

Special Communication

Closing the Oral Health Divide: System-Level Care for Mothers and Young Children - A Forgotten Disparity in the USA, UK, and Sweden

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Knowledge Transfer Statement

Improving maternal and child oral health requires a system-level approach in all countries. Integrating oral health into system health is not just an option but a necessity for building healthier communities. Leveraging partnerships between dental academic institutions and oral health delivery organizations that are embedded in medical institutions, such as the Eastman Oral Health Institutes globally, offers a powerful vehicle for identifying, sharing, and scaling effective solutions to improve system-level oral health.

Abstract (<200 Words)

Maternal and child oral health disparities often share similar phenomena: high disease burdens, limited access to care, and insufficient preventive strategies. These systemic challenges undermine community confidence in oral health solutions. The Eastman Oral Health Institutes in the United Kingdom (UK), Sweden, and the United States of America (USA), through the *Eastman International Alliance*, have facilitated critical discussions in November 2024 on this topic in international grand rounds by highlighting the need to translate research into impactful oral health policies. The special communication calls for global action to elevate maternal and child oral health into system health by leveraging policies, enhancing service integration, addressing inappropriate industry influence (particularly in terms of sugar consumption), and utilizing digital technology. We describe the often-over-looked oral health divide in high-income countries, using the USA, UK, and Sweden as examples, to assess shared challenges, distinct obstacles, and opportunities for global collaboration. The differences between developed countries including USA, UK, and Sweden and the challenges faced by lower-income nations underscore the need for shared learning and a global commitment to integrated oral health care. Policymakers, healthcare providers, and public health advocates worldwide must work together to break down barriers and strengthen services.

Keywords

Maternal, Child, Access to Care, Medical Dental Integration, Sugar, Digital tools

The urgency of promoting oral health as an integral part of systemic health has never been clearer. Oral health is not just about teeth; it is fundamentally connected to overall well-being, growth, and quality of life. The Marmot Review (Marmot and Bell 2012) (Fair Society, Healthy Lives) emphasized that health inequalities stem from differences in the broader social environments in which individuals are born, grow, live, work, and age, applies equally to oral health. Adverse socioeconomic conditions during early childhood, a period of rapid development, significantly impact lifelong oral health trajectories.

The Eastman Oral Health Institutes in the United Kingdom (UK), Sweden, and United States of America (USA), through the ***Eastman International Alliance***, have facilitated critical discussions on this topic in international grand rounds highlighting the need to translate research into impactful oral health policies. The special communication calls for global action to elevate maternal and child oral health into systemic health by leveraging policies, enhancing service integration, addressing industry influence, and utilizing digital technology. We will describe the often-overlooked oral health divide in high-income countries, using the USA, UK, and Sweden as examples to assess shared challenges, distinct obstacles, and opportunities for global collaboration.

Maternal and Child Oral Health Services in the USA, UK, and Sweden

Maternal and child oral health disparities often share similar phenomena: high disease burdens, limited access to care, and insufficient preventive strategies. These systemic challenges undermine community confidence in oral health solutions. Consequently, many individuals accept poor oral health as an inevitable fate for themselves and their children. A summary table comparing key aspects of maternal and child oral health systems, policies, and disparities across the USA, UK, and Sweden is provided in Table 1.

In the USA, many families face limited access to oral healthcare services in both rural and urban communities. Overall, 43% of pregnant women have not had a dental visit, while 76% report suffering from oral diseases during pregnancy. Similar challenges face care for infants. The American Academy of Pediatric Dentistry, American Dental Association, and American Academy of Pediatrics recommend that all children should have their first dental visit at 12 months or when the first tooth erupts. However, this goal is rarely achieved among underserved US children. Fewer than 1% have seen a dentist by their first birthday, and less than 10% between ages 1-2. Access to care in the USA is largely insurance-based: low-income families often face significant barriers to accessing dental care, including lack of insurance, difficulty identifying clinics, and a shortage of providers in their area willing to accept their insurance. Consequently, dental caries in these children are frequently diagnosed at advanced stages, requiring invasive restorative treatments, and, in many cases, require advanced behavior management techniques to provide care safely.

While the UK provides free dental care for pregnant/post-partum women and for children through the National Health Service (NHS), access remains challenging, with persistent regional inequalities. This is exacerbated by the current problems facing NHS dentistry, leading to so-called dental ‘deserts’. For nursing mothers, lower care utilization rates are seen in socioeconomically deprived areas compared to affluent regions. A similar care utilization pattern is seen for young children. Three-year-olds living in the most deprived areas are nearly three times more likely to experience caries (16.6%) than those living in the least deprived areas (5.9%) (England). Initiatives like *Dental Check by Year 1* (DCBY1) - spearheaded by the British Society of Paediatric Dentistry exist - but their impact is unclear. As with the USA, this leads to late presentation necessitating more invasive treatments or extractions. Dental caries are the most common reasons for hospital admission for 6-10-year-olds.

Swedish children generally have good oral health, supported by a strong tradition of preventive care and a well-developed dental and healthcare system. Free dental care, mainly delivered by the Public Health

service, is provided up to age 19, ensuring regular check-ups for over 95% of children. Oral health promotion initiatives are also integrated into the national child healthcare program, reaching 99% of children, including, in some regions, through expanded home-visit programs targeting high-risk families (Brannemo et al. 2021). Pregnant women do not receive specialized prenatal dental care, but benefit from government subsidies for treatment costs. For example, in Västerbotten County, northern Sweden, midwives offer expectant parents free visits for Health Counselling in Dental Care (HCDC), as part of the SALUT Program. The SALUT initiative integrates prenatal and dental care to promote oral health during pregnancy, with counselling on oral hygiene, diet, and tobacco habits. Published results highlight increased discussions of lifestyle topics in dental care and improved cross-sectoral collaboration. Despite improvements over time, significant social disparities persist, especially among disadvantaged and immigrant families. Key challenges include fully integrating dental care into prenatal and child health services nationwide.

Social Determinants of Health (SDOH) Challenges

Although SDOH have been well understood for some time, policy implementation addressing these factors remains limited. While we cannot discuss all aspects of SDOH and their impact on maternal and child oral health, we will highlight examples at two different levels: upstream and downstream. Despite the dental public health community continuing to advocate for integrated, community-based approaches, the downstream approach, such as improving direct chairside services, often takes precedence over broader upstream population-level strategies.

At the downstream level, oral healthcare utilization is heavily influenced by SDOH. In the USA, pregnant women, in both urban and rural settings, often struggle to attend dental appointments due to inadequate public transportation and lack of childcare. Sweden faces access challenges in rural areas, exacerbated by recruitment challenges for dental professionals. Similar access barriers exist in the UK where dentists are withdrawing from the NHS service. This leaves low-income populations, who have increased oral health needs, reliant on under-resourced community dental services. Addressing how SDOH relates to dental services and dental infrastructure is essential to improving oral health outcomes, requiring policies that enhance access to services and tackle economic inequities.

On the upstream level of mitigating SDOH, limited access to fresh, healthy food is a significant factor affecting oral health. Many low-income families live in "food deserts," where healthy food options are scarce, and unhealthy, sugar-rich foods are more accessible and affordable. This lack of access to nutritious food contributes to higher rates of dental caries among children. Without changes in the environment, we cannot expect health-promoting behavior to change. Addressing this requires policy changes and community-level interventions, such as incentives for supermarkets to establish locations in underserved areas, support for community gardens, and school-based nutrition programs. Reducing the influence of commercial determinants of health, particularly sugar availability and consumption, is key to improving dietary choices and oral health outcomes. To effectively implement these dietary interventions, policymakers must also consider the commercial determinants that influence sugar availability and marketing practices.

The Role of the Sugar Industry

The widespread consumption of sugar-rich products, disproportionately affecting lower-income families, results in high rates of dental caries, the most prevalent chronic disease worldwide. The World Health Organization recommends limiting free sugars to less than 5% of daily energy intake. Achieving this target requires a multifaceted strategy that includes legislative measures to support community interventions and health promotion, such as advertising regulations, mandatory front-of-package warning labels and taxation. Agricultural and trade practices heavily influence global sugar consumption,

emphasizing the importance of incorporating health priorities into trade agreements, pricing structures, and subsidy policies.

Taxing sugar-sweetened beverages has proven effective in encouraging consumers to reduce consumption while moving manufacturers to reformulate products with less sugar. A recent systematic review (Sassano et al. 2024) of 76 tax laws implemented between 1940-2020 across 43 countries revealed significant variation in tax design and targeted products. Strong evidence linked taxation to reduced obesity rates among children and adolescents. Five countries including Brazil, Samoa, Palau, Panama, Tonga showed a reduction of overweight prevalence, while other countries including El Salvador, Uruguay, Nauru, Norway, Palau, Tonga reported a decline in the obesity trend after sugar taxation. The Brazil model showed that the implementation of an additional 20% to 30% tax on sugar-sweetened beverages could effectively reduce the consumption of ultra-processed beverages and empty calories, lower body weight, and mitigate substantial health-related costs. Similarly, researchers utilized a microsimulation state-transition model in California, USA, to assess the cost-effectiveness of a soda tax. Their findings indicated that the 1-cent-per-ounce soda tax significantly reduced obesity and diabetes cases, and related complications. Evidence from the UK suggested that introduction of the sugar tax led to a 12% reduction in hospital admissions for dental caries; these impacts were seen across the range of SDOH determinants.

Addressing the impact of sugar on oral health must be a critical focus for policymakers and public health authorities globally, especially in countries with limited regulatory frameworks. **Beyond addressing dietary risk factors, achieving meaningful progress in maternal and child oral health requires transforming how dental care is delivered and integrated within existing healthcare systems.**

Integration of Oral Health into Primary Care via Policy Support and Digital Tools

Policy initiatives integrating oral health into broader healthcare systems can significantly improve oral health outcomes. In Sweden, a National Health Program for Children and Youth is under development. This program adopts a life-course approach, prioritizing holistic well-being and long-term health outcomes from prenatal to age 20. By addressing physical, mental, and oral health, the initiative seeks to promote equitable access to early care through interdisciplinary collaboration. Parallely, the European Health Data Space (EHDS) regulation is also being developed to enhance access to and sharing of health data within the EU, supporting both healthcare and research innovation.

In the UK, the integration of maternal and child oral health into public health and primary care is an increasing concern, with the NHS dental service widely seen as being ‘in crisis’. The *All our Health* initiative encourages all medical and dental professionals to take responsibility for oral health, while the Core20plus5 initiative builds on that by supporting the reduction of health inequalities in children at both the national and system level. There are five focus areas for accelerated improvement with oral health being one of them. Moreover, the Childsmile national oral health improvement program in Scotland, that is delivered across education, health and community settings, has been associated with reduced caries experience, particularly in relation to the universally applied toothbrushing in nurseries.

In the USA, maternal and child oral health remains separate from systemic healthcare. Dental insurance coverage is not included in medical insurance, and each state has its own rules for eligible dental treatment covered by Medicaid (state-support insurance for low-income families) and Child Health Plus. An encouraging trend is that some large-scale medical centers have begun integrating medical and dental services through electronic health record (EHR) systems; however, these efforts remain in early stages. Nevertheless, EHR integration plays a crucial role in promoting a more cohesive approach to patient care.

Despite barriers, another facilitator for system integration is innovative digital tools. Tele-dentistry has emerged as an effective tool to provide care in remote areas, allowing pregnant women and children to

connect with oral health professionals without travelling long distances. Smartphone applications that provide reminders for dental visits, educational videos, and even remote consultations can help families overcome barriers related to transportation and healthcare access. Artificial intelligence (AI)-powered technologies, such as those incorporated into smartphone apps, can analyze tooth images taken via smartphones, allowing early detection of dental caries and facilitating prompt timely interventions (Al-Jallad et al. 2022). In addition, AI-driven virtual assistants, similar to the medical avatar, can also provide educational information, answer questions, and encourage patients to seek care, addressing dental workforce shortages in “dental deserts”. Moreover, machine learning methods in the analysis of epidemiological data allow us to generate evidence about policy evaluation, while providing personalized disease detection and management. These digital innovations, if scaled effectively, have the potential to reduce disparities, improve preventive care, and ultimately enhance oral health outcomes of maternal and child populations.

Future Outlook

In summary, the differences among some high-income countries, including the USA, UK, and Sweden, and the challenges faced by lower-income nations, underscore the need for shared learning and a global commitment to integrated oral health care. Policymakers, healthcare providers, and public health advocates worldwide must work together to break down barriers and strengthen services. The WHO Global Oral Health Action Plan 2023–2030 provides an implementation roadmap and underscores the importance of integrating oral health into primary care and prioritizing health promotion strategies to reduce disparities. Integrating oral health into system health is not just an option but a necessity for building healthier communities. Leveraging partnerships between academic institutions and embedded oral health delivery organizations, such as the Eastman Oral Health Institutes globally, offers a powerful vehicle for identifying, sharing, and scaling effective solutions to improve the oral health of mothers and their children.

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Author contributions

J. Xiao, G. Tsakos, I. Brännemo, contributed to conception, design, data acquisition, analysis, and interpretation, drafted and critically revised the manuscript; T. Dye, P. Ashely, D.T. Kopycka-Kedzierawski, and C. Meyerowitz contributed to conception, data acquisition, drafted and critically revised the manuscript. All authors have their final approval and agree to be accountable for all aspects of work.

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Table 1. Comparison of Maternal and Child Oral Health Systems in the USA, UK, and Sweden

| Domain | USA | UK | Sweden |
|--|---|---|---|
| Dental Care Coverage for Pregnant Women | <p>Medicaid dental benefits vary: All states offer some pregnancy-related Medicaid dental coverage, but level of benefits (cleanings, fillings, etc.) differs widely.</p> <p>No routine coverage under private medical insurance.</p> | Free NHS dental care during pregnancy and 12 months postpartum | Government subsidies; some regions offer prenatal oral health counseling (e.g., SALUT program) |
| Dental Care Coverage for Children | Insurance-based; public programs such as Medicaid/CHIP often provide coverage, but vary by state | Free NHS dental care for all children | Free dental care up to age 19 primarily provided through Public Dental Services |
| Dental Care Utilization by Age 1 | Extremely low, <1% in some states | Data is sparse; although programs like DCBY1 show promise, concrete national statistics are limited | High, many regions have routine check-ups in place. However, currently no national data available for dental attendance at age 1. |
| Prenatal Oral Health Integration | Fragmented; minimal integration with prenatal medical care | Limited integration; regional inequalities in access | Integrated counseling in some counties (e.g., Västerbotten via SALUT program) |
| Key Preventive Initiatives | EHR integration, tele-dentistry pilots, emerging smartphone apps with AI technology for caries detection | Childsmile (Scotland): universal nursery brushing, fluoride varnish, home packs | Oral health counselling during pregnancy, extended home visiting programs, child health centers incorporate oral health |
| Challenges in Care Access | High; barriers include insurance, provider availability, transportation | High; regional 'dental deserts' and lower uptake in deprived areas | Lower access in rural/immigrant communities; disparities persist despite strong infrastructure |
| Hospital Admissions for Dental Caries | Severe dental cases in young children frequently lead to OR-based treatment, but the USA lacks a single nationwide tracking system. | Dental problems (particularly caries in children aged 6-10 years) are among the top reasons for hospital admission | Caries-related hospitalizations in children are relatively rare, thanks to widespread preventive care and public health policies |
| Opportunities | <ul style="list-style-type: none"> Expand integration of oral health into maternal and child health care protocols | <ul style="list-style-type: none"> Expand successful Scottish Childsmile model across all UK regions | <ul style="list-style-type: none"> National coordination potential: Sweden's |

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- Scale successful tele-dentistry and technology-enabled pilot services nationally
 - Develop cross-partnership (i.e., policy makers, industry, community, etc.) to facilitate sugar consumption reduction in early life

- Strengthen integration between medical and dental services
- Address regional inequalities through targeted resource allocation

upcoming *National Health Program for Children and Youth* can align oral health efforts within child and maternal care nationwide.

- **Expand integrated models:** Scaling regional initiatives that combine dental, child, and maternal health can reduce disparities and strengthen early support.
 - **Enable data-driven action:** The upcoming *European Health Data Space* could support better use of health data to inform equitable, cross-country strategies.
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