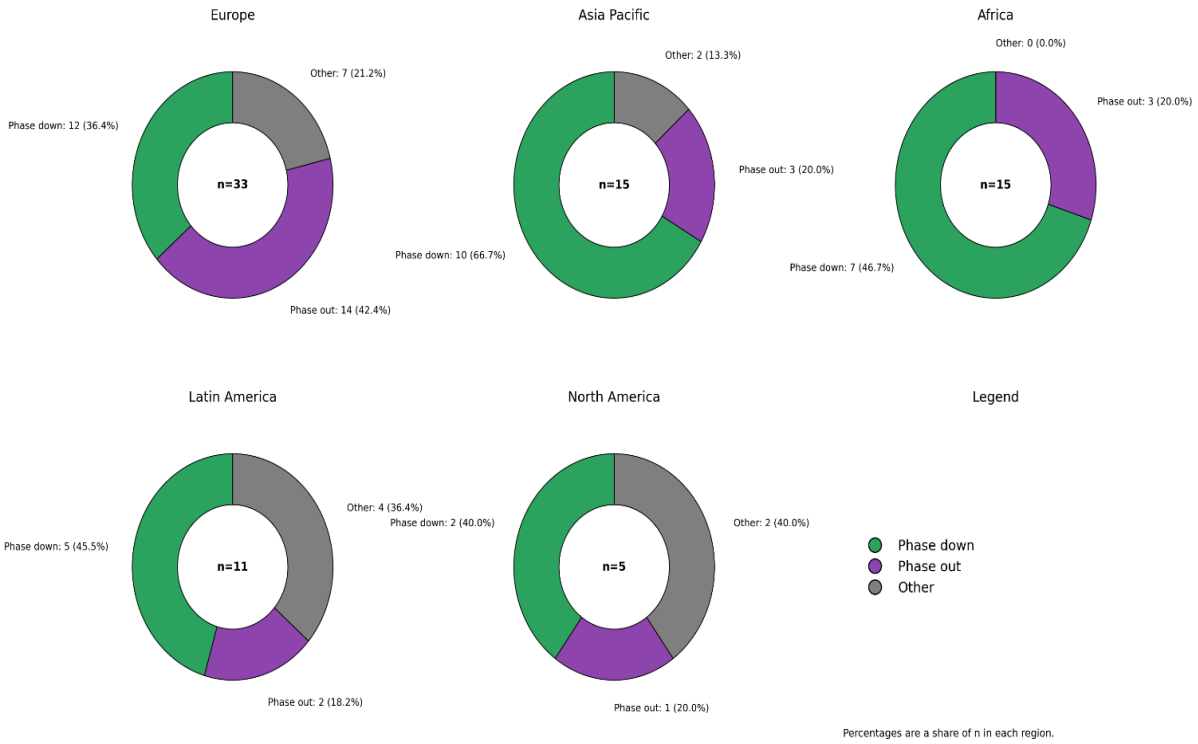

Figure 78- Regional distribution of reported status of dental amalgam use

Regional patterns in the survey responses illustrate the diversity of policy approaches currently being adopted (Figure 78). Phase-down strategies appear particularly prominent in parts of the Asia-Pacific and African regions, whereas European responses show a more diverse mix of policies, including both phase-down and phase-out approaches.

These findings suggest that while the global transition away from dental amalgam is clearly underway, the pace and pathways of this transition remain varied. The predominance of phase-down approaches observed in the survey reflects a pragmatic balance between environmental objectives and the need to maintain access to affordable and effective dental care while alternative materials, preventive strategies and health system capacities continue to evolve.

Beyond identifying whether countries are pursuing phase-down or phase-out strategies, the survey also explored which specific measures under the Minamata Convention are being prioritised by countries to reduce dental amalgam use.

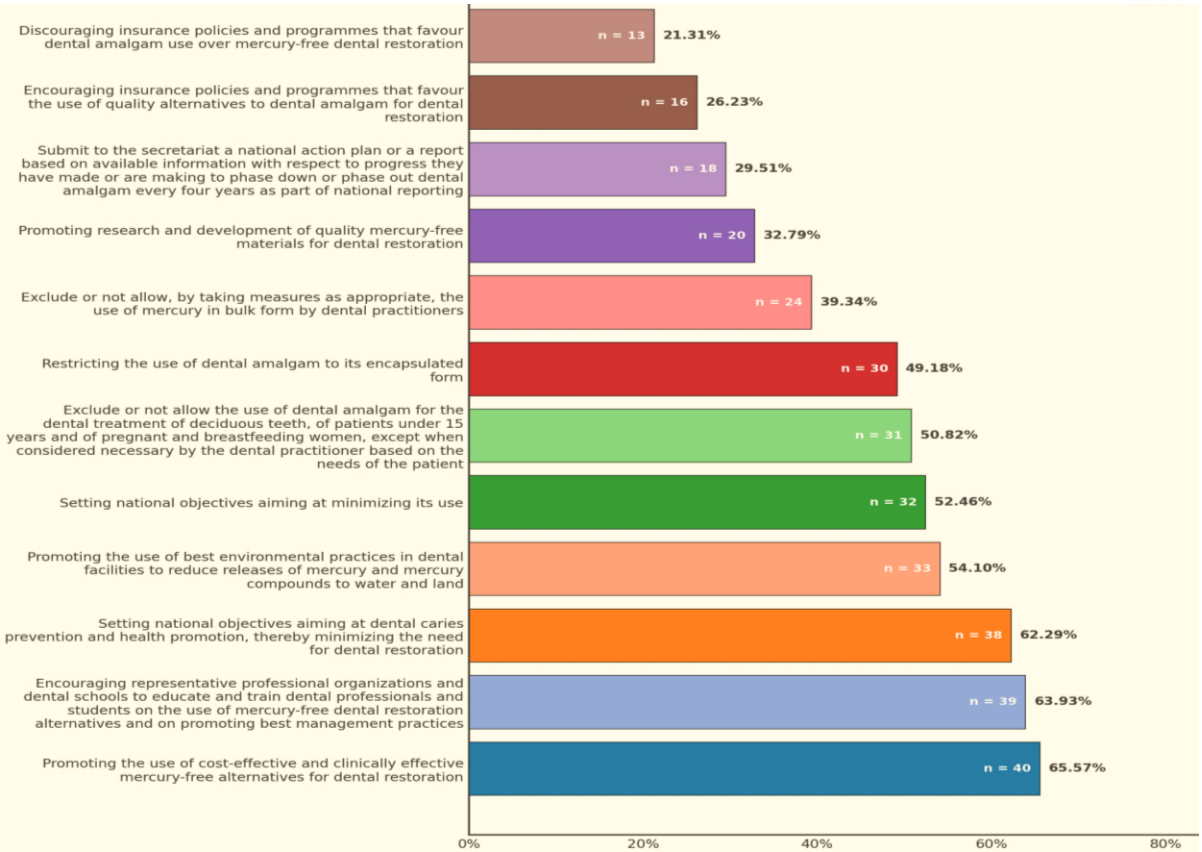

Figure 79- Minamata convention provisions prioritised by responding member countries

The results show that countries are implementing multiple measures simultaneously, reflecting the multi-component approach outlined in Annex A of the Convention (Figure 79). Among respondents, the most frequently reported measures include encouraging representative professional organisations and dental schools to train dental professionals in mercury-free restorative alternatives (63.93%, n = 39), promoting the use of cost-effective and clinically effective mercury-free restorative materials (65.57%, n = 40), and setting national objectives aimed at minimising the use of dental amalgam (52.46%, n = 32). In addition, setting national objectives aimed at dental caries prevention and health promotion to minimise the need for restorative treatment was reported by 62.29% of respondents (n = 38). These measures accounted for the largest share of responses in the survey.

Other measures reported by respondents include promoting research and development of quality mercury-free restorative materials (32.79%, n = 20), discouraging insurance policies that favour dental amalgam use over mercury-free alternatives (21.31%, n = 13), and encouraging insurance policies and programmes that favour the use of quality alternatives to dental amalgam (26.23%, n = 16). These responses reflect the Convention's recognition that reducing amalgam use requires both clinical practice change and broader health-system reforms.

The emphasis on professional training and education observed in the survey aligns with international policy guidance highlighting the importance of workforce preparedness in the transition toward mercury-free dentistry. Dental professionals must adapt clinical techniques and material selection practices as restorative materials evolve and as health systems move toward reduced reliance on amalgam.[118]

At the same time, the survey responses indicate that system-level policy tools, such as insurance reforms or financial incentives are less frequently prioritised. For example, encouraging insurance programmes that favour mercury-free alternatives was reported by 26.23% of respondents (n = 16), while discouraging insurance programmes that favour amalgam was reported by 21.31% (n = 13). This pattern is consistent with research showing that changes in reimbursement structures and funding models for dental care are often slower to implement than professional training or clinical guidance reforms.[125]

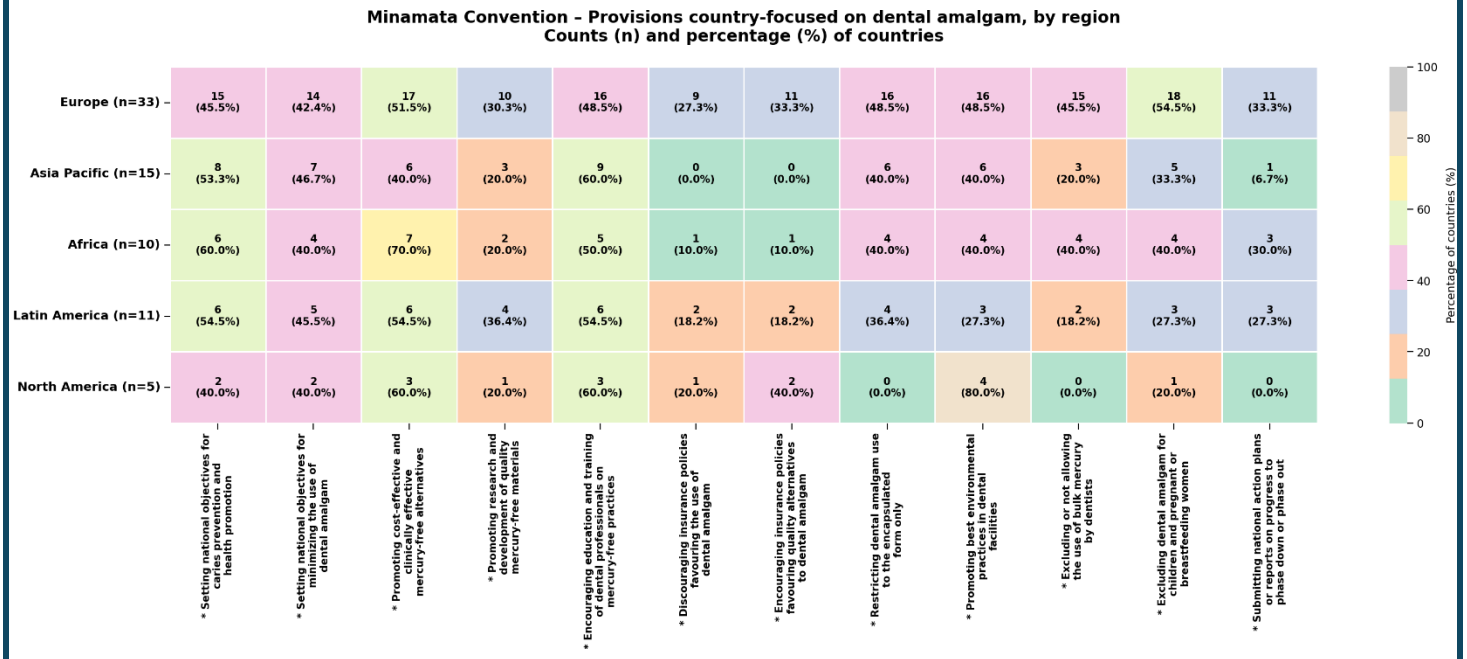

Figure 80- A heatmap showing the focus on Minamata convention provisions related to dental amalgam distributed across regions

The regional heat-map analysis further highlights variation in how these measures are prioritised globally (Figure 80). Some regions report stronger emphasis on professional training and workforce capacity building, while others show greater focus on policy targets aimed at reducing amalgam use or preventive strategies designed to reduce the need for restorative treatment altogether.

Preventive strategies are particularly significant in the Minamata framework. By reducing the incidence of dental caries through oral health promotion and disease prevention, countries can decrease the overall need for restorative treatments and thereby reduce reliance on amalgam. This prevention-oriented approach is also reflected in global oral health policy initiatives such as the WHO Global Oral Health Action Plan.

These findings suggest that countries are approaching the phase-down of dental amalgam through diverse implementation pathways, combining workforce training, preventive strategies, research initiatives and policy targets. This diversity reflects the flexible design of

the Minamata Convention, which allows countries to adopt different combinations of measures depending on their national health system structures and policy priorities.

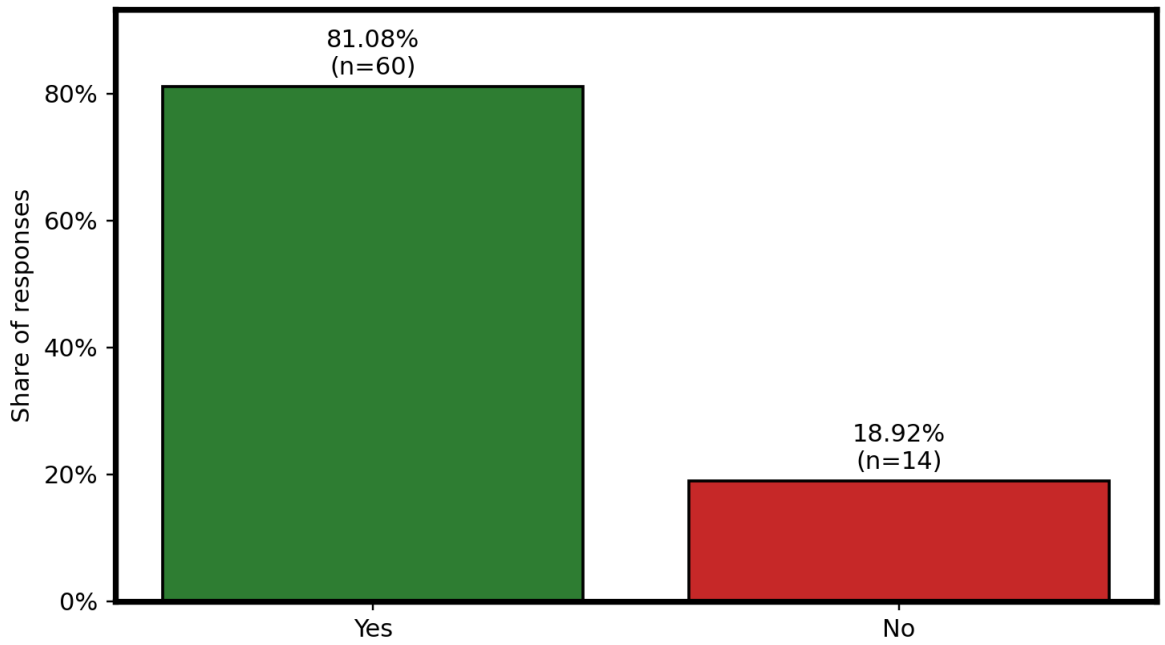

Figure 81- Awareness of the responding member countries of the European union dental amalgam ban effective January 2025 (n=74)

The survey also explored awareness of the European Union regulation banning the use of dental amalgam from January 2025. Overall, 81.1% of responding organizations (60 out of 74) reported that they were aware of the regulation, while 18.9% (14 organizations) indicated that they were not aware (Figure 81).

The relatively high level of awareness reflects the influence of European regulatory developments on global discussions surrounding mercury reduction in dentistry. The European Union has progressively strengthened its regulatory framework on dental amalgam use over the past decade, including restrictions on its use in children, pregnant women and breastfeeding women introduced in 2018, and subsequent policy commitments toward a complete phase-out.

European policy initiatives have played an important role in shaping international debate on mercury reduction in dentistry. The feasibility of eliminating amalgam entirely remains a subject of active discussion among policymakers and researchers, particularly in relation to health-system capacity and treatment accessibility. Evidence from health-services research suggests that replacing amalgam with alternative restorative materials may require additional clinical time and resources, potentially affecting service delivery in publicly funded dental systems.[125] Economic analyses have similarly raised concerns about the cost implications of rapid transitions toward amalgam-free dentistry. Modelling studies conducted in the United Kingdom indicate that composite restorations may involve higher lifetime costs and longer treatment times than amalgam restorations, particularly within publicly funded healthcare systems.[126]

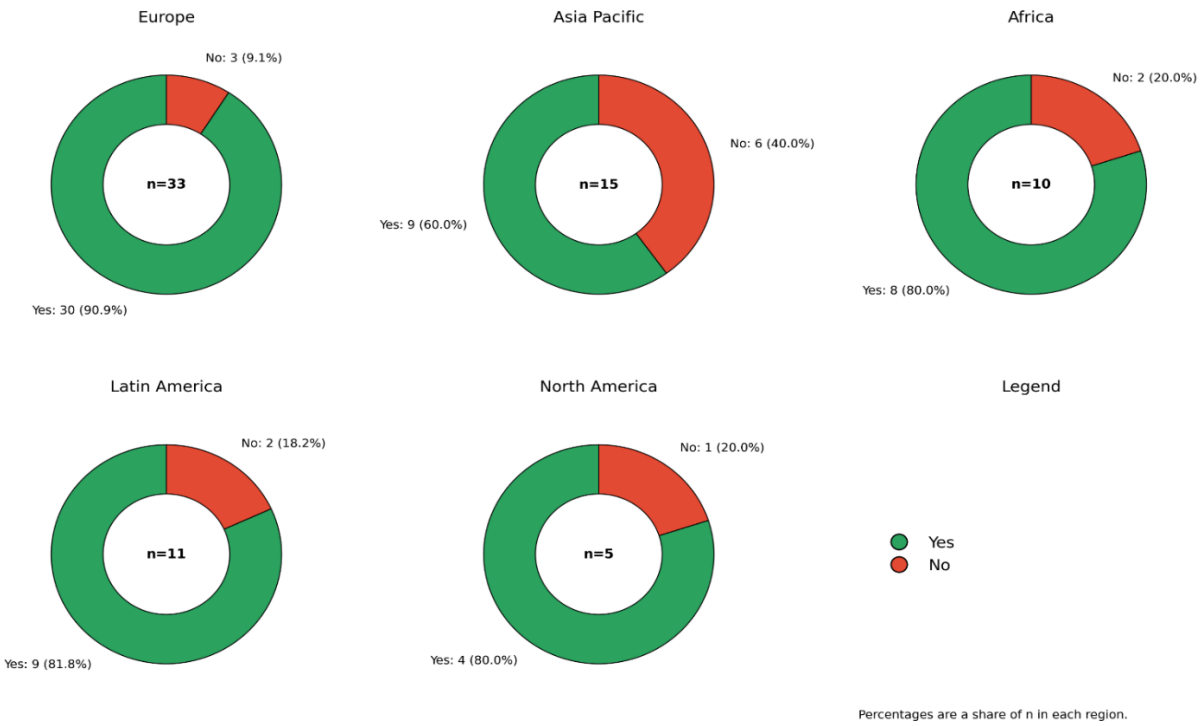

Figure 82- Regional distribution of awareness of the EU dental amalgam ban (effective January 2025)

Regional results from the survey show that awareness of the EU regulation is highest among European respondents, where the policy has direct implications for clinical practice and national regulatory frameworks. However, awareness among organisations outside Europe is also substantial, suggesting that developments within the European Union are closely monitored by the broader international oral health community.

Despite the generally high level of awareness observed, the presence of a notable minority of respondents who were unaware of the regulation highlights the continued importance of communication and information sharing within global oral health networks. As countries move toward implementing Minamata Convention provisions and exploring pathways toward mercury-free dentistry, awareness of regulatory developments in other regions may play an important role in informing national policy decisions.

Toward an Amalgam-Free Dentistry in the European Union

Given the European Union's decision to introduce a complete ban on dental amalgam from January 2025, several survey questions were directed specifically to respondents from EU member states. These questions (Q38-Q41) were designed to assess how stakeholders within EU countries perceive the feasibility of the phase-out, whether national policies or strategies are being developed to support implementation, and the anticipated timelines for the transition.

These responses provide insight into the level of preparedness within EU oral health systems and help identify potential gaps between regulatory commitments and their practical implementation within national dental sectors.

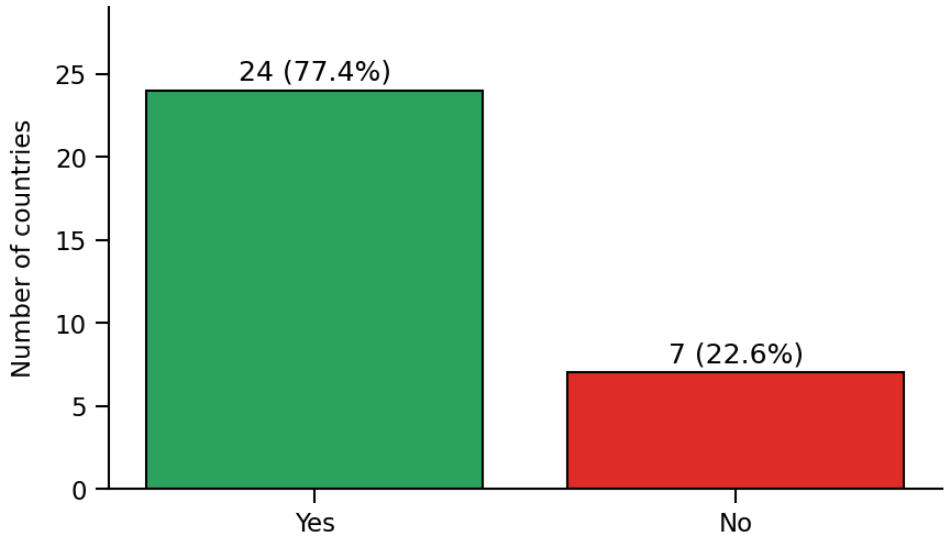

Figure 83- Perceptions of the feasibility of dental amalgam phase-out in EU countries (n=31).

EU respondents were asked whether they believe a complete phase-out of dental amalgam is feasible within their national contexts. A clear majority expressed confidence in the feasibility of this transition: 77.4% of respondents (24 out of 31) indicated that a phase-out is feasible, while 22.6% (7 out of 31) reported that they foresee challenges (Figure 83).

This overall confidence likely reflects the long regulatory pathway that has already been established within the European Union. The EU Mercury Regulation has progressively restricted the use of dental amalgam over the past decade, beginning with restrictions for children under 15 years of age and pregnant or breastfeeding women introduced in 2018, followed by additional environmental controls such as mandatory amalgam separators in dental practices. In 2024, the European Union adopted updated legislation confirming a complete ban on dental amalgam from 1 January 2025, except in limited cases where dentists consider its use strictly necessary for specific patient needs (Regulation (EU) 2024/1849 amending Regulation (EU) 2017/852 on mercury).

The phased regulatory approach adopted in Europe has been designed to allow dental systems time to adapt gradually, including the development of clinical guidance, workforce training and procurement of mercury-free restorative materials.[127] At the same time, the presence of a notable minority of respondents expressing reservations about feasibility highlights ongoing operational concerns. Professional discussions within European dentistry have emphasised that the transition away from amalgam requires careful planning in areas such as workforce training, material availability and clinical practice guidelines (British Dental Journal: EU dental amalgam ban commentary). Research examining professional perceptions of amalgam phase-down also indicates that dentists' attitudes toward the feasibility of phase-out can vary depending on factors such as clinical experience, material familiarity and national policy environments.[126]

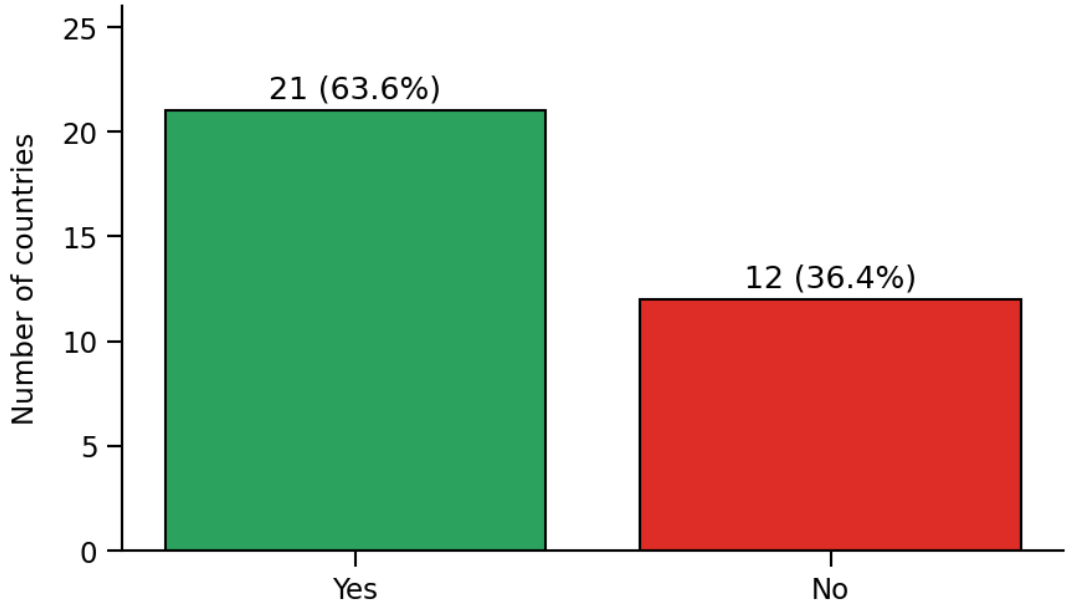

Figure 84- Whether responding member countries are developing policies/strategies to support phase out (n=33)

Respondents were also asked whether their countries or organisations are currently developing policies or strategies to support the phase-out of dental amalgam (Figure 84). The responses reveal that 63.6% of respondents (21 out of 33) reported that such policies or strategies are currently being developed, while 36.4% (12 out of 33) indicated that no policy development efforts are underway.

This suggests moderately better preparedness across countries in translating EU-level regulation into national implementation frameworks. While the EU regulation establishes a common legal requirement to eliminate amalgam use from 2025, member states retain responsibility for implementing the necessary adjustments within their national oral health systems.

While the EU regulation establishes a common legal requirement to eliminate amalgam use from 2025, member states retain responsibility for implementing the necessary adjustments within their national oral health systems.

Implementation measures may include revising national clinical guidelines, aligning reimbursement policies with mercury-free restorative materials, updating procurement frameworks and strengthening training programmes for dental professionals. European policy analyses have highlighted that successful implementation of the amalgam phase-out requires coordinated action across these domains.[126]

Professional organisations have also emphasised the importance of providing clear national transition plans to support dentists during the shift toward mercury-free restorative practice.[128]

Differences in national health-system structures may partly explain the divided responses observed in the survey. Comparative analyses of dental systems in Europe indicate that the organisation and financing of oral health services vary widely between countries, which can influence how quickly regulatory changes are translated into operational policy frameworks.[129]

Following this question, EU respondents were also asked to identify the major challenges they face in implementing the European Union regulation banning the use of dental amalgam. The responses highlight several practical barriers that may affect the pace of transition toward mercury-free restorative dentistry.

Among the challenges most frequently cited by respondents was the lack of cost-effective alternative restorative materials, reflecting ongoing concerns within the profession regarding the affordability and durability of currently available substitutes for amalgam. Respondents also pointed to insurance or government reimbursement systems that continue to cover amalgam restorations, which may inadvertently discourage the use of alternative materials. Closely related concerns included the higher costs associated with mercury-free restorative materials and the limited policy initiatives or financial incentives to support their adoption.

Workforce-related factors were also identified as important challenges. Several respondents noted that many currently practicing dentists were trained primarily using amalgam restorations, which may require additional professional training and adaptation as health systems transition toward alternative materials. In addition, respondents indicated that amalgam remains available in some markets, and that limited clinical situations may still be perceived as requiring its use, highlighting ongoing debates regarding the practicality of complete phase-out.

These responses reflect concerns that have been widely noted in the existing literature on amalgam phase-down, particularly regarding the cost of alternative materials, reimbursement structures and the need for workforce adaptation.

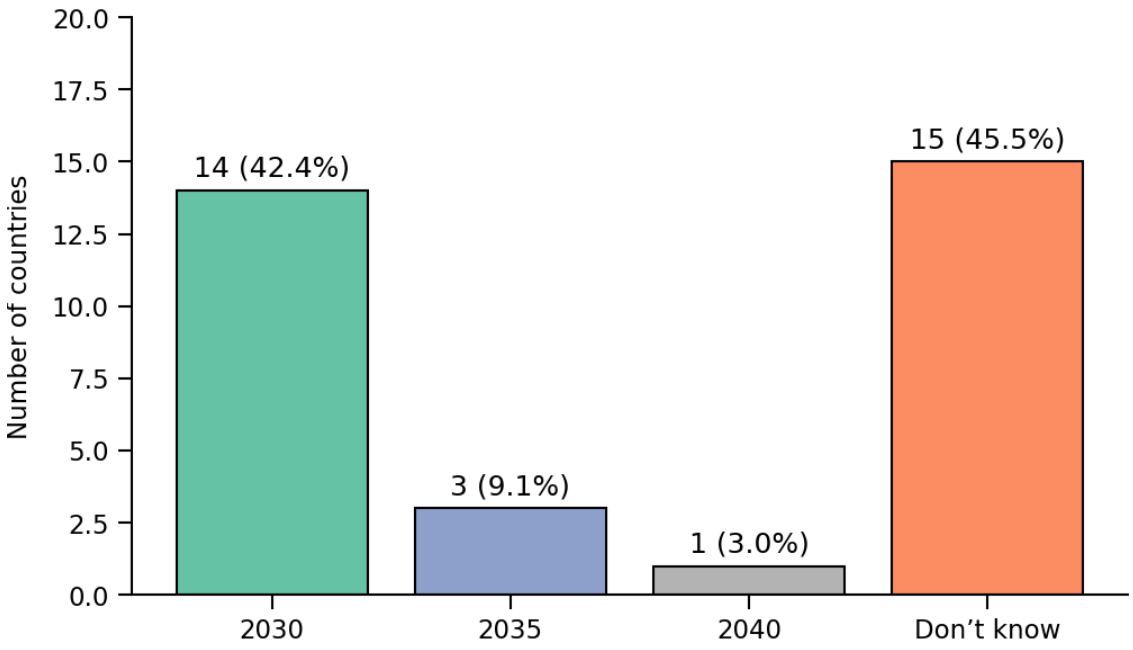

Figure 85- Expected timeline for the phase-out of dental amalgam (n=33).

Furthermore, respondents were asked when they expect dental amalgam to be fully phased out in their countries. The responses reveal substantial uncertainty regarding implementation timelines. Almost half of respondents (45.5%, 15 out of 33) reported that they do not know when amalgam will be fully phased out (Figure 85).

Among respondents who provided an estimate, 2030 was the most frequently cited year, reported by 42.4% (14 out of 33) of respondents. A smaller share indicated 2035 (9.1%, 3 out of 33), while only 3% (1 out of 33) anticipated a phase-out as late as 2040.

The majority of respondents reporting uncertainty may reflect the distinction between regulatory prohibition and practical elimination. Although EU legislation establishes a formal ban on dental amalgam use from January 2025, the complete disappearance of amalgam from dental practice may take longer as dental systems transition toward alternative materials and adapt clinical protocols.

Policy analyses have highlighted that implementing mercury-free dentistry requires coordinated changes in dental education, professional guidelines and material supply chains.[126]

Similarly, studies examining dentists' perspectives on amalgam phase-down have found that practitioners often perceive the transition as a gradual process that depends on clinical training, patient acceptance and the availability of suitable restorative materials.[125]

The uncertainty reflected in the survey responses therefore likely indicates that while the regulatory endpoint is clearly defined, the operational timelines for implementation within national dental systems remain less clearly articulated.

Key Insights from the Global Transition Away from Dental Amalgam

The 2021 baseline survey primarily assessed awareness of the Minamata Convention and the existence of national policies aimed at reducing the use of dental amalgam. The mid-term survey expands this perspective by examining how these policy commitments are translating into practice. In particular, it introduced a dedicated set of questions for European Union member states following the adoption of Regulation (EU) 2024/1849, which mandates a complete phase-out of dental amalgam from January 2025.

The mid-term survey included an open-ended question asking EU respondents to identify the major barriers they face in complying with the regulation. The responses provide practitioner-level insights that closely reflect issues already documented in the literature discussed in this chapter. In particular, respondents highlighted concerns related to the higher costs of mercury-free restorative materials, the need to adapt insurance and reimbursement systems to support alternative materials, and the requirement for additional training as dental professionals transition away from amalgam-based restorative techniques. These themes directly mirror the broader evidence base on amalgam phase-down, which frequently identifies economic considerations, reimbursement structures and workforce preparedness as key determinants influencing the pace of transition toward mercury-free dentistry.

Taken together, the findings presented in this chapter illustrate that the transition away from dental amalgam is well underway within the global oral health landscape. High levels of awareness of the Minamata Convention among responding organisations, alongside widespread implementation of phase-down measures, indicate that the environmental sustainability agenda is increasingly embedded within oral health policy discussions. At the same time, the survey responses highlight the practical realities that accompany this transition. The move toward mercury-free dentistry is not solely a regulatory process but a broader transformation of oral health systems, requiring coordinated action across policy development, professional education, financing mechanisms and clinical practice. As countries continue to implement the commitments of the Minamata Convention and pursue the targets outlined in the Global Oral Health Action Plan, addressing these system-level considerations will be essential to ensuring that environmental sustainability is achieved without compromising access to safe, effective and affordable oral healthcare.

Chapter 9

Surveillance, Monitoring and Digital Infrastructure

Key Highlights

- Only about 31% of responding countries reported conducting stand-alone oral health surveys, indicating limited dedicated surveillance capacity.
- 54.9% of countries reported conducting national health surveys, and 63.8% of these surveys include oral health indicators.
- Nearly half of respondents (47.9%) reported no electronic system for recording oral health patient data nationally.
- Only around 14% of countries reported having a nationwide electronic system for dental patient data.
- 53.5% of respondents reported no integration between dental and medical health records, while 36.6% reported only partial integration.
- Fully integrated medical–dental electronic health records were reported by only about 10% of countries.
- Regional variation is substantial, with stand-alone oral health surveys ranging from 50% of respondents in Africa to 20% in North America.
- Integration of oral health indicators in national health surveys varies widely, from 56% in Europe to 83% in Latin America.

A: National Oral Health Surveillance Capacity

Effective surveillance systems constitute a critical foundation for the accurate assessment of population oral health needs and the quantification of disease burden. These systems are indispensable for guiding strategic planning, prioritizing interventions, and allocating resources efficiently[130,131], thereby aligning with the International Dental Federation (FDI) Vision 2030 objective of achieving “optimal oral health for all”. The establishment of robust surveillance capacity facilitates the systematic collection of comprehensive, population-level oral health data, which is essential for evidence-based decision-making and for monitoring progress toward national and global oral health targets.[130]

The World Health Organization (WHO) reinforces this imperative through its global strategy and action plan on oral health, which explicitly advocates for the strengthening of oral health information systems and the integration of oral health indicators within broader national health information frameworks.[3] This integration is vital to ensure that oral health is not siloed but recognized as an integral component of overall health. Complementing this, the WHO oral health monitoring framework provides a standardized set of indicators designed to benchmark progress toward universal health coverage and global oral health goals, thereby facilitating comparability and consistency across countries.[132]

Despite these clear international policy directives, empirical evidence from the mid-term survey reveals significant deficiencies in oral health surveillance infrastructure worldwide. Stand-alone oral health surveys remain infrequent, with over half of surveyed countries reporting the absence of such dedicated instruments (Figure 86). This gap underscores a systemic weakness in capturing detailed oral health data independently. Conversely, a majority of countries (54.9%) conduct national health surveys (Figure 87), and within this group, a substantial proportion (63.8%) have incorporated oral health indicators into these broader surveys (Figure 88). While this approach may offer efficiency gains by leveraging existing survey platforms, it also introduces vulnerabilities. Specifically, the reliance on general health surveys renders oral health data collection contingent upon fluctuating national priorities, potentially resulting in inconsistent data capture and underrepresentation of oral health concerns.

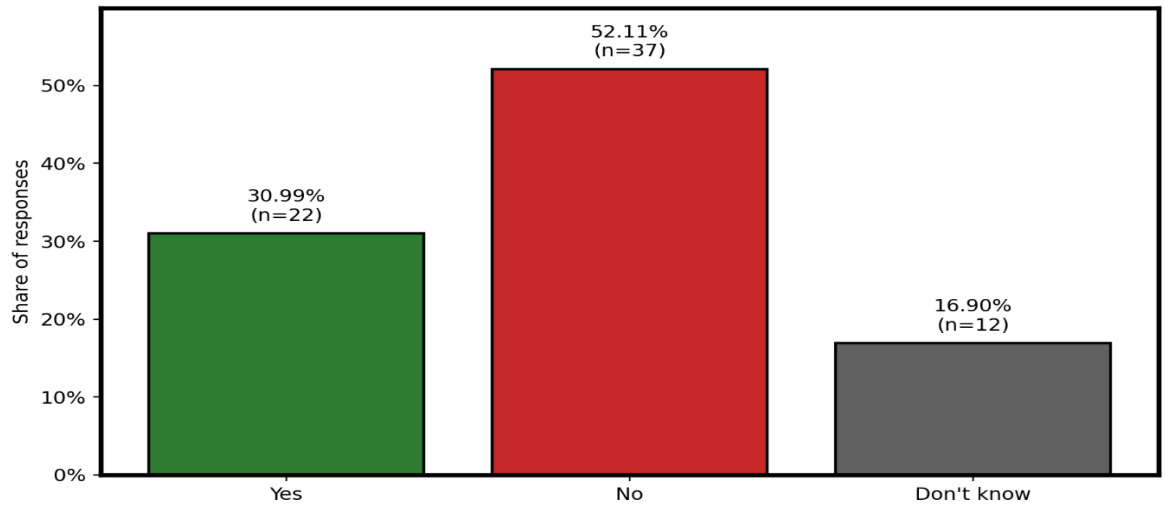

Figure 86 – Proportion of Responding Member countries reported to having stand-alone oral health surveys (n=71).

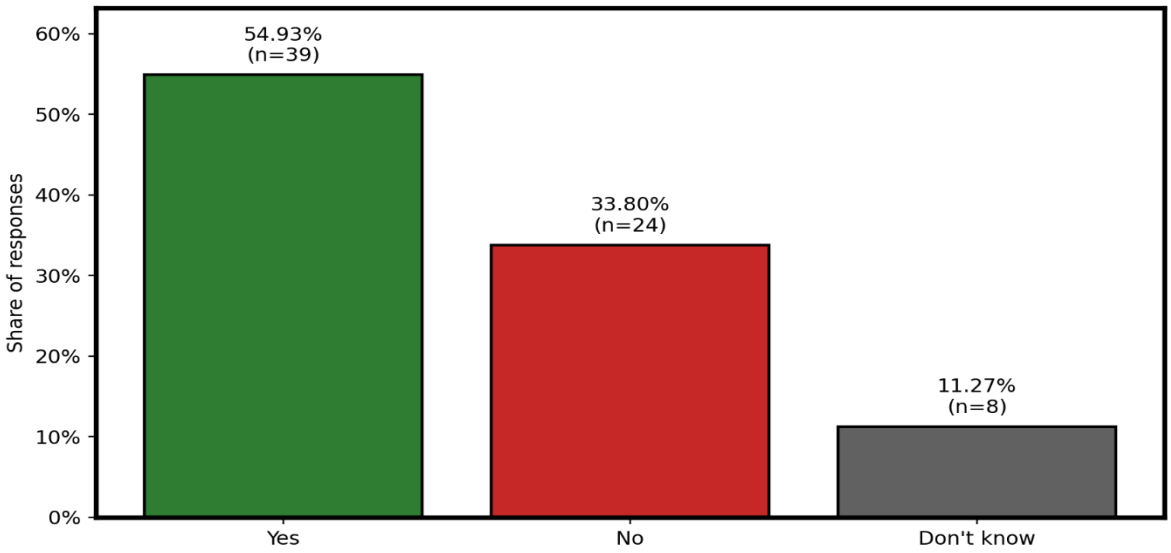

Figure 87 – Proportion of Responding Member countries reported to Having National Health Surveys (n=71).

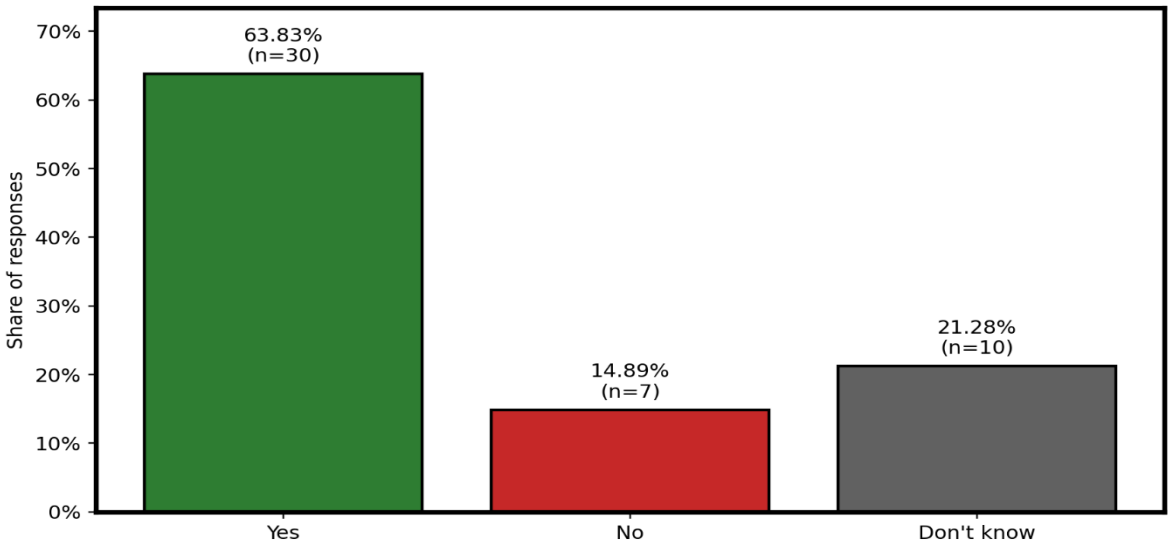

Figure 88 – Proportion of Responding Member countries reported to Having oral health indicators integrated in the country's national health survey (n=47).

Open ended responses related to national survey programmes indicate considerable variation in the frequency and regularity of oral health data collection across countries. While some respondents reported recent survey activities, others indicated that data collection occurs infrequently or lacks a defined schedule. In several cases, respondents were unable to provide specific dates, suggesting gaps in institutional memory or limited visibility of national surveillance activities. This variability points to broader challenges in establishing consistent and sustainable monitoring systems for oral health. Without regular and reliable data, countries may face difficulties in tracking progress, identifying emerging trends, and informing evidence-based policy decisions. The findings reinforce the need to strengthen surveillance infrastructure and integrate oral health indicators more systematically within national health information systems.

B: Digital Health Systems and Record Integration

Parallel to challenges in surveillance, the digital infrastructure necessary for comprehensive oral health data management remains markedly underdeveloped. Digital systems that facilitate the collection, exchange, and analysis of oral health data across the continuum of care are fundamental to ensuring coordinated and continuous care delivery, enabling rigorous monitoring and evaluation, supporting interoperability, and informing health system planning and policy formulation.[133-135] The survey highlights a concerning deficit in this domain: nearly half of respondents (47.9%) report the absence of electronic systems for recording oral health patient data at the national level, while only 38.0% indicate partial implementation limited to specific regions or facilities (Figure 88). This fragmentation and paucity of digital infrastructure severely constrain the capacity for integrated care delivery and impede the realization of data-driven policy making.

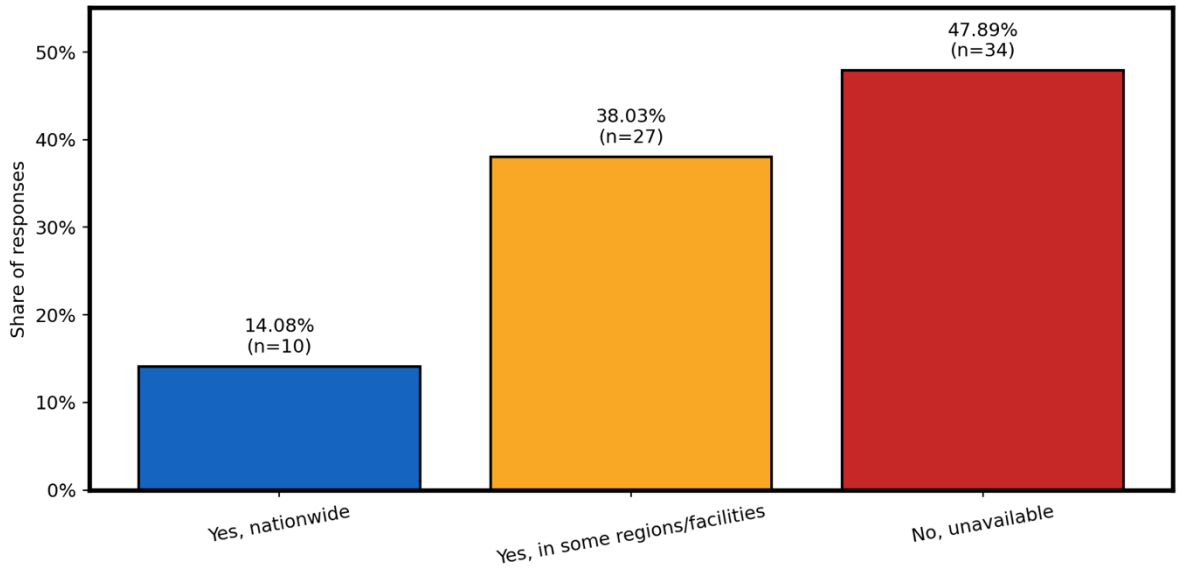

Figure 89 – Proportion of Responding Member reporting the Presence of an electronic system for recording oral health patient data (n=71).

Compounding these challenges is the limited integration of dental and medical health records, which represents a critical barrier to holistic health management. Over half of respondents (53.5%) report no integration between dental and medical records, with an additional 36.6% indicating only partial integration within select regions or facilities (Figure 89). This systemic separation of information systems constitutes a missed opportunity to enhance interoperability and coordinated care, particularly pertinent in the context of ageing populations where multimorbidity is prevalent. Fragmented information systems hinder comprehensive health assessments, create barriers to seamless care coordination, and limit the efficient deployment of resources necessary for managing complex health needs.[136]

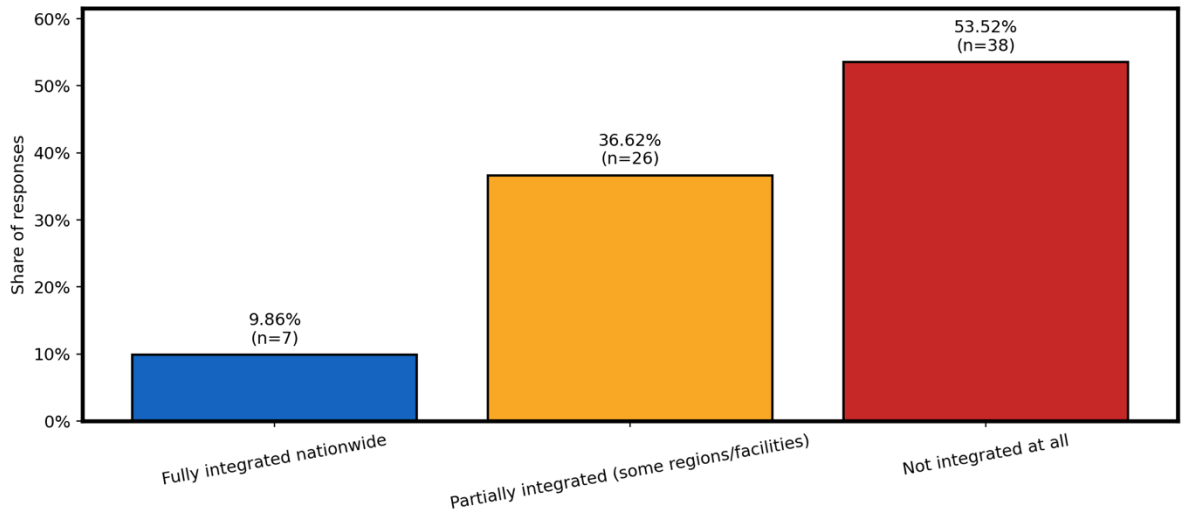

Figure 90 – Proportion of Responding Member Reporting Integration of dental with medical health records (n=71).

Collectively, these findings delineate a dichotomous landscape in oral health surveillance infrastructure. While many countries possess oral health data collection frameworks embedded within broader national health surveillance systems, dedicated oral health surveillance mechanisms remain limited. Concurrently, digital systems for oral health data capture and integration are notably scarce and fragmented. Addressing these critical gaps is essential to fulfilling the commitments articulated in the FDI Vision 2030. Strategic efforts to strengthen digital infrastructure, promote interoperability between dental and medical records, and prioritize the systematic inclusion of oral health indicators in national health surveys will enhance the capacity for evidence-based policy formulation. This, in turn, will improve service delivery models and advance equitable oral health outcomes on a global scale.

Regional Trends and Variations:

The regional analysis presented in the below figures reveals a heterogeneous landscape (Figures 91-95). Stand-alone oral health surveys remain relatively rare, with only approximately 31% of respondents globally reporting their existence. There is significant variation across regions, with 50% affirmative responses in Africa compared to 20% in North America, indicating a range of approximately 30 percentage points. Additionally, some regions exhibit high rates of uncertainty, with "Don't know" responses reaching up to 33%. In contrast, approximately 55% of countries conduct a general national health survey. However, only about 64% of these surveys include oral health indicators, and a substantial proportion, often between 20% and 30%, respond with "don't know" by region, suggesting inconsistencies in survey modules or reporting. In summary, many countries depend on general health surveys for oral health data, but the integration of oral health capturing tools is inconsistent and uneven. For instance, Europe reported only 56% affirmative responses regarding indicators, whereas Latin America reported 83%. These discrepancies likely reflect differences in priority, funding, and survey scheduling.

The World Health Organization's oral health action plan explicitly advocates for stronger integration of oral health indicators into national health information systems. The data on digital infrastructure reveal even more pronounced deficiencies. Only approximately 14% of countries report having a nationwide electronic system for dental patient data, with some regions reporting 0% and a maximum of 25% in Europe. Nearly half (47.9%) of respondents indicate the absence of such a system, with this figure rising to 80% in North America. Similarly, fully integrated electronic medical-dental records are exceedingly rare, at approximately 10% overall, while 53.5% report no integration whatsoever. This "digital divide" implies that dental surveillance remains largely manual or fragmented in most regions. The regional disparities are stark; for example, "fully integrated" systems range from 0% to 20%, with the highest prevalence in Africa and Europe and the lowest elsewhere, indicating that some regions are advancing in health information technology while others lag behind. Methodologically, these findings are derived from a mid-term survey (n=71), and small regional samples (e.g., North America n=5) contribute to volatility in percentages. We have employed ranges and standard deviations to quantify variation: for instance, the "yes" rate for stand-alone surveys varies by approximately 30 percentage points across regions (SD ≈12), compared to only 10 percentage points for national surveys (SD ≈4). These summary statistics aid in interpreting the "don't know" and "no" responses as indicators of genuine gaps.

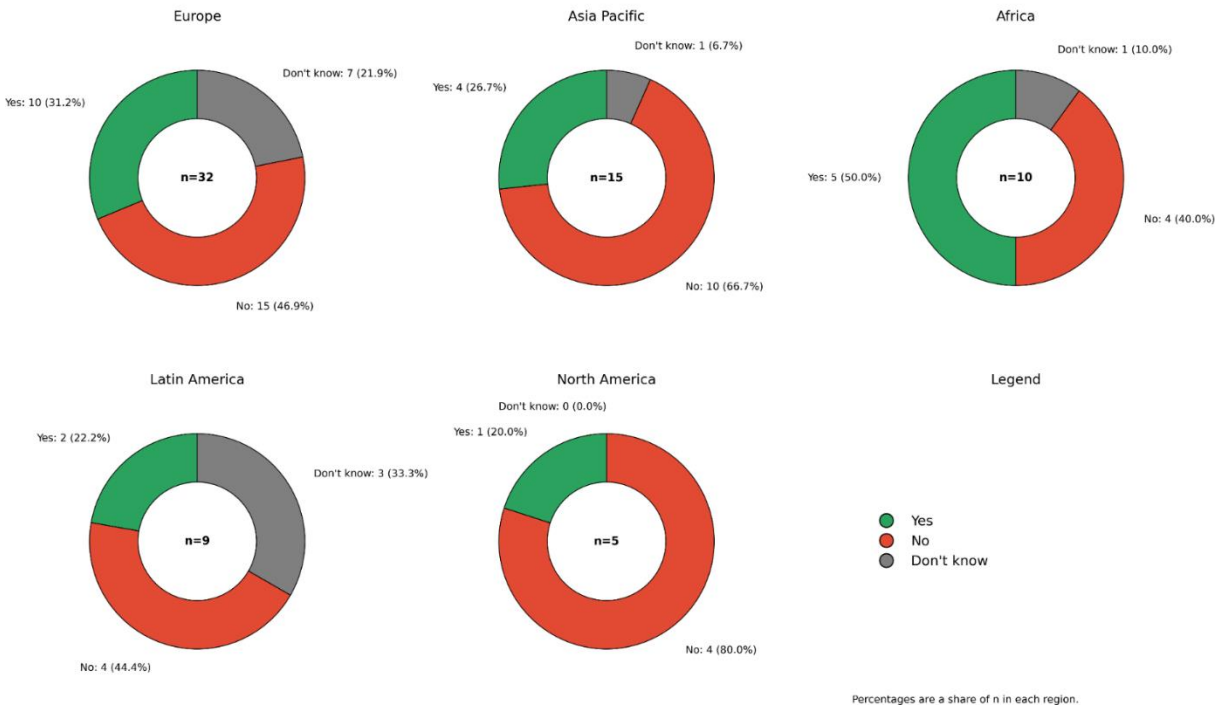

Figure 91 – Regional distribution of responding member countries reporting the presence of stand-alone oral health surveys

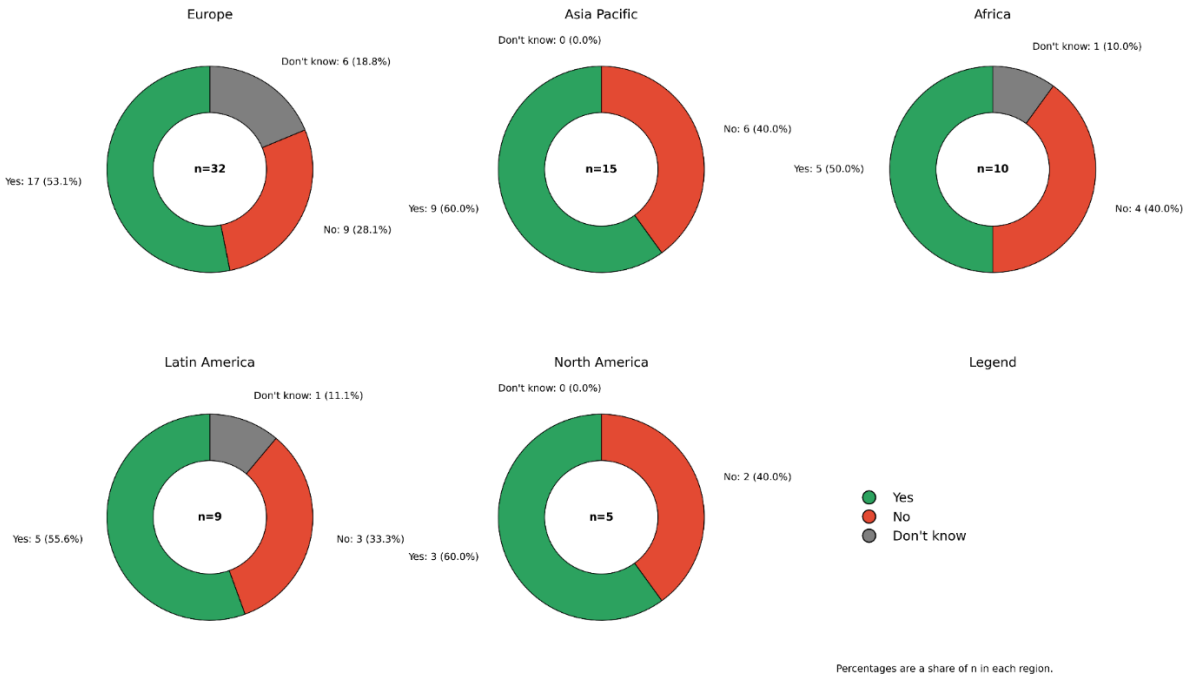

Figure 92 – Regional distribution of responding member countries reporting to having National Health Surveys

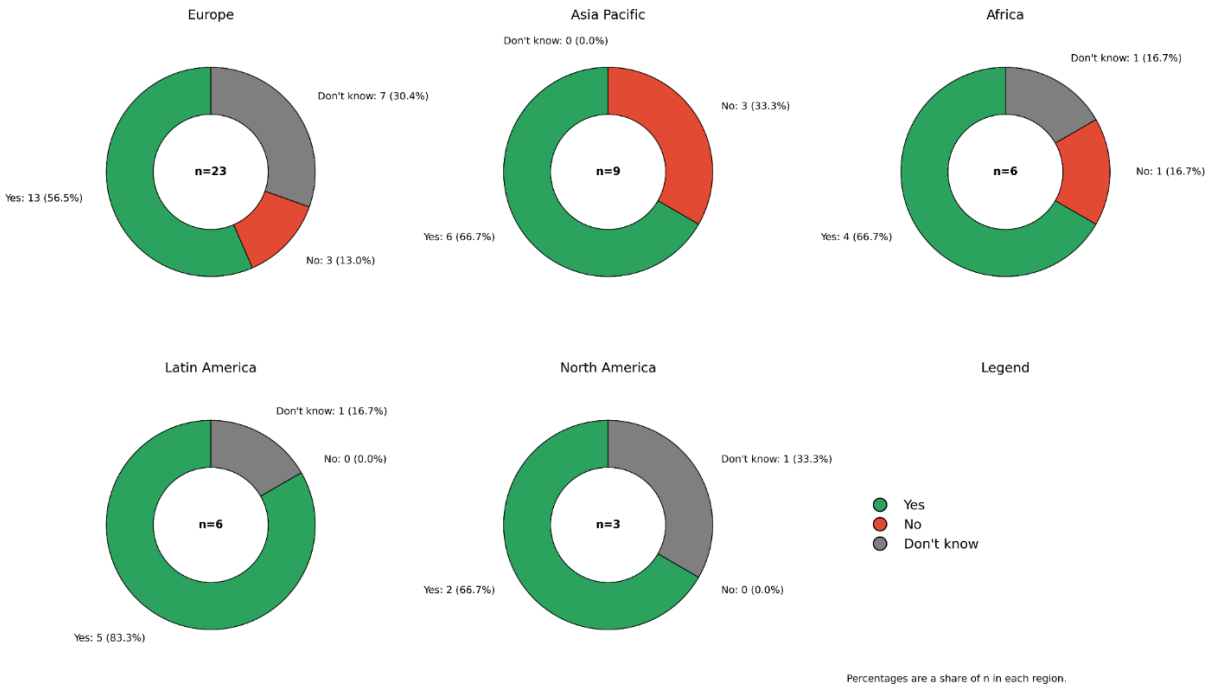

Figure 93 – Regional distribution of responding member countries reporting to having oral health indicators integrated in the country's national health survey

Figure 94 – Regional distribution of responding member countries reporting the presence of an electronic system for recording oral health patient data

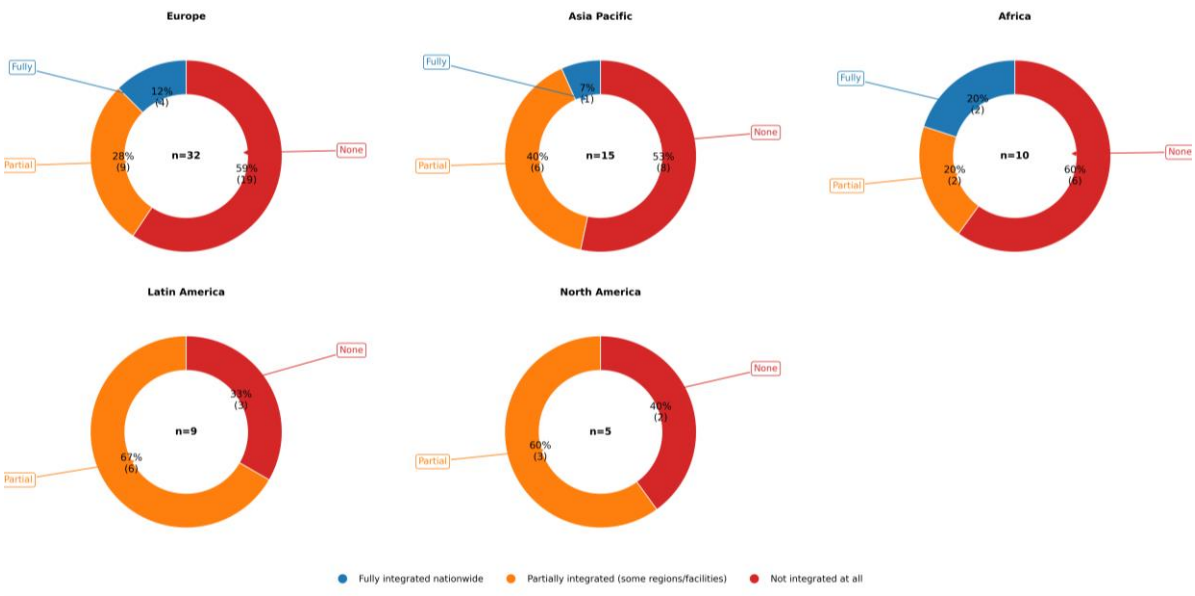

Figure 95 – Regional distribution of responding member countries reporting the integration of dental with medical health records

Chapter 10

Antimicrobial Stewardship and Clinical Governance

Key Highlights

- 71.4% of responding countries reported the existence of national guidelines for appropriate antibiotic prescribing, while 20.0% reported none and 8.6% were unsure.
- 73.2% of respondents reported national guidelines for the treatment of oral conditions, supporting appropriate management of dental infections.
- Only 31.4% of countries reported having national data on antibiotics prescribed by dentists, while 45.7% reported no such data.
- Dentists are estimated to prescribe around 10% of all antibiotics used in human healthcare in some settings.
- Approximately two-thirds of responding organisations considered antimicrobial resistance at least a moderate priority.
- 27.1% of organisations reported AMR as a moderate priority, while 22.9% reported it as a high priority and 17.1% as a very high priority.
- 20.0% of organisations reported AMR as a low priority and 12.9% indicated it is not a priority.
- Regional responses indicated stronger prioritisation of AMR in Europe and North America compared with some other regions.

Antimicrobial Resistance and Antibiotic Stewardship in Dentistry

Antimicrobial resistance (AMR) has emerged as one of the most pressing threats to global health, food security and sustainable development. Resistant infections are responsible for millions of deaths globally each year and are projected to increase substantially if current patterns of antimicrobial use continue. A major driver of antimicrobial resistance is the inappropriate and excessive use of antibiotics, which accelerates the development of resistant microorganisms and reduces the effectiveness of life-saving medicines.[137]

Recognising the scale of this threat, the World Health Organization (WHO) adopted the Global Action Plan on Antimicrobial Resistance, which calls for coordinated international action to optimise antimicrobial use across all health sectors. One of the core priorities of this strategy is improving the quality and consistency of antibiotic prescribing practices, particularly through the development and implementation of evidence-based treatment guidelines and improved surveillance of antimicrobial consumption.[138]

To support more appropriate antibiotic use globally, WHO introduced the AWaRe (Access, Watch, Reserve) classification system, which categorises antibiotics according to their potential for resistance development and their recommended role in clinical treatment. The AWaRe framework encourages the prioritisation of Access group antibiotics, which have lower resistance potential and should be widely available, while reserving Watch and Reserve antibiotics for specific clinical indications where alternative treatments are not effective. The WHO AWaRe Antibiotic Book provides practical guidance on the selection, dosage and duration of antibiotics for common infections in both primary health care and hospital settings.[139]

Although antimicrobial resistance is often associated with hospital medicine, the role of primary health care and community prescribing has become increasingly recognised as an important component of antimicrobial stewardship. Dentistry is an important contributor to antibiotic prescribing globally, accounting for a notable proportion of antibiotic prescriptions in many countries. Studies suggest that dentists prescribe approximately 10% of all antibiotics used in human health care in some settings, highlighting the potential impact of dental prescribing practices on antimicrobial resistance trends.[140]

Antibiotics in dentistry are typically prescribed for the management of acute odontogenic infections, prophylaxis for certain medical conditions and adjunctive treatment in specific oral diseases. However, research has shown that a substantial proportion of antibiotic prescriptions in dental practice may be unnecessary or inconsistent with clinical guidelines. In many cases, local dental infections can be effectively managed through operative treatment such as drainage, debridement or removal of the infection source, without the need for systemic antibiotics.[141]

Concerns regarding inappropriate antibiotic prescribing have therefore led to increasing emphasis on antibiotic stewardship within dentistry. Antibiotic stewardship refers to coordinated interventions designed to improve antibiotic prescribing practices, ensuring that patients receive the right antibiotic, at the right dose and for the appropriate duration while minimising unnecessary use. Professional organisations and public health authorities have highlighted the importance of incorporating dentists into national and international antimicrobial stewardship programmes.[142]

Guidelines for antibiotic prescribing are a key component of these stewardship efforts. Evidence-based clinical guidelines help ensure that antibiotics are used only when clinically indicated and that prescribing practices remain consistent with evolving scientific evidence. Several international organisations, including WHO and FDI World Dental Federation, have emphasised the need for clear treatment protocols for dental infections and improved monitoring of antibiotic prescribing patterns.[138,142]

Despite these efforts, important gaps remain in the availability of national guidelines, the implementation of stewardship programmes and the monitoring of antibiotic prescribing in dentistry. Understanding the extent to which dental organisations are engaged in antimicrobial resistance initiatives is therefore essential for assessing progress toward responsible antibiotic use in oral health care.

In this context, the Vision 2030 Mid-Term Survey included a series of questions examining the availability of national guidelines for antibiotic prescribing in dentistry, the existence of treatment protocols for oral conditions, the availability of national data on antibiotics prescribed by dentists and the extent to which antimicrobial resistance is prioritised within professional organisations. These questions aim to provide insight into the current policy landscape surrounding antibiotic stewardship in dentistry and identify potential areas where further guidance, monitoring or professional engagement may be needed.

Adherence to Guidelines for Antibiotic Prescribing and Antimicrobial Resistance Prioritisation

Respondents were first asked whether standard treatment guidelines for appropriate antibiotic prescribing exist in their country (Figure 96). Among the 70 organisations that responded to this question, 71.4% (50/70) reported that such guidelines are available, while 20.0% (14/70) indicated that no guidelines exist and 8.6% (6/70) were unsure.

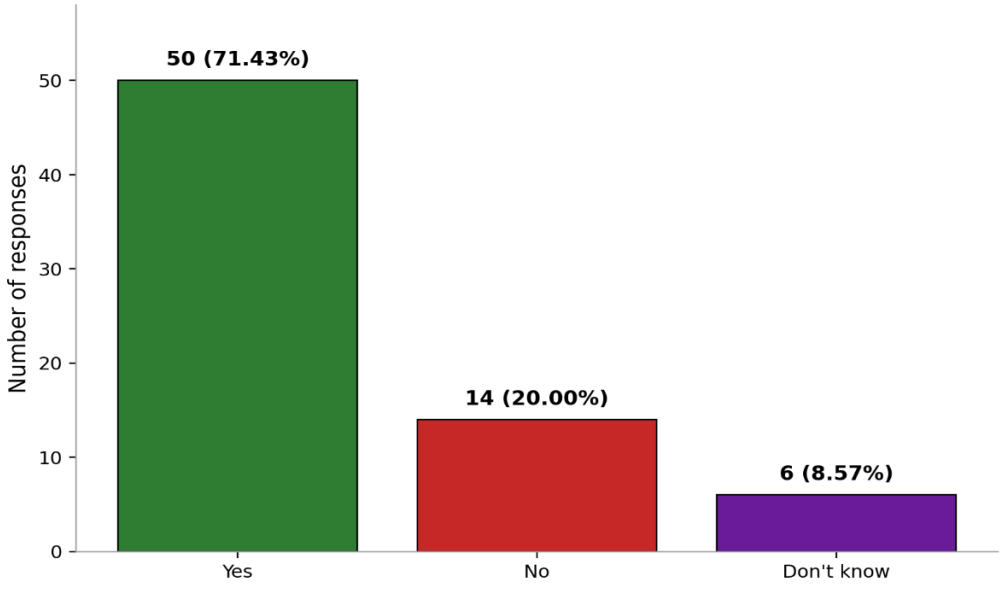

Figure 96- Presence of standard treatment guidelines for appropriate antibiotic prescription among responding countries (n=70).

The presence of national guidelines is an important component of antimicrobial stewardship, as they help ensure that antibiotics are prescribed only when clinically indicated and that treatment choices align with current scientific evidence. Clinical practice guidelines also play a key role in reducing unnecessary antibiotic exposure, which is one of the principal drivers of antimicrobial resistance.

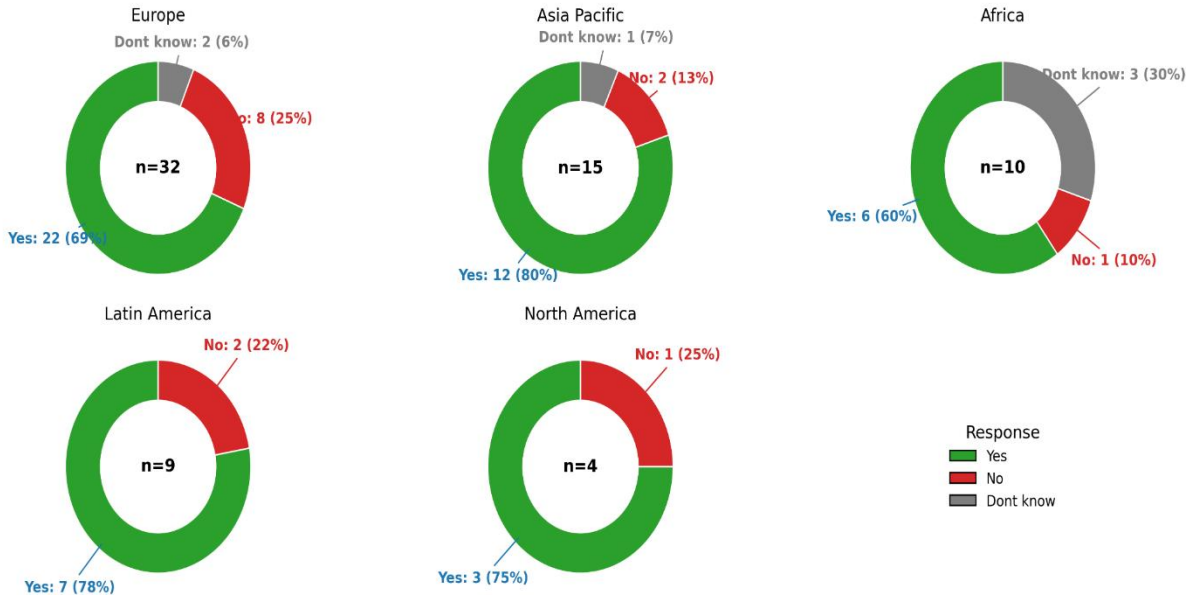

Figure 97- Regional distribution of standard treatment guidelines for appropriate antibiotic prescription

Regional responses suggest that the availability of guidelines is relatively widespread but unevenly distributed. For example, 80% of respondents in the Asia-Pacific region and 78% in Latin America reported the presence of prescribing guidelines, compared with 69% in Europe and 60% in Africa. A notable proportion of respondents in Africa (30%) indicated that they were unsure whether such guidelines exist, which may reflect gaps in dissemination or awareness of national prescribing policies. However, these regional comparisons should be interpreted cautiously due to the differing numbers of respondents across regions.

These findings align with global evidence indicating that access to high-quality clinical practice guidelines for antibiotic prescribing in dentistry remains limited in many parts of the world. A recent systematic review identified only 17 clinical practice guidelines across nine countries and one international guideline issued by WHO, and found that only 59% met recommended methodological quality standards.[143] The review further highlighted that only a relatively small proportion of the global population has access to structured national guidance on antibiotic use in dental care, underscoring the continued need to strengthen guideline development and dissemination.

Respondents were also asked whether guidelines exist for the treatment of oral conditions in their country (Figure 98). Among the 56 organisations that responded to this question, 73.2% (41/56) reported that such guidelines are available, while 17.9% (10/56) indicated that no guidelines exist and 8.9% (5/56) were unsure.

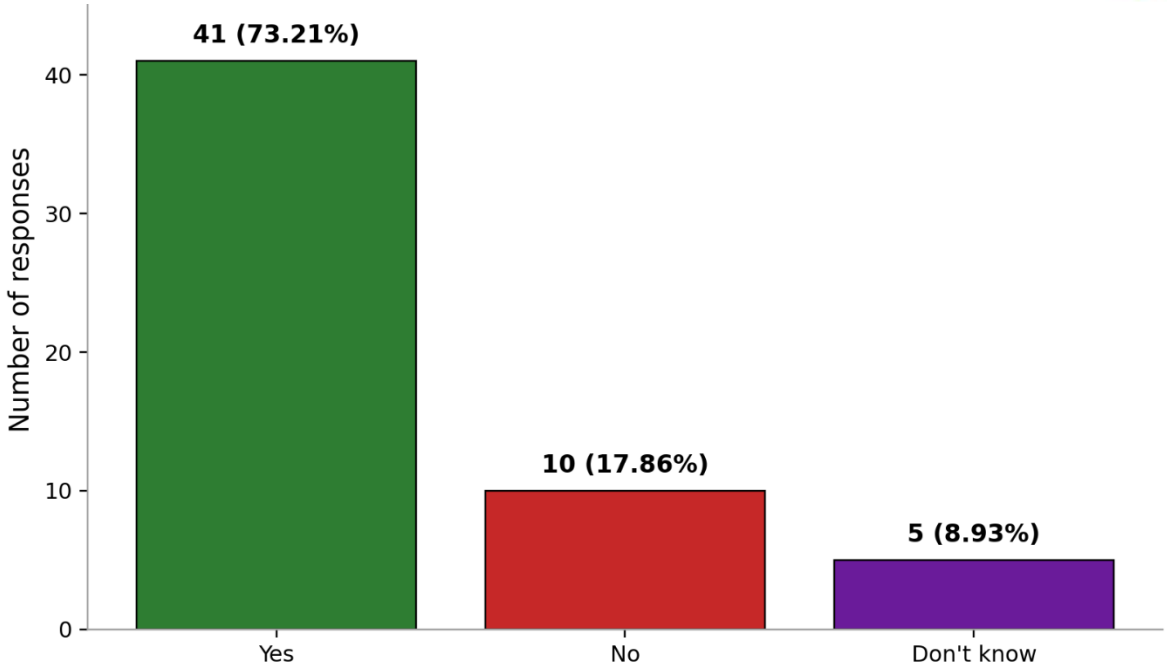

Figure 98- Reported availability of national guidelines for the treatment of oral conditions (n=56).

The availability of treatment guidelines for oral diseases is closely linked to antibiotic stewardship. Clear clinical protocols help ensure that dentists prioritise local operative treatment of odontogenic infection such as drainage, removal of the infection source or endodontic treatment, before considering systemic antibiotics, which are recommended only in specific circumstances such as systemic involvement or medically compromised patients.[144]

Regional responses again show variation. Latin America reported the highest proportion of respondents indicating the existence of treatment guidelines (86%), followed by Asia-Pacific (77%), Europe (75%), and North America (67%) (Figure 99). In contrast, a portion of respondents in Africa (33%) reported uncertainty regarding the existence of such guidelines. While these findings suggest that guidance for managing oral conditions is widely available, they also highlight potential gaps in dissemination or implementation within some settings. Additionally, these regional comparisons should be interpreted cautiously, as the number of responses varies considerably across regions, which may influence the apparent distribution of responses.

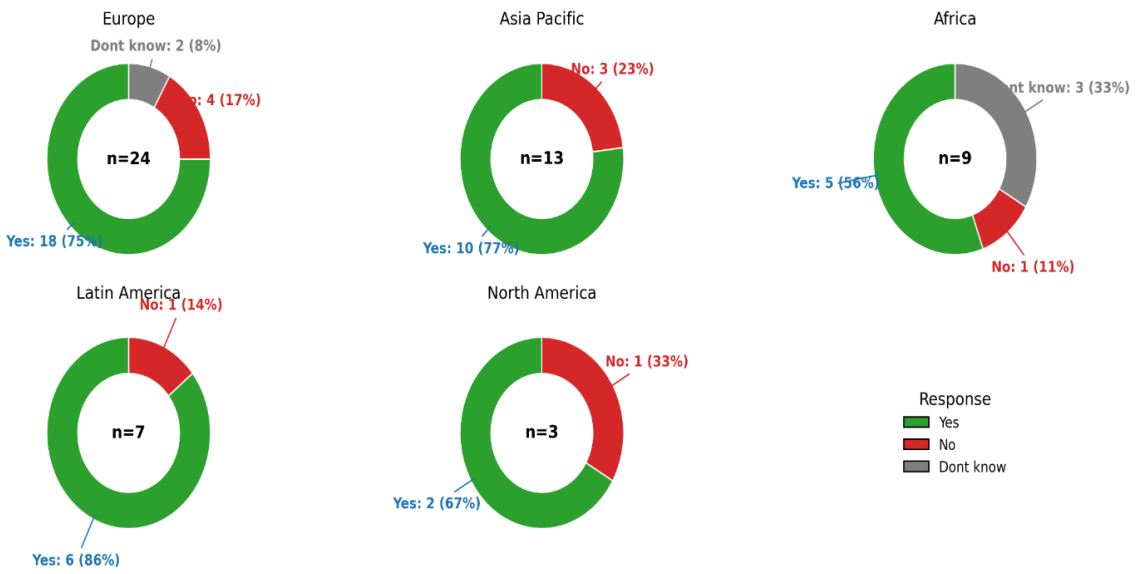

Figure 99- Regional distribution of guidelines for the treatment of oral conditions

International guideline frameworks across Europe, North America and other regions generally adopt a cautious approach to antibiotic use in dentistry, recommending systemic antibiotics primarily for infections with systemic involvement, progressive spreading infections or for certain medically compromised patients. In many common dental conditions such as symptomatic irreversible pulpitis, pulp necrosis or localised abscess without systemic symptoms, guidelines recommend operative dental treatment rather than antibiotic therapy.[144] Ensuring that such guidance is widely accessible and implemented is therefore essential for reducing unnecessary antibiotic prescribing.

Respondents were further asked whether data are available in their country on the amount or proportion of antibiotics prescribed by dentists (Figure 100). Among the 70 organisations responding to this question, 31.4% (22/70) reported that such data are available, while 45.7% (32/70) indicated that no data exist and 22.9% (16/70) were unsure.

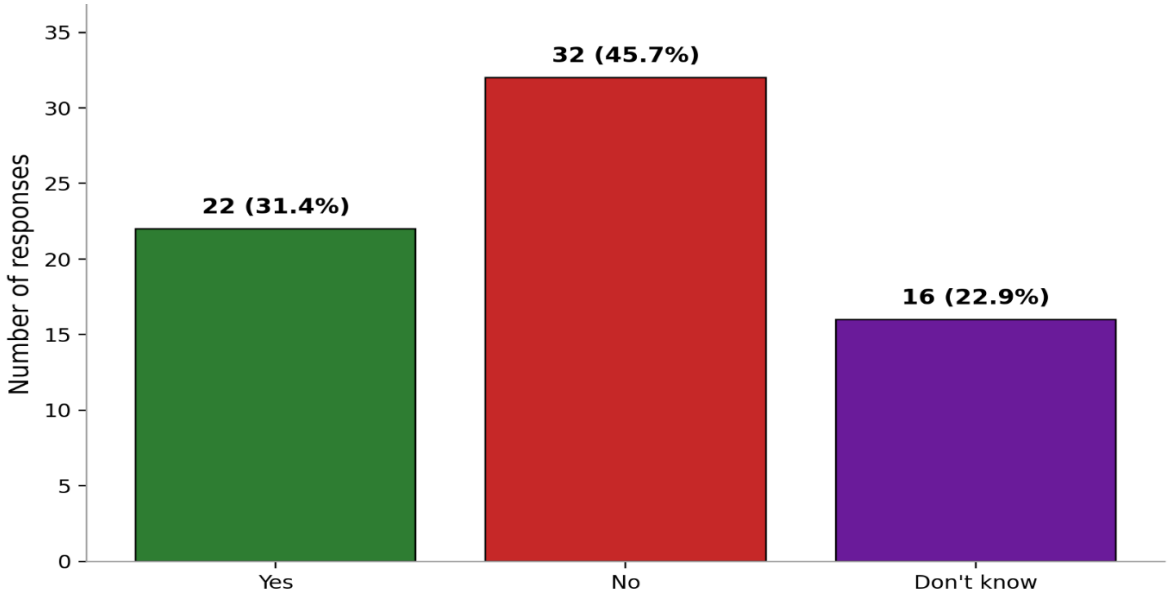

Figure 100- Proportion of responding member countries reporting the availability of national data on dentists' antibiotic prescribing (n=70).

These findings suggest that systematic monitoring of dental antibiotic prescribing remains limited globally. Surveillance systems that track antibiotic consumption are an essential component of antimicrobial stewardship programmes, as they allow policymakers and professional organisations to identify prescribing trends, monitor adherence to guidelines and evaluate the impact of interventions aimed at reducing inappropriate antibiotic use.

Regional patterns reveal particularly limited monitoring capacity in some settings. For example, 73% of respondents in the Asia-Pacific region and 60% in Africa reported that no data are available on antibiotics prescribed by dentists (Figures 102-103). In Europe, responses were more mixed, with 47% indicating that data are available, although a significant proportion reported either no data or uncertainty. Latin America and North America also reported limited monitoring capacity, with substantial proportions of respondents indicating either absence of data or uncertainty. These regional findings should be interpreted with caution due to the uneven number of responses received from different regions, which may limit direct comparability.

Evidence from country-level prescribing studies further illustrates the importance of monitoring antibiotic use in dental practice. For example, a prescription pattern analysis conducted in India reported that antibiotics were prescribed in 17.5% of patient encounters, a level below the WHO reference threshold of 30% for rational prescribing. The study also found that amoxicillin was the most frequently prescribed antibiotic, with most prescriptions belonging to the WHO AWaRe Access category, indicating alignment with recommendations for first-line antibiotics in primary care settings. However, the authors also noted broader concerns about inappropriate antibiotic use and inconsistent adherence to treatment guidelines in some clinical contexts, highlighting the continued need for evidence-based prescribing practices and improved surveillance systems.[145]

The lack of national data on dental antibiotic prescribing reflects a broader challenge identified in antimicrobial resistance research. While global initiatives such as the WHO AWaRe framework encourage improved surveillance of antimicrobial consumption, monitoring systems frequently focus on hospital and primary medical care settings, with comparatively less attention given to prescribing practices in dentistry. Strengthening data collection on dental antibiotic use is therefore an important step toward integrating oral health professionals more fully into national antimicrobial stewardship strategies.

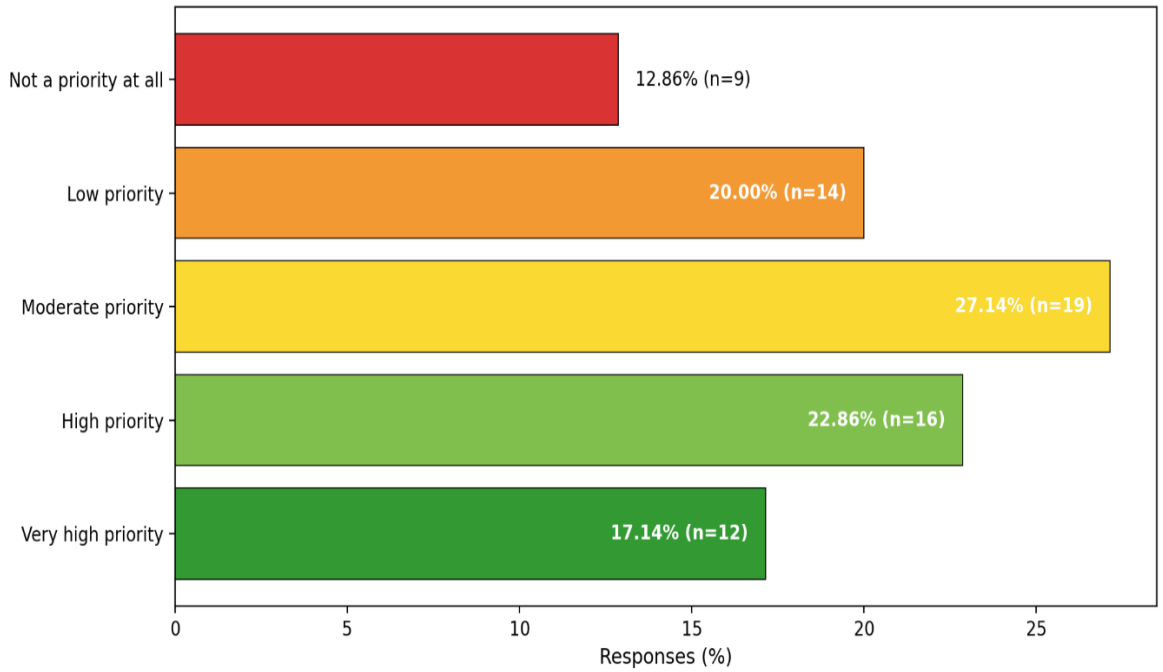

Figure 101- Perceived priority of tackling antimicrobial resistance (AMR) within responding member countries (n=70).

Finally, respondents were asked to assess the level of priority given to tackling antimicrobial resistance within their organisation (Figure 101). Among the 70 respondents, 27.1% (19/70) indicated that AMR is a moderate priority, 22.9% (16/70) described it as a high priority, and 17.1% (12/70) considered it a very high priority. Smaller proportions reported that AMR is a low priority (20.0%, 14/70) or not a priority at all (12.9%, 9/70).

Taken together, these responses suggest that approximately two-thirds of organisations consider antimicrobial resistance at least a moderate priority, although the level of engagement varies across regions.

Regional responses illustrate notable differences in organisational prioritisation (Figures 7-11). In Europe, a majority of organisations reported AMR as either a high or very high priority, reflecting the increasing integration of dentistry into national antimicrobial stewardship programmes. In Asia-Pacific, responses were more evenly distributed, with most organisations identifying AMR as a moderate priority. In contrast, respondents from Africa more frequently reported AMR as a low priority or not a priority, while North America showed relatively high prioritisation despite limited data availability on prescribing patterns. Interpretation of these regional patterns should be approached cautiously given the substantial variation in sample sizes across regions.

Evidence from European prescribing studies further highlights the importance of strengthening antimicrobial stewardship in dentistry. A systematic review examining antibiotic use in dental implant procedures across Europe found that 60.8% of professionals routinely prescribed prophylactic antibiotics, often extending treatment for 5-7 days postoperatively, despite evidence indicating that a single preoperative dose may be sufficient in many cases. The review estimated that the average total antibiotic dose prescribed per implant surgery exceeded 10,000 mg, considerably higher than the recommended 2 g preoperative dose in several guidelines. These findings suggest that deviations from recommended prescribing

practices remain common and underscore the importance of professional training, guideline dissemination and continuing education in improving antibiotic stewardship among dental practitioners.[146] Initiatives that strengthen professional awareness, training and guideline dissemination may therefore play an important role in increasing engagement with antimicrobial resistance initiatives within the dental community.

Figure 102- Regional distribution of available data on dentists' antibiotic prescribing reported by responding member countries

Figure 103- Regional distribution of organisational priority assigned to antimicrobial resistance (AMR) by responding member countries

Key Insights on Antibiotic Stewardship and Antimicrobial Resistance in Dentistry

The 2021 baseline survey provided an initial overview of how antimicrobial resistance (AMR) is addressed within national oral health systems. At that time, 42.3% of responding countries reported the presence of a national multi sectoral working group on AMR, with approximately two-thirds including representatives from the oral health community. The survey also found that only 23.6% of countries had available indicators or data on the amount or proportion of antibiotics prescribed by dentists. This indicator was among the least frequently reported measures used to monitor progress toward the implementation of Vision 2030, highlighting a significant gap in the surveillance of dental antibiotic prescribing.

The mid-term survey expands this perspective by examining additional dimensions of antibiotic stewardship within dentistry, including the availability of national prescribing guidelines, treatment protocols for oral conditions, national data on antibiotics prescribed by dentists and the extent to which antimicrobial resistance is prioritised within professional organisations. While a majority of responding countries report the existence of prescribing and treatment guidelines, the findings indicate that systematic monitoring of antibiotic prescribing in dental practice remains limited.

This limited availability of prescribing data reflects patterns already identified in the baseline survey and aligns with broader evidence highlighting surveillance gaps in dental antibiotic use. Monitoring antibiotic consumption is a key component of antimicrobial stewardship, enabling health systems to assess prescribing trends and evaluate the effectiveness of interventions aimed at reducing inappropriate antibiotic use.

At the same time, the survey responses suggest growing awareness of antimicrobial resistance within the dental community, with most responding organisations identifying AMR as at least a moderate priority. Taken together, the findings indicate that while progress is being made in guideline development and professional engagement, strengthening surveillance systems and monitoring of dental antibiotic prescribing will be essential for fully integrating dentistry into national and global antimicrobial stewardship efforts.

Chapter 11

Capacity Building and Network Strengthening

Key highlights

- 93.2% of FDI member organisations reported involvement in continuing education for oral health professionals.
- Only 47.9% of countries reported national programmes supporting dietary counselling and sugar-reduction advice for oral health providers.
- Support for dietary counselling programmes varied by region, ranging from 80% in North America to 43.8% in Europe.
- 86.4% of organisations reported undertaking advocacy at the national or regional level.
- Advocacy efforts most commonly targeted sugar (72.7%) and tobacco use (72.3%), while advocacy on drug abuse was lowest (41.9%).
- 64.3% of respondents reported needing additional capacity building to strengthen advocacy for sugar reduction.
- Health education campaigns (84.4%) and clear definitions of daily sugar intake limits (73.3%) were the most commonly identified priorities for sugar-reduction advocacy.
- 69.0% of organisations reported partnerships with other NCD-related associations or NGOs, an increase from 63.2% at baseline.

A. Continuing Education and Professional Preparedness

Capacity building and continuing education are fundamental to advancing global oral health targets and are also integrated within the Sustainable Development Goals (SDGs).[3,147] It requires adequate, continuously updated training or education to strengthen institutions broadly and, specifically, to individuals for delivering preventive and evidence-based care. This is one of the central areas of work undertaken by the FDI as an organisation, with 93.2% of member organisations contributing to this. It highlights the role of FDI members in strategically supporting the progress of the Vision 2030 agenda.

An example of this is the provision of support programmes for oral health providers on dietary advice, including sugar-reduction strategies. Such programmes target common risk factors, such as sugar, which is a critical modifiable factor for oral diseases, as well as other NCDs, such as diabetes and cardiovascular diseases, making dietary counselling an important aspect of care.[148] Despite its importance and the contributions of the members, the FDI survey showed that only about half of respondents (47.9%) reported having such national programmes that provide continued education for diet counselling in their countries (Figure 106). Regional disaggregation showed that support or programmes for dietary advice were unevenly distributed. About 80% respondents from North America reported having them, followed by 50% from Africa, 46.7% from Asia Pacific, 44.4% from Latin America, and 43.8% in Europe (Figure 105). This highlights that support or programmes for dietary advice, including sugar reduction, were most common in North America, reported by fewer than half of respondents in other regions, and lowest in Europe. Open-ended responses further highlight that such evidence-based support is generally available through public health guidance or continued professional development rather than through organised and institutionalised programmes. This suggests that many countries still lack institutionalised programmes for continuing education and capacity building.

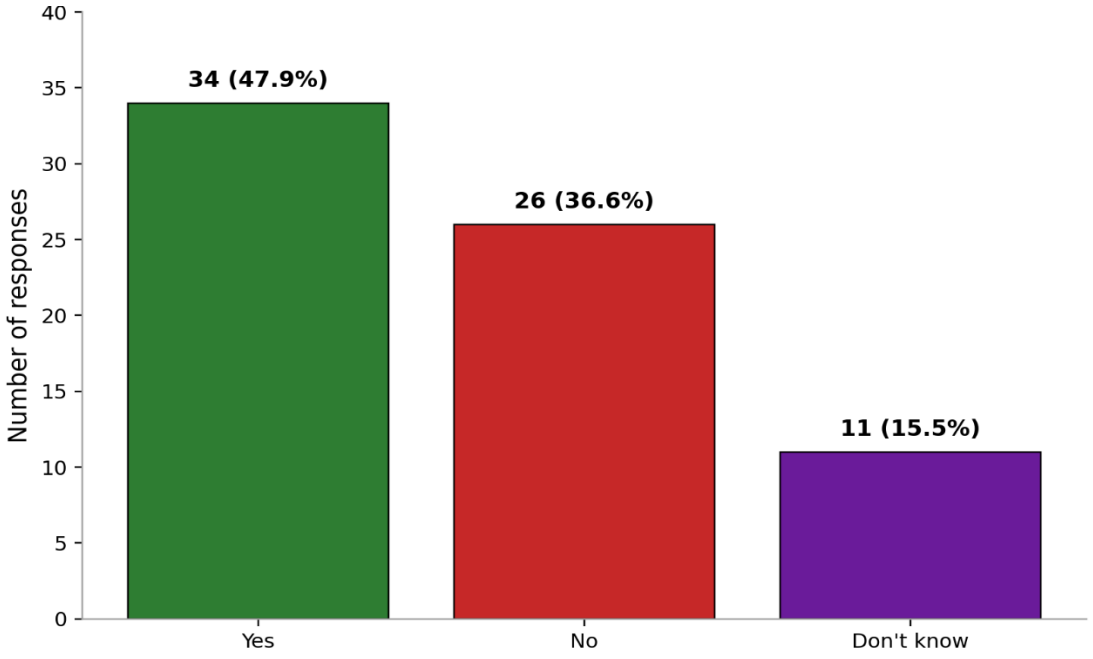

Figure 104 – Proportion of responding member countries reporting to having programmes for dietary advice, including sugar use reduction (n=71).

Figure 105– Regional distribution of responding member countries reporting to having programmes for dietary advice, including sugar use reduction

B. Advocacy Capacity and Strategic Partnerships

Advocacy capacity and partnerships are necessary to influence political priorities so that oral health is integrated with broader health agendas, such as NCDs. Its importance is emphasised in the WHO global strategy and action plan on oral health, and its implementation is supported by the FDI advocacy toolkit.[3,149] This is another area in which FDI members have contributed well. According to the FDI survey, approximately 86.4% of respondents reported undertaking advocacy at the national or regional level. Most organisations were involved in advocacy against sugar intake (72.7%) and tobacco use (72.3%). Half of the organisations were involved in advocacy against alcohol use, while advocacy against drug abuse was the lowest (41.9%) (Figure 106). By region, advocacy against sugar was strongest in North America (100%), Africa (78%), and Latin America (78%), while against tobacco was particularly strong in the Asia Pacific (87%). In contrast, advocacy against alcohol and drug abuse remained relatively low across regions, especially in Latin America (33% and 33%) and Europe (48% and 34%) (Figure 107). Compared with the baseline survey, advocacy has increased across all four shared risk factors, but most against alcohol (28.9% to 50.0%), followed by drug abuse (27.6% to 41.9%).

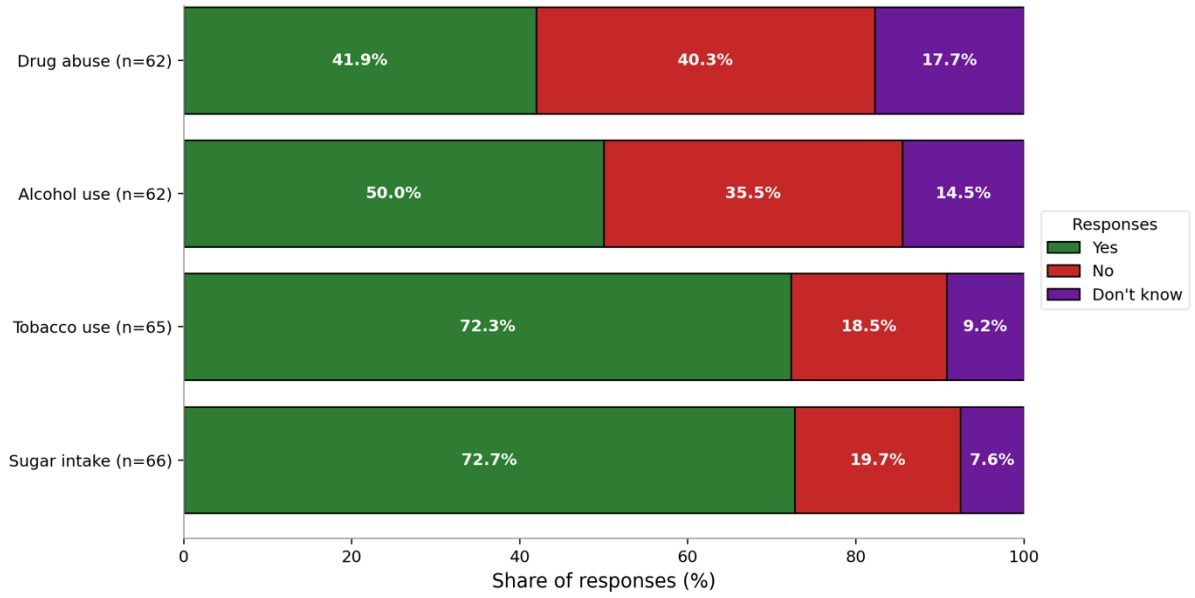

Figure 106 – Proportion of responding member countries reporting to being involved in different advocacy areas

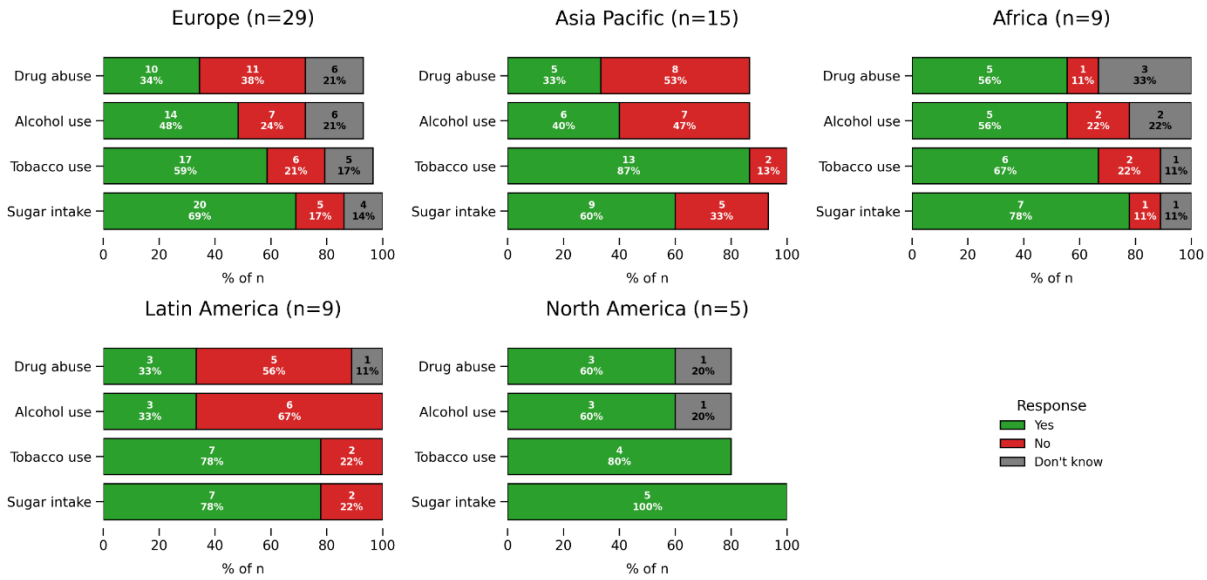

Figure 107 - Regional distribution of responses on the presence of behavioural risk factor policies among member countries

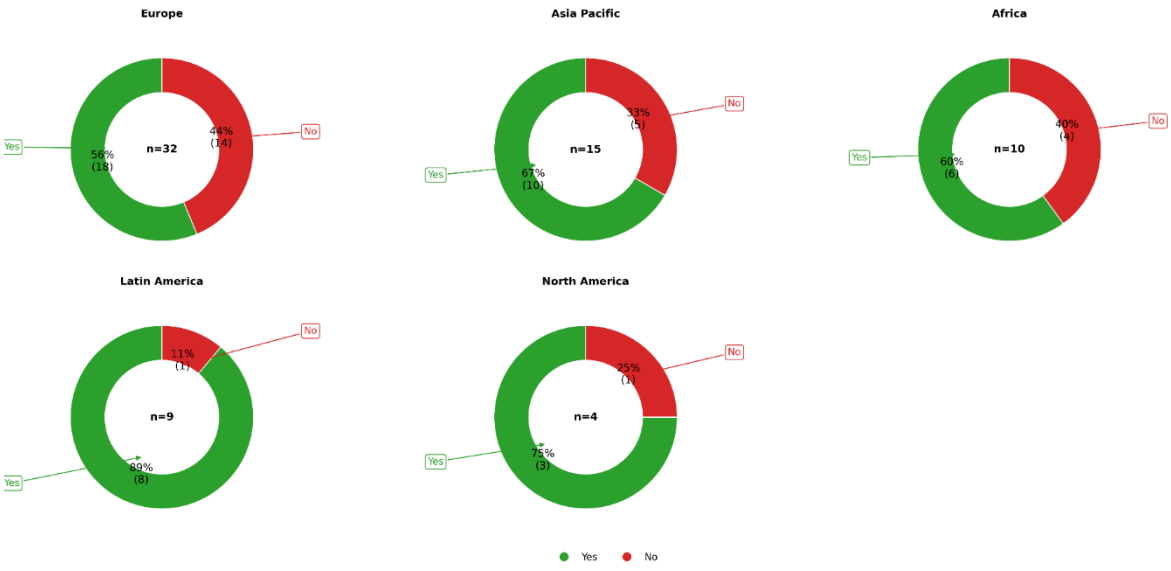

Figure 108– Regional distribution of responding member countries reporting organisational involvement in different advocacy areas.

However, this has not eliminated the need for capacity building. The FDI survey shows that 64.3% of respondents reported the need for further capacity building to strengthen advocacy for sugar reduction (Figure 109). Among those already engaged in sugar reduction advocacy, 64.6% still reported additional needs. This need was evident across all regions, but particularly pronounced for Latin America (89%), followed by North America (75%), Asia Pacific (67%), Africa (60%), and Europe (56.3%) (Figure 110). This may also reflect gaps in the availability of policy-relevant evidence, effective framing of sugar reduction within broader health and economic agendas, and the development of strategic partnerships necessary to advance advocacy efforts.[150]

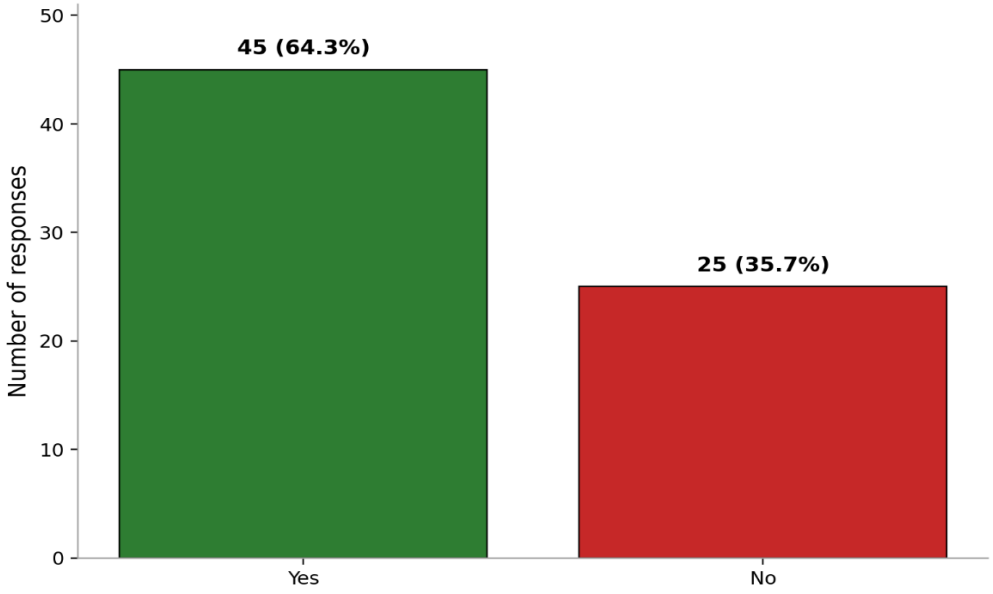

Figure 109 – Distribution of responding member countries reporting the need for capacity building to support sugar reduction advocacy (n = 70)

Figure 110– Regional distribution of responses on the need for capacity building to support sugar reduction advocacy.

In terms of advocacy interests for sugar reduction, most respondents supported health education campaigns to influence the public's food choices (84.4%), followed by establishing clear definitions of permissible daily sugar intake limits (73.3%), developing evidence-based recommendations for taxing sugar-sweetened beverages (SSBs) (71.1%), imposing restrictions on marketing/advertising/sponsorship of unhealthy products (64.4%), and promoting front-of-pack nutritional labelling (55.6%) (Figure 111). Altogether, these findings show that more advocacy is required at the population level, particularly by using stronger policy-framing tools.

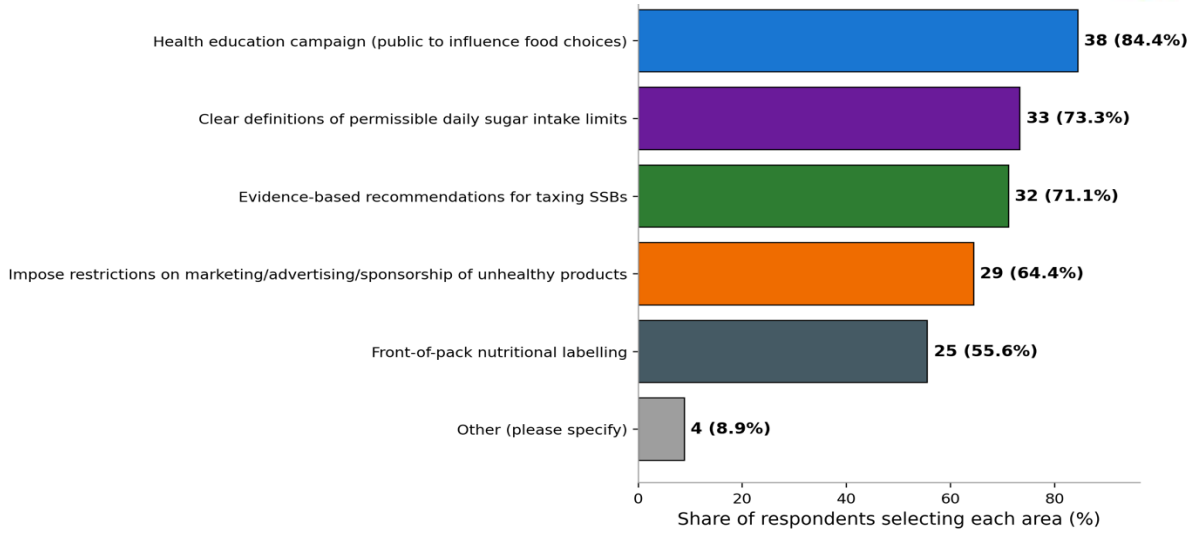

Figure 111 – Distribution of priority areas identified for sugar reduction advocacy among responding member countries (n = 45)

At the regional level, areas of interest for sugar reduction advocacy vary. The Asia Pacific region showed strong interest in evidence-based recommendations for taxing SSBs (90%) and health education campaigns to influence food choices (100%) (Figure 112). European respondents were broadly interested in multiple areas: evidence-based recommendations for taxing SSBs (78%), health education campaigns to influence food choices (78%), and having clear definitions of permissible daily sugar intake limits (78%). The African region was also interested in front-of-pack nutritional labelling and imposing marketing restrictions on unhealthy products (67%). Latin America emphasised having clear definitions of permissible daily sugar intake (100%) and a health education campaign to influence food choices (88%). North America showed the strongest support for health education to influence food choices (100%). Overall, this showed that although sugar reduction is a widely recognised area of interest, regions may prefer different approaches to achieving it.

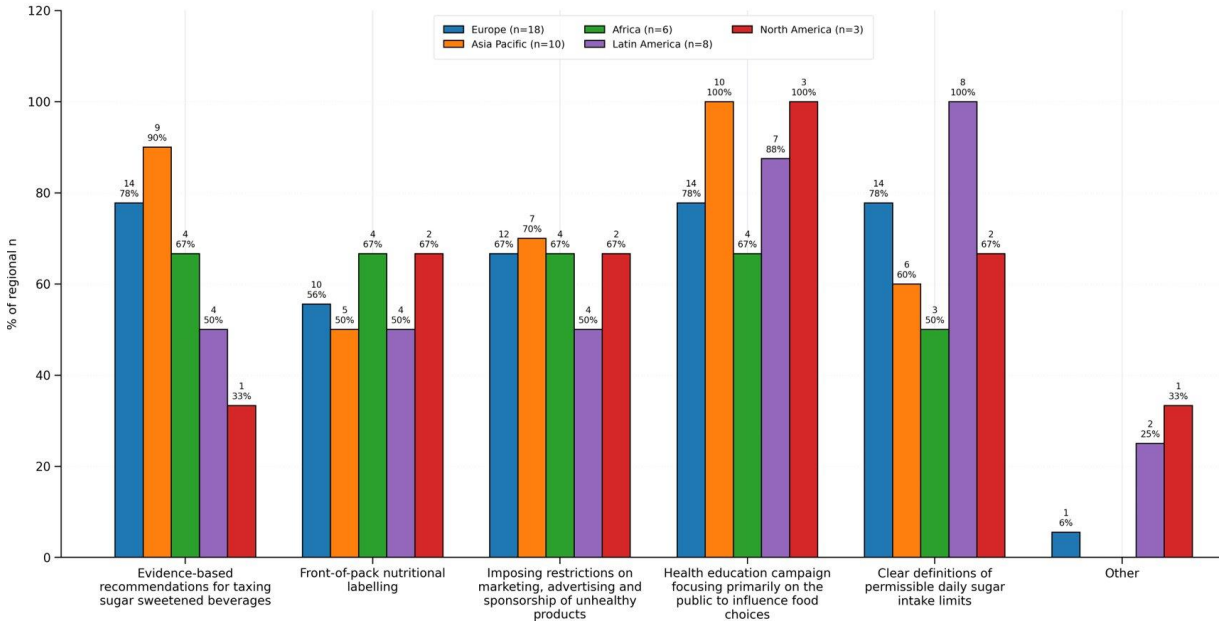

Figure 112– Regional distribution of priority areas identified for sugar reduction advocacy

Strategic partnerships add an extra dimension to advocacy work. The FDI mid-term survey showed that most respondents (69.0%) collaborated with other NCD-related associations or non-governmental organisations (NGOs), up from 63.2% at baseline (Figure 113). Across regions, the collaborations were strongest in Africa and North America (80%), while they remained the weakest in Latin America (56%) (Figure 114). Open-ended responses suggest that these partnerships span a broad range of organisations, including those connected with cancer, diabetes, heart disease, or stroke, aligning well with the common risk factor approach. This suggests that oral health advocacy is not operating in isolation and is increasingly connecting to wider NCD coalitions.

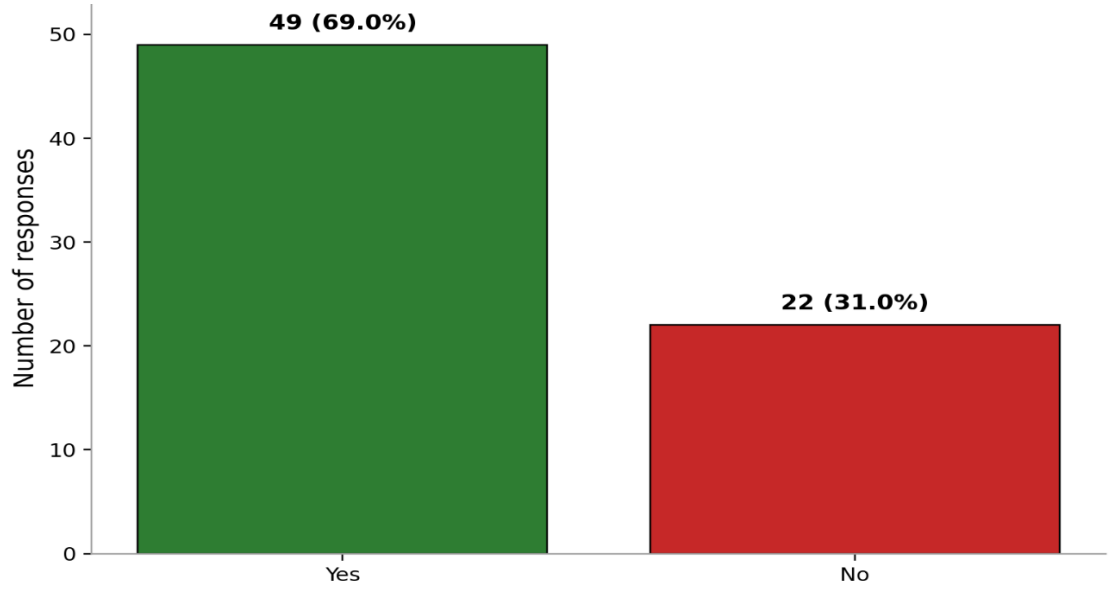

Figure 113 – Distribution of responding member countries reporting engagement in strategic partnerships with NGOs or associations for non-communicable diseases (NCDs) (n = 71)

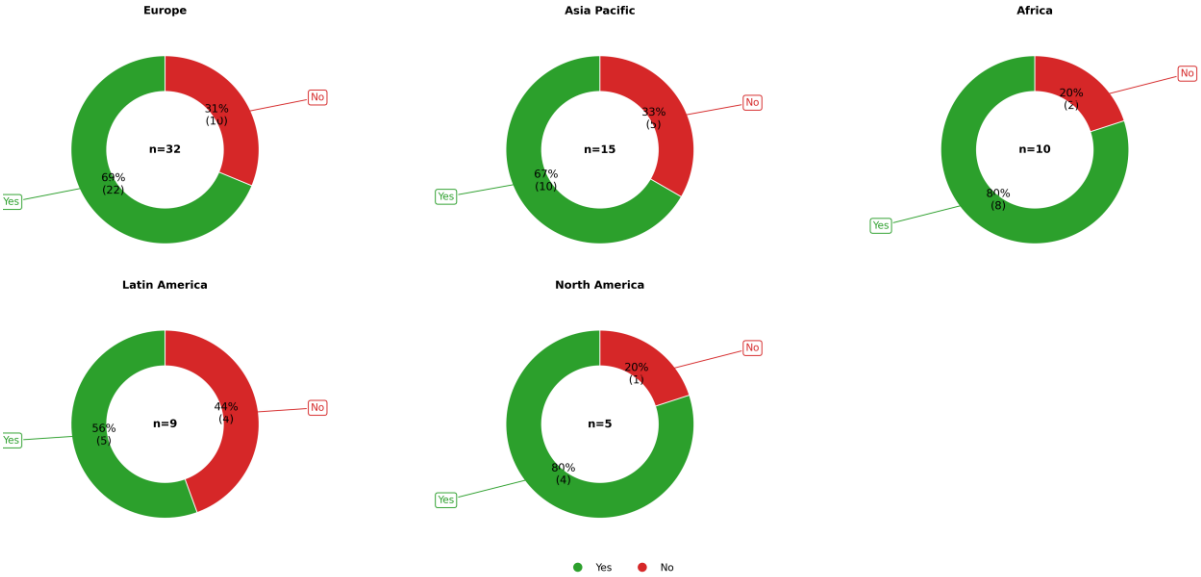

Figure 114 – Regional distribution of engagement in strategic partnerships with NGOs or associations for non-communicable diseases (NCDs)

Overall, these findings demonstrate the organisation's strength in capacity building and advocacy. Moreover, increasing collaboration with other organisations suggests progress in strategic partnerships, which will further support oral health advocacy.

Responses related to advocacy activities and partnerships highlight the increasing importance of cross-sector collaboration in addressing shared risk factors for oral diseases and other non-communicable conditions. Respondents described a range of activities, including public awareness campaigns, policy advocacy, and joint initiatives with organisations focused on conditions such as diabetes, cancer, and cardiovascular disease. These collaborations often aim to align oral health with broader health promotion efforts and to leverage existing platforms for greater impact. However, the extent of engagement varies across countries, with some reporting well-established partnerships and others indicating limited or ad hoc collaboration. The findings suggest that while there is growing recognition of the value of integrated advocacy approaches, further efforts are needed to institutionalise partnerships and strengthen coordination across sectors.

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