



The Hidden Impact Of Oral Health On Children's Lives

Global Report



Unilever



Foreword

More than 100 years ago, William Lever started a business with a social conscience. In Victorian Britain, he made a conscious effort to improve people's hygiene through the use of soap, aiming to 'make cleanliness commonplace'. This legacy of helping address social issues through our brands, of doing well by doing good, is still at the heart of Unilever.

Our oral care brands, Signal and Pepsodent, have been working for over 25 years to address the issue of poor oral health. This is a global problem, with complex cultural and socio-economic causes. Therefore, our brands work in partnership with schools, governments and many other organisations, to run awareness programmes to encourage children and their parents to brush day and night using fluoride toothpaste. Through

“ I hope that this research marks the start of an industry-wide conversation ”

these programmes, we have reached nearly 82 million people globally; well beyond our original target of helping 50 million people by 2020.

While we are pleased with these results, there are still challenges that we need to understand better, in order to address more effectively.

This report, on the Impact of Oral Health on Children's Lives, is the first ever global study that looks beyond a narrow definition of dental health and examines the wider effects of oral care on children's participation at school and their sense of self-worth. The results show clearly that - no matter which country they live in - a child's oral health has an impact that is not only physiological, but also affects their personal potential and development.

The findings provide challenges and opportunities for our Signal and Pepsodent teams, and for the oral care industry more broadly. We must re-examine our current oral care message, which is too narrowly focused on health, prevention and pain. Together with dentists, educators and other health care providers we must expand the arguments, to also highlight the impact of oral health on other success factors in a child's life: school attendance and performance, self-confidence and sociability.



Alan Jope
CEO, Unilever

I hope that this report prompts an industry-wide conversation that leads us to work even harder to promote better oral care from an early age; to make it easier for parents and children to have access to dental professionals in all countries; and to encourage positive reinforcement and preventive measures from government and business working together.

It is our collective responsibility to give children and their parents powerful new reasons to care about their teeth and gums, and help them to do so.

Introduction

“It is appalling that in the 21st century, dental decay remains the most prevalent chronic disease throughout the world affecting both children and adults. What is even more shameful is that dental decay is at least 90% preventable and the damage caused is both cumulative and costly.... Good oral health is integral to overall health and well-being, whilst poor oral health can lead to low self-esteem, embarrassment and difficulty to socialize, as well as time off work or school. Despite an awareness of the importance of twice daily tooth brushing, the disease remains unchecked.”

Nigel Hunt,
Professor of Orthodontics,
UCL Eastman Dental Institute, London.

Tooth decay is the world’s most widespread disease - a fact that’s well known among professional dental communities. It’s also not news that many children around the world have poor oral health; at least 3 out of 5 children suffered dental cavities.¹

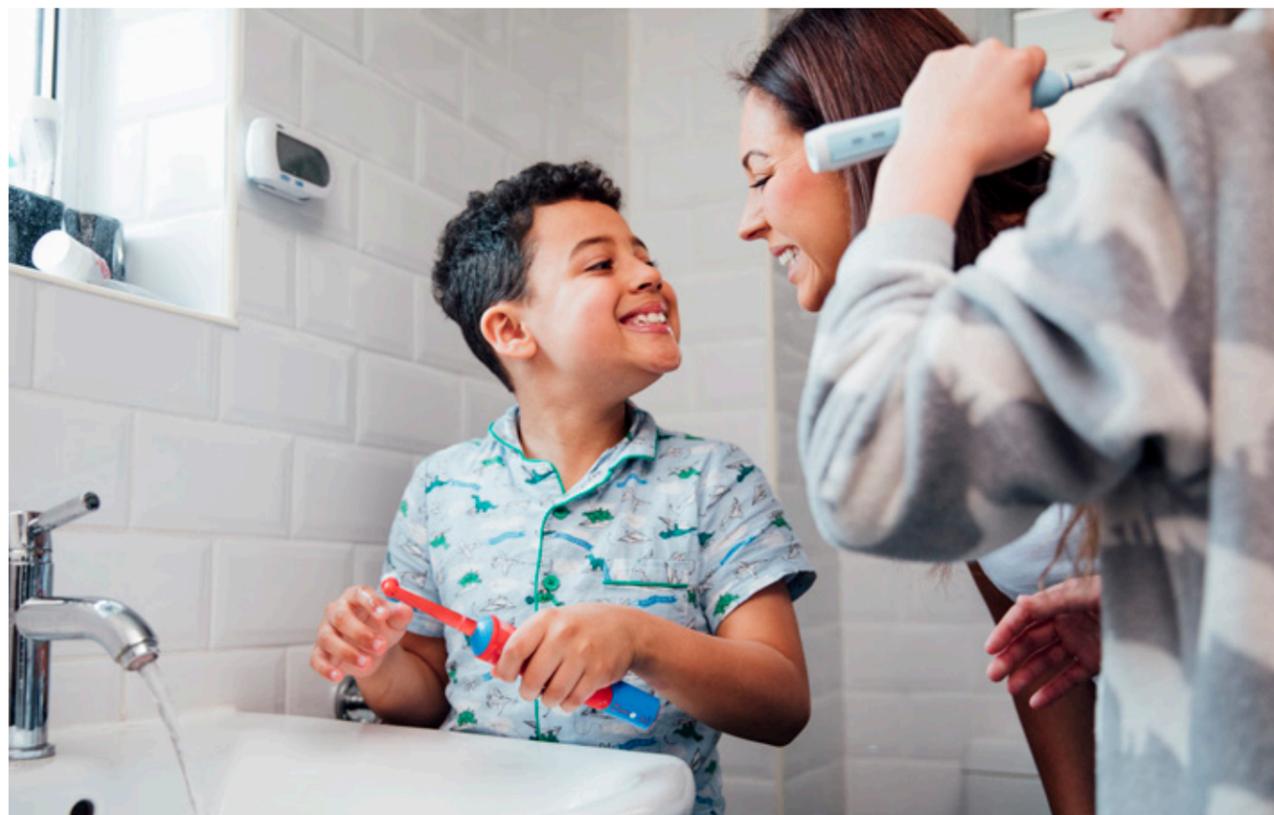
This study, however, shows that children with poor oral health don’t just suffer bad breath, cavities and pain; poor oral health in childhood also causes hidden damage, because it is linked to lower self-esteem and can impact children’s overall potential during education and beyond.

Thanks to this latest global research we now know that children with poor oral health are:

- Less likely to attend school due to oral pain;
- Less likely to participate and perform in class;
- Less likely to smile;
- Less likely to enjoy being at school;
- Nearly twice as likely to find it difficult to socialise with other pupils and also find it harder to make friends;
- Three times more likely to opt out of school activities.



Introduction



Our research also reveals that the majority of children has endured oral pain in the past year, with more than one third of these reporting this pain to be moderate-to-severe.²

It is hardly remarkable then, that in many countries toothache is a major reason why children miss school.³

These findings point to a problem that until now has not been widely recognised: the current messaging around oral care, with its focus on oral hygiene and avoiding tooth decay, is simply not working well enough, because it does not address the broader issues of poor oral

care. As a result, when it comes to children's oral health, we still seem to be fire-fighting rather than preventing – even though both children and their parents say that toothbrushing is their number one, most important personal care routine which, on the whole, they perform twice a day.⁴

We hope that this report on the full impact of oral health on children's lives will be a starting point for find a fresh approach to this global health crisis. Aimed at dentists, educators, nurses and other professionals involved in shaping and delivering the global dental agenda, the report is based on new research

commissioned by Unilever Oral Care as part of our ongoing 25-year mission to actively improve oral health for children and adults worldwide.

The results make a compelling, evidence-based case that a child's oral care has repercussions beyond just his or her health – that there is, in fact, a link with self-esteem. For us at Unilever Oral Care, they are a call to action to re-examine and broaden our current health-focused oral care messaging. We believe that we have to put more emphasis on how poor oral care has an impact on other success factors in a child's life, such as their school attendance, school performance, self-confidence and sociability. We want to give children and their parents powerful new reasons to care about their teeth, while at the same time – for maximum impact - making sure that we continue with our mission to highlight prevention and spread good brushing habits among the young continues.



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A child's oral care has repercussions beyond just his or her health, that there is, in fact, a link with self-esteem
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These findings also provide an urgent reminder for dentists, educators and other Healthcare Professionals that we have to rethink the actual experience of going to the dentist – as varied as it will inevitably be – because the fear of going to the dentist is trickling down the generations, with a measurable impact on oral health.

Without doubt we need to tell a different story: one that takes as

its starting point the connection between children's oral health and their self-esteem, and the fact that children who experience tooth or mouth pain and have poor oral health are less likely to believe in themselves, flourish at school or simply enjoy time with friends... with the inevitable implications for their future lives.

It's time to get our industry talking.



01

Children's Oral Health The Hidden Impact



The Oral Health Problem



Donald L. Chi, DDS, PhD

I've been a dentist for almost 13 years. Yet, I'm still surprised by how many school children come to see me with swollen gums, rampant decay, and toothaches. If you've ever had a toothache, you know that dull aches can spontaneously morph into throbbing, electrifying pain. Toothaches keep children from eating, playing, and socializing. Toothaches wake children up at night. Toothaches lead to missed school days and get in the way of concentrating and learning in the classroom. Toothaches may necessitate invasive treatments like extractions that can lead to dental anxiety, fear, and avoidance as well as hospitalizations that expose children to general anesthetics.

Most oral health problems can be easily avoided by visiting the dentist regularly for checkups and preventive

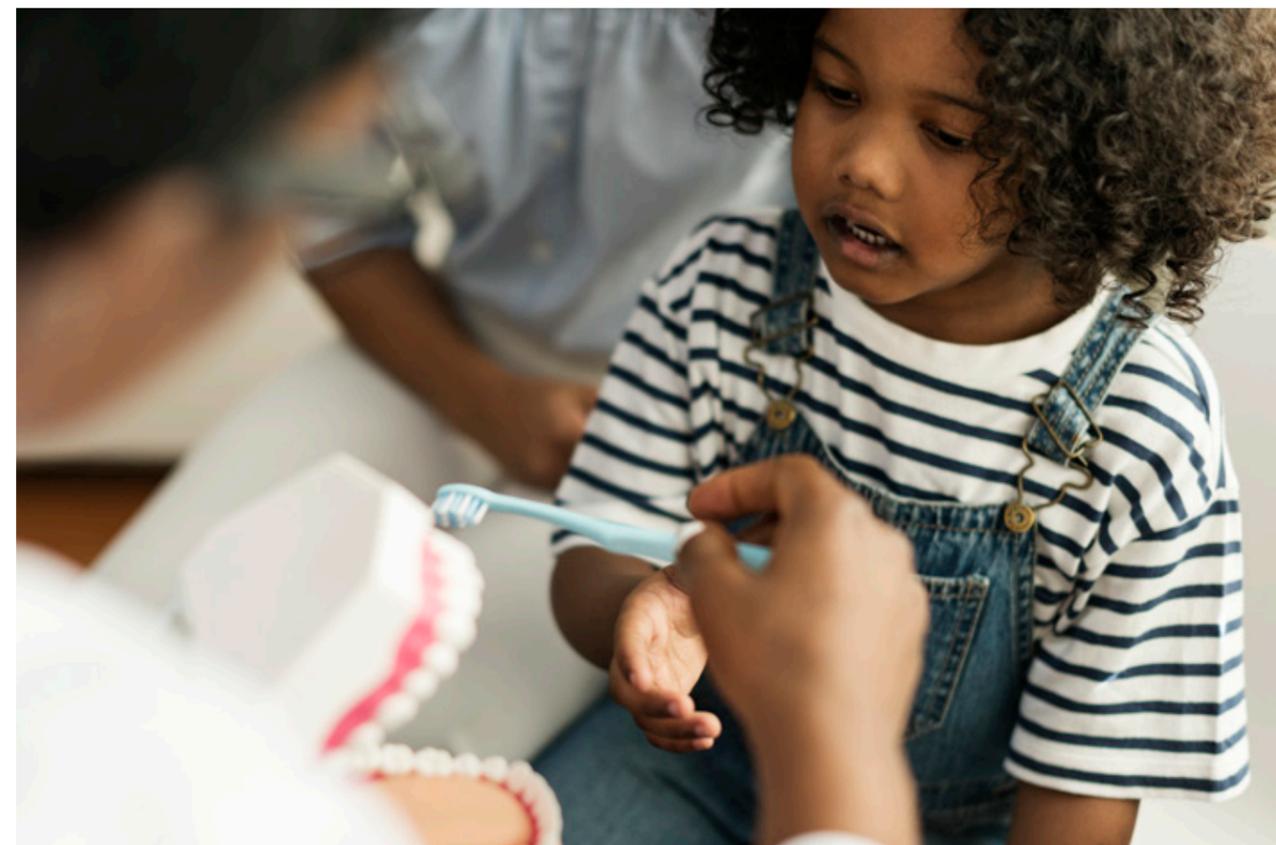
“ Untreated tooth decay can lead to dental and systemic health problems. Equally concerning are the broader non-health impacts of tooth decay ”

care, minimizing sugar intake, and brushing twice daily with fluoride toothpaste.

Yet tooth decay continues to be the most common disease in children globally. Untreated tooth decay can lead to dental and systemic health problems. Equally concerning are the broader non-health impacts of tooth decay, many of which are unknown to those outside of dentistry, including chronic school absenteeism, poor academic performance, low self-confidence, and reduced quality-of-life. The long-term consequences of tooth decay have critical implications for the social and emotional development and overall well-being of children.

The Hidden Impact Of Oral Health On Children's Lives Report is based on interview data from eight countries, spread across Europe, Latin America, North America, Africa, and Asia. There was the remarkable consistency in findings across these very different countries, which supports the notion that the health, social, and emotional consequences of poor oral health manifest in similar ways regardless of where in the world a child lives.

In both developing and developed countries, we know disadvantaged children are at greater risk for poor oral health and the broader consequences of untreated



tooth decay. Preventing tooth decay will not only help to improve oral and general health but is likely to lead to downstream benefits in the form of improved access to educational opportunities, better learning outcomes, and optimal social development.

So where do we go from here? Moving forward, I think we can make additional progress by adopting a three-pronged strategy. The first strategy is to ensure that children have adequate access to dental care, which consists of timely restorative treatment to prevent diseased teeth from causing larger problems - including some

of the more surprising non-health related impacts outlined in this report. Where there is access to dental care, regular dental visits and prevention-oriented check-ups allow for monitoring and timely treatment - something which the Unilever data shows is not occurring regularly.

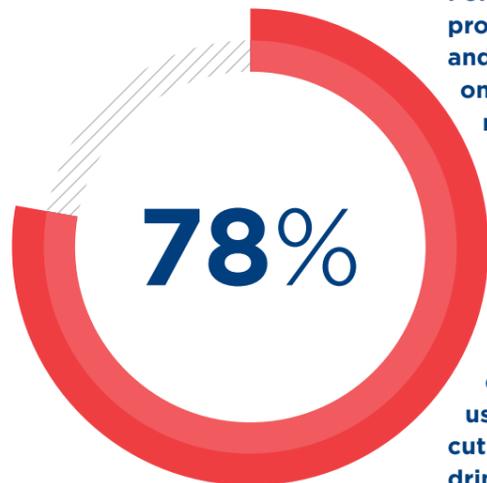
The second strategy is to promote healthy habits and routines. Minimizing added sugar intake and brushing twice daily with fluoride toothpaste are the two main behaviors that help prevent tooth decay.

The third is to endorse policies that support prevention at the population level. Examples include

community water fluoridation and taxes on sugar-sweetened beverages. Policy-oriented strategies may need to be tailored to local resources and context, but the principles are based on reducing costs and optimizing population-level outcomes.

We have a long way to go to ensure that all children can benefit fully from the opportunities that come with having optimal oral health. It is my hope that findings from the Smile Report will help to stimulate further conversations about children's oral health that will lead to innovative, evidence-based, scalable solutions.

Children's Oral Health: The Hidden Impact



of children with good oral health say they are doing well at school (as opposed to **48%** of those with poor oral health)

For decades, when oral health professionals spoke to parents and children, they focused on one set of problems: the need to prevent cavities, bad breath, rotting teeth and swollen gums. The message was simple, straightforward, and went like this: Brush your teeth twice a day, for two minutes each morning and evening, and make sure to use fluoride toothpaste; also cut down on sweets and fizzy drinks, and your teeth will be ok.

Consumers heard us; both parents and children say that brushing teeth is the most important personal hygiene routine and indeed they claim to perform it twice a day.

Clearly, though, this message is not powerful enough. Generally speaking, the quality of oral care among many children continues to be poor, resulting in physical health issues.

This study was designed to look beyond the usual focus on oral health and pain. We wanted to understand whether the health issues triggered by poor oral care have an impact beyond the medical problems. We spoke to representative groups of children and their parents in eight countries around the world - in Chile, Egypt, France, Ghana, Indonesia, Italy, the United States and Vietnam. As the results came in, we were surprised to find that children with poor oral care have significant problems that go way

beyond any medical issues, and that's true anywhere in the world, whether they live in developing or highly developed countries.

Low self-esteem

Trouble with your mouth and teeth is not just painful, it also hurts children's self-esteem. As the literature shows, good self-esteem is a key component in the healthy development of children and adolescents.⁵ A young person with low self-esteem will feel that they are unimportant and nothing they do will make a difference.

Our study shows that just under half of all children with poor oral health and 40 per cent of those who felt pain during the preceding year suffer from low self-esteem. In contrast, among children with good oral health or who have been pain-free, just 32 percent and 26 percent respectively report low self-esteem.

“ We wanted to understand whether the health issues triggered by poor oral care have an impact beyond the medical problems ”

Poor oral health is the key driver here. Children say that the state of their teeth makes them embarrassed to speak up in class, while many report being teased or bullied because of their teeth (31% of children with low self-esteem). The embarrassment or shame they feel when they have to speak publicly feeds into this lowered sense of self-esteem.

Unsurprisingly, children with low self-esteem, are much less enthusiastic going to school (just 64%), compared to their peers with high self-esteem (82%). A third of all children with low self-esteem report that they don't want to go to school because of their teeth.

Nor does it stop there. Just as children with good oral care are more likely to experience high self-esteem with its accompanying educational and social benefits, those with poor oral care (who are more likely to have lower self-esteem) find their lack of confidence and lower sense of self-worth affects the way they feel and behave in other ways.

Socialising

Children with low self-esteem are nearly five times more likely to avoid smiling and laughing because of their teeth (34% vs 7%); find it more difficult to make new friends (20% vs 6% of those with high self-esteem), perceive the highly visual culture of social media as more of a challenge, as well as talking and having fun. They are more likely to stay at home and play by themselves than to play outside.

This is crucial because the social-emotional skills that they develop as a consequence of socialising are an important predictor of future educational success as well as their ability to get a job, stay out of trouble and effectively manage their emotions.⁶ In other words, socialising with other children is essential if they are to blossom as adults.

Performance at school

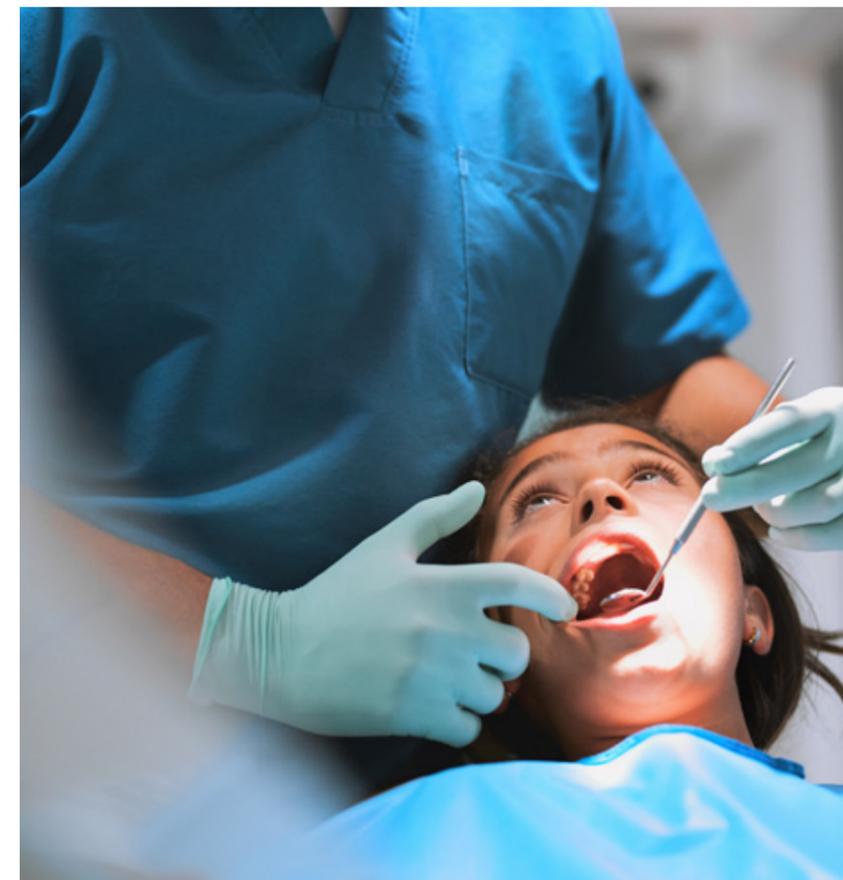
This problem then reverberates across their performance at school. More than a quarter of all children have missed a day of school over the past



of children who suffered from pain in the past 12 months felt less confident speaking because of their teeth

year because of oral pain. That makes poor oral health the number one reason for children missing school.⁷

Pain distracts, so it is not surprising that a quarter of children who suffered oral pain reported that they struggled to concentrate in class because of their teeth.



Children's Oral Health: The Hidden Impact

However, it is the lack of self-esteem due to poor oral health that has the biggest but least obvious impact on children's performance in school.

Children with low self-esteem are four times less likely to draw attention to themselves by raising their hand and contribute in class, asking the teacher for help or even saying when an idea is theirs. Those with low self-esteem are also more likely to have issues with motivation, working hard or prioritising being a 'good student', with just 64% agreeing that being a good student is important (vs 91% with high self-esteem).

They are also eight times less likely to play sport or participate in other school activities (low self-esteem 33% vs high self-esteem 4%).

In other words, children with poor oral health who also have low self-esteem act and feel differently in the classroom, with their peers, families and – if they have them – friends. Unlike a child with high self-esteem, they are far less likely to feel they can accomplish anything and far more likely to feel 'that they are unimportant and nothing they do will make a difference'.⁸ That attitude influences their behaviour today, the educational choices they make tomorrow and their longer-term lives in the more distant future.

The implications in terms of children's lowered self-esteem



and its knock-on effects are profoundly concerning.

Sleeping poorly

Poor oral health even has an impact on children's ability to sleep. Poor sleep – or too little of it – can compound many of the issues that affect a child's mood, brain function and immune system. It can make them more accident-prone, more likely to overeat, to feel irritable or depressed and to find it more difficult to think creatively or learn new things. It can also make them susceptible to coughs, colds and other illness - all of which can have an impact on their academic and social lives.⁹

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02

The Parent Paradox



Oral health, school performance and self-esteem



Cynthia Pine

The UN Millennium Development Goals¹ include universal access to quality school education, a foundation for child development and well-being; lost school days due to chronic ill health impairs children's progress^{2,3,4,5} and deprives them of a universally recognized right. Worldwide, tooth decay is the most common chronic childhood disease, five to eight times more common than asthma.⁶ As is highlighted by this Unilever report, the pervasiveness of this disease is having a detrimental impact on attendance at school, with approximately 243 million school days being lost a year due to poor oral health.

Unilever's global study into the relationship between oral health and a child's school

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Lost school days due to chronic ill health impairs children's progress and deprives them of a universally recognized right
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life fits into a wider body of research spanning 30 years^{7,8}. Children experiencing pain have diminished ability to learn.⁸ Indeed chronic pain, like toothache, affects children's cognitive function.⁹ It is perhaps not so surprising therefore, that self-reported tooth decay has been associated with poor academic performance^{6,10,11,12} in studies from several countries, despite self-reporting giving underestimates.^{13,14} A global review¹⁵ of studies in this field demonstrates that children with decayed teeth have 44% higher probability of poor school performance and 57% greater likelihood of poor school attendance. Such findings are very much in line with Unilever's data, that shows the impact of oral health on a child's ability to concentrate, sleep and participate at school. Even after controlling for school-level characteristics of income, race and geography, untreated tooth decay is associated with school performance.^{8,16}

Notably, school absences due to dental pain have been significantly related to children's poor school performance, whereas school absences for routine dental



care have not¹². This certainly adds weight to the argument that preventative regular check-ups should not be neglected, although unfortunately this is often the case. The Unilever study shows that 72% haven't been for a dental check up in the past 2 years. Poorer performances for children with decayed teeth may occur due to functional and psychosocial impacts affecting their health, quality of life, self-esteem and cognitions.^{17,18} A survey in Kuwait¹⁹ identified that children with low self-esteem brushed their teeth less often than their peers. This relationship between oral health and self-esteem is further explored in the Unilever report. My own research with colleagues in Indonesia²⁰,

revealed that children with toothache had lower school performance, and children's self-esteem was significantly associated with school performance. More children with higher levels of self-esteem had good or excellent school performance.²⁰

In summary, childhood tooth decay has many impacts, including toothache which is associated with lower self-esteem and poorer school performance. This is a concerning and important message that needs to be shared with parents and children alike in order to help spread the benefits of better oral health care habits and preventative action.

The Parent Paradox

It's indisputable: the basic message that we have to take good care of our teeth so that they stay healthy is getting through - worldwide. Our study confirms that parents and children see toothbrushing as their most important, health-focused personal care routine. On the whole, children also claimed to be brushing twice a day.

On closer questioning, however, some parents admitted they were prepared to let their children take shortcuts and skip brushing. Significantly, 3 in 10 (29%) families surveyed admitted letting their child go to bed without brushing their teeth. Even more startling than this was the admission by nearly one-fifth (18%) of all parents that they allowed their child to skip brushing "as a reward".

However, what's designed as a treat turns out to be a penalty, because there the survey shows that there is a link between this behaviour and a higher incidence



of pain. Given the potential health consequences of not brushing at night time, the fact that it's viewed by some as a reward is deeply problematic. It flies in the face of the fact that most parents say they believe that toothbrushing is important, and that nearly three quarters rated either health (73%) or happiness (72%) as the top aspiration for their child.

A similar paradox emerges in relation to pain, with three quarters of parents not acting on their child's oral pain when told about it by their child, and only

approximately one third taking their child to visit the dentist for the recommended routine check-up every six months.¹⁰ Most visits to the dentist turn out not to be preventative, but address acute oral health issues, such as bleeding gums, cavities and pain.

Why then, if parents say that their children's health and happiness are so important to them, are they prepared to ignore the potentially serious consequences of their child not brushing, not visiting the dentist as often as they should, and even being in pain?

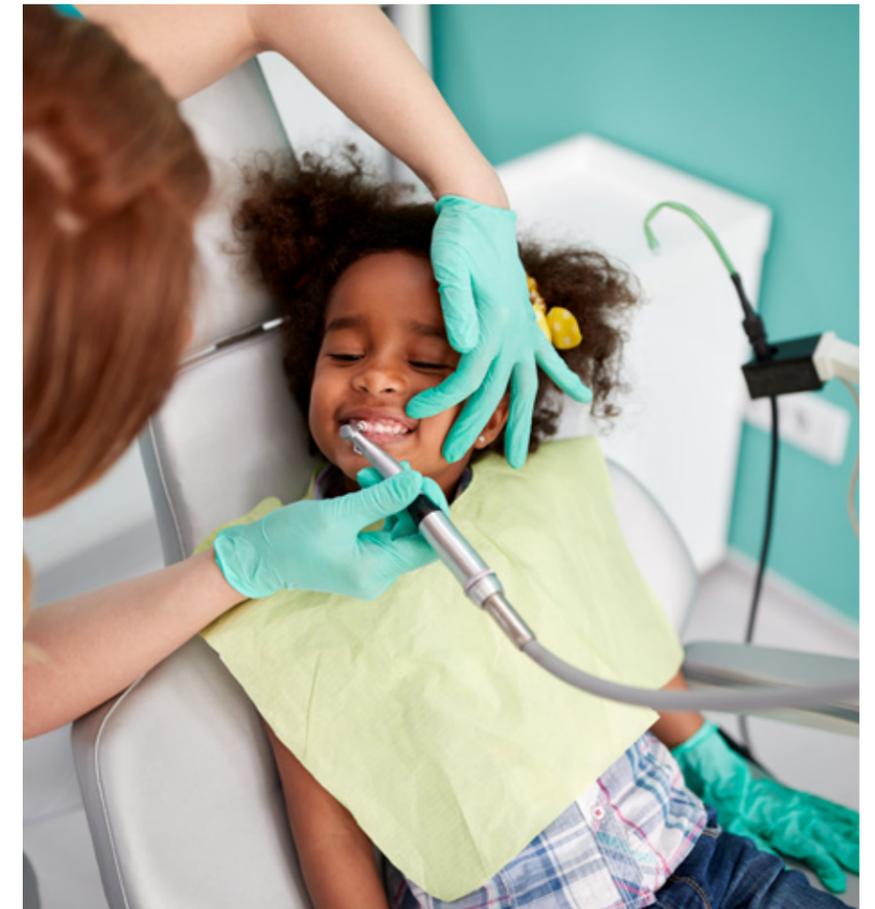
- Potential reasons are differences in parental education and income levels, along with other socio-economic inequalities in and between countries. In France, for example, all children between the ages of 6 and 18 are entitled to free, 3-yearly check-ups and dental care is generally of a high standard.¹¹ This contrasts with the US or Egypt where access to freely available or inexpensive, good-quality dental provision for under-18s is patchier. Yet even in France, 44% of parents surveyed admitted their child's last visit to the dentist was either for an oral health problem or that they simply hadn't gone at all.

- Limited access to dental care is another possibility, especially in geographically challenging or developing markets without national, state-funded oral care provision, such as Vietnam, Indonesia - or Ghana, a country with 30 million inhabitants that has a dentist to people ratio of 1:150,000.¹²

- Different cultural attitudes to physical pain and how it should be managed may also factor in, as could a potential misunderstanding of the differences between the discomfort which is a normal part of shedding primary teeth versus the type of pain triggered by cavities and other oral health problems that require professional attention.

- Finally, there are also the parents' own fears and anxieties relating to a visit to the dentist. Whether acknowledged or not, they affect their attitude and willingness to visit the dentist, even if that visit is not for their own oral health need but that of their child's. Of the parents surveyed, 47% across all markets said they were "really scared" of the dentist, while 40% admitted to feeling "nervous and anxious" when taking their child to the dentist even though it wasn't their own appointment.

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Approximately one third taking their child to visit the dentist for the recommended routine check-up every six months
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The Parent Paradox

As these fears are so widespread and powerful, dentists clearly have to have another look at the kind of experience they provide, what it means for children and their families - across all the markets despite their varied characteristics. Tackling this fear could end this paradox, where parents understand the importance of oral care routines, but are also prepared to “reward” their child by allowing them not to brush, especially at night time, never mind the very real consequences of pain and poor oral health.



30% of parents admit not visiting the dentist because they were scared

The parental paradox implies denial - because parents see toothbrushing as both a priority and something that’s onerous - but also a reduced self-confidence, because such oral health shortcuts are increasing the likelihood that their children will grow up with a compromised sense of self-worth as well. What this behaviour ensures is that the next generation inherits not only the same tired, health-related reasons for brushing their teeth, but possibly even a similar dread of the dentist’s chair.

Parents need to realise that their children should see a dentist as soon as the first baby teeth appear, and when they are one year old at the latest. It shows the child that going to the dentist is not painful, and allows the dentist - or hygienist - to give the parents preventive advice.

“It is of interest that 20% of those who did not go for a routine check did so for reasons associated with orthodontic treatment. This result has several possible implications. For example, when teeth are extracted early for decay, for example baby teeth, it is extremely common for the space for the adult teeth to be lost and so the adult teeth become crooked requiring straightening with braces. This longer-term effect of poor oral hygiene and dental health has important implications for the future health and self-esteem of the child. This is something not often appreciated by parents. Conversely, routine orthodontic treatment for predominantly aesthetic reasons is only undertaken where there is good oral health anyway and therefore this group would probably be less likely to attend routine check-ups frequently. Their oral health status would be constantly monitored by their clinician undertaking the orthodontic treatment.”

Nigel Hunt,
Professor of Orthodontics,
UCL Eastman Dental Institute, London.



69%

of parents say brushing their teeth is their most important daily routine

80%

of children say they brush twice a day

29%

of parents let their child go to bed without brushing their teeth

18%

of parents have told their child they do not need to brush their teeth as a reward

73%

of children who brush their teeth say having a “healthy mouth” is their top reason for doing so

72%

of children when in pain told their parents and only 33% went straight to the dentist



Preventing Not Firefighting: A Call To Action



Francisco Ramos-Gomez

Early childhood caries (ECC) are an infectious, transmissible disease that can be easily and entirely prevented if the right measures are taken early. If left untreated, ECC can lead to infection, severe pain and can even affect growth. As the Unilever Oral Care Report sheds light on, ECC can also limit school readiness and diminish the quality of a child's life.

Given the severity and wide-reaching consequences, it is crucial that parents and children are acting preventatively when it comes to oral health. Adopting the following simple guidance can help provide children with happy teeth and a happy life!

ROUTINE DENTAL CHECK UPS

The International Association of Pediatric Dentistry recommends a dental visit for children by their first birthday and/or at first tooth

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A disease that can be easily and entirely prevented if the right measures are taken early
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emergence, in alignment with the 1-year vaccination periodicity schedule. Establishing a dental home for children at a young age and making it a regular routine will provide access to early preventative dental care. Such visits can also provide parents with an individualized preventative care plan with achievable goals that assist parents to adopt the appropriate behavioral changes to keep their child's teeth healthy.

However, the Unilever report makes it apparent that not enough children are going for regular check-ups. Moreover, the data reveals that those who are visiting the dentist are doing so primarily when they already have an oral health problem - not for routine checkups. Indeed, many parents wait until their children are in need of dental treatment to schedule a dental visit. Perhaps they are unaware that the lack of early preventative oral health care can lead to negative impacts in the future around their child's speech, growth, development and even self-esteem. We therefore need parents to value the importance of regular check-ups, during which they can learn important preventative techniques. Preventive checkups will also help children become familiar

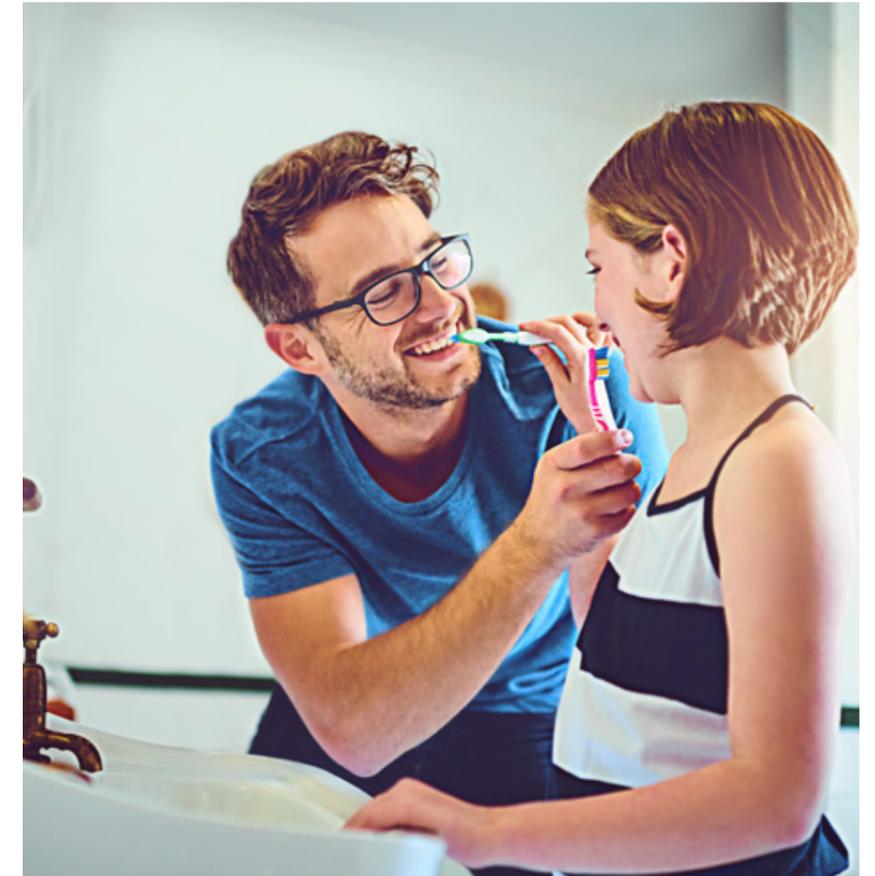
with their dentist and the dental setting and allow them to see the dentist as a less scary place. Clearly, this is an important fear to fight, given that the Unilever report shows that even parents have felt anxiety when taking their child to the dentist.

BRUSHING

In addition, many parents are unaware that they should assume responsibility for brushing their child's teeth until they are 8 years of age, or at least until the child can tie their own shoe - this is when they have the motor capacity to brush appropriately.

At night, parents are occasionally overwhelmed and allow their children to skip brushing - especially before bed time. Establishing routine, fun brushing habits for after breakfast and right before bed is vital to prevent ECC, such as doing so in combination with reading a book or singing a song.

It is also important to brush teeth using the proper recommendations: brushing for two minutes with a soft bristled toothbrush, using fluoridated toothpaste. The mandate of universal use of fluoridated toothpaste for all children at all ages includes the recommendation of the "smear amount" for infants under three years of age and a pea size or "pea size" amount for children older than three years once they are capable of spitting out.



SUGAR

The global epidemic of ECC is in part attributed to the early introduction, exposure and increasing amounts of consumed sugary foods and drinks to children. It is recommended that parents limit the amounts of sugars children are consuming on a daily basis by replacing these drinks with alternatives such as milk or fluoridated filtered or boiled tap water. It's also important to limit the frequency of snacks throughout the day in order to maintain a healthy

7.0 pH level in the mouth. Healthy snacks such as cheese and fresh fruits and vegetables should be consumed during the day and any other sugar sweetened beverages should only be consumed with a main meal. Encouraging healthy eating habits at a young age will make it easier for the child to maintain these habits as they grow, and will help prevent ECC.



03

Oral Care

A Global Perspective



Oral Care: A Global Perspective

This global study tried to take a snapshot of children's oral health that is broad and representative across a wide spectrum of social and economic development. The statistics extracted from the data reveal the endemic nature of children's oral pain across all markets. Most importantly, they show the hidden damage that is experienced by those who don't take care of their teeth; they are more likely to experience problems inside and outside the classroom, which in turn can affect their self-esteem, their future education, career and personal life choices: in sum, who they can grow up to be.

Looking across markets, what stands out is the prevalence of oral care issues in developing countries – despite parents and children claiming to understand and accept the importance of oral care and brushing twice a day. Nevertheless, the percentage of children experiencing oral pain

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What is remarkably similar across countries is parents' relatively relaxed attitude to their children's oral care routines
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and waiting to visit the dentist until they have an such an issue is still high. Notably, a concerning level of children have low self-esteem that is related to their poor oral health.

Children living in African markets are less likely to visit the dentist than anyone else and when they do, it is because of dental issues. It seems that the preventive message is not working and there is potential to better educate parents around the importance of regular dental visits.

The situation in Asian countries is not much better, but there is a greater awareness of the impact poor oral care has on children's lives. Within both Vietnam and Indonesia, oral pain has a significant impact on children's social interactions. Educational messages around the importance of oral care and its link with social issues, alongside local, school-based and community initiatives focused on prevention, could be very beneficial to the lives of many young sufferers.

What is remarkably similar across countries is parents' relatively relaxed attitude to their children's oral care routines. A significant proportion of parents in all 8 markets reward their children at least occasionally by letting them go to bed without brushing their teeth, and the data show the knock-on effect in the form of oral pain, worsening oral health, and the social impact for the child.



Here is the breakdown market by market:

Egypt

Oral health is a major concern in Egypt with nearly 3 in 10 children (27%) not having visited the dentist in the last 2 years. Of those that did, almost all (89%) went because of pain or other issues - highlighting the need to look at issues around access to dentists and overall oral health education focused on prevention. Unremarkably perhaps, one third of parents admit to letting their child going to bed without brushing their teeth (35% vs 29% global average). As a result, children with poor oral care are more likely to skip their nightly brush (54% vs 37% global average).

Ghana

In Ghana, few children visit the dentist and those that have only do so when they are in pain. Indeed, over half (56%) of parents said that their child had not been to the dentist in the past 2 years. In general, parents in Ghana seem very relaxed about oral care duties. They are most likely to let their children go to bed without brushing their teeth (39% vs 29% global average), and the most likely to let their child skip brushing as a “reward” (31% vs 18% global average). As a result, children miss an average of 9 days of school because of their oral pain – a higher number per child than in any other country. Despite a modest population, these school absences are the equivalent of 25 million school days.

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Indonesia

School children with poor oral health in Indonesia experience high levels of self-consciousness around speaking in front of others (48% said they were not confident speaking in front of others) compared with the global average (33%). They are also twice as likely to experience low self-esteem as Indonesian children with good oral care. This apparent awareness of the social impact of oral health issues is reflected in the above global average percentage of Indonesian parents who say that toothbrushing is their most important personal care routine (80% compared to the global average of 69%), and the fact that more children than anywhere else (94%) claim to brush their teeth twice a day. Given Indonesia's large population, the 2 days of school missed by more than one third of the country's pupils in the past year because of oral pain amounts to the equivalent to a massive 57 million school days missed.

Vietnam

The widespread experience and debilitating effect of oral pain is most obvious in Vietnam, which has the highest percentage of children who experience pain because of their teeth (78% vs 60% average). Moreover, they miss approximately 42 million school days because of it. This is one of the countries with the highest number (87% vs 72% global average) of children visiting the dentist for oral health problems rather than for routine check-ups. More startling is how pain is experienced by 53% of those who said they did visit the dentist for routine reasons. Young Vietnamese experiencing oral pain are the most hampered by lack of confidence when it comes to speaking publicly (58% vs 33% global average) and are more likely to have low self-esteem. Unsurprisingly perhaps, their parents are more likely than most other nationalities to let them off toothbrushing as a “reward”.

Italy

In Italy, awareness of the importance of oral care is high, with 7 out of 10 parents saying tooth brushing is their child’s most important daily personal care routine. An even higher percentage (91% vs 81% global average) claims their child brushes twice a day. Yet a relaxed attitude to children’s oral health still prevails with as many as 22% admitting to letting their child go to bed without brushing their teeth. This attitude also appears to influence the frequency of children’s routine dental check-ups with significantly less than half of parents (36%) saying their child’s last visit to the dentist was routine; many more were for oral pain and other dental issues. Overall, half of Italian children are experience oral pain (vs 60% global average), which leads to difficulties with sleeping and concentration.

France

Despite France’s free, state-of-the-art dental care for children, 39% of 14-year-olds are estimated to have dental erosion, which suggests a lack of effective countrywide education around brushing technique and the ways diet can affect oral health.¹³ The lack of education emerges from the data, with a quarter of parents letting their child go to bed without brushing their teeth and over half of these children experiencing oral pain. Little surprise then that 8 in 10 children do not visit the dentist as often as recommended. What needs more attention are the possible outcomes of poor



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Looking across
markets, what stands
out is the prevalence
of oral care issues in
developing countries

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oral care on self-esteem. Indeed, French children with poor oral care are more likely than those in any other country to suffer from low self-esteem (64% vs 49% global average). The message is strong: what parents might see as relaxed parenting, could have very detrimental effects. When a child skips their night-time brush it affects not just their health, but their overall wellbeing.

United States

Despite the country’s wealth and the relative availability of high-quality dental care, American children are still less likely to be taken to the dentist for a routine check-up than they are for fillings, bleeding gums or pain. This may be partly explained by American parents’ relaxed attitudes to brushing (more than one third let their child skip their night-time brush (36% vs 29% global average), as well as by the cost of dental care and the difficulties some families have accessing lower-cost and free treatment. As a result, half of all American children have experienced oral pain in the past year and almost



a quarter missed school because of it. The average number of days missed – 4.9 – is equivalent to 74 million days in total, the highest of all 8 countries.

Chile

Overall, Chile has a more positive story to tell than other countries: 8 in 10 parents believe toothbrushing is the most important daily personal care routine (vs 69% global average) for their child; and just 1 child in 10 missed school because of oral pain. Significantly, while half of Chilean children still experienced pain over the past year, and those who attended despite it were nearly twice as likely to opt out of activities or socialise, the pain was moderate to severe for just 1 in 5 of them. Nevertheless, as in most other developing and developed countries, the majority of children go to the dentist because they have an oral health problem rather than for a routine check-up. There is a link between

poor oral health and self-worth, with children suffering oral disease being much more likely to have low self-esteem.

The global prevalence of poor oral health among children demands a unified response from Healthcare Professionals, governments, NGOs and the international business community if the situation is to change and children’s longer-term educational, career and wellbeing prospects are to improve. However, as the differences between the markets surveyed in our study show, it is also vital that cultural, socio-economic and access issues specific to individual countries and communities are factored in if any intervention is to be successful. These include knowledge of local data around oral health, children’s school attendance, average brushing frequency, their social interaction, as well as the frequency of and their reasons for visiting the dentist.



04

Re-Examining The Prevention Message



Where Do We Go From Here?



Nigel Hunt

So what can be done to improve children's oral health? In my view there is no single 'silver bullet' but a new approach to understanding the problem and the implementation of other preventive measures is required in a concerted, coordinated and systematic approach with contributions from bodies that include but reach far beyond the dental profession.

An approach is required that for ease of classification can be grouped as: Better Education, Better Access and Better Prevention, although these effectively merge into one.

Better Education

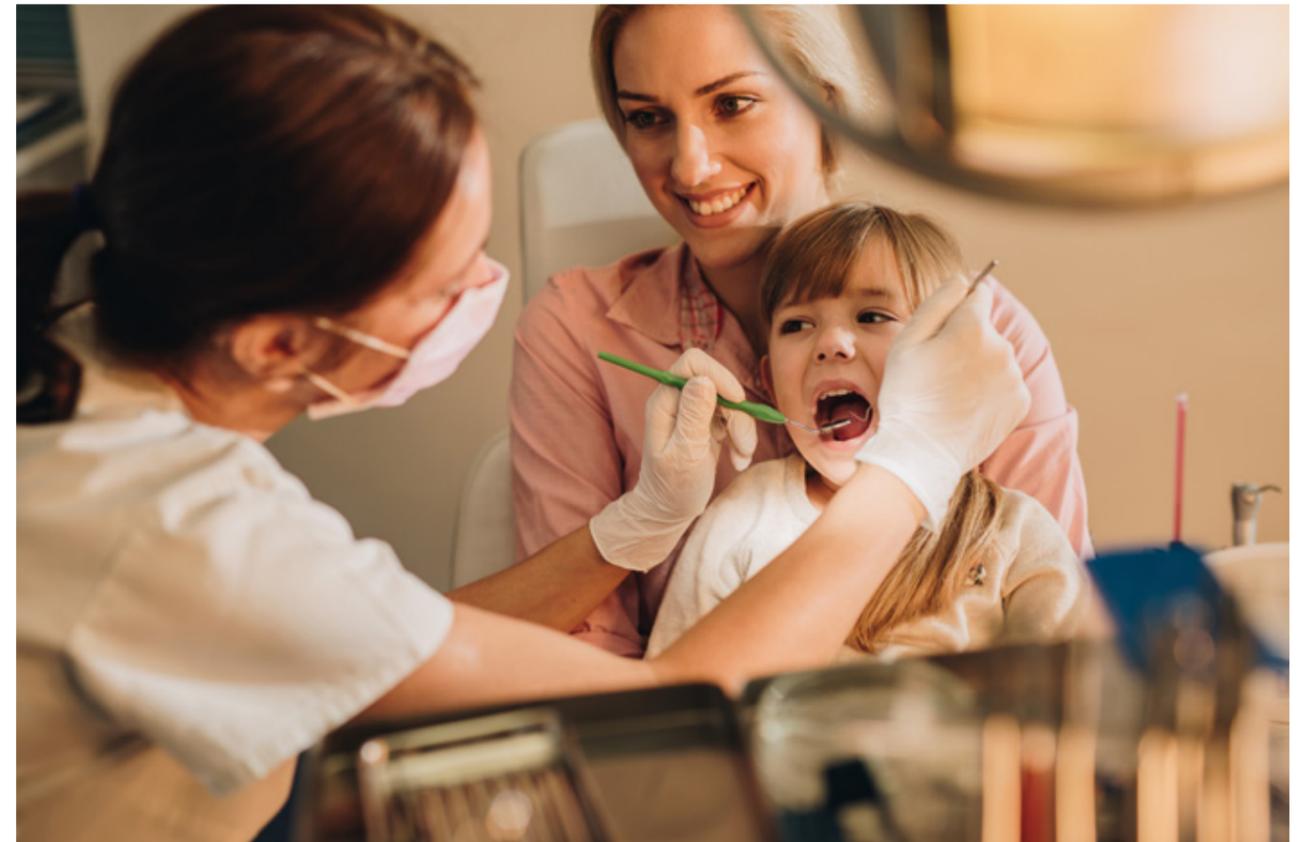
This starts with ensuring parents and children understand what is involved in dental decay. The recognition of the importance of not just timely, well directed tooth brushing with a fluoride containing

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All early years healthcare workers should be trained in giving advice on oral care for children
”

toothpaste, but also the contribution of dietary sugars is frequently overlooked. In the UK, the average 5-year-old consumes his/her own body weight of sugar and drinks - a bath-full of fizzy drinks - every year! This not only leads to obesity but also chronic dental decay.

An understanding of detrimental effects of 'snacking' or eating/ drinking between meals is often forgotten. So who should provide this education? Pregnant mothers and parents of new born children are often at their most receptive with regard to advice on how to do their best for their child. Therefore, all early years healthcare workers (e.g. midwives, health visitors etc.) should be trained to be proactive in giving advice on when and how to begin oral care for the child, including when parents should take their child to the dentist for the first time (by one year of age).

This information can be reinforced through medical GPs surgeries (it is amazing how little doctors know about the mouth), and especially Community Pharmacies. Digital technology is important here with many free Apps, web-based learning resources and social media sites that can reinforce



messages. Later, nurseries and schools should be encouraged to give dietary advice and run tooth brushing sessions daily.

Better Access

Access to dental professionals is poor through a combination of parents not seeking access but also a lack of affordable, readily available services. More research is required as to the socio-economic reasons behind why access is so poor. As highlighted in the research there exists a genuine fear factor of attending a dentist by both the parent and the child. Hopefully if a young

child attends with the parent for preventive advice, the pain free experience will be to the benefit of both and set the tone for years to come.

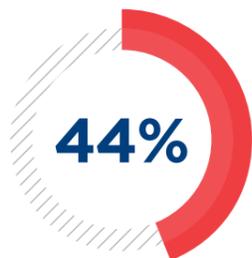
Better Prevention

In addition to the early preventive advice which can be offered, dental professionals should be encouraged to apply topical fluoride varnishes to teeth. Studies have shown that this offers an extremely favorable 'return on investment'. On the wider scale, governments should be encouraged to work with

industry to reduce the sugar content of foods, supermarkets and shops should be discouraged from placing sweets etc. near check-outs and schools should be advised to stop giving sweets as rewards for good work or behavior.

This commentary offers just a few of the many areas where new messages for improving children's oral health can be applied, but I hope it gives a flavour of a different approach. After all, we owe it to the children of today to protect them against this devastating disease.

Re-Examining The Prevention Message



44% of parents surveyed admitted their child's last visit to the dentist was either for an oral health problem or that they simply hadn't gone at all.

Poor oral health is a worldwide problem with complex underlying causes. Beyond the fundamentals of physical health, children with poor oral care also suffer a hidden damage, which can limit their potential and affects their fulfilment and happiness in the long-term (and can have an impact on their economic situation).

Our study demonstrates how significant oral care is when it comes to education, social relationships, and how these correlate to self-esteem. As a result, we see a clear need for a new type of initiatives that address the broader impact of this worldwide epidemic, so that we are ultimately in a better position to help young people thrive.

Dentists, educators, other Healthcare professionals and key stakeholders need to address the following key areas as a matter of urgency:

- Reasons for brushing teeth
- Night-time brushing
- Oral pain
- Dental visits
- Diet
- Outreach and access

New reasons for brushing teeth

When it comes to daily brushing routines - especially at night - there is an obvious gap between the claims and the reality of toothbrushing. While both parents and children both cite dental health as their main



motivator for brushing their teeth, they clearly don't see the correlation between their own poor oral health and what they see as "occasional" skipping of toothbrushing.

In other words, if accepting the health message is not good enough to reduce the incidence and experience of oral pain, then we have to re-examine the messaging around why toothbrushing is important. Maybe the long-term health benefits of daily brushing are too far removed from the reality of the "now", where brushing is perceived as a skippable chore. This begs the question whether highlighting more immediate and short-term effects - such as school performance, having friends and later getting a job - may provide a

more urgent impetus for parents and children to look after their oral health. Dental professionals and educators have to reconsider how they communicate the benefits of consistent and better toothbrushing, because it goes beyond a reduction in cavities, gum disease and other painful oral health issues.

“ You brush for others in the morning and you brush for yourself in the evening. We need more people brushing for themselves. ”

Rather than proposing a one-size-fits-all approach, we believe that any new messaging must take account of the age range of the children at whom it is directed. Simply telling a 6- or 7-year-old that if they brush their teeth, they are more likely to get a job or a boyfriend, may not be effective; telling them that they may miss out on playtime with their friends, and eating and having a good sleep if they don't look after their teeth could feel more relevant. Such a message would have to be combined with the promise that visits to the dentist are more likely to be for prevention, rather than treatment.

We have to find a way of inspiring and galvanising both children and their parents, so

that they brush twice a day not because they are told so, but because they know that it's what they want to do. It is therefore essential that educators and HCPs make parents aware of the consequences of neglecting their own and their child's oral care, and that they do so in a way that parents can understand and feel compelled to act on. Only if parents and other care-givers reassess the importance of their brushing routines in the morning, when they want a fresh mouth, and at night, to prevent acids and bacteria damaging their teeth while they sleep, and transmit this message to their offspring, will change happen. As described by the Unspoken Smiles Foundation, an NGO dedicated to providing early oral health treatment and education for children in underserved communities around the world; "You brush for others in the morning and you brush for yourself in the evening. We need more people brushing for themselves."

The importance of the night-time brush

As we have highlighted before, children who go to bed without brushing their teeth are more likely to have poor health and suffer from oral pain. As the statistics show, this fact is now widely known, and so across all markets nearly a third of parents are not enforcing bedtime brushing. We need to shift our prevention messaging, so that children and their parents understand how crucial the

Re-Examining The Prevention Message



night-time brush is. Instead of focusing on the twice a day message, more emphasis has to be placed on the night-time brush. The benefits of the night-time brush need to be explained in a more relatable way, so that children and parents understand the urgency (your teeth are less likely to hurt, because brushing at night stops acid and bacteria from making holes in them as you sleep). It's also vital that we find a way of communicating a somewhat intangible ROI, which is rooted in the relationship between good oral health and self-esteem.

Helping parents read oral pain

Parenting can be confusing, not least when it comes to children's oral health. Knowing when your 6-year-old's headaches, jaw pain

or low-grade fever require further investigation, or are simply a normal part of their development as molars emerge isn't always clear cut - especially if the pain is accompanied by bleeding, sore gums and lasts several days. Most children lose their primary teeth between the ages of 6 and 13, and the majority of children in that age band surveyed said they

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The benefits of the night-time brush need to be explained so that children & parents understand
 ”

had experienced oral pain over the past year. Only three in ten who told their parents however, only a third were taken straight to the dentist.¹⁴

Despite multiple possible reasons for parental inaction - including the genuinely felt conviction that there was nothing wrong with their child other than normal tooth-shedding and growth - given the prevalence of oral pain (and dental caries) among children worldwide, it makes sense to look again at the teaching around it. The global situation cries out for new guidelines that acknowledge the potential for confusion when it comes to oral pain and simultaneously help parents better understand when their child's symptoms warrant professional attention, and the potential consequences - in terms of health and otherwise - if that is not forthcoming.

User-friendly dentists

It's a well-known fact: dentists cause anxiety in patients and potential patients. However, what has not been obvious before is that parents' fears of going to the dentist can result in skipped routine visits to the dentist, which in turn can have an impact on the oral health and overall wellbeing of their children. Of the children who visited a dentist during the previous year, the majority had gone because of an oral health issue rather than for a recommended routine check-up¹⁵ which, by itself, would heighten the fear factor. Add to this the

vastly varied nature of the dental experience across and within countries, and the need for less intimidating clinical environments becomes obvious.

While dental professionals are increasingly aware that they need to reduce factors that might intimidate patients feel, more needs to be done to make families with oral health issues more welcome. Improvements could include (but are not limited to):

- Warmer décor to set a friendlier tone
- Toys (including models of medical instruments) for children
- Child-friendly language (for example, telling a child they are going to “count their teeth” rather than examine them)

- Straightforward, non-judgmental explanations
- Emphasis on constructive partnership with parents
- Wider availability of dental surgeries with free, low-cost or sliding-scale fees

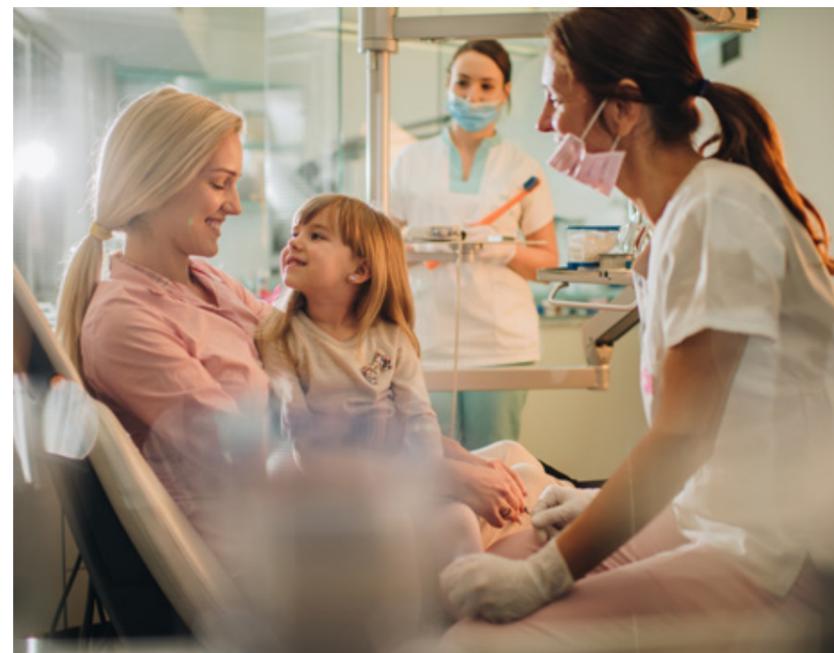
The significance of diet

Global urbanisation and rapid industrialisation have meant the spread of unhealthy diets high in meat, sugar, fat and salt to developing countries. Twice as many people with obesity now live in poor countries than rich ones,¹⁶ but concerns around waistlines often arise alongside worries around oral health. Different cultural attitudes to weaning and bottle feeding, along with the wider availability of processed food, insufficient consumption of fruit and vegetables, the rapidly increased popularity of sugary drinks and

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The global situation cries out for new guidelines that acknowledge the potential for confusion when it comes to oral pain
 ”

the adoption of snacking, can all have a negative impact on children's oral health and their self-esteem. In Vietnam - the market with the highest ratio of children suffering oral pain (8 in 10)¹⁷ - a quarter of adults are overweight or obese and obesity among under-fives is growing fast. What is more, Vietnamese eat on average 46.5g of sugar a day - almost double the WHO recommendation of less than 25g.¹⁸

Tobacco use and alcohol consumption are also a concern, particularly among teenagers. Thirty per cent of the world's smokers live in Asia and, at 76%, Indonesia has the highest percentage of adult male smokers. The majority of these live in lower-income households.¹⁹ Many smokers take up the habit as children; in other parts of the world, such as Europe and the Americas, alcohol consumption often goes hand in hand.



Re-Examining The Prevention Message

We have to get better at raising awareness of the negative effects of consuming too much sugar, salt and fat. The harm done to teeth and mouth by tobacco and alcohol must also be better communicated. However, HCPs, dentists and other educators must do so in a way that helps parents and their children make the link not just between diet and oral health, but also the broader impact on the overall wellbeing of children and teenagers.

Dental outreach and access

In many parts of the world, good quality dental care is still the exception, not the rule. The number of trained dental professionals and well-resourced dental facilities in many middle- and lower-income countries does not meet their population's needs.²⁰ In high-income countries such as the US, meanwhile, a significant percentage of families forego routine dental services because they can't afford them.

The result, even in some wealthier countries, is that large numbers of people are unable to access adequate dental care and are ignorant of simple, preventive self-care measures and correct techniques. Instead, they endure niggles, pain and correlating lowered self-esteem in silence as small, often treatable problems grow into significant ones.

Unsurprisingly, the prevalence of tooth decay, gum disease, oral trauma from injury and other serious diseases – such as oral

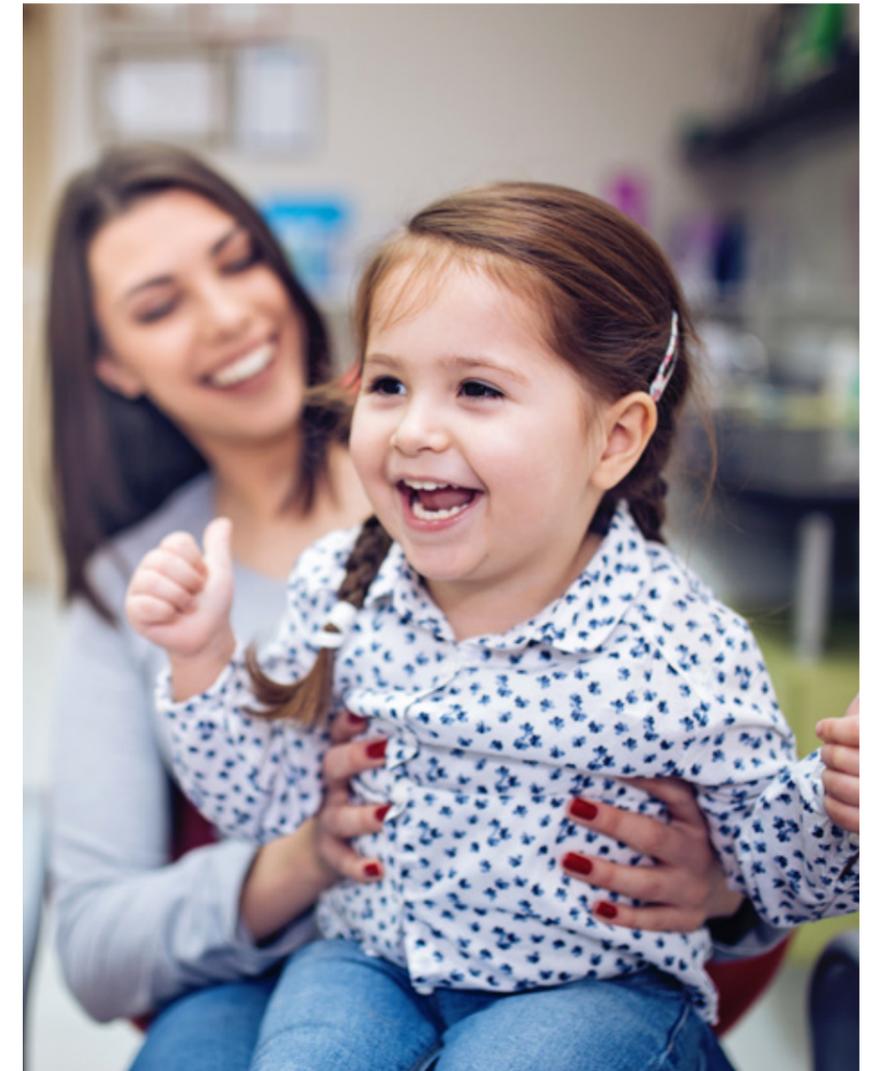


cancers, edentulism and noma – is disproportionately high among adults and children from socially disadvantaged groups and those living in poorer countries.²¹ In some regions of the world, such as Asia-Pacific, the high incidence of oral cancer makes it one of the top three cancers most commonly suffered.²²

Improving the situation worldwide requires a multi-pronged approach to dental outreach and access that includes (but is not limited to):

- **Identification of gaps** in oral care infrastructure and affordable treatment
- **Better integration** of current oral health services and education programmes at local, regional, national and international levels
- **More investment** in up-to-date, good quality dental facilities and low-cost treatments, particularly in poorly served areas
- **More low-cost and mobile dental services** offering free dental check-ups to increase access, especially for remote, rural and poor urban communities
- **An increase in the number of trained dental professionals and other healthcare workers**, such as midwives and doctors, collaborating to proactively teach basic preventive oral care to parents, particularly in countries where the ratio of dentists to patients is high
- Wider access to **safe drinking water, ideally fluoridated**, especially in areas where the water is considered unsafe and / or natural fluoride levels are below average
- **Recruitment** - and training - of **local volunteers** in the principles of prevention, so they can reach out to in-need families and other community members
- **School programmes** with teaching and Q&A

sessions that span last long enough to embed and consolidate learning about the importance of daily oral care and general hygiene, correct brushing and flossing techniques, signs of problems, and so on.





Unilever Oral Care: Our Vision And Approach

We believe that every smile matters. Nothing should get in the way of smiling, especially not poor oral health. That's why we see the findings of this report as a call to action.

For many years we have been on a mission to actively improve oral health in communities around the world. We do this through school programmes, digital dental advice, free dental check-ups and large-scale brushing events at World Oral Health Day (WOHD) and in partnership with the FDI World Dental Federation, an association of more than one million dentists worldwide.

Prevention is obviously the key to a happy mouth. Through our educational programmes we aim to establish long-lasting brushing habits, which are proven to increase brushing frequency by 25%. Using a fluoride toothpaste can reduce tooth decay by up to 50%.

Yet tooth decay is still the world's most widespread disease and toothache is the main reason for children to miss school.

When we commissioned this global research, we wanted to better understand the context of oral care, especially its relationship with children's school performance and their social lives. This is the first study of its kind and it gives oral healthcare professionals around the world



a good baseline to better understand and remedy the hidden impact to children caused by poor oral health.

The research shows that children with poor oral care and dental health issues are more likely to frequently skip their night time brush, and that they also have greater difficulties at school – starting with attendance all the way to their participation in classroom activities, right down to being able to laugh and make friends. Far fewer see themselves as “good” students and many more are likely to have low self-esteem.

The impact of poor oral health on their confidence and sense of self-worth is clear. Poor oral health doesn't just cause bad

breath, cavities and pain: it profoundly affects children's wellbeing, which in turn makes them less likely to fulfil their potential.

So if we want to make every smile matter, then we have to recalibrate our message. We must broaden the message of our school programmes and other interventions, so that we don't just focus on the health benefits of good oral care, but also explain its more fundamental personal and social impact. We hope that this can motivate many more individuals and communities to brush, and to brush effectively.

We don't know yet, how we can best land these messages; however, we know that we

have to evolve our educational programmes to achieve the best outcome.

After all, our objective has not changed: we want children everywhere to feel good about their oral health. They should know

that they are doing the right thing by “brushing for themselves” – for superior lasting protection, relief from pain, better performance at school, unaffected personal confidence and brighter smiles. Already, we've reached nearly 82 million smiles and counting.

“
Nothing should get in the way of smiling, especially not poor oral health.
”

Final thoughts

Consider for a moment the truly game-changing possibilities of children – and their families – brushing their teeth as an investment in themselves. An investment in their future opportunities. Whether you are a dentist seeking to expand your patient base among a harder-to-reach demographic; an academic eager to give healthcare workers of tomorrow a head start; an NGO grappling with the challenges of improving on-the-ground oral care access, or a policymaker pondering the unpalatable limitations of universal health care, the idea of people brushing for themselves before they go to bed may be worth a thought. After all, it could redefine the world of oral health care as we know it.
www.unilever.com

A healthy smile takes you further

While losing teeth is a natural part of growing up, oral pain related to cavities and tooth decay is not. Current oral care messaging focusing on health impacts alone isn't working.

THERE IS AN ORAL HEALTH CRISIS

6 in 10

Children felt **pain** due to their **teeth** in the last 12 months



OVER 1 in 3

Children experiencing **moderate to severe oral pain** in the past year



WITH

37%

of children with poor oral health **don't always** brush their teeth **before bed** compared with 20% of children with good oral health



18%

of parents allow their children to **skip brushing** as a 'reward'

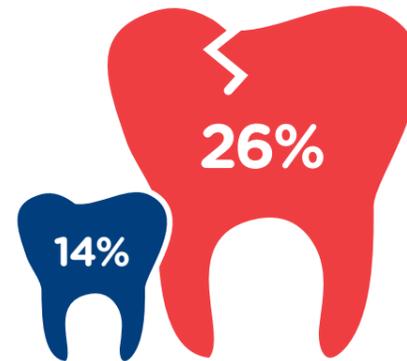
ONLY 32%

of children visit the dentist for **check ups** as recommended



POOR ORAL CARE ROUTINES ARE COMMON

THE IMPACT GOES BEYOND HEALTH



Children with **poor oral health** are nearly twice as likely to find it **difficult to socialise** with others

ALMOST 1 in 3

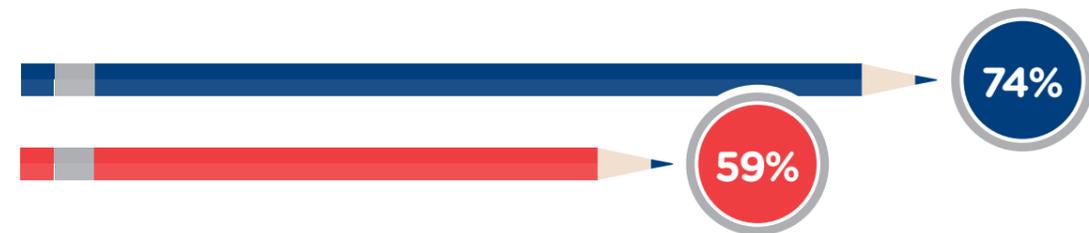


Children have **missed school** in the last year due to **oral pain**. **243 million days** of school missed.



Children who suffer from **oral pain** are **3x** more likely to **opt out of school activities**

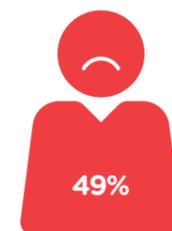
Children with **good oral health** are more likely to **enjoy school**



CHILDREN'S ORAL HEALTH LINKED TO SELF-ESTEEM

Proven link between oral health and a child's **confidence and sense of self-worth**

Children with **poor oral health** are more likely to have **low self-esteem**



49%
Poor oral health



32%
Good oral health

New Global Study: Methodology

As part of its mission to better understand the challenges and difficulties that poor oral care can bring, Unilever Oral Care has commissioned the first-ever global study looking at the social significance of children's oral care on their lives within, and beyond, the classroom. It is the first broad-based, multi-market study to ask questions about how the quality of a child's oral health affects the way s/he feels, interacts with others and lives their life, rather than focusing solely on their school grades.

In the final quarter of 2018 and the first of 2019, researchers conducted oral health surveys in eight different markets: France, Italy, Ghana, Egypt, Vietnam, Indonesia, Chile and the United States. Participants within 6 of these completed questionnaires online; face-to-face surveys were conducted in Ghana and Egypt where internet access is lacking among socio-economic groups with low income while women and children have reduced online access across the board.

Five hundred respondents took part in each market. Each "respondent" was made up of one parent and their child (aged between 6 and 17 years old). All children involved were attending primary or secondary school, with an even split across the two main age groups: 6 to 12 years old and 13 to 17 years old.

To qualify for participation, parents had to be solely or jointly responsible for their child's health and live with their child for most of the week.

The survey was designed to establish the state of the child's oral health; to give an understanding of their attitudes, perceptions and challenges around oral care; their own and their parent's frequency of brushing and relationship with their teeth; as well as the consistency – or not – of their oral care routine and its level of priority in their day-to-day lives. The survey explored how their oral health and the experience of oral pain affected their life at school; specifically, their attendance, confidence, ability to concentrate, participate, connect with teachers, make friends, socialise, and have fun.

To understand the quality of children's oral health, the survey incorporated part of a WHO self-assessment questionnaire designed to establish the state of a child's teeth. To understand if oral health is linked to self-esteem, the survey incorporated adapted questions from the Rosenberg Self-Esteem Scale; a widely used self-reported tool for measuring an individual's self-esteem based on their positive and negative feelings about themselves.²³

Advanced statistical analysis was employed to establish if oral health is linked to a child's self-esteem and, if so, how does this influence broader outcomes such as the child's ability to socialise, their performance at school, and their enjoyment at school.

A regression analysis was used to establish if oral health is linked to a child's self-esteem. The Index Score devised from the Rosenberg scale was used as the dependant variable, with descriptors of oral health used as the independent variables. Parent's income and education status were added as control. Full details of the model set-up can be found in the appendix.

Once a link between oral health and self-esteem had been established, an uplift analysis was employed to understand the influence of self-esteem (as measured by the Index Score) and several 'outcome' measures in our survey, such as enjoyment of school. This method was preferred to a correlation analysis as many of the statements were binary in nature (that is, they were either selected or not selected). The analysis measures the change in self-esteem score when each of the answer codes is selected, compared to when it is not selected.

Cynthia Pine, Professor of Dental Public Health, Queen Mary University of London

Cynthia Pine is Professor of Dental Public Health at the Institute of Dentistry, Barts & The London, Queen Mary University of London. Her research focuses on oral health promotion for children, particularly the prevention of childhood dental caries, tooth decay. She works with disadvantaged communities nationally and internationally with the goal of reducing health inequalities.

Professor Pine was appointed President of the British Association for the Study of Community Dentistry; became Founding President of the European Association of Dental Public Health & was elected first Honorary Member "for her outstanding contribution to promoting teaching and research in dental public health across Europe". She was Director of the WHO Collaborating Centre for Research in Oral Health of Deprived Communities. Professor Pine was recognised by a Special Merit Award for Outstanding Achievement in Community Dentistry – International by the American Association of Public Health Dentistry; appointed CBE by the Queen, For Services to Dentistry; elected to Honorary Fellowship of the Royal College of Surgeons (England); awarded by the National Health Service, NHS, National Clinical Excellence Award; made Fellow of the City & Guilds Institute, London, Fellowship (FCGI) is the highest honour conferred by the Council "to recognise outstanding professional and personal achievement". In 2015, she was awarded the ORCA Prize by the European Association of Dental Research, "in recognition of outstanding contributions to the field of dental caries research"; and in 2018, awarded the International Association of Dental Research, IADR E.W. Borrow Memorial Award for "the originality of her contributions and record of achievement in the field of oral health promotion and on the significance of research carried out on the oral health of children".

Donald Chi, University of Washington

Donald Chi is an Associate Professor at the University of Washington School of Dentistry and School of Public Health. He is board-certified in pediatric dentistry and dental public health. Chi's research focuses on understanding and addressing children's oral health inequalities. He was appointed to the U.S. Department of Health and Human Services, Advisory Committee on Training in Primary Care Medicine and Dentistry, is a Board Member of the International Association for Dental Research (IADR) and is Chair of the American Academy of Pediatric Dentistry (AAPD) Council on Scientific Affairs. He is the first dentist to be named a William T. Grant Foundation Scholar, received the 2017 Distinguished Scientist Award from IADR, and was named the AAPD Pediatric Dentist of the Year in 2018. He spent the 2016-2017 academic year as a Fellow at the Center for Advanced Study in the Behavioral Sciences at Stanford University. Chi teaches public health to dental students and residents, and has been a staff pediatric dentist at the Odessa Brown Children's Clinic in Seattle since 2009.

Biographies

Francisco Ramos-Gomez, DDS, MS, MPH, UCLA Professor Pediatric Dentistry

Dr. Ramos-Gomez is a professor in the Division of Pediatric Dentistry and he serves as the Executive Director for the UCLA Center for Children's Oral Health at the School of Dentistry. He has been a pediatric dentist for more than thirty years with specific focus and research in the areas of early childhood caries (ECC) prevention, oral disease risk assessment, and community health with an emphasis on underserved populations. In addition to clinically based interventions, Dr. Ramos-Gomez conceptualized and co-founded the Center to Address Disparities in Children's Oral Health. As a proponent of global health, Dr. Ramos-Gomez has supported the UC California-Mexico Health Initiative, and chaired the Oral Health Task Force. He has received numerous accolades over the years and in 2011, Dr. Ramos-Gomez received the National Dental Association Foundation Recognition Award for Research and in 2015 the IAPD Innovation Award in Glasgow. He is a national and international recognized speaker and a Fellow of College of Dentistry as well as Fellow and a Diplomate of the American Academy of Pediatric Dentistry.

Professor Nigel Hunt OBE PhD, BDS, MSc, FRCS, FDS RCS, FGDP, M.Orth RCS, FHEA.

Chairman, Division of Craniofacial Development (incorporating Paediatric Dentistry and Orthodontics), Professor of Orthodontics, UCL Eastman Dental Institute, London.

Professor Hunt qualified in dentistry in 1974 and after working in primary care, undertook several junior hospital posts in the specialities of paediatric dentistry, orthodontics, prosthodontics and oral and maxillofacial surgery. Having passed the Fellowship exams of the Royal Surgical Colleges, he completed his specialist orthodontic training in 1980. He was appointed Senior Lecturer and honorary Consultant in 1984, Professor and Head of Orthodontic Research (1996) and Head of Division in 1998. He was elected Dean of the Faculty of Dental Surgery at the Royal College of Surgeons of England (2014 - 17) where he ensured improving children's oral health was the Faculty's prime focus. He is a founder member of Public Health England's Children's Oral Health Improvement Programme Board and has co-authored several reports and media articles on ways to improve oral health, especially in children, which has culminated in numerous press, radio and TV interviews. Nigel has received many national and international awards culminating in the award of the OBE in the Queen's Birthday Honours in 2017 for his work in orthodontics and children's oral health.

Data Appendix

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¹⁵ Global stat t/c

¹⁶ <https://www.theguardian.com/global-development-professionals-network/2014/apr/22/eat-smaller-and-smarter>, **accessed 12/2/19**

¹⁷ Country Fact Sheet Vietnam (February 2019)

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