Global oral health status report

Towards universal health coverage for oral health by 2030

Executive summary

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for oral health by 2030

Executive summary

World Health
Organization

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Foreword

Oral diseases are among the most common noncommunicable diseases worldwide, affecting an estimated 3.5 billion people. The burden is increasing, particularly in low- and middle-income countries.

Good oral health is essential for eating, breathing and speaking, and contributes to overall health, well-being and confidence in interacting with others. But oral health is challenged by a range of diseases and conditions, and stark and persistent inequalities in the burden of disease and access to oral health care. Disadvantaged and marginalized people are more likely to be at risk of oral diseases and their negative consequences.

The good news is that many oral diseases can be prevented and treated. Cost-effective preventive and clinical interventions are available, together with approaches to tackle risks common to all noncommunicable diseases, with the potential to be effective in a range of contexts, including low- and middle-income countries.

Oral health has long been neglected in the global health agenda. Our biggest challenge now is ensuring that all people, wherever they live and whatever their income, have the knowledge and tools needed to look after their teeth and mouths, and access to prevention and care when they need it. For this to happen, all countries need sufficient staff trained in oral health, and oral health services must be included in national health coverage packages, either free of charge or at a price that people can afford.

The adoption by WHO Member States of a historic resolution on oral health at the World Health Assembly in 2021 was an important step forward. The development and adoption of a comprehensive Global Strategy on Oral Health, with a bold vision for universal coverage of oral health services by 2030 was another milestone. The Global Oral Health Action Plan to be discussed in 2023 will include a monitoring framework, with clear targets to be achieved by 2030. These policies will provide us with a clear path towards ensuring oral health for all.

This WHO *Global Oral Health Status Report* provides a comprehensive picture of the oral disease burden, the resources available for oral health, and the challenges ahead.

The report also includes country profiles, and will serve as a baseline for tracking progress. Integrating oral health promotion and care into primary health care and UHC benefit packages will be key to success. WHO is committed to providing guidance and support to countries to help make this happen.

I am confident that this report will contribute to continued and increased efforts to improve oral health globally, so that no one is left behind with preventable and treatable oral diseases.

Dr Tedros Adhanom Ghebreyesus
Director-General, World Health Organization

What is oral health?

The WHO defines *oral health* as the state of the mouth, teeth and orofacial structures that enables individuals to perform essential functions, such as eating, breathing and speaking, and encompasses psychosocial dimensions, such as self-confidence, well-being and the ability to socialize and work without pain, discomfort and embarrassment. Oral health varies over the life course from early life to old age, is integral to general health and supports individuals in participating in society and achieving their potential.

1 Towards global oral health equity through universal health coverage

The status of global oral health is alarming and requires urgent action by all stakeholders. Untreated oral diseases affect almost half of the world's population. Global case numbers have increased by 1 billion over the last 30 years—a clear indication that many people do not have access to appropriate oral health care. The consequences of untreated oral diseases—including physical symptoms, functional limitations and detrimental impacts on emotional, mental and social well-being—are severe and debilitating. For those able to obtain treatment, the costs are often high and can lead to significant economic burden.

Stark and persistent socioeconomic inequalities in oral diseases exist, with a higher disease burden found in disadvantaged and marginalized population groups. At the same time, public and private expenditures for oral health care have reached almost 390 billion US dollars globally, with very unequal distribution among regions and countries. Despite these challenges, oral diseases are largely preventable through population-based public health measures.

In 2021, the 74th World Health Assembly adopted a historic resolution on oral health. The resolution calls for a paradigm shift in oral health policy and planning from a conventional model of restorative dentistry towards a promotive and preventive model. The resolution also emphasizes that oral health should be fully embedded in the noncommunicable disease (NCD) agenda and that essential oral health care interventions should be included in universal health coverage (UHC) benefit packages. The resolution calls for several actions, including developing a Global Strategy on Oral Health by 2022, a global oral health action plan by 2023 and a global monitoring framework with indicators, targets and "best buys for oral health" as part of Appendix 3 of the WHO *Global Action Plan for the Prevention and Control of Noncommunicable Diseases*. The Global Strategy on Oral Health was adopted during the 75th World Health Assembly in May 2022, and the draft Global Oral Health Action Plan (2023–2030) will be discussed by the WHO governing bodies in 2023.

The WHO *Global Oral Health Status Report* complements these initiatives by providing foundational information and, as far as possible, baseline data to help monitor progress towards UHC for oral health. It is an important milestone in the larger process of mobilizing political action and resources for oral health.

Specifically, this report highlights the global burden of oral disease and inequalities using the latest data available from the Global Burden of Disease (GBD) project, the International Agency for Research on Cancer (IARC) and global WHO surveys. It emphasizes social and commercial determinants and common risk factors that oral diseases and other NCDs share as a foundation for concerted action, and it highlights challenges and opportunities for oral health within the wider global health context that require stakeholder engagement to accelerate progress towards universal coverage for oral health. The report provides fundamental data as a basis for initiating discussion and generating commitment to changing the current situation of neglect. The report also introduces the first country oral health profiles providing key health and oral health information for each WHO Member State, available as a separate online resource.

2 Oral diseases represent an unmatched and growing global burden

As the most widespread conditions among all diseases and conditions that affect humanity, oral diseases present a major public health problem. Globally, oral diseases affect almost 3.5 billion people; three out of four people affected live in middle-income countries. The estimated number of cases of oral diseases worldwide is about 1 billion more than cases of all five main NCDs (mental disorders, cardiovascular diseases, diabetes, chronic respiratory diseases and cancers) combined.

Comparison of estimated global case numbers for selected NCDs

Oral diseases
3 474 M

Cardiovascular
diseases
522 M

Chronic respiratory
diseases
453 M

Mental
disorders
967 M

Diabetes mellitus
(type 1 and type 2)
458 M

Cancers
(all malignant
neoplasms)
86 M
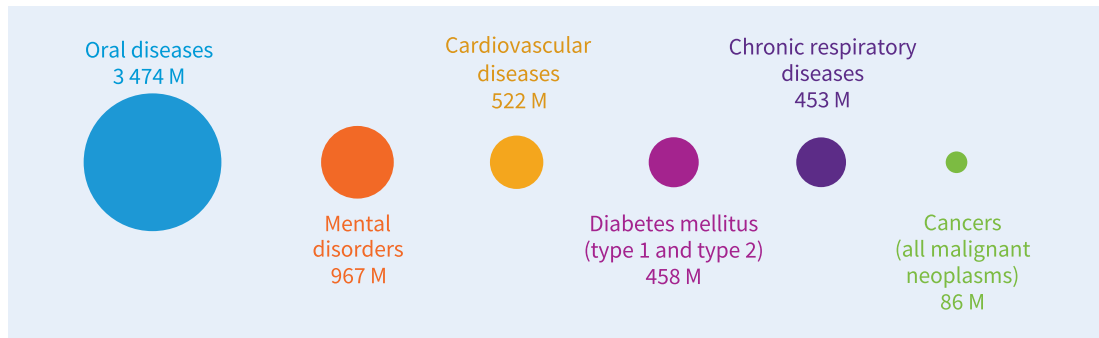
Note. Data are for all ages and both sexes from GBD 2019; oral diseases do not include lip and oral cavity cancer. A standard method has been applied to incorporate the latest UN population estimates.

Oral diseases have a high global average prevalence of 45%. This is very similar across World Bank country income groups and WHO regions. Both the South-East Asia Region and the Western Pacific Region have the highest case numbers among the WHO regions, as they include countries with large population sizes. The other four WHO regions have similar yet still high case numbers.

Estimated case numbers and prevalence of the major oral diseases combined per WB country income group (excluding lip/oral cavity cancer)
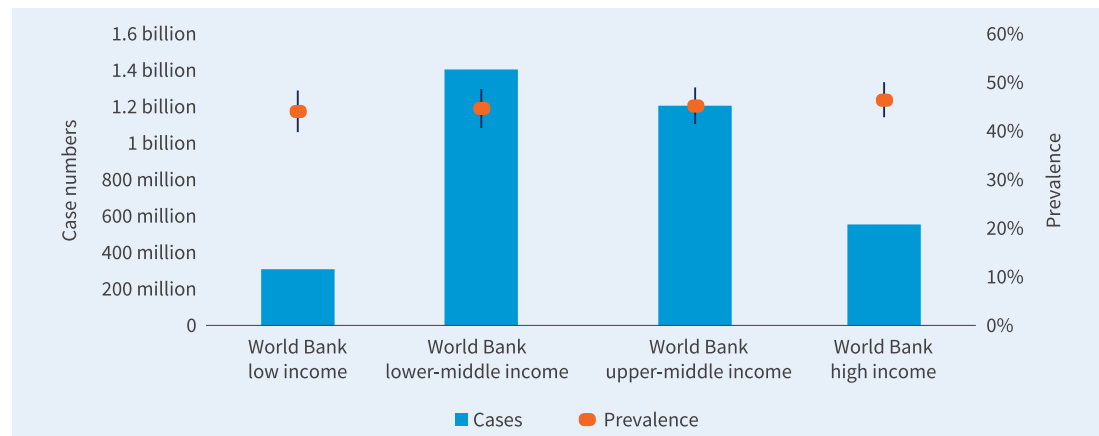
Note. Data are from GBD 2019.

Estimated case numbers and prevalence of the major oral diseases combined per WHO region (excluding lip/oral cavity cancer)
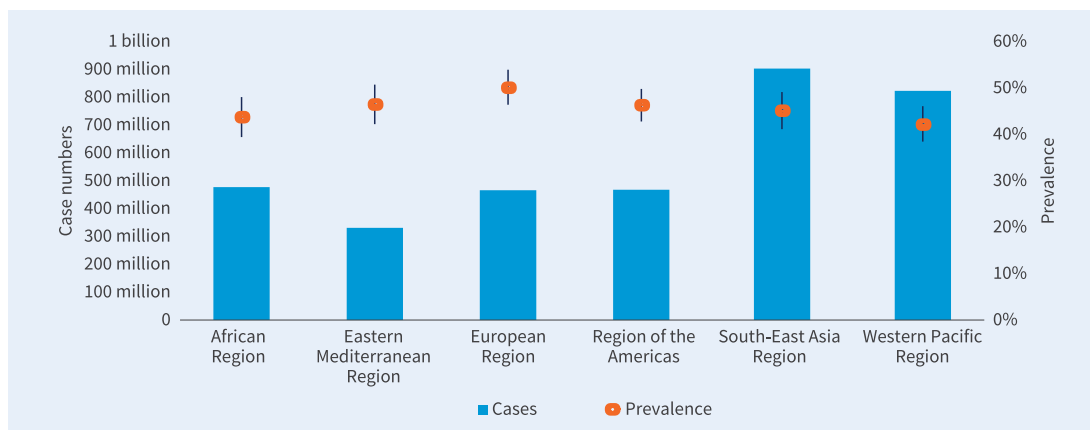
Note. Data are from GBD 2019.

Oral diseases show significant inequalities

The burden of oral diseases is unequally distributed across populations. All oral diseases show strong social gradients, disproportionally affecting the most vulnerable and disadvantaged population groups within and across societies as well as over the life course. People who are on low incomes, people living with disabilities, older people living alone or in care homes, people who are refugees, in prison or living in remote and rural communities, children and people from minority and/or other socially marginalized groups generally carry a higher burden, a pattern of inequalities similar to other NCDs.

Such vulnerable and disadvantaged groups often have less access to oral health services. In addition, both private and public services are poorly distributed with an overconcentration in affluent urban areas, leaving rural and poorer populations with limited or no access even to essential oral health services.

Oral diseases share determinants and risk factors with other NCDs

The underlying social determinants of oral health inequalities are the conditions under which people are born, grow, live, work and age, including the structural drivers of those conditions, such as the inequitable distribution of power and wealth in societies. In addition, commercial determinants of health comprise the private-sector activities that affect people's health positively or negatively. The private sector influences the social, physical and cultural environments through business actions and societal engagements, such as supply chains, labour conditions, product design and packaging, research funding, lobbying and preference shaping. The global tobacco and alcohol industries, as well as some food and drink industries, target governments, public opinion and science to delay, modify or hinder public policies to protect population health.

The common risk factor approach recognizes that NCDs and conditions, including oral diseases, share a set of key modifiable risk factors. High sugar intake, all forms of tobacco and harmful alcohol use are major public health challenges for a wide range of NCDs. They are also the key modifiable risk factors for oral diseases.

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Oral diseases result in a high economic burden

Among 194 countries, the total direct expenditure for oral diseases (which includes public and private treatment costs for oral health care except for oral cancer) amounted to 387 billion US$, or a global average of about 50 US$ per capita, in 2019. This represents about 4.8% of global direct health expenditures. At the same time, productivity losses from oral diseases were estimated at about 42 US$ per capita, totalling around 323 billion US$ globally.

Inequalities in oral health expenditures are striking. The average per capita expenditure in low-income countries is 0.52 US$, whereas high-income countries spend an average of 260 US$ per capita—500 times more.

Per capita dental expenditures in US$ per country (2019)

Per capita dental
expenditures in US$
- Less than $1
- $1 to $10
- $11 to $50
- $51 to $300
- More than $300
- Data not available
- Not applicable
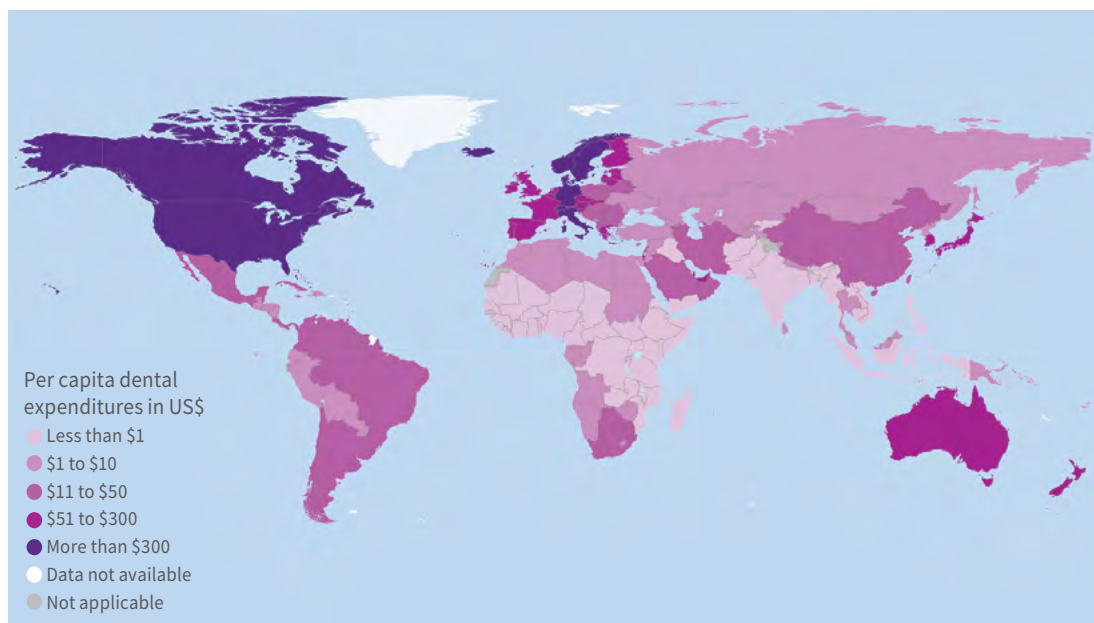
Data Source: Jevdjevic & Listl 2022. Economic impacts of oral diseases in 2019. Map Production: WHO NCD/MND unit. Map Creation Date: 30 August 2022. *Note:* N = 194 countries.

3

The burden of the main oral diseases

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Each of the main oral diseases presents a significant public health problem on a global, regional and national level. With an unparalleled burden, stark inequalities and risk factors shared with other NCDs, oral diseases have a major impact on health, well-being, health care systems and economies, adding to the increasing burden of NCDs. Most oral diseases are preventable through self-care or with evidence-based, cost-effective, population-wide measures. These include actions on the wider social, economic and political determinants of health, which can reduce the disease burden significantly and limit negative impacts.

Dental caries

More than one-third of the world's population lives with untreated dental caries. Dental caries affects all age groups, starting with the eruption of the first teeth (deciduous teeth/primary dentition) and, after eruption of the permanent teeth, increasing in prevalence until late adulthood (permanent teeth), then remaining at high levels until older age. Consumption of sugars in food and beverages together with inadequate oral hygiene and insufficient use of fluoride toothpaste or other fluoridation measures are the main risk factors.

The estimated global average prevalence of caries of deciduous teeth is 43%, and 134 of 194 WHO Member States have prevalence figures greater than 40%. Global case numbers are estimated at about 514 million (2019). More than three-quarters of cases of untreated caries in deciduous teeth are found in middle-income countries.

The estimated global average prevalence of caries of permanent teeth is 29%, representing more than 2 billion cases. Prevalence differs little between country income groups.

Estimated prevalence of caries of permanent teeth per country
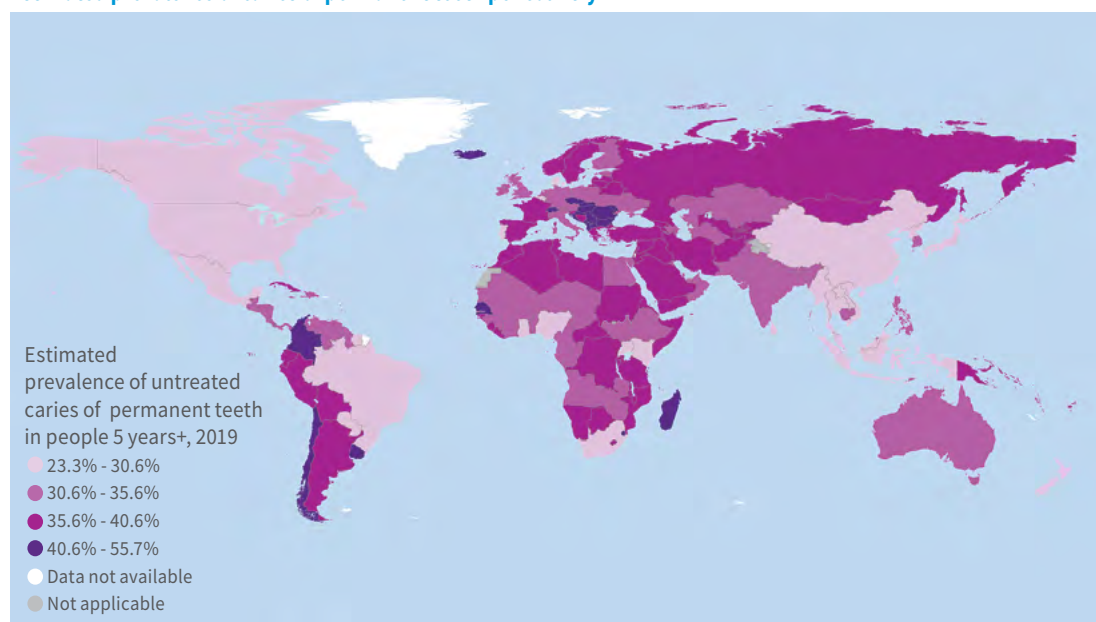
Estimated prevalence of untreated caries of permanent teeth in people 5 years+, 2019
- 23.3% - 30.6%
- 30.6% - 35.6%
- 35.6% - 40.6%
- 40.6% - 55.7%
- Data not available
- Not applicable

Data source: Global Burden of Disease Collaborative Network. GBD 2019. Seattle: IHME; 2020. Map Production: WHO NCD/MND unit.
Map Creation Date: 30 August 2022. *Note.* N = 194 countries; data are age standardized, for ages greater than 5 years, both sexes, from GBD 2019.

Severe periodontal disease

The estimated global prevalence of severe periodontal disease is about 19% in people older than 15 years, representing more than 1 billion cases worldwide. Case numbers of severe periodontal disease doubled between 1990 and 2019. Prevalence of severe periodontal disease starts in late adolescence, peaks at around 55 years of age and remains high until old age. Poor oral hygiene is a major behavioural risk factor for periodontal disease, together with common NCD risk factors such as tobacco use.

Severe periodontal disease is closely interlinked with major NCDs; an association with unmanaged type 2 diabetes is particularly well documented. Good periodontal health improves glycaemic control. Deterioration of periodontal health may be an early indicator of poorly managed diabetes.

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Estimated prevalence of severe periodontal disease per country

Estimated prevalence of severe periodontal disease in people 15 years+, 2019
- 2.9% - 10.6%
- 10.6% - 19.6%
- 19.6% - 27.3%
- 27.3% - 36.7%
- Data not available
- Not applicable

Data source: Global Burden of Disease Collaborative Network. GBD 2019. Seattle: IHME; 2020. Map Production: WHO NCD/MND unit. Map Creation Date: 30 August 2022. *Note.* N = 194 countries; data are age standardized, for ages greater than 15 years, both sexes, from GBD 2019.
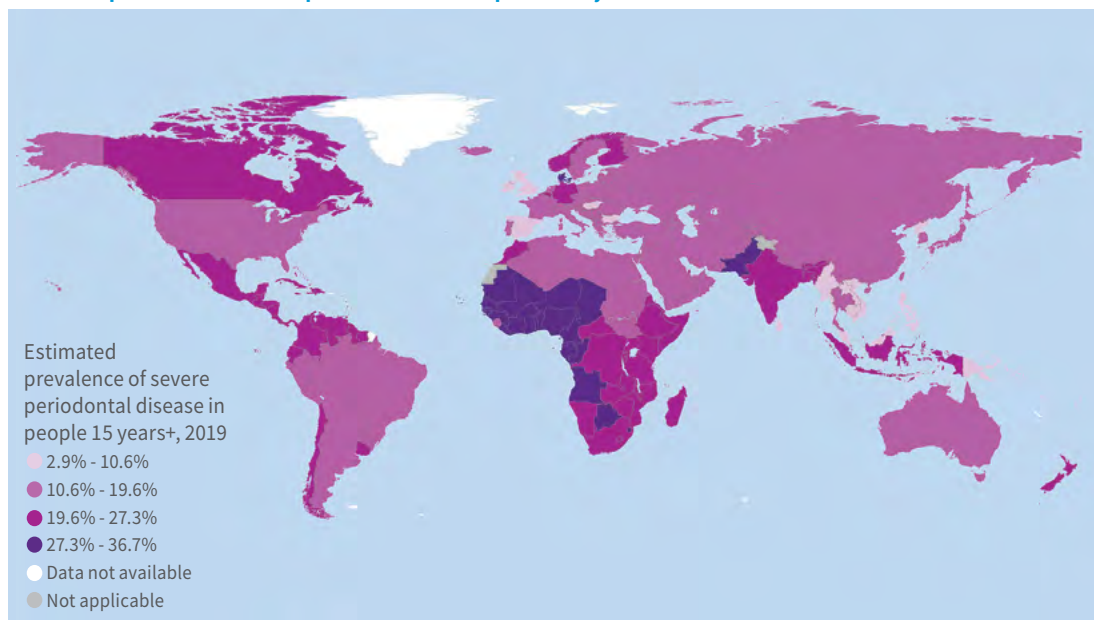
Estimated prevalence of edentulism per country
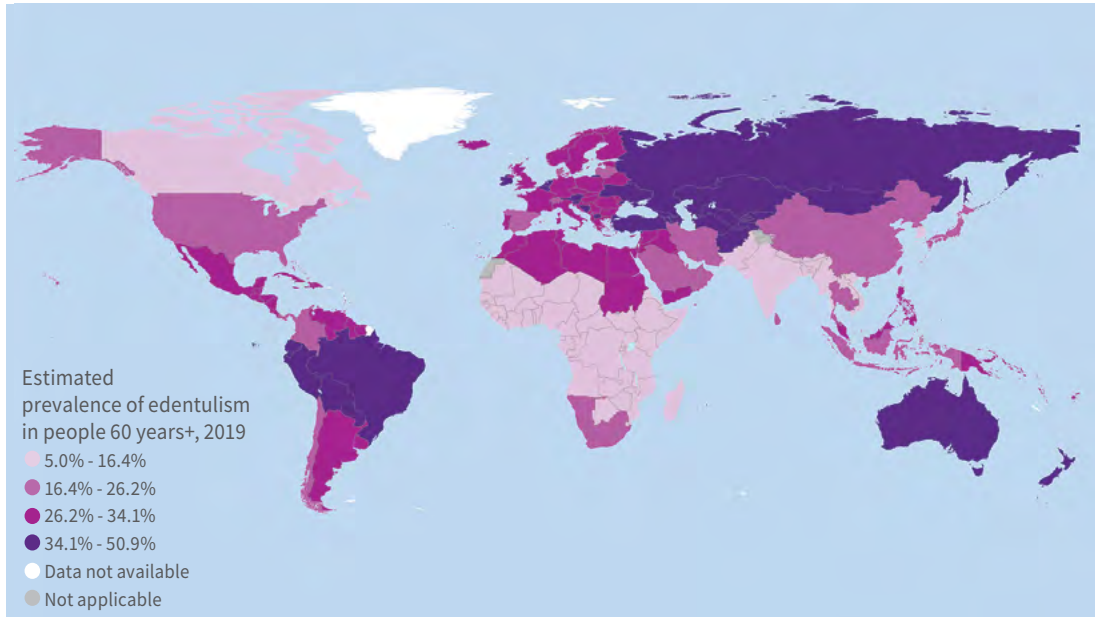
Estimated
prevalence of edentulism
in people 60 years+, 2019
- 5.0% - 16.4%
- 16.4% - 26.2%
- 26.2% - 34.1%
- 34.1% - 50.9%
- Data not available
- Not applicable

Data source: Global Burden of Disease Collaborative Network. GBD 2019. Seattle: IHME; 2020. Map Production: WHO NCD/MND unit.
Map Creation Date: 30 August 2022. *Note. N* = 194 countries; data are for ages greater than 60 years, both sexes, from GBD 2019.

Edentulism

Losing teeth is generally the end point of a lifelong history of oral disease, primarily advanced dental caries and severe periodontal disease, but can also be due to trauma, all possibly leading to tooth extraction. Edentulism (total tooth loss) is a stark indicator of social and economic inequalities, with disadvantaged populations experiencing disproportionately high rates. The estimated global average prevalence of complete tooth loss is almost 7% among people aged 20 or older, with more than 350 million cases worldwide (2019). Case numbers more than doubled between 1990 and 2019 in all country income groups. For people aged 60 years or older, a much higher global prevalence of 23% has been estimated.

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Lip and oral cavity cancer

Lip and oral cavity cancer ("oral cancer") is a preventable global public health problem that represents a significant burden and reflects strong inequalities. The number of estimated incident cases of lip and oral cavity cancers ranked 16th among all cancers for both sexes in 2020, and the incidence rate was 2.5 times higher in men. Combined with cases of oropharyngeal cancers, the rank increased to the 13th most common cancer worldwide in 2020. The South-East Asia Region shows the highest incidence and mortality of all WHO regions, with oral cancer rates almost double the global average.

Tobacco use and unhealthy alcohol consumption are the key risk factors for oral cancers. In Southeast Asia and the Pacific Islands, the use of betel quid (a mix of different chewing products and areca nut, a major carcinogen) is also a key risk factor. Infections with human papilloma virus are increasingly contributing to oropharyngeal cancers of specific populations. Mortality from oral cancer remains high and survival rates low, particularly in low- and middle-income countries, highlighting the importance of prevention, early diagnosis and appropriate care.

Estimated incidence rates of lip and oral cavity cancer

Estimated incidence rates of lip and oral cavity cancer in people 30 years+ per 100 000 population (2020)

- 0.0 - 3.1
- 3.1 - 5.4
- 5.4 - 8.1
- 8.1 - 11.0
- 11.0 - 14.6
- 14.6 - 47.6
- Data not available
- Not applicable
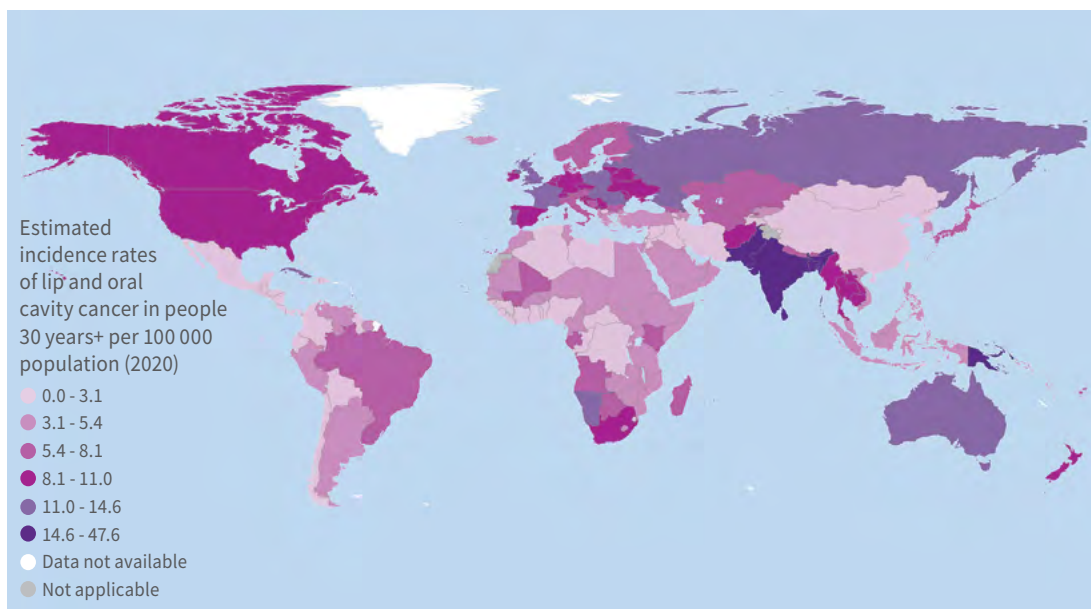
Data source: Ferlay et al. Global Cancer Observatory: Cancer Today. International Agency for Research on Cancer: Lyon, France; 2020.
Map Production: WHO NCD/MND unit. Map Creation Date: 30 August 2022. *Note. N* = 176 countries; data are age-standardized, for ages 30–85 years, both sexes, from GLOBOCAN 2020.

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Other oral conditions of public health relevance

Other oral conditions are less prevalent than the main oral diseases, but some are more severe in terms of mortality. Orofacial clefts are among the most common human congenital malformations and the predominant congenital malformations of the face and mouth. They include cleft lip and/or cleft palate in different combinations. Global case numbers are estimated at about 4.6 million cases. More than 90% of cases occur in low- and middle-income countries.

Noma is a serious gangrenous disease of the mouth and face with very high mortality rates. It typically starts as a sore on the gums inside the mouth. Noma mostly affects children between the ages of 2 and 6 living in extreme poverty, predominantly in sub-Saharan Africa.

Traumatic dental injury is a widespread yet often overlooked condition, defined as an impact injury to the teeth and/or other hard and soft tissues inside or around the mouth and oral cavity. In the absence of surveillance data, it has been estimated that 1 billion people are affected, with a prevalence of around 20% for children up to 12 years old.

4

Challenges and opportunities towards oral health for all

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Health services and oral health care

Oral diseases are largely preventable or require only minimally restorative interventions if they are diagnosed and treated at early stages. Ideally, oral health professionals should primarily focus on delivering evidence-based preventive care and minimally invasive interventions, supporting patients in effective self-care practices and acting as advocates for policies to promote oral health. When needed, clinical oral health care procedures can effectively alleviate pain, discomfort and infection caused by oral diseases and can help to restore patients' oral function and aesthetics.

However, major challenges exist related to coverage, accessibility, availability, appropriateness and affordability of oral health care across the globe. These problems frequently result from system-level failures in the model of care and provision of oral health services, which largely rely on expensive high-tech equipment and materials, highly specialized providers and too few midlevel providers.

Oral health services are often poorly planned. Typically, they are demand-led and influenced by entrepreneurial choices inherent to the predominant model of private practice. This leads to oral health services that are not always adequately aligned with the oral health needs of populations and are not well integrated with primary health care models.
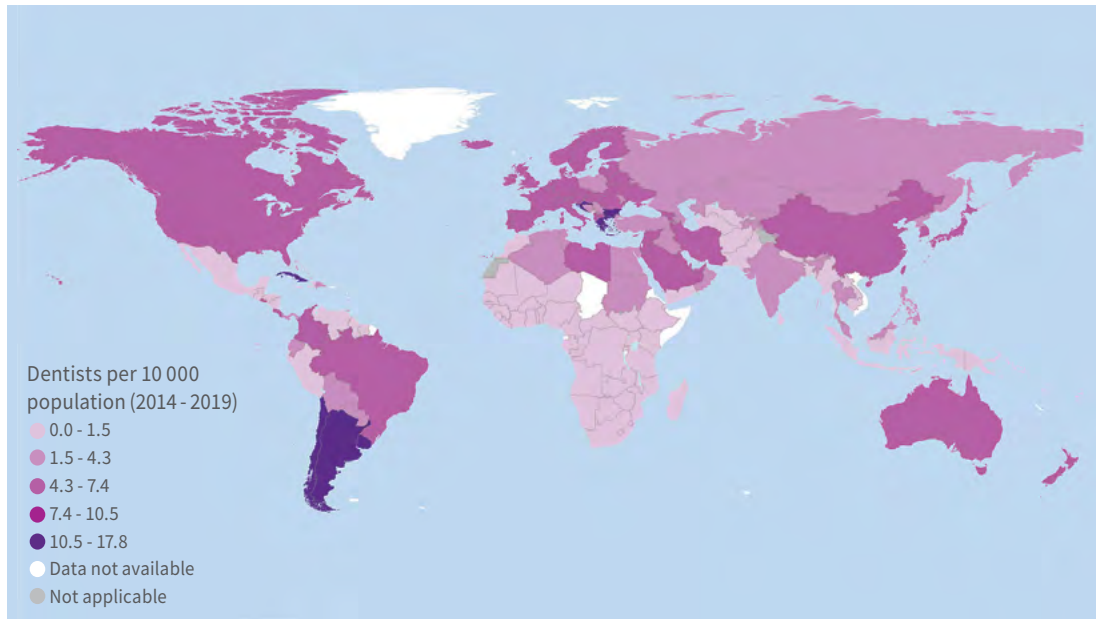

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Global oral health workforce

To achieve UHC for oral health, a range of oral health care professionals with complementary roles need to work together within teams, in collaboration with other health and community care teams and fully aligned with the principles of primary health care. Currently, however, oral health care is frequently characterized by low workforce numbers, a predominance of private provision models, underresourced public services, inadequate task sharing and skill mixes within teams, limited or no access for rural, remote or disadvantaged populations, and lack of financial protection and coverage for oral health care.

Globally in 2019, the oral health workforce was estimated to consist of nearly 4 million professionals, comprising about 2.5 million dentists, 1.2 million dental assistants and therapists and 300 000 prosthetists/technicians. Stark differences are evident in the distribution of the oral health workforce across the globe, with sub-Saharan Africa and parts of Southeast Asia reporting the lowest absolute numbers and professional-to-population ratios. Efforts should focus on the development of "innovative workforce models" and the expansion of "competency-based education" to better address population needs as outlined in the Global Strategy on Oral Health.

Workforce for oral health—dentist density

Dentists per 10 000
population (2014 - 2019)
- 0.0 - 1.5
- 1.5 - 4.3
- 4.3 - 7.4
- 7.4 - 10.5
- 10.5 - 17.8
- Data not available
- Not applicable

Data source: The National Health Workforce Accounts (NHWA) data platform, WHO; 2020. Map Production: WHO NCD/MND unit.
Map Creation Date: 30 August 2022. *Note.* Per 10 000 population, *N* = 184 countries, from the latest available data (2014–2019).

Fluorides for oral health

Dental caries can be effectively reduced or prevented through optimal fluoride delivery for the population, along with reducing sugar consumption. The different applications of fluorides for oral health have been extensively studied since they were first introduced more than 70 years ago, including self-applied fluorides (in toothpaste and mouth rinses), professionally applied forms (varnish and gel) and community-based programmes (in water, salt or milk). There is a large body of scientific evidence on the safety, efficacy, cost-effectiveness and population wide feasibility of different fluoride vehicles according to the national contexts. The effects of fluorides are largely topical. Negative side effects (fluorosis) only occur if fluoride is ingested in excess during the formation of teeth.

Brushing teeth with fluoride toothpaste twice daily is a simple, effective method of topical fluoride delivery. WHO and other public health agencies recommend a fluoride concentration in toothpaste of between 1 000 and 1 500 ppm. Fluoride toothpaste is easy to use and widely available. Efforts to improve affordability of toothpaste can enhance usage and population coverage. Optimizing the level of fluoride in drinking water is another safe, cost-effective public health measure. This includes adding fluoride in areas where natural fluoride levels in drinking water are too low to prevent caries as well as eliminating fluoride from drinking water in areas where fluoride concentrations are too high to be safe.

Oral health information and research

Significant data and information gaps exist related to oral diseases. Fewer than one-third of all countries have oral health surveillance data on their populations. Oral health is rarely included in existing health surveys, or only to a limited extent. The costs of conducting dedicated, regular, national, population-based oral health surveys are high and often prohibitive for countries. It is therefore important to include oral health in existing and emerging national health surveillance and monitoring systems, particularly as part of ongoing NCD surveillance.

High-quality oral health research is fundamentally important to fill crucial knowledge gaps, improve quality of oral health care and ultimately promote better oral health for individuals and populations. Oral health research activities and resources are, however, unequally distributed, with high-income countries dominating global oral health research agendas and funding. Oral health researchers have an important role in supporting the development and evaluation of population oral health policies and in evaluating and applying the evidence generated by new public health interventions. This will be particularly critical in accelerating implementation of the Global Strategy on Oral Health.

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Issues of public health relevance in oral health care

Delivery of oral health services and the practice of dentistry face several challenges from developments that affect current and future approaches, yet all of them are also opportunities for improvement and reform.

The impact of oral health care systems on the environment is of growing concern. Eliminating the use of mercury-containing products reduces mercury pollution, which is harmful to both the environment and public health. The Minamata Convention on mercury requires the phasedown of the use of dental amalgam as a filling material. This necessitates a major shift in the routine delivery of oral health care.

The COVID-19 pandemic has challenged oral health care services and caused major disruptions of services in most countries. Pandemic preparedness and resilience of oral health care services need to be addressed to ensure continuation of essential oral health care without increased risks of infection for patients and providers. Growing public health threats from antimicrobial resistance, amplified by challenges in infection prevention and control, also require continued and heightened attention in oral health care.

Promisingly, mobile and remote technologies using smartphones and other digital technologies are expanding the scope of and approaches to health literacy, early disease detection and accessibility of oral health care. However, these can also pose challenges to patient–provider relations and data protection.

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Reorientation on primary oral health care and universal health coverage

The concept of primary health care remains the cornerstone of public services in most countries. In 2020, WHO and UNICEF published a new operational framework defining *primary health care* as "a whole-of-society approach to health that aims to maximize the level and distribution of health and well-being through three components: (a) primary care and essential public health functions as the core of integrated health services; (b) multisectoral policy and action; and (c) empowered people and communities." Reorientation of existing oral health care towards primary oral health care prioritizes integrating essential oral health care into primary care, empowering people and communities and developing multisectoral policy and action for oral health. The goals and expected outcomes of a reorientation of oral health care towards primary oral health care and UHC include improved access, utilization and service quality; better self-care, oral health literacy and participation in decision-making processes; and progress towards improving key determinants of oral health.

5 Roadmap towards universal health coverage for oral health 2030

The status of global oral health is alarming in many ways. However, there are opportunities for reform to solve oral health challenges. These include continuing to address the global epidemic of NCDs and their common risk factors as well as renewing attention to primary health care and integrating essential oral health care as a strategy to achieve UHC. Better integration of and advocacy for oral health within global NCD, UHC and primary health care agendas will also lead to critical opportunities for improvement. The 2030 Agenda provides overarching direction, particularly Sustainable Development Goal 3 ("Ensure healthy lives and promote well-being for all at all ages") and its target 3.8 on achieving UHC. Overarching principles, strategic objectives and actions in the Global Strategy on Oral Health and its draft Global Oral Health Action Plan (2023–2030) give further guidance.

Action by Member States, WHO Secretariat and other stakeholders

The historic resolution on oral health adopted by the 74th World Health Assembly in 2021 is a major opportunity for renewed global health action on oral health. The resolution calls for a paradigm shift in oral health policy planning from a conventional model of restorative dentistry towards a promotive and preventive model. The resolution also confirms that oral health should be fully embedded in the NCD agenda and that essential oral health care interventions should be included in UHC benefit packages. The resolution, adopted with widespread country support, calls for a comprehensive set of steps, including the development of a Global Strategy for Oral Health by 2022 and a Global Action Plan on Oral Health by 2023, accompanied by a global monitoring framework with indicators and targets as well as "best buys for oral health" as part of Appendix 3 of the WHO *Global Action Plan for the Prevention and Control of Noncommunicable Diseases*. The Global Strategy on Oral Health was adopted during the 75th World Health Assembly in May 2022, and the Global Oral Health Action Plan is in preparation. This WHO *Global Oral Health Status Report* complements these initiatives by providing foundational information and, as far as possible, baseline data to help monitor progress towards UHC for oral health.

Recognition of oral diseases as global public health problems will continue to generate momentum and action by all stakeholders, guided by the principles and six strategic objectives outlined in the Global Strategy on Oral Health. This will be possible only with the concerted efforts of all stakeholders, including governments, the United Nations system, intergovernmental bodies, nonstate actors, nongovernmental organizations, professional associations, youth and student organizations, patients' groups, academia, research institutions and the private sector. Working together, these stakeholders can achieve the ambitious targets put forward in the draft Global Oral Health Action Plan (2023–2030) and make substantial progress towards closing the global gaps in oral health by 2030.

World Health Organization

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