Ending the neglect of global oral health – time for radical action

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Abstract

Oral diseases are a major global public health problem affecting over 3.5 billion people. Dentistry however has failed to tackle this problem. A fundamentally different approach is now needed. In this second paper on oral health, we present a critique of dentistry highlighting its key limitations and the urgent need for system reform. In high-income countries (HIC) the current treatment-dominated, increasingly high-tech, interventionist and specialised approach, is failing to tackle the underlying causes of disease and is not addressing oral health inequalities. In low- and middle-income countries (LMIC) the limitations of “westernised” dentistry are most acute – dentistry is often unavailable, unaffordable and inappropriate to the majority of these populations, but particularly the rural poor. Rather than being isolated and separated from the mainstream health care system, dentistry needs to be more integrated with primary care services in particular. The global drive for universal health coverage (UHC) provides an ideal opportunity for this. Dental care systems should focus more on promoting and maintaining oral health and achieving greater oral health equity, rather than the interventionist treatment approach that currently dominates. Sugar, alcohol and tobacco use and their driving social and commercial determinants are the underlying causes of oral diseases, common risks shared with a range of other non-communicable diseases (NCDs). Coherent and comprehensive regulation and legislation is needed to tackle these shared risk factors. In this paper we focus on the need to reduce sugars consumption through the adoption of a range of upstream policies designed to combat the corporate strategies used by the global sugar industry to promote sugar consumption and profits. At present the sugar industry is influencing dental research, oral health policy and professional organisations through its well-developed corporate strategies. There is a pressing need to develop clearer and more transparent conflict of interest policies and procedures to limit and clarify the influence of the sugar industry on research, policy and practice. Combating the commercial determinants of oral diseases and other NCDs is a major policy priority.

Key messages

- Dentistry continues to adopt a treatment-dominated, interventionist, technical and increasingly high-tech and specialised approach to care.
- Such an approach has failed to tackle the global burden of oral disease; radical reform of dental care systems is now urgently needed.
- Universal health coverage provides an opportunity for dental services to become better integrated in the wider health care system and to be more accessible and responsive to the oral health needs of the population.
- Provider payment systems should put more emphasis on incentivising prevention instead of rewarding restorative and interventionist dental care.
- A different preventive approach, focusing on population-wide impact, is also needed as the current individualistic clinical paradigm has failed to achieve sustained improvements in population oral health or to address persistent inequalities.
- Integrated public health policies are needed to tackle the shared common risks (free sugars, tobacco and alcohol use and their driving social and commercial determinants) of oral and other non-communicable diseases (NCDs).
- A range of highly developed corporate strategies are used by the global sugar industry to increase their sales and profits, and to undermine public health efforts to reduce free sugars consumption.
- There is a pressing need to develop clearer and more transparent conflict of interest policies and procedures to limit and clarify the influence of the sugar industry on dental research and oral health policy.

Recommendations of this Series

Epidemiology and oral health surveillance systems

Standardised and comparable oral disease surveillance systems are needed to assess the full extent and nature of oral conditions globally. The use of a range of clinical epidemiological disease measures should be complemented with appropriate indicators that assess the wider impact of oral conditions. Established and commonly used oral health indicators should be aligned and integrated with NCD surveillance systems to allow for comparability with and monitoring of global NCD targets and Sustainable Development Goals (SDGs). The World Health Organisation has a key role in leading the development and strengthening of integrated oral health surveillance systems globally.

Reform of oral health care systems

System-wide reform of oral health services is urgently needed. The reformed system needs to integrate with wider health care; incentivise and encourage the prevention and maintenance of oral health; utilise the skills and competencies of wider team of oral health care professionals and other health workers; deliver high-quality, evidence-based treatment; respond to the diverse needs of local populations and promote oral health equity. The growing international momentum towards Universal Health Coverage is a unique opportunity to integrate and reform oral health care.

Education and training of the future oral health workforce

To achieve the goals and aspirations of a reformed oral health care system requires a suitably trained and skilled oral health workforce. Shifting the dentist-centred model of care delivery towards a team approach is essential. Integrated community-based models of training are required to ensure that the future workforce understand and are equipped to respond to population oral health needs and deliver high-quality, appropriate and evidence-based care.

Tackling oral health inequalities

Oral health personnel have a professional and ethical responsibility to provide care in an equitable and fair fashion to meet the diverse needs of their patients and local communities. Oral health care systems need to be more inclusive, accessible and accommodating to

socially deprived and vulnerable groups. Further staff training, resources and closer liaison with support and specialist agencies will be needed to achieve improved oral health equity. Advocacy and wider policy change is also needed to address the broader social determinants of oral health inequalities that lie outside the remit of health systems.

Moving upstream to maximise oral health improvement

Individualistic, clinical and educational preventive approaches may achieve short-term benefits, but these soon fade unless the underlying causes of disease are tackled.

Investment in upstream, coherent and integrated population-wide policies should be prioritised such as taxes on sugary drinks, stronger regulation on the advertising and promotion of sugary foods/drinks targeting children, the promotion of appropriate exposure to fluoride through toothpaste and water; as well as embracing a common risk factor approach to address tobacco use and harmful use of alcohol.

Addressing commercial determinants of oral diseases

Stricter regulation and legislation are needed to combat corporate strategies that threaten and undermine oral health and related NCDs. Based upon experience gained from tobacco control, dental professional organisations, academic institutions, individual researchers and policy makers should not accept any funding, sponsorship or support from the sugar industry. Clear and transparent procedures and policies need to be adopted to identify and mitigate any possible objective or perceived conflicts of interests.

Research agenda

Research focusing on oral diseases is often given low priority by research funding agencies. Given the global public health significance of oral diseases, more funding should in future be invested in this important area. Defining a global oral health research agenda would help to direct resources and efforts to addressing critical knowledge gaps including translational and implementation research. Future dental research should focus more on population oral health needs, particularly in LMICs and evaluate oral health improvement interventions that promote oral health equity. Cross-disciplinary research partnerships using a range of appropriate methodologies and study designs are essential.

Global advocacy

The neglect of oral health in the global and national health discourse should be addressed through multi-level advocacy efforts aiming to improve knowledge and awareness of the magnitude of the oral health challenges; create a culture of inclusiveness and recognition vis-à-vis oral conditions and various ways of addressing them in the context of existing policies and programmes (“oral health in all policies”), ensure alignment of efforts to prioritise oral conditions with international policies and frameworks (such as the SDGs, the WHO Global Action Plan on NCDs); and using existing momentum to promote oral health (such as the provisions related to oral health promotion in the UN Minamata Convention on Mercury).

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Introduction

Despite significant scientific developments in our understanding of the pathogenesis and aetiology of oral diseases over recent decades, the global burden of oral conditions has persisted, and is indeed likely to worsen.¹ As outlined in paper one in this series, oral diseases affect over 3.5 billion people across the world, with untreated dental caries being the most prevalent health condition globally. In high-income countries where overall levels of caries have declined in the child population, the progressive and cumulative nature of the condition into adulthood and older age remains a major problem.^{2,3} Stark socioeconomic inequalities in oral health mean that poorer and more vulnerable groups in society are particularly affected. Oral diseases continue to cause pain, infection and misery for vast numbers of people around the globe and the costs of dental treatment can have a major impact on household budgets⁴ and wider health care systems.⁵

In this paper we will present a critique of dentistry highlighting its key limitations and the urgent need for radical reform. The global perspective on dentistry presents three contrasting but interconnected realities. In high-income countries, the current treatment-dominated and increasingly technology-focused system of oral health care is trapped in an interventionist cycle failing to tackle the underlying causes of diseases and not meeting the needs of large proportions of the population. In many middle-income countries the burden of oral diseases is significant, but oral care systems are often underdeveloped and unaffordable to the majority of the population. In low-income countries the current situation is most bleak. Although the overall disease burden is still comparatively low, there are indications that oral diseases are increasing in prevalence.¹ With other competing demands on scarce resources, investment in oral health is very limited, making dentistry an unavailable and unaffordable luxury reserved for the well-off. Most disease therefore remains untreated in the majority of the population, but particularly the rural poor, having very limited access to dental care. To effectively tackle the global burden of oral diseases requires a fundamentally different approach. We argue that a system change is needed - more of the same will achieve little. This is particularly the case in low-income countries where the 'western' model of dentistry is unaffordable, unsustainable and inappropriate.⁶⁻⁸ In addition to reform of dental services, we also highlight the urgent need to change the individualistic, downstream preventive approach that currently dominates, but which has failed to achieve significant population oral health gain or to effectively tackle inequalities. We particularly focus on the need for cohesive, comprehensive and integrated policy action to reduce free sugars consumption, a significant shared risk for

dental caries and other non-communicable diseases (NCDs). (Free sugars are defined as monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates).⁹ We recommend that bold action is needed to address the power and influence of the global sugar industry which uses a wide range of measures to promote their products globally, and to limit the impact of any public health efforts to reduce free sugars consumption. These commercial determinants of oral health highlight the urgent need for stronger regulation and legislation, and also the importance of developing clear and transparent conflict of interest policies to shield industry influence from dental research, oral health policy and professional dental organisations. The paper closes with a plea to step-up global advocacy efforts in the wider health and human development arena in order to end the widespread neglect of oral health globally.

Limitations of dentistry – a system no longer fit for purpose

Dentistry is in a state of crisis. Twenty-first century dentistry has largely failed to combat the global challenge of oral diseases.^{1,10,11} This is not the fault of individual dental clinicians committed to caring for their patients. The philosophical approach, system and model of dental care delivery are at fault. (See appendix – panel 1).

The dental profession and the practice of dentistry are still very much dominated by a treatment, interventionist and technical philosophy that reflects patterns and understanding of dental disease which were current over 80 years ago, and ultimately date back to the surgical origins of the profession.^{7,12} This approach emphasises a biomedical and reductionist understanding of disease causation and a belief that treatment and high-tech intervention will ultimately restore oral health and “dental fitness”. The fundamental principles of dental training have remained broadly unchanged for decades. Although teaching on certain techniques and approaches has evolved, the “dental surgeon” paradigm persists, with dentists largely trained to intervene reactively (i.e. once the disease/problem, has started to manifest itself) and surgically (using a drill, scalpel and/or other instruments) rather than proactively and preventively. Dentist’s training prepares them to be “disease-centred” rather than patient- or “health-centred”.^{12,13}

For a variety of historical, professional, political and economic reasons, dentistry around the globe is largely provided by dentists working independently in the private sector in single-

handed or small group practices, often isolated from mainstream health services.^{7,14} Increasingly, in many countries there has been a growth in large corporate bodies and insurance companies that provide health care including dentistry. These commercial, for-profit, organisations can provide high-quality care, but also need to ensure adequate returns on their investments for their shareholders, and therefore have a tendency for promoting excessive diagnostic testing and over-provision of treatment.^{10,15,16} These commercial pressures and incentives fuel an interventionist approach and risk unnecessary, and inappropriate care. Treatment becomes incentivised and drives further treatment rather than health.

There is a significant mismatch between the oral health needs of communities and the availability, location and type of dental services provided. Dentistry is largely a demand-led service, often poorly planned as a result of entrepreneurial choices, and is therefore poorly aligned to the oral health needs of the local population. In HMIC, young children, low-income families, marginalised groups such as homeless people and prisoners, and people living with disabilities are generally underserved^{17–21}, whereas dental services often tend to be located in wealthy urban neighbourhoods where affluent “healthy” adults may be receiving unnecessary and often unneeded dental care – a perfect example of the inverse care law.^{22–24} In many low-income settings the situation is far worse. Across much of Sub-Saharan Africa and many other low-income countries, dental services tend to be located in urban areas inaccessible to the majority of the rural poor. Individuals suffering from dental problems may need to travel far to reach a dentist, or need to resort to using local traditional street “dentists” and be exposed to the risks of using these unregulated providers of care.²⁵ Even though concepts for integrating basic oral health care in primary health care exist, they have failed to gain widespread traction, which further contributes to making access to even basic oral health care a major problem.^{26–28} Coverage for oral health care in LMIC is generally lower than in HIC, with median estimations ranging from 35% in low-, 60% in lower-middle, 75% in upper-middle and 82% in high income countries.²⁹ Within countries, the poorest quintiles have the lowest coverage rates – in Lao, in south-east Asia coverage of the richest quintile is more than 8-times higher than for the poorest.²⁹

The extent to which patients have to pay or co-pay for dental care and the manner in which dental care providers are reimbursed for their services have important bearings for the utilisation and quality of care.⁵ Evidence from high-income settings such as that from the US

RAND Health Insurance Experiment has shown that individuals who have to co-pay more, tend to access less dental care.³⁰ Worldwide, there are substantial differences in patient co-payment rates for dental care³¹ and this may limit access to and utilisation of care for people on lower incomes. Households in LMIC face a significantly higher risk of impoverishment or even falling below the poverty line, if they have incurred excessive out-of-pocket payments for dental care.⁴

The conventional types of provider payment in dentistry include fee-for-service, fixed salary and capitation payments.^{5,32} Empirical evidence for the impacts of the various reimbursement schemes on dental care is relatively scarce.³³ Capitation and salary payments provide good incentives for cost-containment but impose risks of patient selection and/or under-treatment. Fee-for-service payments foster higher utilisation of care but may impede cost-containment. Recently, Chalkley and Listl identified significant increases in the provision of potentially harmful dental radiographs when dentists received fee-for-service rather than salary payments.³⁴

There is little planning concerning the numbers or distribution of dentists and the wider oral health workforce, nor for the skill sets they require. Even though dentist-population ratios are only a crude measure of oral health care service availability and there is no correlation to disease levels, the numbers of dental personnel show stark variations across countries, as well as within countries.^{35,36}

Some countries have recently seen significant increases in numbers of dental schools e.g. the USA³⁷, Chile^{38,39}, India⁴⁰, Brazil⁴¹ and Colombia⁴², many of which are private, for-profit institutions responding to competition and demand for dental courses, with no reflection on the needs of their local populations.⁴³ (Figure 1). The rapid increases in dentist-to-population ratios particularly seen in certain HMIC are likely to lead to an over-supply of dentists, risk of iatrogenic over-treatment and increasing rates of unemployment amongst dentists.⁴⁴ Meanwhile, few of these increasing numbers of dentists move into rural and remote, and low dentist/population-ratio areas, so the vulnerable groups with greatest need for dental treatment remain without care. In many low-income countries few dental schools exist so the supply of dental personnel is very limited. A situation not helped by the “brain drain” of dentists moving to higher income countries where they can earn higher incomes, have better

career perspectives, can practice the high-tech dentistry they were taught at dental school and enjoy a better quality of life.³⁵

Figure 1 here

Problems in dental training and the mismatch between need and provision of care are compounded by the expansion of specialist practices in dentistry.⁴⁴ In the UK for example, there are now 13 different dental specialities.⁴⁵ While there is no doubt that a proportion of patients have complex oral health needs requiring additional specialist skills, most oral health needs can be met by primary care dentists and there is some debate as to whether the expansion in specialist dental practices truly reflects and aligns with the oral health needs in the community.⁴⁶ The growth of specialist practice increases the cost of care and access is often sparse in areas of greatest need. The interface between primary and secondary dental care can be problematic in terms of equity, seamless care, effectiveness and efficiency.

⁴⁷Additionally, eroding the role of primary dental care removes the stable “dental home”⁴⁸ for patients which is essential to ensure they receive appropriate preventive and continuity of care, something of particular relevance to children and adults with high risk of developing oral conditions, such as those living with disabilities and long-term conditions.

Unlike in medicine, in dentistry there is a only limited use of a wider professional team to deliver care.⁴⁴ This is partly a legacy of the “dental surgeon” paradigm, in which the dentist was seen as solely responsible for the diagnosis of disease and the provision of treatment. Many dental schools around the world continue to produce dentists who are trained to treat and work in isolation rather than training a wider range of dental care professionals with different and complementary skills to address the oral care needs of their patients and local populations.^{43,44} Treatment needs range from very simple preventive procedures (such as topical fluoride application), to complex treatments (such as implant retained prosthesis). These can be delivered with greater efficiency, effectiveness and coverage by an oral health workforce with an appropriate and mixed skills set. Mid-level providers are also instrumental in increasing access to dental care in underserved and remote population groups. Indeed, in many settings, and particularly in LMIC, training a more community-oriented oral health workforce rather than dentists is a realistic solution to address the acute workforce shortages and access challenges.⁴⁹ The type of dental professional trained varies across different countries and jurisdictions but commonly consists of dental hygienists, dental therapists,

denturists, dental assistants/nurses and dental technicians amongst others. As with many other professional fields, discussions over scopes of practice and the independence of these different professional groups are often complex and fractious. The debate over which of these professionals can do what, under what circumstances, is often decided as a compromise between professional groups rather than with a view to the public's well-being or needs.⁵⁰ Despite advances made by the Cochrane Collaboration and other groups, the lack of evidence for many common dental procedures remains a major challenge. This may be illustrated using the example of dental caries. Management of caries has traditionally been to remove decay and place a filling, that regardless of the initial size of the cavity enters the tooth into a cycle of repeat restoration with increasing complexity, eventual failure and tooth loss.^{12,51-55} This "restorative approach" fails to acknowledge that it is not possible to "treat away" caries, neither does it reflect contemporary understanding of the pathogenesis of caries.⁵⁶⁻⁵⁹ Current clinical evidence demonstrates that caries is preventable, and once established, may also be reversible, if detected and addressed in the early stages.⁵⁸⁻⁶⁰ New developments in adhesive dental materials mean that treatment of established disease, that includes appropriate use of topical fluorides,^{61,62} may be managed with less destruction of tooth tissue⁵⁸ and less need for high technological and rehabilitative dentistry.¹² Indeed, since 2017 dental amalgam, the filling material central to this restorative approach is being phased down as part of the United Nations Minamata Convention on Mercury.⁶³ Other long established treatments used in routine dental practice are also being challenged because of the lack of evidence about their effectiveness.⁶⁴⁻⁶⁶ Two pillars of clinical dental practice may serve as examples: the six-month dental recall and scale and polish for the management of gingival and periodontal diseases. The UK National Institute of Health Care Excellence found that there was no scientific basis to the six-month dental recall and recommended that recall intervals should instead be specifically tailored for each patient based on disease levels and disease risk.⁶⁷ A recently completed UK trial demonstrated no clinical benefit in providing either 6 or 12 monthly scale and polishes.⁶⁸

An additional shortcoming is the narrow and somewhat simplistic approach adopted to prevent oral diseases. The use of clinical preventive interventions such as topical fluorides to control caries^{59,60,69} is proven to be highly effective, yet is often seen as a panacea and thereby losing sight of the fact that sugar consumption remains the primary aetiological factor in caries development. While topical fluorides are proven clinical preventive agents,⁶⁹ caries will still develop in the presence of free sugars above 10% of total energy intake.⁷⁰ Even

where exposure to fluoride is optimal, evidence suggests that free sugars exposures as low as 2-3% of total energy may still carry a risk of caries.⁷¹ The general approach to the prevention of caries has been individualistic and reductionist, focusing on educating patients and the public about individual risk behaviours in oral hygiene and nutrition, with little regard to where and how these behaviours develop and are shaped. This clinical approach to prevention has been unsuccessful at achieving long-term oral health gains or in tackling oral health inequalities.^{72–74}

In summary, dentistry and oral health care systems need radical reform. The current outdated and treatment-focused approach is failing to meet the oral health needs of large segments of the population, and is totally inappropriate and unaffordable for low-income countries. A different approach is now needed.

Rethinking oral health care and improving population outcomes

The described limitations of the prevailing dominant approach in dentistry (See appendix – panel 1) indicate their complexity, yet also reveal their inadequacy in reducing the global oral disease burden. From a public health perspective, this lack of global impact would seem to be a good starting point and motivator to consider major, even disruptive innovation in the way dentistry delivers care. In many HIC reform of oral health care systems is often in response to concerns over cost containment rather than more proactive efforts to improve quality of care. Where LMICs are establishing or strengthening oral health care systems, they often strive to follow the example of high-income countries by liberalising health care markets or reducing public health services. Public oral health care is often the first service to suffer as it is considered to be expensive and not essential, resulting in increased unmet oral health care needs.^{75–77}

Key features of an ideal oral health care system have been postulated as follows: no divide between dental and general health care; emphasising health promotion and disease prevention; monitoring and responding to population needs; evidence-based, effective and cost-effective; as well as sustainable, equitable and universal; and empowering for individuals and populations.⁷⁸ The goal would be to achieve better and equitable oral health for all through oral health care being integral to a framework of universal health coverage (UHC), empowering

people in self-care, providing protection against health risks, and preventing them from inadequate out-of-pocket expenditures when accessing the required quality oral health care.

Looking at the current practice of dentistry, significant reforms in five key areas would be required to achieve these fundamental characteristics: 1) providing universally available essential oral health care services meeting the most common population needs; 2) innovative oral health workforce models and training; 3) an enabling health system governance context that facilitates a flexible continuum of patient-centered support with appropriate quality of services; 4) integrated surveillance, programme monitoring and implementation research to ensure appropriate health outcomes; and 5) shifting intervention focus to upstream population-wide policies. The implementation of any reforms needs to take into account the local context and population needs.

Universal oral health care (See Figure 2): The growing international momentum towards UHC is a unique opportunity to integrate oral health care.^{79,80} Bold examples from Brazil (See appendix – panel 2) Thailand have shown that such major reforms are possible and yield positive oral health impacts. Concepts for decision-making are required to select interventions for essential oral health care interventions, which must include prevention and self-care. The WHO-endorsed *Basic Package of Oral Care*, which aimed to direct scarce resources for oral health towards evidence-based interventions addressing essential and common needs, must be reviewed and adapted in the light of implementation experience and recent evidence.²⁶ The concept of *Best Buy* interventions established by WHO to tackle NCDs should be expanded to include cost-effective priority interventions for the prevention and treatment of oral diseases. Appropriate Universal Oral Health Coverage (UOHC) tracer indicators need to be defined to measure all three dimensions of UHC – coverage, financial protection and service quality. Ideally, cost-effective and evidence-based essential services for the most common needs must be available for all segments of the population, with a pro-poor focus and delivered through primary health care; while more costly specialised services would be available at higher referral levels of the health care system. The balance between service availability and inclusion in essential UHC, delivery through the wider dental team, and appropriate financial protection needs to be locally determined.

Figure 2 here

Innovating the oral health workforce: Achieving UOHC requires appropriately-trained oral health care workers with relevant skill mix at all levels of service. This involves shifting the dentist-centered model of care towards a team approach, with non-dentist providers delivering the majority of essential care at the entry level of the primary health care system. More specialised services, provided by dentists and specialists in referral settings, should complement the care spectrum, with advanced care options. Such a model requires a new approach to dental education and training not conceptualised by pre-defined job descriptions or scopes of practice, but rather focusing on community needs and evidence-informed care pathways so that the required care can be flexibly provided in an integrated manner.^{81,82} The focus of training will be on prevention and health promotion, including liaison and collaboration within integrated public health services and community colleagues working on upstream determinants, and referral for complex care.⁸³ Continuing professional development, on-the-job training and appropriate supervision should be mandatory, including training on professional ethics, public health values, social responsibility and avoidance of conflicts of interest.

Enabling health system context: Integrated, publicly-funded (oral) health care systems require infrastructure, financing, and governance structures that are all tailored to foster collaborative practice and quality services with maximum reach. Professional licensure and regulation must be able to accept overlapping, complementary and flexible scopes of practice to enable needs-based patient care. Payment and remuneration concepts favouring health outcomes, such as Pay-for-Performance systems, have shown some potential to improve quality and outcomes of care.⁸⁴⁻⁸⁶ The share of services delivered by public and private providers can vary and change over time depending on country context, resources and political priorities. The priority for public spending should remain on providing and strengthening public (oral) health care services,⁸⁷ while private sector providers continue to provide specialist care for population segments able to afford the services or with relevant insurance coverage. Quality assurance measures, practice regulations and professional legislation must apply equally to both sectors to prevent differential service quality and the common patient perception that public services are of inferior quality.

Integrated surveillance, monitoring and implementation research: Evidence, service data and impact evaluations are essential to advocate for, conceptualise, manage, fine-tune and provide services at scale. Appropriate disease surveillance, integrated with NCD and other

appropriate surveillance contexts, using relevant existing or new indicators, must be in place. Priorities for oral health research should promote health service and implementation research, including health impact, economic, qualitative, social and mixed research methodologies, so that planners are able to assess programme performance comprehensively, particularly focusing on improving equity. Advocacy for inclusion of relevant oral health information in SDG monitoring and accountability in the context of NCDs should be encouraged.

Shifting intervention focus on upstream population-wide policies: Oral diseases and inequalities in oral health are caused by a complex array of individual, social, environmental, economic, political and commercial determinants, mostly shared with other NCDs. Although this is increasingly acknowledged across the dental profession globally,^{88,89} the predominant response continues to prioritise downstream interventions. These focus on delivering clinical preventive measures and traditional health education aiming at behaviour change. The evidence, however, shows that such approaches are effective only in the short term^{72,73,90,91} and may increase, rather than decrease socioeconomic inequalities in oral health.^{92–94} A bolder and more radical preventive approach is now needed. More of the same will achieve little and is indeed unaffordable in most LMIC. Integrated and coordinated strategic upstream, mid-stream and downstream policies are required that tackle the underlying social and commercial causes of oral diseases. These approaches need to be integrated with the broader NCD prevention agenda and require multi-sectorial working beyond the confines of dental services, and indeed health care systems. Placing (oral) health in all policies requires effective advocacy to achieve broader societal change. Interventions should be tailored to the needs of communities and delivered in a proportionate manner to ensure oral health equity.

Sugar reduction strategies

From being a somewhat fringe topic, sugar is now a mainstream global public health priority. Informed by comprehensive and detailed reviews of the international scientific evidence on the role of free sugars on weight gain and dental caries,^{70,95} national and international nutrition guidelines now advocate for population-wide reduction in free sugars consumption.^{9,96,97} WHO recommends for both children and adults reducing free sugars to less than 10% of total energy intake and a further conditional recommendation that sugar should be less than 5% of total energy.⁹ In most countries around the world, free sugars consumption is considerably higher than the WHO recommendation, particularly amongst children and young people, and low-income and disadvantaged groups. A major concern is

also the high level of sugars in commercial baby foods (Panel and figure 3). To achieve the WHO guideline will require an ambitious, systematic and coherent sugar reduction strategy.^{97–99} Upstream policies include international trade agreements on sugar production quotas, price subsidies, minimum price and trade mechanisms. Other upstream policies include industry action in the reformulation of products to reduce their sugar content (similar to what has been achieved in salt reduction), government taxes or levies on sugary products (a 20% price increase is most effective), improved labelling of products to enable consumers to make informed choices, and restriction of the marketing and promotion of sugary foods and drinks, especially to children. Midstream strategies include restrictions on retailers selling high-sugar foods and drinks at checkouts, ending price promotions on sugary products (“buy one, get one free offers”), and a reduction in portion sizes of sugary foods and drinks sold in cinemas and other public spaces. Public sector organisations should not be supporting the sales of sugary products to their users and staff, and finally mandatory food guidelines should be introduced in preschools and schools which should include tighter restrictions on free sugars. Voluntary agreements with industry to reduce sugar consumption have failed.^{100–102} Regulatory and legislative mechanisms are now needed with specific quantifiable targets set and independent monitoring processes established. Upstream sugar reduction policies need to be evaluated using appropriate methods and should include oral health outcomes.

Panel and Figure 3 here

Significant progress has been made with the introduction of sugar taxes/levies on sugar sweetened beverages (SSBs) in over 59 countries.¹⁰³ Data from Mexico highlight that pricing policies on SSBs have an effect on reducing sales and consumption, and a reduction in levels of overweight.^{104,105} The positive outcomes resulting from the pricing policies have particularly benefitted low-income groups who generally consume higher quantities of SSBs.¹⁰⁵ The introduction of a national sugar levy can also have a major influence on industry in reformulating their products reducing the sugar content to avoid price increases as seen in the UK. It is important to recognise however that pricing policies alone cannot deal with the sugar related epidemic, a package of coherent policies are needed. The dental profession has an important role to play in supporting the implementation of WHO guidelines to reduce sugar consumption. However undeclared and opaque conflicts of interest between the sugar industry and certain dental organisations and academic institutions need to be addressed (see accompanying Comment).

Better political priority for oral health – role of global advocacy

In view of the described significant burden and impacts of oral diseases, the inadequate health system responses and the proposed concepts for reform, a global roadmap or action plan may be a logical next step, with global advocacy as a key strategy to move from concepts to action. So far, oral health advocates and professional organisations have repeatedly highlighted the neglect of global oral health, without offering a realistic vision about how oral health for half of the world's population can be sustainably improved. On the contrary, the discourse of neglect has been so deeply internalised that often it appears to be the only and central challenge for oral health globally. The priority accorded to oral health is indeed inadequate in many contexts; symptoms and consequences of neglect are manifold.

The ensuing debate, however, is often rather limited and re-active, focusing on justifying more resources towards expanding current oral health care models, thus doing more of the same. This points to a key weakness hampering effective advocacy – a clear objective to argue for or against something is required. The narrow focus of advocating a higher priority for oral health may have deflected resources and efforts from generating a broad consensus among key sector stakeholders about a joint problem definition, agreement on population-level interventions, and approaches to reform and strengthen oral health systems. The current state of global oral health is hence not only a result of external factors such as competing disease priorities or lack of resources, but also related to inadequate coalescence and leadership among global oral health actors, further widening the disconnect with the wider global health mainstream.¹⁰⁶

The processes and politics behind changing global health priorities has been studied and key elements for change have been identified.¹⁰⁷ Today, the situation is far from the bold priority that oral health received in 1994, when the WHO declared the first-ever “International Year of Oral Health”, following-up on the declaration of global goals for oral health by the year 2000.^{108–110} Since then, the WHO's Global Oral Health programme was scaled-down from a well-staffed unit to a single position at headquarter level. Such changes were subsequently mirrored by WHO member states who also limited their oral health resources or did not even establish national oral health programmes. The ongoing organisational reform of WHO may be an advocacy opportunity to correct the under-resourced situation of oral health at WHO headquarters and regional levels.

Oral health is part of the basic human right to health and integral to sustainable human development – key notions of a rights-based approach to global advocacy.³⁵ Promoting oral health positively contributes to overall development by easing the disease, economic and social burden caused by oral conditions. (Figure 4).

Figure 4 here

The global health agenda continues to provide many opportunities for advocacy, yet they need to be monitored, filtered and seized upon (See appendix – panels 3-5). More recently, the commercial determinants have seen increasing attention, and the various interlinkages with other determinants of health have been highlighted. Together with other international health frameworks they provide opportunities for impactful advocacy, benefiting not only oral health but also NCDs and sustainable development at large.

Conclusion

Oral diseases are a major global public health problem. The current public health and health system responses are largely inadequate, inequitable, and costly, leaving billions of people without access to even basic oral health care. Simple, cost-effective and equitable interventions exist, as well as population-wide upstream policy measures to reduce risks that are common to NCDs and oral diseases. Setting public health, oral health professional, health system, education and training, research and policy priorities on a path towards Universal Oral Health Coverage requires sustained and concerted political support and engagement of all stakeholders, including patients and communities. Achieving such convergence of efforts needs bold leadership, solid evidence, innovative policies and openness to a global change agenda on all levels. As the world intensifies efforts to reach the Sustainable Development Goals within the coming decade, oral health can no longer be left behind and requires urgent and decisive action.

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Contributors

All authors jointly formulated the major concepts of this paper and approved the final version. RW, BD, PA, SL, HB, and CK initially drafted and edited sections of this paper. RW and CCG-H analysed the growth in commercial baby foods in selected countries, and BD, RV, RKC and CCG-H assessed changes in dental schools in selected countries. LMDM, RKC and MP specifically made critical revisions to the text for important scientific content. RGW and HB provided overall supervision. All authors provided information and references for this paper.

Declaration of interests

The authors have stated explicitly that there are no conflicts of interest in connection with this article. The authors alone are responsible for the views expressed in this paper, and they do not necessarily represent the views or policies of the institutions with which they are affiliated.

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Panel: Commercial baby foods – a sugary start to life

The global commercial baby food market is estimated to be worth over US\$37 billion in 2010 with Europe, US and Asia holding the major share of the market. However emerging economies are expected to see high growth in sales.¹¹¹ Analysis of sales data in selected countries show high growth rates between 2004 and 2017 particularly in China, United Arab Emirates, Russia, Vietnam, Peru, and Indonesia, although sales have also risen steadily in Czech Republic, Colombia, Brazil and South Africa (Figure 2).

Commercial baby foods are generally highly processed products often containing high sugar levels. A very recent European Commission Report of over 4200 commercial baby foods and drinks sold across Europe revealed that 41% of products analysed contained free sugars.¹¹² Free sugars were particularly found in baby biscuits and rusks, baby cereals, baby juices and drinks, baby fruit products, desserts and yogurts and baby snacks. An Australian study has recently reported that nearly a quarter (23%) of 12-14 month old babies had consumed free sugars above the 5% WHO recommended level, and that the major source of sugars came from commercial baby foods (27%), cereal based products (20%) and yogurts (10%).¹¹³ The consumption of sweetened commercial baby foods is a major concern as this presents a significant risk for early childhood caries, encourages infants to develop a preference for sweetness and may contribute to overweight in later childhood.

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