

# The State of Oral Health in Europe

Report Commissioned by the Platform  
for Better Oral Health in Europe

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## Foreword

The news on Europe's oral health is both good and bad: the good news is that we have witnessed incredible progress in the last decades in the prevention of caries in children. The bad news is that having damaged, missing or filled teeth is still the norm rather than the exception in Europe, and oral diseases remain amongst the most important health burdens. Moreover, we still fail to realise that oral health is about much more than having good teeth. It is an integral part of our general health, and it impacts not only our quality of life, but also on society and health systems through the associated economic costs.

In a time of austerity measures and growing pressure on healthcare budgets, this report is a timely reminder that we have to tackle the persisting disparities in oral health across and within EU countries, with regards to socioeconomic status, age, gender, or indeed general health status.

In order to do so and to ensure that European citizens can all have healthier smiles in the future it is my belief that the EU can, and must, play a stronger role in the fight for better oral health.

This report clearly underlines the challenges that citizens and policymakers are confronted with when trying to improve oral health:

- Traditional curative dental care has a significant economic burden for many industrialized countries: the current EU 27 spending on all aspects of care and treatment is close to €79 billion, and if the trends continue, this figure could be as high as €93 billion in 2020.
- Demographic change presents a formidable challenge for oral health, since decreasing loss of teeth within the elderly population is expected to increase treatment needs significantly in the coming years.
- There are rising inequalities across Member States in terms of access to appropriate oral care, as low-income populations most in need of dental care face higher hurdles compared to high-income groups.

At the same time, this report also outlines a number of successful initiatives that can help reduce the social and individual burden of oral diseases through a number of measures such as: community-based prevention initiatives, reduction of the socioeconomic and environmental risk factors of chronic diseases, the promotion of routine oral hygiene practices and oral health awareness and the provision of better access to dental care.

Applying these successful models and sharing good practices across the EU can play a vital role in improving the oral health of European citizens. In that sense, this report provides the evidence-base for good policymaking. I encourage everyone to help in putting the report's recommendations into action.

Ms. Karin Kadenbach, Member of the European Parliament



A handwritten signature in black ink, appearing to read 'K. Kadenbach', written in a cursive style.

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## Foreword

The “State of Oral Health in Europe” report has been commissioned by the Platform for Better Oral Health in Europe, a forum which brings together European organisations that work towards the promotion of oral health and improving the prevention of oral diseases in Europe.

Despite significant achievements in the prevention of caries in Europe, a lot remains to be done in a number of areas including: oral health awareness, tackling oral health inequalities and addressing common risk factors. In addition, the development of high quality, comparable oral health data in Europe and better cost-effectiveness studies, to assess the impact of prevention initiatives, are indispensable tools in the fight for better oral health in Europe.

The “State of Oral Health in Europe” report was born from the desire of the Platform to promote the evidence base and seek opportunities to deepen cooperation with European decision-makers to improve oral health policies in Europe and accelerate the sharing of good practice. The report has gathered the most reliable data available on the prevalence of oral diseases in Europe and presents new evidence of the economic and social impact of oral health. The report also aims to contrast and benchmark good practice initiatives in oral health across Europe, in order to identify priorities and define a set of key recommendations to improve oral health in Europe.

The report is published ahead of the 1st Pan-European Oral Health Summit, to be held on 5<sup>th</sup> September 2012, at the European Parliament, with the kind support of Ms. Karin Kadenbach MEP and Dr. Cristian Silviu Buşoi MEP and under the patronage of the Cypriot Presidency of the European Union. The Summit brings together policymakers and specialists in Brussels, at the occasion of World Oral Health Day, to discuss the current situation and engage policymakers to commit to developing and funding policies that will improve the prevention of oral diseases prevention and their treatment.

It is somewhat surprising and regrettable that – for years – there has been no concerted effort at an EU level to bring dental public health to the attention of the European Institutions, and to give policymakers a deeper understanding of what can and needs to be done about oral health in Europe, particularly its integral role for general health and well-being. The stakes on this issue are high and the time for change is now. With the Platform, the Report and the 1<sup>st</sup> Pan-European Oral Health Summit I hope and believe we finally have the adequate tools and procedures in place to work effectively together and foster policy decisions which will benefit the oral health of everyone in Europe in the years to come.

Professor Kenneth Eaton, Chair of the Platform for Better Oral Health in Europe



*K. A. Eaton*

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The opinions and views expressed in this report are the sole responsibility of its author.



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Reena graduated as a dentist from the University of Wales, College of Medicine. She gained her Diploma of Membership of the Faculty of Dental Surgery at the Royal College of Surgeons of England, and then went on to complete an MSc in International Health management at Imperial College, London.

Reena has worked in a variety of clinical roles within the National Health Service in the UK, and in voluntary placements abroad, in India and Nepal. In recent years, she has expanded her knowledge and corporate experience by working as a Management Consultant at Deloitte, in the Healthcare and Lifesciences Division. Reena has undertaken several independent commissions for a variety of organisations. She has also presented the findings of her work at national and European scientific conferences, and published in the British Dental Journal and Oral Health and Dental Medicine.

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# Executive Summary

## Introduction and context

Across Europe, oral diseases constitute a major public health burden, and significant oral health inequalities exist both within and between individual Member States in terms of severity and prevalence. The burden is attributable principally to dental caries, periodontal diseases, and oral cancer.

Oral diseases not only impact on the individual through pain and discomfort, and the broader impact on their general health and quality of life, but also on the wider community, through the health system and associated economic costs.

Expenditure on treatment of oral conditions often exceeds that for other diseases, including cancer, heart disease, stroke, and dementia. This is disturbing, given that much of the oral disease burden in high-income countries is due to dental caries and its complications, and this is preventable through the use of fluoride and other cost-effective measures.

There is a distinct lack of policy emphasis placed on prevention within oral health in Europe. This is compounded by the dearth of routinely available and comparable epidemiological and economic data, which describe the current situation in Europe. Robust data is of supreme importance in the planning, implementation and evaluation of community preventive activities and oral health promotion, and as a result there are thus challenges in identifying best-practice initiatives, and allocating resources to where they are most needed.

In light of this situation, the Platform for Better Oral Health in Europe commissioned Dr Reena Patel, Dental Advisor, to examine some of the key issues relating to oral health. These include:

- Prevalence and trends of oral diseases in Europe;
- Assessment of the economic impact of oral diseases in Europe;
- Identification of best practice initiatives in oral health promotion across Europe;
- Development of a set of key recommendations for decision-makers to improve oral health in Europe.

This Section contains a summary of the key findings of the report, which assesses the burden caused by oral diseases in Europe, and identifies policy orientations to address it.

In order to provide a representative view of the situation across Europe, while reflecting the most reliable data available, the author focused on the following countries: Austria, Cyprus, Denmark, France, Germany, Ireland, Italy, Lithuania, Poland, Romania, Spain and the UK.

## Prevalence and trends of oral diseases in EU Member States

Chronic non-communicable diseases and conditions such as obesity, heart disease, stroke, cancer, diabetes, and oral diseases all share a set of common risk factors which include diet, smoking and alcohol use.

Despite being largely preventable, oral diseases and inequalities, constitute a significant public health problem alongside the inequalities in the prevalence of the major diseases of the 21st century.

A range of health conditions are associated with oral disease. Poorly controlled diabetes is a well-established risk factor for developing periodontal breakdown and recent research shows how chronic gum diseases can increase diabetic complications. Gum diseases are also associated with rheumatoid arthritis, adverse pregnancy outcomes, and coronary heart disease.

### Key points

- *Despite a global decline in caries, the disease still remains a problem for many groups of people in Eastern Europe, and for those from socio-economically deprived groups in all European Union Member States.*
- *Over 50% of the European population may suffer from some form of periodontitis and over 10% have severe disease, with prevalence increasing to 70-85% of the population aged 60-65 years of age. Periodontal health may be deteriorating within the population of the EU. This is principally due to a larger number of people that are retaining some of their teeth into old age, and an increase in the prevalence of diabetes. Epidemiologic data on periodontal diseases are of very poor quality.*
- *Oral cancer is the eighth most common cancer worldwide. In the EU, lip and oral cavity cancer is the 12th most common cancer in men. In 2008, there were approximately 132,000 cases of head and neck cancer across Europe, resulting in 62,800 deaths. Highest prevalence rates are found in Spain and Hungary. Trends in oral cancer are now showing an increasing incidence in women, and young adults. Mortality rates have continued to increase in several Eastern European Member States.*

## Economic impact of oral diseases in Europe

Dental disease and its complications can impose a significant financial burden to the individual and society. This is disturbing, given that much of the oral disease burden in high-income countries is due to dental caries and its complications, and this is preventable through the use of fluoride and other cost-effective measures.

However, there are challenges in estimating the expenditure on the provision of oral healthcare due to a lack of data, and difficulties in quantifying out-of-pocket expenditure and indirect costs arising from the social burdens of poor oral health, and its interaction with systemic diseases.

Out-of-pocket expenditure is an important, and often underestimated, aspect of oral healthcare delivery. In Member States where oral health services are mainly provided by private practitioners, there may be a significant impact on low income groups, which may not be captured by decision-makers.

The lack of robust data on the economic burden of oral diseases and the cost-efficiency of preventative measures is a major public health issue in Europe. This may lead to an underestimation of the true costs of oral healthcare provision, thus limiting the ability to assess the impact of existing public health measures, and invest in the most effective initiatives.



### Key points

- *Delivering oral health services is costly, accounting for 5% of total health expenditure and 16% of private health expenditure across OECD countries in 2009.*
- *The current EU 27 spending is close to €79 billion, and if the trends continue, this figure could be as high as €93 billion in 2020.*
- *Studies have also shown that the mouth is the most expensive part of the body to treat. Expenditure is likely to exceed that for cancer, heart disease, stroke or dementia.*
- *There is strong evidence that the benefits of preventing tooth decay exceed the costs of treatment. This is particularly evident in Member States such as Denmark and Sweden, which have invested heavily in the provision of preventative oral health services, with a significant reduction in the prevalence of oral disease.*

## Inequalities relating to the treatment of oral diseases in Europe

Inequalities in health between people in higher and lower educational, occupational and income groups have been found in all Member States. Lower socioeconomic groups are more susceptible to poor nutrition and to tobacco and alcohol dependency, all of which are major contributory factors in many diseases and conditions. There are also profound oral health disparities across EU countries, related to socio-economic status, age, gender, and general health status.

Caries still remain a major health problem for many groups of people in Eastern Europe, and in all European Member States, for those from socio-economically deprived or vulnerable groups. The incidence of oral cancer and periodontal diseases is also strongly related to social and economic deprivation.

A factor which impacts on dental attendance is the structure for the delivery of oral healthcare services, which varies significantly between individual Member States. A far lower percentage of the population appear to attend the dentist in socially and economically less well developed EU Member States, where there is little or no publically funded dentistry, than in those which provide publicly subsidised oral health care.

### Key points:

- *Ensuring access to oral healthcare services remains a major health problem among vulnerable and low income groups. These individuals generally attend services less frequently than the general population, for primary care or emergency treatment when in pain, rather than for preventive indications.*
- *Eurobarometer survey data (2010) suggest that of those who responded to the survey, the respondents most likely to have visited a dentist in the last twelve months were inhabitants of Northern EU Member States.*
- *The association between education and attendance at the dentist varies significantly between Member States. Europeans who are in full time education the longest appear to be more likely to visit a dentist for a check-up, rather than only attending when in pain.*

## Oral health policies, the promotion of oral health and the prevention of oral diseases in Europe

Frequent exposure to fluoride, regular brushing, a healthy diet and routine oral care all contribute to improved oral health outcomes and a reduction in oral health inequalities.

Most of the evidence in oral health promotion relates to dental caries prevention and control of periodontal diseases. Strong evidence exists that topical fluorides (fluoride toothpaste, fluoride varnish and fluoride mouth rinses) can prevent tooth decay.

Gum diseases can be prevented by good personal oral hygiene practices, including brushing and cleaning between teeth, which are important for the control of advanced periodontal conditions as shown by successful programmes e.g. in Sweden.

Limited evidence exists for the effectiveness of screening for early detection of oral cancer on a population basis, but assessment of the oral soft tissues should be a routine part of an oral examination, especially for groups at higher risk of oral cancer, such as smokers and heavy drinkers.

Across the EU, a variety of successful community-based public oral health programmes exist. These focus on the delivery of preventative treatments, increasing awareness and enhancing patient education to encourage healthy routines and self-care. However, there is a consistent lack of coordination between public authorities in identifying and sharing good practices. In particular, cost-effectiveness studies of preventative initiatives are lacking.



### Good practice: Denmark's preventative oral health care model

Approximately 40 years ago, Danish children's oral health was among the poorest in Europe. However, a targeted and proactive approach to deliver preventive care within the public oral health care service has had significant results. Between 1974 and 2000, the average DMFT scores in 12-year-old Danish children fell by 78% from 4.5 to 0.98. By 1997, more than 99% of Danish children received oral health care every year.

All municipalities in Denmark are obliged to establish local clinical facilities to provide all children and adolescents residing in the municipality with free and comprehensive oral health care, including health education and prevention, from newborn to 18-year-old children. Clinics are often located in, or nearby primary schools.

A sophisticated register of all children residing in the municipality is utilised to monitor attendance to the clinic. The initial visit to the clinic is organised by the local oral health service. A letter is posted home to inform parents that their child is now entitled to free dental care.

Preventative efforts are directed at the individual through tailored advice and guidance. However, significant emphasis is also placed upon reinforcing these messages within other health, social and education environments through staff in day-care centres, teachers, health visitors and paediatricians (Association of Public Health Dentists in Denmark 1997).



### Good practice: An evidence-based toolkit for prevention

In the UK, the Department of Health and the British Association for the Study of Community Dentistry have jointly produced an evidence-based toolkit for the prevention of oral disease by primary care dental teams “Delivering Better Oral Health: An evidence-based toolkit for prevention” (DH 2009). This toolkit provides easy to use advice on the prevention of dental caries, periodontal diseases and oral cancer. The third revised edition is due to be released shortly, and the tool is currently being translated into Spanish.

#### Key points

- *A range of effective population-based preventative initiatives have been implemented across Europe. These include water fluoridation programmes (Ireland, Poland, Serbia, Spain, UK); fluoridated salt programmes (Switzerland, Slovakia, France, Germany and the Czech Republic) and fluoridated milk programmes targeting children (Bulgaria, UK).*
- *Oral health education programmes delivered in a school setting have demonstrated improvements in child dental health, especially when delivered alongside additional home support and community interventions (France, Germany, Ireland and UK).*
- *A targeted and proactive approach to deliver preventive care within the public oral health care service in Denmark has had significant results. Local clinical facilities provide children and adolescents with free and comprehensive oral health care, using a sophisticated register to monitor attendance.*
- *Evidence-based toolkits for the prevention of oral disease can be developed by Ministries of Health to provide dentists and the public with accessible and accurate information (UK).*
- *Several countries (Finland, Germany and Switzerland) actively promote sugar-free products*
- *Restricting marketing, and improving the labelling of certain food products, as part of broader initiatives to tackle the socio-behavioural and environmental factors of oral diseases, has shown some effect.*
- *An international example of good practice includes the online Canadian Best Practices Portal which showcases effective “best” practices models, methods, and research evidence in the fields of community based health promotion and disease prevention interventions.*

## Conclusions and recommendations for European decision-makers

In the last 30 years, despite major improvements in the prevalence of dental caries in children and young adults who live in Western Europe, it is evident that oral diseases, and oral health inequalities, remain a significant public health problem in Europe.

In many EU Member States, oral health care is not fully integrated into national or community health programmes. There is a clear lack of research in oral health promotion, and very few high quality outcome measures exist for use in the evaluation of oral health policy and environmental interventions. This problem is compounded by the lack of routinely available and comparable EU oral health data.

There are also challenges in identifying best practice measures, and sharing learning outcomes from oral health promotion activities. A more progressive health promotion approach that recognises the importance of tackling the underlying social, political and environmental determinants of oral health is required. However, across Europe, there is a lack of suitably trained advisors with the ability to develop oral health epidemiological infrastructures and assist in oral health strategy and policy development.

To address the burden of disease, the following actions should be considered by European decision-makers:

- Making a commitment to improving oral health as part of EU policies by 2020;
- Addressing increasing oral health inequalities;
- Encouraging good practice sharing;
- Improving the data and knowledge base, bridging the research gap in oral health promotion and developing common methodologies in data collection processes;
- Supporting the development of the dental workforce in Europe.

## *Key policy recommendations*

- *Recognise the common risk factors for oral diseases and other chronic diseases, and work towards linking oral health policies across other EU policies.*
- *Better integrate oral health into relevant national and EU health programmes and policies.*
- *Develop a coherent European strategy for the promotion of oral health and the prevention of oral diseases.*
- *Address the major oral health challenges of children and adolescents, socio and economically deprived groups, an increasing elderly population and other vulnerable populations in Europe.*
- *Employ an approach that focusses on the wider political, environmental, social and economic drivers that create oral health inequalities. A multi-strategy approach is needed that considers further measures such as legislation, fiscal policy and community development. This radical policy reorientation is principally the remit of national policy makers and professional organisations.*
- *Develop supportive oral health environments in local settings such as schools, colleges, hospitals, workplaces and care organisations.*
- *Encourage and promote policies to ensure access to fluoride for the whole population.*
- *Guarantee availability and access to high quality and affordable oral health care, including free basic treatment for individuals under 18 years of age*
- *Ensure access to relevant and evidence based oral health information to encourage patient empowerment and self-care.*
- *Maximise the potential of the dental team (dentists, hygienists, therapists, nurses, technicians, oral health promoters and educators) to ensure an appropriate use of skill mix in undertaking preventative interventions.*
- *Develop the role of oral health professionals in generic health promotion to address risk factors such as cigarette smoking, poor diet, high alcohol consumption, and sedentary lifestyles.*
- *Support the training and education of dentists to develop robust oral health epidemiological infrastructures and assist in oral health strategy and policy development.*
- *Make oral health and the prevention of oral diseases a priority under the European health and research programmes to specifically focus on community-based research on the social determinants of general and oral health, and inequalities in health.*
- *Improve the collection of validated oral health data, align methodologies between EU countries, and frequently collect reliable and comparable data. This may involve creating and financing European infrastructures such as a database or a registry.*
- *Disseminate all major research outcomes, best practice measures and learning experiences in oral health policy to enhance probability of building a systematic body of evidence.*

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## Section 1: About oral health

### Key points

- *Oral health is not solely concerned with teeth, but also with gums and the supporting bone and soft tissues of the mouth, tongue and lips. The three main groups of oral diseases are dental caries (tooth decay), gum diseases (known as periodontal diseases) and oral cancer.*
- *Oral diseases not only impact on the individual through pain and discomfort, and the broader impact on their general health and quality of life, but also on the wider community, through the health system and associated economic costs.*
- *Oral health is integral to general health. Chronic non-communicable diseases and conditions such as obesity, heart disease, stroke, cancer, diabetes, and oral diseases all share a set of common risk factors. Alongside increasing inequalities in the prevalence of these major diseases of the 21st century, oral health inequalities also constitute a significant public health problem.*
- *Oral diseases are largely preventable, and share aetiological factors with other conditions. Sustainable improvements in oral health and a reduction in inequalities may be achieved by controlling the risk factors for oral diseases.*
- *Dental caries is a disease of the hard tissues of the teeth caused by the interactions over time between microorganisms found in dental plaque and dietary fermentable carbohydrates (principally sugars, such as sucrose). Dental decay is entirely preventable, but is one of the most common chronic diseases. Dental caries experience among 12 year old children is assessed by the Decayed, Missing and Filled Teeth (DMFT) index, which measures the lifetime experience of dental caries in permanent dentition.*
- *Gum or periodontal diseases are caused by inflammation of the gums and bone that support and anchor teeth. When severe, the bony support for teeth is extensively compromised causing otherwise healthy teeth to be lost. Plaque deposits on the gum margins of teeth, is the primary factor that causes gum disease. Other factors that increase susceptibility include age, tobacco, stress, genetic disorders and local factors, such as crowded teeth. Poorly controlled diabetes is a well-established risk factor for developing periodontal breakdown and it is also recognised that there is a bidirectional relationship, with recent research showing how chronic periodontitis has an adverse effect on the control of blood sugar, and the incidence of diabetic complications.*
- *Oral cancers refer to cancers of the lip, tongue, gum, mouth and organs around the mouth and neck. Important risk factors are age, gender, sunlight, tobacco, alcohol, poor diet, viral infections, and pollution. A potential role for the human papilloma virus in oral cancer has also been documented.*
- *A range of health conditions are associated with oral disease. Gum diseases are associated with rheumatoid arthritis, adverse pregnancy outcomes, and coronary heart disease, although causation has not been proven. Poor oral health is also associated with aspiration pneumonia and infective endocarditis.*

Oral health is not solely concerned with teeth, but also with gums and the supporting bone and soft tissues of the mouth, tongue and lips. The three main groups of oral diseases are dental caries (tooth decay), gum diseases (known as periodontal diseases) and oral cancer.

“Oral health is essential to general health and quality of life. It is a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) diseases, tooth decay, tooth loss, and other diseases and disorders that limit an individual’s capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing.” WHO 2012(a).

Oral diseases not only impact on the individual through pain and discomfort, and the broader impact on their general health and quality of life, but also on the wider community, through the health system and associated economic costs. A study undertaken in Germany has demonstrated how oral health related quality of life impacts upon general health-related quality of life, both physically and mentally (Zimmer at al. 2010). This shows how oral well-being has an impact on general well-being. For children in particular, poor oral health can have a detrimental effect on their quality of life, performance at school and success in later life (Kwan et al. 2005).

## What are oral diseases?

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### Dental caries (tooth decay)

Dental caries is a disease of the hard tissues of the teeth caused by the interactions over time between microorganisms found in dental plaque and dietary fermentable carbohydrates (principally sugars, such as sucrose). This interaction produces organic acids which dissolve tooth substance. Dental decay is entirely preventable, but is one of the most common chronic diseases. Progressive dental caries may result in cavities, pain, and loss of teeth, which may impair some of the most basic functions of eating, sleeping, speaking and being productive. It can become a potential barrier to attaining health by interfering with growth and weight gain, especially in young children (Sheiham 2005, Sheiham 2006).

Dental caries experience among 12 year old children is assessed by the Decayed, Missing and Filled Teeth (DMFT) index, which measures the lifetime experience of dental caries in permanent dentition.

### Gum (Periodontal) Diseases

Gum or periodontal diseases are caused by inflammation of the gums and bone that support and anchor teeth. When severe, the bony support for teeth is extensively compromised causing otherwise healthy teeth to be lost. There are a number of gum (or periodontal) diseases. However, the disease with the most public health implications is chronic periodontitis in adults. Chronic periodontitis can cause bleeding gums, loss of fibres and bone that hold the teeth in place, recession of gums, periodontal abscesses, drifting of teeth, tooth mobility and ultimately tooth loss. These symptoms can have a significant impact on the individual ranging from halitosis (smelly breath) and discomfort, to changes in appearance and loss of function (Corbet 2007).

Plaque deposits on the gum margins of teeth are the causal factor. However, other factors that increase susceptibility include diabetes, smoking, stress, genetic disorders and local factors, such as crowded teeth (Corbet 2007). Periodontal diseases tend to be more prevalent in men than women (Shiau 2010).

## Oral cancer

Oral cancers refer to cancers of the lip, tongue, gum, mouth and organs around the mouth and neck. The most common sites are the lip and tongue. Causes are predominantly lifestyle-related, including tobacco, areca nut, alcohol, poor diet, viral infections and pollution (Johnson et al. 2011). Other important risk factors are age, gender and sunlight, although a role for candida and the human papilloma virus has also been documented (Scully 2009). Patients rarely seek help for oral cancer at an early stage of the disease due to its painless nature in the early stages and consequently oral cancers are usually well advanced at diagnosis. The overall five year survival rates for cancers of the tongue, oral cavity and oropharynx are around 50–60% (Rogers et al. 2009).

## Risk factors for oral diseases

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Oral diseases are largely preventable, and share aetiological factors with other conditions. Oral health is determined by a number of factors including diet, oral hygiene, smoking and alcohol use (Sheiham and Watt 2000, Benzian et al. 2012) and therefore socio-behavioural and environmental factors play an important role, as well as access to health services (Peterson et al. 2005). Sustainable improvements in oral health and a reduction in inequalities may be achieved by controlling the risk factors for oral diseases. Exposure to risk factors is determined by individual biological factors and oral health-related behaviours, which in turn is governed by economic, political and environmental conditions which influences the social and community context (Watt and Fuller 2007).

Certain health damaging lifestyle behaviours can increase the risk of oral disease. These are listed and detailed below in greater detail:

### Poor diet and nutrition

Poor oral health is associated with a poor diet (Nowjack-Raymer and Sheiham 2003, Sahyoun and Krall 2003). The frequent and high consumption of sugars is the major cause of tooth decay (Moynihan 2005), and forms a common risk factor for other health problems such as obesity (Han et al. 2010).

Recent studies of adolescent health and well-being have shown that socioeconomic inequalities exist in adolescent eating habits, (Richter et al. 2009, Vereecken et al. 2005), with those from a higher social class often reporting a more favourable diet. Fruit consumption, for example, was seen to increase with family material wealth and parental occupational status across Europe, whereas soft drink consumption was lower among adolescents of higher parental occupational status in many European Member States (Vereecken et al. 2005).

Associations with head and neck cancer have been identified for low intake of fruit and vegetables (Chuang et al. 2012).

### Poor oral hygiene

Regular brushing of the teeth and gums from an early age with a fluoride toothpaste will help prevent tooth decay and also periodontal diseases (Marinho et al. 2003, Wong et al. 2011).

### Tobacco

Smoking is recognised as an important risk factor for periodontal diseases (Johnson and Guthmiller 2000). It is also one of the main risk factors for oral cancer. Collectively, associations with increased rates of head and neck cancer have been identified for: long duration of passive smoking, especially for pharyngeal and laryngeal cancers (Lee et al. 2008); increased use of alcohol and tobacco, especially used together (Lubin et al. 2009, Hashibe et al. 2009, Purdue et al. 2009).



Smoking combined with excessive consumption of alcohol can lead to a 38 times greater risk of developing oral cancer compared to abstainers (Blot 1988). Tobacco use is also linked to a range of other health problems such as coronary heart diseases and lung cancer.

### **Alcohol consumption**

There is a well-recognised relationship between alcohol misuse and oral disease. Research suggests that patients suffering from alcohol use disorders experience poor oral health, including significant levels of dental caries, gingival inflammation, soft tissue abnormalities, tooth erosion and an increased risk of developing periodontal diseases (Araujo 2004).

Excessive alcohol consumption, particularly spirits, is a further risk factor for oral cancer, especially when combined with smoking and a poor diet. Increased consumption of alcohol has been implicated in the increasing incidence of the disease in the UK (Hindle 2000) at a time when tobacco use is falling (Ogden 2005). In addition, excessive alcohol consumption is considered to be of particular importance in the development of malignancy in younger cohorts (Petti and Scully 2005), given the volume of spirits consumed in binge drinking.

### **Age**

Retaining teeth into later life presents increased restorative problems, and is associated with increased periodontal disease (Ericsson 2009, Holtfreter 2010). In addition, complex medical conditions and reduced manual dexterity and mobility impact on oral hygiene routines, and may restrict access to appropriate dental provision.

## **Good oral health is an integral part of general health and well-being**

Oral health is integral to general health and should not be considered in isolation, as many of the key factors that lead to poor oral health are risk factors for other diseases. Chronic non-communicable diseases and conditions such as obesity, heart disease, stroke, cancer, diabetes and oral diseases all share a set of common risk factors.

A range of general health conditions are associated with oral disease. Poorly controlled diabetes is a well-established risk factor for developing periodontal breakdown. Gum diseases are also associated with rheumatoid arthritis, adverse pregnancy outcomes, and coronary heart disease, although causation has not been proven. A potential role for the human papilloma virus in oral cancer has been documented. Poor oral health is also associated with aspiration pneumonia and infective endocarditis. These factors are described in greater detail below.



## Diabetes

Poorly controlled diabetes is a well-recognised risk factor for developing periodontal diseases (Sepälä 1993; Papapanou 1996) with evidence indicating that people with both Type 1 and Type 2 diabetes experience gum disease, and, it is of greater severity than in the general population (Firlati 1997; Sandberg 2000).

It is also recognised that there is a bidirectional relationship between diabetes and periodontal diseases, with recent research showing how chronic periodontitis has an adverse effect on the control of blood sugar and the incidence of diabetes complications (Grossi 1998; Stewart 2001; Taylor 2001).

Recent evidence has suggested that there may be a small but significant improvement in blood sugar control from treating pre-existing gum disease in people with Type 2 diabetes mellitus (Simpson 2010).

## Adverse pregnancy outcomes

It has been suggested that gum disease is associated with adverse pregnancy outcomes (Vergnes and Sixou 2007, Xiong et al. 2006). There is also some evidence to suggest that periodontal intervention may reduce adverse pregnancy outcomes (Scannapieco 2003).

## Coronary heart disease

Gum disease is associated with coronary heart disease (Mathews 2008, Humphrey et al. 2008) although causation has not been proved. Furthermore, gum disease and coronary heart also share similar risk factors such as smoking, diabetes mellitus, obesity and hypertension (Friedewald 2009).

## Human papilloma virus infection

Human papilloma virus has a causal role in several types of cancer, and an association may exist with oral cancer (Syrjänen et al. 2011).

The relationship between HPV infection and cancer is well established for cancer in the oropharynx, but inconsistent for cancer in the oral cavity. The major evidence, observed at a population level is the decreasing trend for cancer in the oral cavity related to alcohol and tobacco consumption, and the increasing trend for cancer in the oropharynx occurring in some countries (Gillison et al. 2009, Grulich et al. 2010, Heck et al. 2010, Chaudhary et al. 2010).

The effectiveness of the HPV vaccine in preventing oropharyngeal cancers is unknown (Cleveland et al. 2011).

## Aspiration pneumonia, infective endocarditis and rheumatoid arthritis

Poor oral health is also associated aspiration pneumonia and infective endocarditis (Loesche and Lopatin 1998). Gum disease has been linked to rheumatoid arthritis (Ortiz 2009), although causation has not been proved.

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## Section 2: The prevalence of oral diseases in EU Member States

### Key points

#### Dental caries

- In the last 30 years, there has been a major improvement in the prevalence of dental caries in children and young adults who live in Western Europe, and some improvement in Eastern European Member States. For example, the mean national DMFT score in Denmark for 12 year olds has decreased from 5 in 1980, to 0.7 in 2008, and in Lithuania it has decreased from 4.5 in 1983, to 3.7 in 2005.
- However, population averages can mask oral health inequalities, and in spite of a decline in childhood caries, inequalities exist between social classes and between certain ethnic minority groups. Dental caries still remains a problem for many groups of people in Eastern Europe, and for those from socio-economically deprived groups in all European Union (EU) Member States.

#### Periodontal diseases

- Epidemiologic data on periodontal diseases are of very poor quality, and are absent from several European Member States.
- It has been suggested that over 50% of the European population suffer from some form of periodontitis and over 10% have severe disease, with prevalence increasing to 70-85% of the population aged 60-65 years of age. There is a perception that periodontal health may be deteriorating within the population of the EU. This is principally due to a larger number of people that are retaining some of their teeth into old age, and an increase in the prevalence of diabetes.
- There is a marked social class gradient in the distribution of periodontal diseases, with studies showing that periodontal diseases are associated with individuals' income and socio-economic status.

#### Oral Cancer

- Oral cancer is the eighth most common cancer worldwide. In the EU, lip and oral cavity cancer is the 12th most common cancer in men. In 2008, there were approximately 132,000 cases of head and neck cancer across Europe, resulting in 62,800 deaths. The highest estimated age-standardised incidence rates per 100,000 of lip and oral cancer (both sexes and all ages) are found in Spain (6.7) and Hungary (9.4).
- The incidence of oral cancer is strongly related to social and economic deprivation. Trends in oral cancer are now showing a gender and age shift. In most European Member States, oral cancer incidence is increasing in women, perhaps largely reflecting increasing rates of smoking. In parts of Europe, incidence rates for oral cancer sites related to HPV infections are increasing in young adults. This may be due to changes in oral sexual behaviour.
- Mortality rates have continued to increase in several Eastern European Member States, including Hungary and Slovakia, which have the highest mortality rates. Studies have shown how the 5-year relative survival rate for cancer in the oral cavity is lower in Eastern Europe (23%), when compared to Northern Europe (51%).

## Prevalence and trends in dental caries

In the last 30 years, there has been a major improvement in the prevalence of dental caries in children and young adults who live in Western Europe, and a decline in the percentage of people with no natural teeth. This is presumed to be mainly due to improved living conditions, the widespread use of fluorides, especially fluoride toothpaste, changed dietary patterns and to some extent improved oral hygiene practices.

However, population averages can mask oral health inequalities, and in spite of a decline in childhood caries, inequalities exist between social classes and between certain ethnic minority groups (Watt and Sheiham 1999, Locker 2000, Sabbah et al. 2007). Dental caries still remains a problem for many groups of people in Eastern Europe, and for those from socio-economically deprived groups in all EU Member States (Figure 1 and Table 1). As an example, in Lithuania, the mean national DMFT score in 12 year olds is high at 3.7 (WHO 2012b). In addition, in Spain, young adults from lower socio-economic groups have twice as much untreated tooth decay when compared to those from higher socio-economic groups (Consejo Dentistas Organización Colegial de Dentistas de España 2010).

In children from low socio-economic status backgrounds, the prevalence of caries is higher than in other children, and there is more untreated disease (Droz et al. 2006). In Denmark, a study has demonstrated how, in all age groups, major inequalities in dental health were found when families with Danish and non-Danish backgrounds were compared (Christensen et al. 2010). These findings parallel results from similar studies in other Scandinavian Member States (Wendt et al. 1999, Skeie 2005). However, these conclusions are worrying given that despite in many of these Member States, children and adolescents attend a free public dental service based on preventive dentistry, a social gradient still exists for dental health.

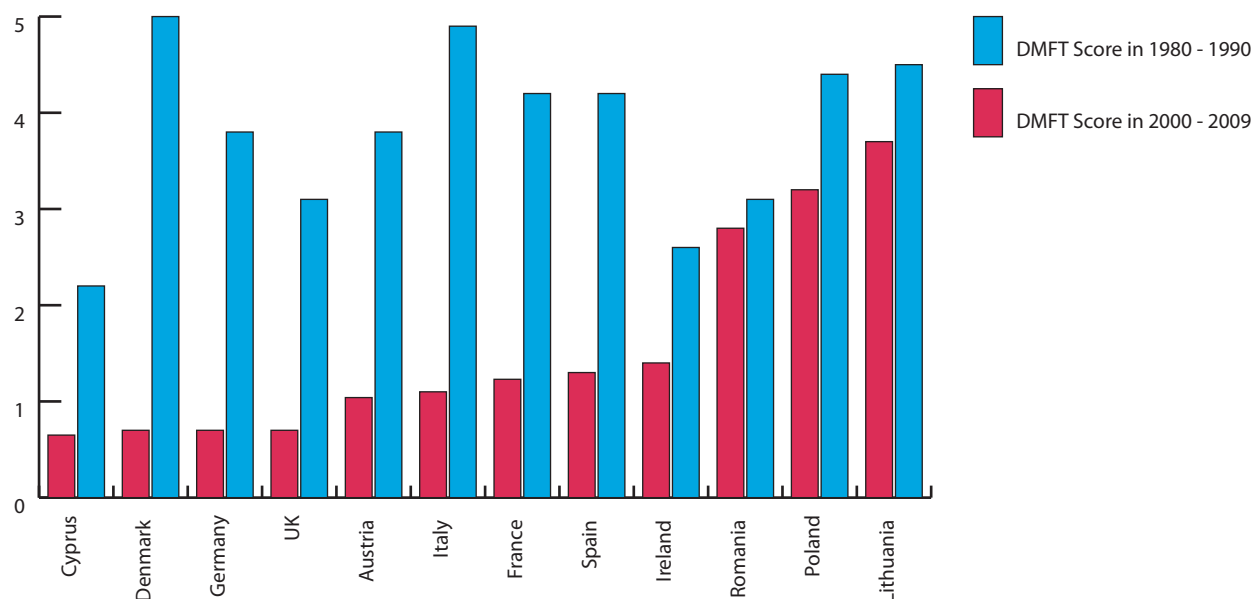
Table 1 and Figure 1 show how there has been a significant reduction in the prevalence of dental caries in 12 year-olds in all Western European countries, and some improvement in Eastern European Member States, in the last thirty years. However, it is not pertinent to make a direct comparison of the DMFT scores between individual Member States (Eaton et al. 2003) as different methodologies are often used to collect these data, some of the surveys concerned are not national, and they are frequently collected in different years.

**Table 1: Changes in mean Decayed Missing Filled Teeth (DMFT) scores for 12 year olds from profiled Member States between the 1980s and first decade of 2000 (WHO 2012b)**

Country	DMFT score in the 1980s	DMFT score in the 2000s
Austria	3.8 (1984)	1.04 (2002)
Cyprus	2.2 (1990)	0.65 (2003-2004)
Denmark	5 (1980)	0.7 (2008)
France	4.2 (1987)	1.23 (2006)
Germany	3.8 (1989)	0.7 (2005)
Ireland	2.6 (1984)	1.4 (2001-2001)
Italy	4.9 (1986)	1.1 (2004-2005)
Lithuania	4.5 (1983)	3.7 (2005)
Poland	4.4 (1985)	3.2 (2003)
Romania	3.1 (1986)	2.8 (2000)
Spain	4.2 (1984)	1.3 (2005)
UK*	3.1 (1983)	0.7 (2008-2009)

Note: Table 1 presents WHO data. More up-to-date data may be available on the CECCDO database or from the Chief Dental Officers of the respective countries. \*England only

**Figure 1: Changes in mean national Decayed Missing Filled Teeth (DMFT) scores for 12 year olds from profiled Member States between the 1980s and first decade of 2000 (WHO 2012b)**



**Notes:**

- Ireland: DMFT score for children receiving fluoridated water at home since birth
- DMFT score for Poland in 2003 was ascertained from examination of 180 children in Gdansk region
- DMFT score in UK in 2008-2009 is for England only

Whilst the overall trend appears positive, it conceals gross inequalities. For example, Poland has experienced a slower rate of improvement that is typical of that seen in many other Eastern European Member States (Figure 1 and Table 1). This may reflect the fact that since 1989 the provision of free oral health care for children from public health services has greatly diminished (Petersen 2008) and that many people are unable or unwilling to pay private fees for their oral health care.

## The state of periodontal health in Europe

A recent review of the literature on periodontal health in Europe concluded: *Actual epidemiologic data on periodontal diseases are non-homogenous and absent from several European countries* (König et al. 2010). Another recent review (Leroy et al. 2010) highlighted the problems with regard to the collection of reliable data on periodontal health and suggested how they could be improved.

Studies report how severe periodontitis affects 5-20% of most adult populations worldwide, and it is a major cause of tooth loss in both developed and developing countries (Petersen et al. 2005, Pihlström et al. 2005, Jin et al. 2011). It has been suggested that over 50% of the European population suffer from some form of periodontitis and over 10% have severe disease (König et al. 2011), with prevalence increasing to 70-85% of the population aged 60-65 years of age. There is also a perception that periodontal health may be deteriorating within the population of the EU. This is principally due to a larger number of people that are retaining some of their teeth into old age, and an increase in the prevalence of diabetes.

The national data for periodontal health in EU Member States that are available, have been collected from relatively small samples and show very wide variations, which it seems likely are due to inconsistencies in methodology as much as to actual disease levels. For example, between 1998 and 2001, surveys in Denmark, Germany and the UK reported advanced periodontal breakdown (Community Periodontal Index = 4) in 14% of Danes, 76% of Germans and 31% of British aged 65- 74 years (Table 5. (König et al. 2010). In spite of these problems in data collection, there is a perception that periodontal health may be deteriorating among the population of the EU, and indeed the world.

The World Health Organisation (WHO) considers that because far more people are retaining some of their teeth into old age, and there are more diabetics, who are at risk of periodontal diseases, far more emphasis should be placed on the prevention of periodontal breakdown. As with dental caries, there are marked inequalities in the distribution of periodontal diseases, with studies showing that periodontal diseases are associated with individuals' income and socio-economic status (Sheiham and Nicolau 2005, Sabbah et al. 2010).

WHO plans to launch a revised methodology for periodontal epidemiology and to hold a global conference to highlight the need for improvement, in Europe and around the world.

## Oral cancer in Europe

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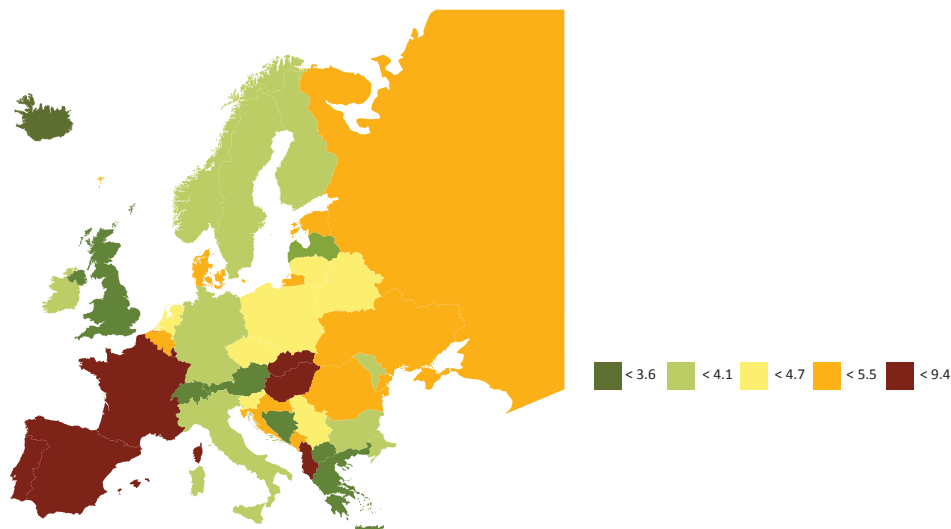
Oral cancer is the eighth most common cancer worldwide (Johnson et al. 2011); however, the incidence of head and neck cancer varies widely across the world. Regions with a high incidence of head and neck cancer include much of Southern Asia and parts of Central and Southern Europe (Boyle and Levin 2008). In the EU, lip and oral cavity cancer is the 12th most common cancer in men (IARC 2012a: GLOBOCAN 2008). Across Europe, there were approximately 132,000 cases of head and neck cancer in 2008 (91,900 cases of cancer of the oral cavity and pharynx and 40,400 cases of cancer of the larynx), resulting in 62,800 deaths (Ferlay et al. 2010).

The incidence of oral cancer is strongly related to social and economic deprivation, with the highest rates occurring in the most disadvantaged sections of the population (Menvielle 2005, Conway 2007, Conway 2008, Warnakulasuriya 2009).

Head and neck cancer is more than twice as common in men, than in women (Ferlay et al. 2008). However, trends are now showing a gender and age shift. The incidence of head and neck cancer is increasing in women, and decreasing in men (Curado and Hashibe 2009). This increase in head and neck cancer in females in most European Member States may reflect the increasing rates of smoking (Garavello et al. 2010). Furthermore, in young adults in the United States, and in some Member States in Europe, incidence rates for oral cancer sites related to HPV infections, such as the oropharynx, tonsil, and base of the tongue, are increasing (Robinson and Macfarlane 2003, Shiboski et al. 2005, Conway et al. 2006, Hammarstedt et al. 2006, Chaturvedi et al. 2008, Jemal et al. 2011) which it is proposed may partly be due to changes in oral sexual behaviour (Marur et al. 2010).

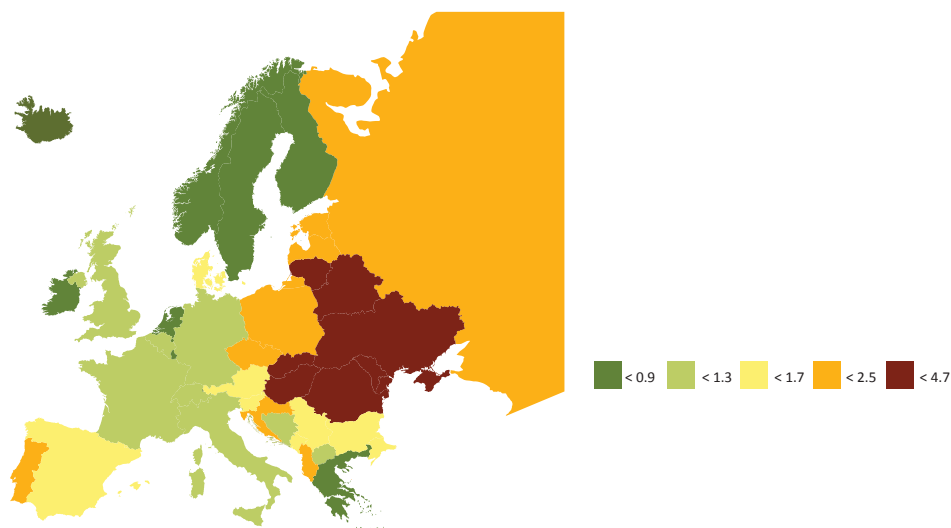
Incidence of oral cancer varies across EU Member States, and the pattern apparently relates to regional differences in risk factor exposure. The highest estimated age-standardised incidence rates per 100,000 of lip and oral cancer (both sexes and all ages) are found in Spain (6.7) and Hungary (9.4) (Figure 2). The historically high rates in North-Western France are now stabilising, and the still-growing rates in central and Eastern Europe (Ferlay et al. 2010) are associated with heavy tobacco and alcohol use – the latter involving acetaldehyde-containing fruit distillates.

Figure 2: Estimated age-standardised incidence rate (IR) per 100,000 of cancer in the lip, oral cavity, both sexes and all ages across Europe (IARC 2012b: GLOBOCAN 2008)



Of equal concern to the increasing incidence in oral cancer, is the pattern of age standardised mortality rates, which varies across Europe (Figure 3). Slovakia and Hungary have the highest mortality rates and Cyprus and Iceland have the lowest (IARC 2012c). Oral cavity cancer mortality rates among males have decreased significantly in most countries, including those of Europe and Asia, over the past decades (Garavello et al. 2010, Mayne et al. 2006). But rates have continued to increase in several Eastern European Member States, including Hungary and Slovakia (Garavello et al. 2010).

Figure 3: Estimated age standardised mortality rate per 100,000 of cancer of the lip, oral cavity, both sexes and all ages across Europe (IARC 2012c: GLOBOCAN 2008)



Survival rates of cancer of the oral cavity and oropharynx show distinct geographical variations across Europe. There are also marked differences between socio-economic groups. As with most cancers, survival is better for affluent groups (Edwards and Jones 1999). Studies have shown how the five-year relative survival rate for cancer in the oral cavity was 23% in Eastern Europe versus 51% in Northern Europe (Zigon et al. 2011).

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## Section 3: Economic impact of oral diseases in Europe

### *Key points*

- *Oral diseases remain a major public health issue for high-income countries, where expenditure on treatment often exceeds that for other diseases, including cancer, heart disease, stroke, and dementia. This is disturbing, given that much of the oral disease burden in high-income countries is due to dental caries and its complications, and this is preventable through the use of fluoride and other cost-effective measures.*
- *Dental treatment is costly, averaging 5% of total health expenditure and 16% of private health expenditure across OECD countries in 2009. Data from Australia show how oral conditions were the second-most expensive disease group to treat, just below cardiovascular disease. Dental conditions were found to be more expensive to treat than all cancers combined. Studies have also shown how in some industrialised countries the mouth is the most expensive part of the body to treat. In 2000, it was estimated that the total spend on all aspects of care and treatment provided by dentists in the “old” EU (15 Member States) was over €54 billion per year. The figure for the current EU (27 Member States) is now more likely to be closer to €79 billion. If current trends continue, this figure could be as high as €93 billion in 2020.*
- *Data suggests that out-of-pocket dental expenditure is likely to vary according to the structure of the oral health care system. In Member States such as Spain, oral health services are mainly provided by private practitioners, and thus patients usually pay the total cost. This may create access problems for low-income groups. In Denmark, oral health care is free of charge for all children under the age of eighteen, and adults pay for treatment from private dental practitioners through a system of government subsidies. In Member States such as France and Germany, prevention and treatment are covered within the basic package of public health insurance, but a share of the cost is borne by patients.*
- *Indirect costs arise from the social burdens of poor oral health and its interaction with systemic diseases and conditions including diabetes, heart and circulatory diseases, and the effects of poly-pharmacy on oral health and vice-versa*
- *There is strong evidence that the benefits of preventing tooth decay exceed the costs of treatment. For example, savings in dental expenditure have been demonstrated in Member States such as Denmark and Sweden, which have invested in the provision of preventative oral health services, and where positive trends have been noted in terms of reduction in the prevalence of oral disease.*



## Spending on health and oral health

In the EU, the overall spending by Member States on all forms of general healthcare (including dentistry) appears to vary significantly, generally but not wholly in line with a country's wealth as measured by GNI per capita, PPP (Figure 4 and Figure 5).

Figure 4: GNI per capita, PPP in 2010 [current international \$] (World Bank 2012)

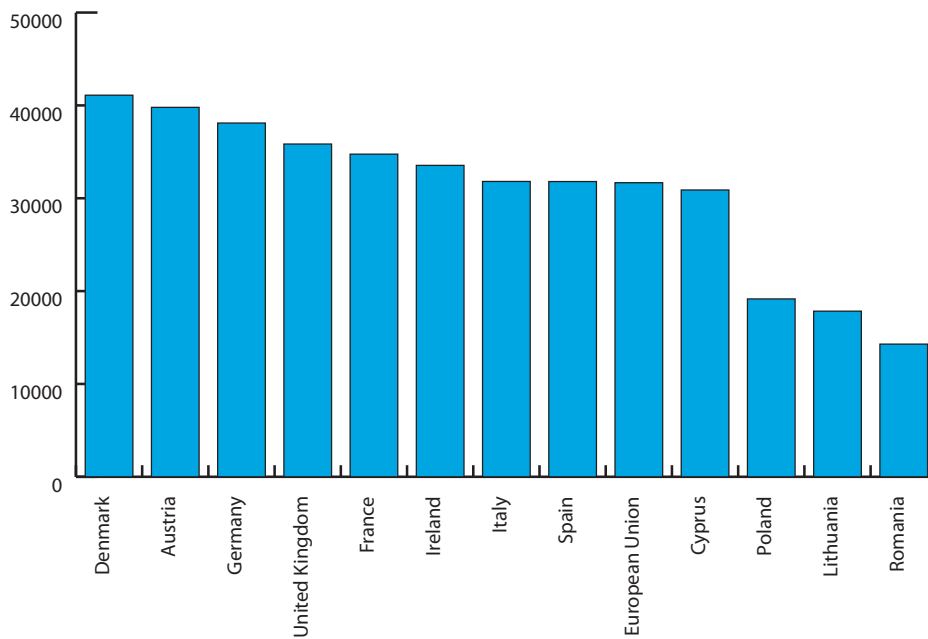
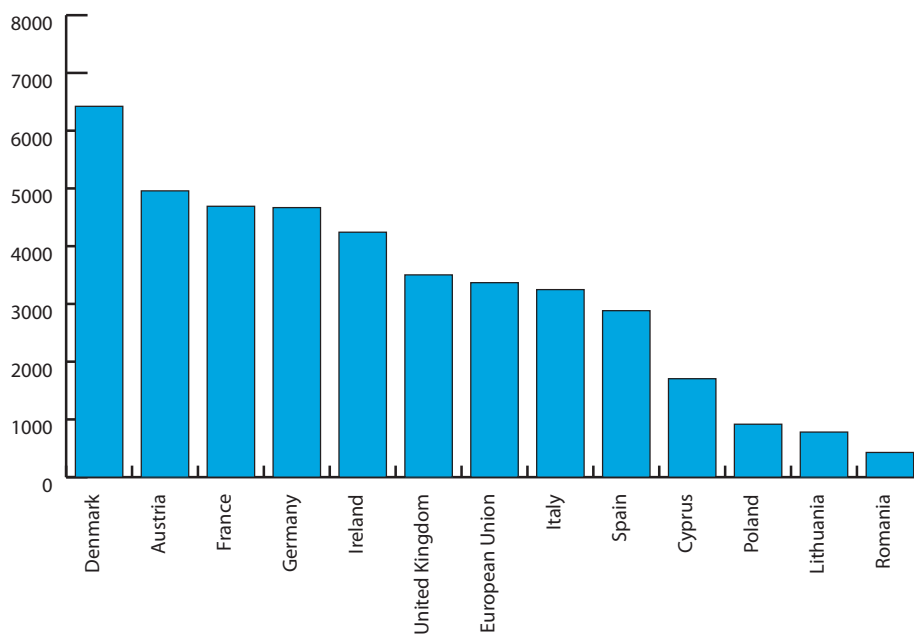


Figure 5: Health expenditure per capita in 2010 [current US\$] (World Bank 2012)

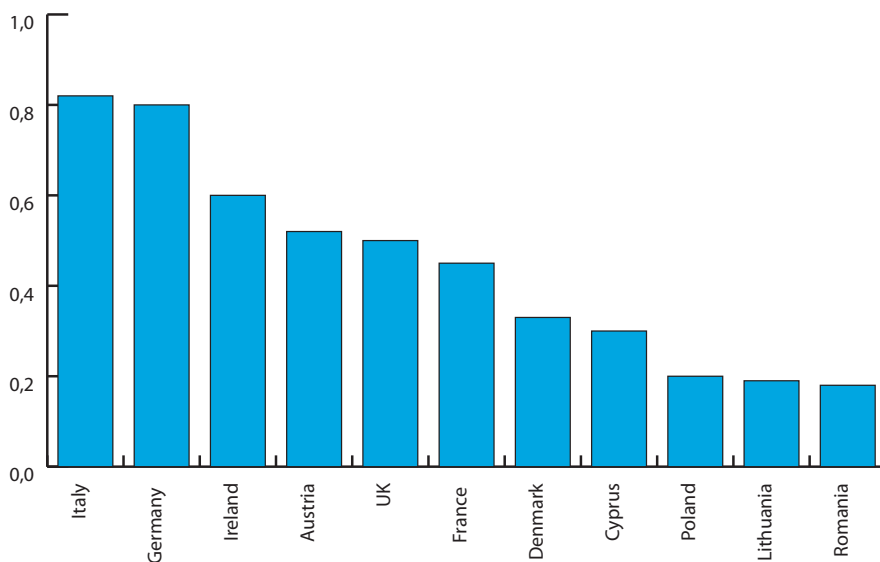


Oral diseases remain a significant public health issue for many high-income countries, where expenditure on treatment often exceeds that for other diseases, including cancer, heart disease, stroke, and dementia. This is a cause for concern, given that much of the oral disease burden in high-income countries is due to dental caries and its complications, and this is preventable through the use of fluoride and other cost-effective measures (Pitts et al. 2011). Data from Australia shows how oral conditions are the second-most expensive disease group to treat, just below cardiovascular disease. Dental conditions were found to be more expensive to treat than all cancers combined (Australian Institute of Health and Welfare 2010). In addition, studies have shown how in some industrialised countries the mouth is the most expensive part of the body to treat (Schneider et al. 1998, Bauer et al. 2009).

It appears that expenditure on oral health care is significant, averaging 5% of total health expenditure, and 16% of private health expenditure across Organisation for Economic Co-operation and Development (OECD) countries in 2009 (OECD 2011).

The estimated percentage of Gross National Product (GNP) spent on the provision of oral health care varies significantly across Europe (Figure 6).

Figure 6: Estimated percentage of GNP spent on oral health in 2010 (unpublished data from CECD0 2012)\*



\*No data available for Spain

In 2000, it was estimated that the total spend on all aspects of care and treatment provided by dentists in the “old” EU (15 Member States) was over €54 billion per year (Widström and Eaton 2004). The figure for the current EU (27 Member States) is now more likely to be closer to €79 billion. If current trends continue, this figure could be closer to €93 billion across the EU in 2020 (Table 2).

**Table 2: Estimated predicted EU (27) spend on the provision of oral health care services**

Country	GNI 2010 (\$)*	GNI (€)**	% of GNP spent on OH in 2010***	Spend on oral health care services (€)			
				2010	2012	2015	2020
Austria	377	308	0.52	1.60	1.67	1.77	1.95
Belgium	478	390	0.5	1.95	2.03	2.15	2.38
Bulgaria	46	38	0.18	0.07	0.07	0.07	0.08
Cyprus	23	19	0.3	0.06	0.06	0.06	0.07
C. Repub	179	146	0.3	0.44	0.46	0.48	0.53
Denmark	319	260	0.33	0.86	0.89	0.95	1.05
Estonia	18	15	0.39	0.06	0.06	0.06	0.07
Finland	242	198	0.4	0.79	0.82	0.87	0.96
France	2607	2128	0.45	9.58	9.96	10.57	11.67
Germany	3341	2728	0.8	21.82	22.70	24.09	26.60
Greece	293	239	1.1	2.63	2.74	2.91	3.21
Hungary	122	100	0.16	0.16	0.17	0.18	0.19
Ireland	171	140	0.6	0.84	0.87	0.92	1.02
Italy	2051	1674	0.82	13.73	14.28	15.16	16.74
Latvia	24	20	0.24	0.05	0.05	0.05	0.06
Lithuania	36	29	0.19	0.06	0.06	0.06	0.07
Luxembourg	38	31	0.29	0.09	0.09	0.10	0.11
Malta	8	7	0.4	0.03	0.03	0.03	0.03
Netherlands	773	631	0.5	3.16	3.28	3.48	3.85
Poland	452	369	0.2	0.74	0.77	0.81	0.90
Portugal	221	180	0.4	0.72	0.75	0.80	0.88
Romania	159	130	0.18	0.23	0.24	0.26	0.28
Slovak Rep.	86	70	0.15	0.11	0.11	0.12	0.13
Slovenia	46	38	0.36	0.14	0.14	0.15	0.16
Spain	1389	1134	0.4	4.54	4.72	5.01	5.53
Sweden	467	381	0.68	2.59	2.70	2.86	3.16
UK	2272	1855	0.5	9.27	9.65	10.24	11.31
TOTAL (billion)				€ 76	€ 79	€ 84	€ 93

**Notes and explanation**

\* GNI (Gross National Income in current USD) in Billions 2010 (World Bank 2012)

\*\* GNI 2010 converted to Euro at a rate of 1 USD = 0.816510 on 08/07/2012

\*\*\* % GNP spent on the provision of oral health care services in 2010 (unpublished CECD0 data 2012). The % GNP estimates for several former Eastern Bloc Member States may not include private expenditure

Data for Spain, the Czech Republic and Bulgaria are estimates.

A predicted annual 2% increase in expenditure on oral health was utilised to calculate predicted expenditures up to 2020.

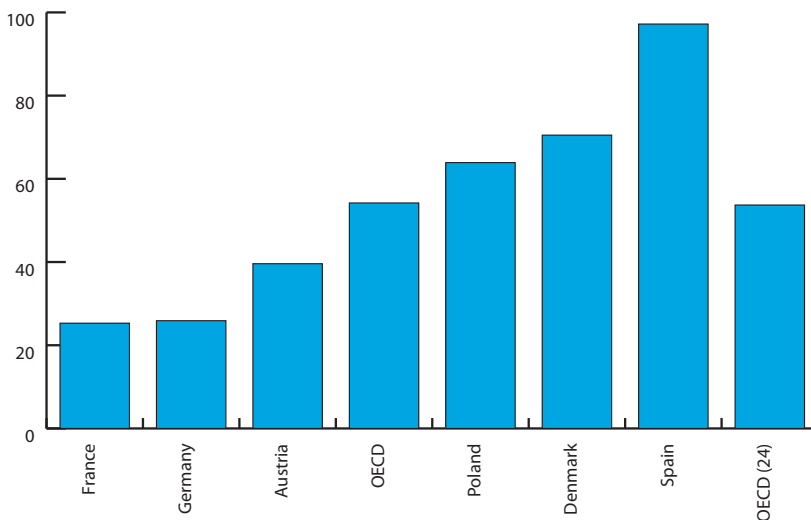
It is important to note that these figures are estimates, as it is extremely difficult to collect data for Member States in which there is very little public or insurance funding of oral health.

Although these data may well be inaccurate for some Member States, they do give an overall picture of the level of the cost of oral health across the EU.

In almost every Member State, the overall levels of expenditure and the amount of care provided by practitioners is directly influenced by the regulations which govern patients' fees and private dentists' remuneration. Because of the dominance of "private practitioners" in oral health care provision, regulations about patient payments, fixed remuneration fees, and subsidy systems can all affect the dentist's incentive to treat, and the patient's incentive to seek treatment.

In addition, OECD data suggests that out-of-pocket dental expenditure is likely to vary according to the structure of the oral health care system (Figure 7). In Member States such as Spain, oral health services are mainly provided by private practitioners, and patients usually pay the total cost. This may create access problems for low-income groups. In Denmark, oral health care is free of charge for all children under the age of eighteen, and adults pay for treatment from private dental practitioners through a system of government subsidies. In Member States such as France and Germany, prevention and treatment are covered within the basic package of public health insurance, but a share of the cost is borne by patients.

Figure 7: Out-of-pocket dental expenditure, 2009 or nearest year (OECD 2011)



Estimating expenditure on oral health services can be extremely challenging due to the difficulties in assessing out-of-pocket or "private expenditure". In many Member States, for example Greece and Italy, the assessment of private spending is made through self-reporting in household surveys, which may introduce inaccuracies.

Dental disease and its sequelae can impose a significant financial burden to an individual and society. For example, in the UK, the costs of maintaining teeth, especially for adults in the second half of their lives, who frequently have heavily restored teeth, appears to be rising (Steele Report 2009). There are also indirect costs to consider, arising from the social burdens of poor oral health and time off work. This burden is increasing as more and more people retain their teeth later and later into life.

The common risk factors for chronic diseases, including chronic oral diseases, have been recognised for some years (Sheiham and Watt, 2000). Using diabetes as an example, in the last few years evidence has been published suggesting how gum diseases have an adverse effect on the control of blood sugar levels and the incidence of diabetes complications (Grossi 1998; Stewart 2001; Taylor 2001). The cost to the health budget of managing people with diabetes is substantial. In the UK, estimates suggest 5% of total

National Health Service (NHS) resources and up to 10% of hospital in-patient resources are used for the care of people with diabetes (DH 2001).

The challenges of assessing the health-economic effects of caries prevention methods are well accepted in the literature. However, studies have highlighted how the benefits of preventing tooth decay exceed the costs of treatment (Oscarson 2007, Burt 1998), as well as the cost-effectiveness of using fluoride toothpaste to prevent dental caries (Davies 2003, Yee 2004).

Furthermore, savings in dental expenditure have been demonstrated in Member States such as Denmark and Sweden, which have invested in the provision of preventative oral health services, and where positive trends have been noted in terms of reduction in the prevalence of oral disease (Wang et al. 1998).

Finally, a study analysing the USA oral health system describes the global situation: “A system focused primarily on treatment of disease in individuals is not economically sustainable, socially desirable, or ethically responsible. The understanding exists to prevent a very large proportion of oral diseases (Gooch et al. 2009 Truman et al. 2002), and community-based prevention generally is cost-saving compared with a treatment-focused approach, particularly for communities and individuals at high risk for disease” (Tomar and Cohen 2010).

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## Section 4: Inequalities relating to the treatment of oral diseases in Europe

### Key points

- *The European Parliament Resolution on Reducing Health Inequalities in the EU (2011) acknowledged that the EU faces a challenge arising from the wide disparities in physical and mental health which exist, and are growing both between and within EU Member States. Inequalities in health between people in higher and lower educational, occupational and income groups have been found in all Member States. There are profound oral health disparities across EU countries, related to socio-economic status, age, gender, or general health status. Equitable access to dental services is an important factor in reducing oral health inequalities.*
- *Despite improvements, problems in access persist, most commonly among vulnerable and low income groups. These individuals often experience difficulties in accessing dental care, generally attending services less frequently than the general population, for primary care or emergency treatment when in pain, rather than for preventive indications. In France, it has been reported that 30-40% of people living in residential homes need restorative dental treatment. It has also been highlighted that one out of every three individuals with physical or learning disabilities have at least one untreated cavity.*
- *A factor which impacts upon dental attendance is the structure for the delivery of oral health care services, which varies significantly between individual member states. A far lower percentage of the population appear to attend the dentist in socially and economically less well developed EU Member States, where there is little or no publically funded dentistry, than in those which provide publically subsidised oral health care. In some Member States, low-income groups appear to be disadvantaged by oral health insurance programmes. Economic and political changes in Eastern Europe have led to the decentralisation of oral health services, with less emphasis placed on the provision of public health programmes. This has had a negative impact on the utilisation of oral health services.*
- *Eurobarometer survey data suggest that of those who responded to the survey, the respondents most likely to have visited a dentist in the last twelve months tend to be inhabitants of northern EU Member States: the Netherlands (83%), Denmark (78%), Germany and Luxembourg (77%), followed by Slovakia (73%) and Sweden (71%). Inhabitants of several countries in EU Member States in Eastern Europe appear to be the least likely to have visited a dentist during the past year: Lithuania (46%), Poland (44%) and Romania (34%). This is also the case for residents in both Spain (43%) and Portugal (46%). The percentage of the population who claim to have visited a dentist in the last twelve months in Austria (56%), Ireland (54%), Cyprus (54%), Italy (52%) and France (52%) are all below the EU (27) average percentage of 57%.*
- *People with high incomes appear to be more likely to have visited a dentist within the last 12 months. The association between education and attendance at the dentist varies significantly between Member States. Europeans who are in full time education the longest, appear to be more likely to visit a dentist for a check-up. Where dental attendance is generally poor for the entire population, this difference is even more pronounced. For example in 2004, only 27% and 33% of the most educated men and women in Romania were reported as accessing dental services in the previous 12 months. For those who had only the most basic level of education this percentage dropped to 4% of men and 5% of women.*

The WHO Global Commission on Social Determinants of Health (CSDH) stated that: [Health inequalities are] “caused by the unequal distribution of power, income, goods and services, globally and nationally, the consequent unfairness...in access to health care, schools, education, conditions of work and leisure, homes, communities,... and chances of leading a flourishing life.... Poor and unequal living conditions are the consequence of poor social policies and programmes, unfair social arrangements and bad politics” (CSDH 2008).

The European Parliament Resolution on Reducing Health Inequalities in the EU (2011) acknowledged that the EU faces a challenge arising from the wide disparities in physical and mental health which exist, and are growing between, and within, EU Member States. Inequalities in health between people in higher and lower educational, occupational and income groups have been found in all Member States.

In addition to economic, social and environmental factors, health is also influenced by people’s lifestyles and access to healthcare services, including health information, education, disease prevention and definitive treatment. Lower socioeconomic groups are more susceptible to poor nutrition, tobacco and alcohol dependency, all of which are major contributory factors in many diseases and conditions.

There are profound oral health disparities across EU countries, related to socio-economic status, age, gender, or general health status. Marked inequalities remain within socio-economically deprived and/or vulnerable groups in society:

- People living in areas of material and social deprivation (Marmot and Bell 2011)
- Residents of psychiatric hospitals (Vigild et al. 1993)
- The frail and vulnerable elderly population (Griffin et al. 2012)
- Prisoners (Jones et al. 2005, Walsh et al. 2008)
- Homeless (DePalma et al. 2005)
- Refugees (Angelillo et al. 1996)
- Immigrants (Heidmann and Christensen 1985)
- Travelling populations (Edwards and Watt 1997)
- Ethnic groups suffering from social disadvantages (Verrips et al. 1992, Wendt et al. 1999, Sundby and Petersen 2003, Christensen et al. 2010)
- Adults with learning disabilities (Tiller et al. 2001, Glassman et al. 2003)

Throughout the EU, it is acknowledged that these groups have a poor level of oral health, and often experience difficulties in accessing dental care. They generally attend services for primary care or emergency treatment when in pain, rather than seek prevention. For example, in France, it has been reported that 30-40% of people living in residential homes need restorative dental treatment. It has also been highlighted that one out of every three individuals with physical or learning disabilities have at least one untreated cavity (Haute Autorité de Santé 2010).

## **Toothbrushing habits in Europe**

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Those who brush their teeth more than once a day by 12 years of age are more likely to continue to do so throughout their teenage years and into adulthood (Koivusilta et al. 2003).

A survey investigating the toothbrushing habits in 11 year olds across Europe revealed how brushing more regularly is associated with higher family income (HSBC 2010).

These findings mirror the results from previous research demonstrating how caries experience is highest among children of low-income families (Maes et al. 2006) and those living in low-SES areas (Levin et al. 2009).

A study from Scotland has illustrated how home routines and good parent–child communication are associated with more regular tooth brushing among adolescents, suggesting that familial factors may have a protective effect on oral health behaviours (Levin and Currie 2010).

## Access to dental services

Equitable access to dental services is an important factor in reducing oral health inequalities. It is widely recognised that there are major disparities in general and oral health across the EU, and within Member States, which are related to socio-economic status, age and gender, and that they have not been adequately addressed.

A factor which impacts upon dental attendance is the structure for the delivery of oral health care services, which varies significantly between individual Member States (Table 3). In terms of oral health inequalities, the provision of oral health care services for children, and vulnerable population groups is especially important to consider.

**Table 3: Models of healthcare provision and the provision of dental services for children and vulnerable population groups (based on a table from The EU Manual of Dental Practice, CED 2009, with updates)**

Model of healthcare provision	Public dental services for children and vulnerable population groups
<b>State funded</b>	
<u>Categorical:</u> <i>Majority of funding is from national or local taxation, but service is limited to certain groups</i>	
Cyprus	80 per cent of the population, including all primary school children, individuals on a low income, government employees, members of the National Guard and police officers are entitled to free dental treatment within the public sector. However, the vast majority of the population utilise the private sector where they pay a fee per item of service. Domiciliary care is available.
Ireland	Public dental service for children up to the age of 16 years, and others who cannot afford private care, have restricted access to dental services and have special needs.
Spain	Almost all oral health care in Spain is provided by private practitioners and adult patients usually pay the full cost. In most autonomous regions, there is a small publicly funded capitation system for children aged between 7 and 14 years.
<u>Universal:</u> <i>This service is available to all citizens in theory, but treatment options and availability may be limited in reality.</i>	
Denmark	Oral health care is free for children up to the age of 18 years, and is usually provided at school. Vulnerable population groups, including the elderly, and those of low socio-economic status also receive free dental care.
Italy	In theory, children up to the age of 14 years, and vulnerable population groups receive free dental treatment. However, in practice, in many areas only emergency dental treatment is provided by the NHS.
UK	Groups receiving free NHS dental care include: children under 18 years; pregnant or nursing mothers; individuals on certain welfare benefits; and those under 19 years old who are in full time education. Domiciliary care is available.



Social insurance type	
<u>Income ceiling*:</u> <i>Income-based criteria restrict access to oral health care services</i>	
Germany	The vast majority of the population are members of not-for-profit 'sick funds' which gives the member entitlement to a package of free basic dental care, with advanced treatment options such as crowns and bridges and orthodontics sometimes requiring significant patient co-payments. A public dental service exists but is restricted to examination, diagnosis and prevention.
<u>No income ceiling**:</u> <i>Other criteria exist which determine access to subsidised care</i>	
Austria	The cost of basic restorative and preventative dental treatments are generally covered by compulsory health insurance schemes, although benefits vary across schemes. Children are covered by the same scheme as their parents. In every county ("Bundesland"), preventative (solely educational) dental programmes are delivered in schools, and in the majority of counties children's teeth are examined regularly. Domiciliary care is available.
France	Children and teenagers aged 6,9,12, and between 15 and 18 years are entitled to a free check up. Any subsequent treatment required is also free (Rochereau and Azogui 2007). Preventative interventions are provided up to the age of 12 years at school. Domiciliary care is available.
Lithuania	Free public oral health care is provided free of charge to children and teenagers up to the age of 18 years. Prosthodontic care (dentures and crown/bridgework) for pensioners and the disabled is reimbursed with a fixed sum of money. For adults between the ages of 18 and 65 years, dental care in the public dental service is partly financed by the fund and partially by co-payments from patients.
Poland	Provision of oral health care funded by common health insurance is limited. As a minimum, this includes an annual check-up, but children under the age of 18 and pregnant women are able to obtain a wider range of services more frequently.
Romania	Oral health care treatment is funded by the public health insurance system. Annual check-ups and free treatment is available to children under the age of 18 years. Those people who are unemployed, pregnant and nursing mothers, military personnel, war veterans, or in prison are exempt from paying contributions to the insurance system but are still covered by it (Amariei and Eaton 2009).

Note: \* Income ceiling: There are income criteria for excluding some adults from access to all or most of care within schemes. So there is mainly private provision and finance, with a government organised residual health service for specific "priority" groups  
 \*\* No income ceiling: There may be other criteria for access, but there is usually full access for the elderly, children, medically compromised groups, and low income adult groups.

Another factor which impacts upon dental attendance is the provision of publically subsidised oral health care. A far lower percentage of the population appear to go to the dentist in socially and economically less well developed Member States, where there is little or no publically funded dentistry, than in those which provide publically subsidised oral health care. An example is the difference between Catalonia (the wealthiest part of Spain) where there is virtually no public funding for oral health care, and Belarus, where there is still significant public funding for oral health care. In Catalonia in 2006, it was reported that only 32% of men and 38% of women had visited a dentist (Casals et al. 2007). Whereas in Belarus in 2007 the reported figure for a visit to dentist was 60% (Tserakheva et al. 2011).

In EU Member States in Eastern Europe, prior to 1989, oral health care for children was provided by public health services and most Member States had dental services within schools. However, the recent privatisation and decentralisation of oral health services have meant that most public health programmes have ceased operation (Amariei and Eaton 2009, Heidi wiki 2012).

In all EU Member States, there is a theoretical entitlement for each individual to receive either state or social insurance funded health care as a constitutional right, or as a stated principle (CED 2009). However, this is rarely guaranteed and in some Member States, low-income groups appear to be disadvantaged by oral health insurance programmes.

## Inequalities in attendance

In general, it appears that the recommended frequency of attendance at the dentist varies across EU Member States (Table 4).

**Table 5: Recommended frequency of attendance at the dentist**  
(based on a table from The EU Manual of Dental Practice, CED 2009, with updates)

Recommended frequency	EU Member State
Approximately every 6 months	Poland
Every 9 to 12 months	Denmark
Annually	Austria, Cyprus, France, Germany, Ireland, Italy, Lithuania*, and Romania
According to need	UK (NICE 2004)
Unclear	Spain

Note \* For children under the age of eighteen years

Eurobarometer survey data suggest that of those who responded to the survey, the respondents most likely to have visited a dentist in the last twelve months tend to be inhabitants of northern EU Member States: the Netherlands (83%), Denmark (78%), Germany and Luxembourg (77%), followed by Slovakia (73%) and Sweden (71%). It is interesting to note that for some of these Member States it is compulsory for inhabitants to attend their dentist annually, or even every six months, as part of their statutory medical insurance requirements (Eurobarometer 2010). However, it is worth noting that even in these Member States, problems can exist within particular age groups. For instance, one of Germany's largest statutory health insurance companies highlighted in a recent annual report that two out of three children (aged between 2 and a half to 6 years of age) are not attending annual oral health examinations (Barmer GEK 2012).

Inhabitants of several countries in EU Member States in Eastern Europe appear to be the least likely to have visited a dentist during the past year. These Member States include Lithuania (46%), Poland (44%) and Romania (34%). This is also the case for residents in both Spain (43%) and Portugal (46%) (Eurobarometer 2010).

The percentage of the population who claim to have visited a dentist in the last twelve months in Austria (56%), Ireland (54%), Cyprus (54%), Italy (52%) and France (52%) are all below the EU (27) average percentage of 57% (Eurobarometer 2010).

## **Inequalities in types of dental treatment**

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Inequalities in types of dental treatment, whether curative or preventive, are also apparent across Europe. A recent study among Europeans aged 50 years and over, demonstrated how in comparison with other European regions, there was a tendency toward more frequent and preventive dental treatments being undertaken in the elderly populations residing in Scandinavia and Western Europe. The authors reported a high incidence of operative treatment in Member States such as Austria, Italy, and France, whereas in the Netherlands, Sweden, Denmark, Switzerland, and Ireland, the incidence of operative treatment was low in comparison (Listl, 2011).

However, in certain Member States, a higher incidence of solely clinical treatment may be observed. According to the Eurobarometer survey (2010), the interviewees whose last visit to a dentist was for routine treatment, were inhabitants of Austria, Germany, Lithuania and Poland. A higher percentage of the population in Cyprus and Romania attend the dentist, but solely for emergency treatment.

## **Inequalities in income status and dental attendance**

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Recent findings suggest that people with a high income were more likely to have visited a dentist in the last 12 months (OECD 2011). This is despite differences in public or private oral health coverage, and the extent of reimbursement. Inequalities appeared to be larger in Member States with a lower likelihood of a dental visit such as Poland and Spain. For example, in Spain, young adults from lower socio-economic groups have twice as much untreated decay when compared to those in wealthier socio-economic groups (Consejo Dentistas Organización Colegial de Dentistas de España 2010).

## **Inequalities in education levels and dental attendance**

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The association between education and attendance at the dentist varies significantly between Member States. Europeans who remain in full time education the longest appear to be more likely to visit a dentist for a check-up. According to the Eurobarometer survey data (2010), senior executives, students, employees and self-employed people are more likely to visit a dentist for a check-up, than unemployed people, pensioners and manual workers. In Member States where dental attendance is generally poor for the entire population, this difference is even more pronounced. For example in 2004, only 27% and 33% of the most educated men and women in Romania were reported as resorting to dental services in the previous 12 months. For those who had only the most basic level of education this percentage dropped to 4% of men and 5% of women (Eurostat 2004).

## Reasons impacting upon dental attendance

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Individuals can be reluctant to go for routine check-ups and dental care for a variety of reasons including dental anxiety, fear of cost, inconvenience and perceived difficulty in finding a trusted dentist.

In a 2010 survey, the main reason given by respondents for not having consulted a dentist in the last two years was that their dental problem was not considered to be serious enough (Eurobarometer 2010). Having no teeth, or the fact that the respondent had false teeth, and the cost of dental consultation and treatment were also frequently mentioned reasons.

In Member States such as Romania, the cost of seeking dental treatment can be a very significant barrier to treatment. However, this is less of an issue in Finland, Slovenia and the UK (Eurostat 2010).

When the data are analysed by age, in the older populations, the cost of dental treatment appears to be a fundamental factor upon dental attendance (Eurostat 2010 and Eurobarometer 2010). The least advantaged categories e.g. unemployed people, manual workers, and pensioners, and those who remained in full time education for the shortest time may be more likely to mention cost as their reason for not consulting a dentist (Eurobarometer 2010).

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## Section 5: Oral health policies, the promotion of oral health and the prevention of oral diseases in Europe

### *Key points*

- *Frequent exposure to fluoride, regular brushing, a healthy diet and routine oral care all contribute to improved oral health outcomes and a reduction in oral health inequalities.*
- *Most of the evidence in oral health promotion relates to dental caries prevention and control of periodontal diseases. Strong evidence exists that topical fluorides (fluoride toothpaste, fluoride varnish and fluoride mouth rinses) can prevent tooth decay.*
- *Gingivitis can be prevented by good personal oral hygiene practices, including brushing and cleaning between teeth and where the tooth and gums meet, which are important for the control of advanced periodontal conditions.*
- *Limited evidence exists for the effectiveness of screening for early detection of oral cancer on a population basis, but assessment of the oral soft tissues should be a routine part of an oral examination, especially for groups at higher risk of oral cancer, such as smokers and heavy drinkers.*
- *Across the EU, a variety of successful community-based public oral health programmes exist.*
- *An international example of good practice includes the online Canadian Best Practices Portal which showcases effective “best” practices models, methods, and research evidence in the fields of community based health promotion and disease prevention interventions.*

### Preventing oral diseases

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Oral disease such as dental caries, periodontal diseases, and oropharyngeal cancers are major public health problems. Research has shown that individual, professional and community preventive measures can be effective in preventing dental caries. Across the EU, a variety of community-based public health programmes and initiatives exist.

Frequent exposure to fluoride, regular brushing, a healthy diet and routine oral care all contribute to improved oral health outcomes and a reduction in oral health inequalities. Most of the evidence in oral health promotion relates to dental caries prevention and control of periodontal diseases. Brushing twice per day with a fluoride toothpaste is effective at preventing dental caries, and can also prevent gingivitis and periodontal breakdown (Marinho et al. 2003).

Studies investigating the evidence for screening for oral cancer concluded that limited evidence exists on the effectiveness of screening the entire population (Kujan et al. 2006, Downer et al. 2006). However, general agreement exists that assessment of the oral soft tissues should be a routine part of an oral examination, especially for groups that have higher risks of developing oral cancer such as smokers and heavy drinkers. The World Health Organisation recommends that prevention of oral cancer be an integral part of national cancer control programs and that oral health professionals or primary health personnel should be involved in detection, early diagnosis and treatment (Petersen 2009). Social marketing utilising mass media has been used successfully to raise awareness about oral cancer and to encourage people to have a mouth examination (Sankaranarayanan et al. 2005).

## Fluorides and oral health

The use of fluorides is recognised as an important measure in caries prevention (WHO 2007). Exposure to fluorides can be achieved in many forms and various modes of fluoride use have evolved, each with its own recommended concentration, frequency of use, and dosage schedule. Fluoride can be ingested as a part of diet in water, salt, tablets or milk; or applied topically from toothpastes, mouthrinses, varnishes, or gels.

Toothpaste is the most widespread vehicle of fluoride, and the decline in caries experience in children in Western Europe over the past 30 years has been attributed to its regular use. The effectiveness of fluoride toothpaste in reducing caries in children is well established (Marinho et al. 2003).

## Good practice from across Europe



### Good practice: Water fluoridation

Water fluoridation is the controlled adjustment of the underlying fluoride concentration in drinking water to a level that prevents dental decay. The optimal concentration in temperate climates is 1 part per million (ppm). It is safe, cost-effective and has a demonstrable long term benefit to population dental health. Notwithstanding reports from anti-fluoridationist groups, over the last 50 years, the fluoridation of water has been a significant method to help in the prevention of tooth decay, especially in the United States of America, where water fluoridation has been identified by the Centers for Disease Control in the US as one of the “ten great public health achievements” in the twentieth century (Centers for Disease Control 1999).



The best available evidence suggests that the fluoridation of drinking water reduces the prevalence of caries, both in terms of the proportion of children who are caries free and by the mean change in DMFT. There is also evidence to suggest that water fluoridation reduces the severity of caries (as measured by DMFT) across social groups and between geographical locations (Mc Donagh et al. 2000). Water fluoridation is consequently one of the few public health interventions that directly reduces disparities in dental decay between high and low socioeconomic status groups (Burt 2002, Neidell et al. 2010).

In the EU, fluoridation schemes operate in the UK, the Irish Republic, Spain, and Poland (Table 5).

Table 6: Fluoridation schemes across Europe (British Fluoridation Society 2004)

Country	Number of people supplied with artificially fluoridated water	Number of people supplied with naturally fluoridated water	Total (artificial and natural)	Percentage of population with optimally fluoridated water
Irish Republic	3250 000	200 000	3450 000	73%
Poland	80 000	300 000	380 000	1%
Spain	4250 000	200 000	4450 000	11%
United Kingdom	5797 000	330 000	6127 000	10%

A higher percentage of the population of the Irish Republic (73%) is supplied with optimally fluoridated water than in any other European country. However, both the UK and Spain have higher overall numbers of people drinking fluoridated water.



### Good practice: Fluoridated salt programmes

Fluoridated salt is widely used in parts of Europe, for example Switzerland, Slovakia, France, Germany, and the Czech Republic (The Borrow Foundation 2012, CED 2009), and is considered to be beneficial to children, especially for their permanent dentition (Yeung et al. 2011).



In Germany, a fluoridated salt programme was introduced in 1991. This was a carefully managed process which involved establishing a scientific board and utilising a public relations agency to ensure that the issue of fluoridated salt maintained a meaningful and permanent presence in public media. Since its introduction, the market share of fluoridated salt continued to increase until 2007, where it reached a maximum of 70% and it has remained at this level since. In comparison, fluoridated salt achieved a 60% market share in France in 1993 shortly after its introduction. However, without the support of a scientific board and promotional campaigns, the market share dropped to 8% in 2010. In other European countries, the market share of fluoridated salt is comparatively lower: 5% in Slovakia, and 35% in the Czech Republic (Marthaler et al. 2011).



### Good practice: Fluoridated milk programmes

Milk fluoridation programmes targeted at children are currently in operation in Bulgaria and the UK (The Borrow Foundation 2012, CED 2009). A systematic review to determine the effectiveness of fluoridated milk for preventing caries on a community basis found insufficient studies of good quality to make a definitive conclusion, but stated fluoridated milk may be beneficial in the permanent dentition (Yeung et al. 2005). Milk is often available to children through school and nutritional programmes and can be targeted at the communities in greatest need of intervention. It is particularly appropriate in those communities where the fluoridation of neither water nor salt is possible.



### Good practice: Childsmile Program, Scotland

The Childsmile Program (Childsmile 2012) operating in predominantly non-fluoridated Scotland incorporates:

- Oral health education and free daily supervised toothbrushing in all nurseries and priority schools
- Free dental packs with toothbrush and toothpaste, to support toothbrushing at home
- Advice and information for parents and carers to help them care for their child's teeth
- Biannual fluoride varnish applications to high risk young children's teeth in priority nurseries and schools by trained dental nurses
- Additional home support and community interventions delivered by a range of partners
- An enhanced programme of care within Primary Care Dental Services

Since the implementation of the programme, children's dental health in this age-cohort across Scotland has shown a distinct improvement. Figures released in 2010 showed the highest ever percentage of children with no decay. In addition, the mean DMFT score decreased from 1.86 in 2008, to 1.52 in 2010 (NDIP 2010).





### **Good practice: Denmark's preventative oral health care model**

Approximately 40 years ago, Danish children's oral health was among the poorest in Europe. However, a targeted and proactive approach to deliver preventive care within the public oral health care service has had significant results. Between 1974 and 2000, the average DMFT scores in 12-year-old Danish children fell by 78% from 4.5 to 0.98. By 1997, more than 99% of Danish children received oral health care every year.

All municipalities in Denmark are obliged to establish local clinical facilities to provide all children and adolescents residing in the municipality with free and comprehensive oral health care, including health education and prevention, from newborn to 18-year-old children. Clinics are often located in, or nearby primary schools.

A sophisticated register of all children residing in the municipality is utilised to monitor attendance to the clinic. The initial visit to the clinic is organised by the local oral health service. A letter is posted home to inform parents that their child is now entitled to free dental care.

Preventative efforts are directed at the individual through tailored advice and guidance. However, significant emphasis is also placed upon reinforcing these messages within other health, social and education environments through staff in day-care centres, teachers, health visitors and paediatricians (Association of Public Health Dentists in Denmark 1997).



### **Good practice: An evidence-based toolkit for prevention**

In the UK, the Department of Health and the British Association for the Study of Community Dentistry have jointly produced an evidence-based toolkit for the prevention of oral disease by primary care dental teams "Delivering Better Oral Health: An evidence-based toolkit for prevention" (DH 2009). This toolkit provides easy to use advice on the prevention of dental caries, periodontal diseases and oral cancer. The third revised edition is due to be released shortly, and the tool is currently being translated into Spanish.



### **Good practice: Community centre based programmes**

Oral health promotion targeted at immigrant families with pre-schoolers, delivered via an accessible community centre has shown some success in preventing tooth decay in Sweden. The programme involved the delivery of parent education, toothbrushing instruction, diet advice, and the prescription of a free daily 0.25mg tablet of fluoride to children from in a low socio-economic area in Malmö (Wennhall et al. 2008, Wennhall et al. 2005).



### **Good practice: Use of peer leaders in school-based oral health promotion**

Programmes involving primary school-aged children in disadvantaged areas of Germany and Ireland have shown the benefits of using peers to teach younger children about oral health. Grade 4 students devised a toothbrushing instruction program for Grade 1 children in Cologne, Germany, and in the process increased their own oral hygiene skills (Reinhardt et al. 2009). In a similar programme, eleven year old children in a disadvantaged area of Belfast, Northern Ireland were trained as 'tooth teachers' to teach five year olds about diet and snacking. A decrease in sugary snacking occurred, as well as an increase in knowledge among the tooth teachers compared to children attending the control schools (Freeman and Bunting 2003).







### **Good practice: Integrating oral health checks within general health assessments for elderly people living in the community**

A study involving three general medical practices in rural England found that offering a dental examination to elderly patients as part of their general preventive health check led to a significant increase in their subsequent dental attendance, when compared to the control group that was not offered a clinical examination (Lowe et al. 2007). The offer of an oral health assessment was taken up most readily by those with current oral problems, and those with no regular dentist. The authors reported how both the inclusion of a dental checklist within the preventive health check, alongside support in arranging a dental appointment showed potential as a way of ensuring the dental needs of this vulnerable population group are met.



### **Good practice: raising patient awareness in oral hygiene measures to encourage self-care and limit periodontal breakdown**

A study undertaken in Sweden over a 30 year period demonstrates the importance of raising patient awareness in oral hygiene measures to encourage self-care and limit periodontal breakdown (Axelsson et al. 2004). As part of the programme, each (adult) patient was educated on an individual basis in self-diagnosis and self-care focusing on plaque control measures, including the use of toothbrushes and interdental cleaning devices (brush, dental tape, toothpicks). This occurred at the beginning of the programme and then once every 2 months in the first 2 years, and then once every 3-12 months during years 3-30. These sessions were delivered by a dental hygienist, and also included a plaque-disclosing exercise, and professional mechanical tooth cleaning, including the use of a fluoride-containing paste. Whilst the authors acknowledge the limitations of the data (ie patients were not randomly selected), the results illustrated how the study group experienced a very low incidence of periodontal diseases.



### **Good practice: Oral cancer screening of high risk groups**

A pilot programme undertaken in Hungary demonstrated how the use of mass media served to raise awareness of oral cancer, and encourage attendance for a dental examination (Gyenes et al. 2006). Certain at-risk groups including adults who smoked and were heavy drinkers were invited to attend for a free oral health examination. Information about the programme was disseminated via local and national television, radio, newspapers and posters, as well as a dedicated website. The exercise served to identify a significant number of individuals with premalignant lesions, as well as diagnosing cases of early oral cancer.



### **Good practice: A national preventative programme to increase the frequency that teenagers attend the dentist for check-ups**

In 1997, major French health insurance funds introduced a national oral screening and prevention programme (Bilan Bucco-Dentaire) for improving access to dental care for teenagers. The main objective was to increase the frequency that teenagers attend the dentist for check-ups, and also to raise awareness of this preventative approach to dental care. This was the first oral prevention programme to be introduced on a national scale, comprising of a free annual check-up with 100% reimbursement for any subsequent treatment to those aged between 15 and 18 years. In France, preventative inter-



ventions undertaken in a school environment are only provided up to the age of 12. Following this, generally only 35% of 15-18 year-olds visit a dentist annually.

Adolescents are invited to take part in the scheme via a letter, sent every year to their home by the health insurance body, from their 15th to their 18th birthday. Advertising campaigns run concurrently to promote the scheme through TV, radio commercials, and written communications in dental surgeries, junior and high schools, etc.

More than half of the teenagers who took part in the program required treatment. However, while the scheme provided a good opportunity for teenagers from modest-income households to attend for a check-up, overall, the participation rate was quite low, especially amongst the most deprived groups (Rochereau and Azogui 2007).



### **Good practice: Promotion of sugar-free products**

Sugar-free products (such as chewing gum and confectionery) have sweetening agents other than the sugars which cause dental decay. The most commonly used sugar substitutes are the polyols such as xylitol, sorbitol and manitol. When sugars are replaced with non-decay causing sugar substitutes, the risk of tooth decay is reduced. Many studies have reported the impact of chewing sugar-free gum in preventing decay (Deshpande et al. 2008, Ly et al. 2008).

The European Food Safety Authority (EFSA 2010) have also concluded that a cause and effect relationship exists between the consumption of sugar-free chewing gum and plaque acid neutralisation, leading to a subsequent reduction in the incidence of caries. In order to obtain the claimed effect, 2-3 g of sugar-free chewing gum should be chewed for 20 minutes at least three times per day after meals. These health claims have been included in EU Commission Regulations 432/2012 of 16/05/2012 and Commission Regulation 655/2011 of 11/07/2011.

Sales of sugar-free confectionery are relatively high in some Member States e.g. Germany and Switzerland, where they are actively promoted. Almost one-quarter of confectionery sold in Switzerland is toothfriendly, sold under the logo Zahnfreundlich (toothfriendly). The registered trademark wording and logo, “toothfriendly” in combination with a diagram of a smiling tooth under an umbrella, can be used worldwide and are already commonly used in Switzerland, Germany, Turkey, Korea, Japan, China and other countries. To qualify for the “Toothfriendly” claim, foods must not lower the pH of the dental plaque below 5.7 during consumption, and for up to 30 minutes after consumption. Moreover, foods containing acids must not expose the teeth to excessive amounts of acid (not more than 40  $\mu\text{mol H}^+$  x min) during consumption. The tests can only be accomplished in certified labs using the intraoral plaque-pH-telemetry. Currently, three University institutes in Switzerland, China and Germany are certified to perform such tests. The toothfriendly article 13.1 claim was positively evaluated by the EFSA in its 5th batch of Scientific Opinions on health claims in 2011 (EFSA 2011a, EFSA 2011b). EFSA’s scientific backing strengthens the argument for the continued use of the “Toothfriendly” quality seal, a registered trademark since 1982. EFSA also makes reference to the US FDA which accepted the “Toothfriendly” health claim in 1997. The “Toothfriendly” quality seal is licensed to food manufacturers for use in labelling, and in the promotion of their qualifying foods by Toothfriendly International, an internationally acting non-profit organisation located in Basle/Switzerland. In Finland, ‘toothfriendly’ sweets have also been used extensively and are considered to have contributed to approximately 10% of the reduction in children’s tooth decay since the 1960s (Marthaler 1990).



## Good practice: Restricting marketing and improving the labelling of certain food products

Watt and Sheiham (2012) have recently suggested how the oral health team should tackle the “upstream causes” of oral health inequalities. These include lobbying actions directed at the activities of the manufacturers and distributors of processed sugar products.

It is worth noting, however, how in recent years, the food industry has made significant changes to the front-of-pack labelling to help consumers to understand nutrition labelling. The implementation of the EU food information regulation (EU Regulation no 1169/2011) and the nutrition and health claims regulation (Regulation (EC) No 1924/2006) have both supported these developments through specifying requirements regarding GDA (guideline daily amounts), and nutrient profiling in defining the criteria that foods must meet in order to bear nutrition and/or health claims.

The UK Department of Health is currently undertaking a consultation on front of pack nutrition labelling. The UK Health Ministry wants to see all food manufacturers and retailers using the same nutrition labelling system to show, on the front of packs, how much fat, salt and sugar and how many calories is in their products. This would make it easier for consumers to compare the nutritional information provided on the food they buy. Providing nutrition information consistently, on the front of food packs, is key to consumer awareness, and using this information to make healthier choices and improve their diets (DH 2012).

Also in the UK, the Food Standards Agency (FSA 2010) made recommendations to food manufacturers on reducing saturated fat and added sugar in key sweet foods. This included:

- Reducing saturated fat in biscuits, cakes, buns and chocolate confectionery
- Reducing added sugar in soft drinks
- Producing smaller single-portion sizes more easily available for chocolate confectionery and soft drinks

A recent development in the EU has been a change to the regulations on the authorised ingredients that can be added to fruit juice. The addition of sugar to sweeten fruit juice is no longer permitted (European Public Health Alliance 2012). Currently, many companies selling fruit juice utilise text in the labelling such as ‘no added sugar’. During this transition phase, before ‘no added sugar’ is phased out, manufacturers will need to inform consumers that ‘from 2015 no fruit juices contain added sugars’. The new rules will apply to any fruit juice being marketed in the EU.

In considering advertising, Lustig et al. (2012) argue that government imposed regulations on the marketing of alcohol to young people have been quite effective, and suggest that similar measures may be helpful in the marketing of sugar-containing foodstuffs. In a recent development under the framework of the EU Platform for Action on Diet, Physical Activity and Health, leading food and beverage companies have pledged: “No advertising of products to children under 12 years, except for products which fulfil specific nutrition criteria based on accepted scientific evidence and/or applicable national and international dietary guidelines. For the purpose of this initiative, “advertising to children under 12 years” means advertising to media audiences with a minimum of 35% of children under 12 years.” This rule has been applicable since the 1<sup>st</sup> of January 2012, throughout the EU (EU Pledge 2012).



### **International examples of good practice: An online forum to share best practices**

The Oral Health Section of the Canadian Best Practices Portal (Public Health Agency of Canada 2012a) is comprised of community based health promotion and disease prevention interventions that improve access to care and oral health outcomes of the population. Oral health best practice approaches are considered in terms of: access to care; sustainability; cost-effectiveness and efficiency; community Involvement.

It has been designed to provide public health program decision makers with better access to information about effective “best” practices models, methods, and research evidence in chronic disease prevention and health promotion interventions (Public Health Agency of Canada 2012b).



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## Section 6: Conclusions: Understanding the problems

### Key Points

#### *The problems:*

##### *Current trends in periodontal health and oral cancer*

- *It has been suggested that over 50% of the European population suffer from some form of periodontitis and over 10% have severe disease, with prevalence increasing to 70-85% of the population aged 60-65 years of age. There is a perception that periodontal health may be deteriorating within the population of the EU.*
- *Globally, regions with a high incidence of head and neck cancer include much of Southern Asia and parts of Central and Southern Europe. The highest incidence rates in Europe are found in Spain and Hungary.*
- *Trends in oral cancer are now showing a gender and age shift. In most European Member States, oral cancer incidence is increasing in women, perhaps largely reflecting increasing rates of smoking. In parts of Europe, the incidence of oral cancer at sites related to HPV infections are increasing in young adults.*
- *Mortality and survival rates for oral cancer vary across Europe.*

##### *Increasing oral health inequalities*

- *Oral health inequalities can be observed in age, gender, socio-economic and education level, within and between EU Member States. Caries still remains a major health problem for many groups of people in Eastern Europe, and in all European Member States, for those from socio-economically deprived or vulnerable groups. The incidence of oral cancer and periodontal diseases is also strongly related to social and economic deprivation.*
- *Despite improvements, problems in access to oral health care services persist, most commonly among vulnerable and low income groups.*
- *Over half of the EU Member States do not place policy emphasis on reducing health inequalities.*

##### *A lack of coherent and coordinated oral health promotion and disease prevention policy*

- *In many EU Member States oral health care is not fully integrated into national or community health programmes.*
- *There is a clear lack of research in oral health promotion. Very few high quality outcome measures exist for use in the evaluation of oral health policy and environmental interventions. There are challenges in identifying best practice measures, and sharing learning outcomes from oral health promotion activities.*
- *There is a need to define best practice principals in prevention and oral health promotion. A more progressive health promotion approach that recognises the importance of tackling the underlying social, political and environmental determinants of oral health is required.*

## Key Points

### *The problems:*

#### *Improving the data and knowledge base*

- *Lack of routinely available and comparable EU oral health data (and public health data), and research knowledge poses an obstacle to assessing the current situation, identifying best-practices, and allocating resources where they are most needed.*
- *Epidemiological data relating to tooth decay and periodontal diseases are particularly unreliable. The data are frequently either estimates or collected using different methodologies. The oral health needs of the most disadvantaged groups, such as individuals with special needs, institutionalised persons and the homeless, are not clearly identified.*

#### *Dental workforce limitations*

- *Across Europe, there is a lack of suitably trained advisors with the ability to develop oral health epidemiological studies and needs assessments and assist in oral health strategy and policy development.*

## Current trends in periodontal health and oral cancer and increasing oral health inequalities

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In the last 30 years, there has been a major improvement in the prevalence of dental caries in children and young adults who live in Western Europe. However, caries still remains a major health problem for many groups of people in Eastern Europe, and for those from socio-economically deprived groups both across the EU, and within all EU Member States (Petersen et al. 2005). Due to the inadequacies of periodontal epidemiology (Leroy et al. 2010), it is unclear whether the periodontal health of the European population is improving or deteriorating. However, it is evident that the number of diabetics is rising and, that more people are retaining their teeth into their old age. These groups are at greater risk of periodontal breakdown. There appears to have been no improvement in the prevalence of oral cancer (Stewart and Kleihuis, 2003) or, in some Eastern European Member States, in its early detection. These diseases exact a heavy burden on individual quality of life, and costs to health care systems. The burden of oral disease, and its impact on the quality of life is particularly high among older people.

While there is general agreement on the principle of reducing health inequalities, the level of awareness and the extent to which action is being taken varies substantially. Over half of the EU Member States do not place policy emphasis on reducing health inequalities and there is a lack of comprehensive inter-sectoral strategies (Commission of the European Communities 2009).

Thus, alongside the inequalities in the prevalence of the major diseases of the 21st century (cancer, heart disease, stroke, diabetes, and dementia), oral health inequalities constitute a significant public health problem, as a consequence of these determinants (Sheiham et al. 2011), and a failure to adopt population-based health promotion using a common risk factor approach.

## Improving the data and knowledge base, and mechanisms for measuring, monitoring, evaluating and reporting

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In Europe, there are distinct challenges in estimating the burden of oral disease. This is principally due to the difficulties in integrating oral health data into national and European health information systems. The following limitations are observed:

- Problems are associated with the DMFT indicator, including its lack of reactivity and insensitivities to health inequalities (Major and Chronic Diseases Report 2007).
- Variation in methodology and frequency of epidemiological studies limits comparisons between EU Member States and regions
- High numbers of indicators can overwhelm epidemiologists, limiting the evaluation of programmes and generating costly and unnecessary monitoring efforts. 620 indicators were identified in 2004 (Bourgeois and Llodra, 2004)
- In general, limited geographic coverage – data often are only available for selected cities or regions. There is a scarcity of data from national studies which are based on a representative sample of the population of the country. Only the UK has secular epidemiological data on the prevalence of caries in young adults. Germany has representative epidemiological data on a national scale. Sweden and other Nordic countries utilise country council reports to the National Board of Health and Welfare through the public dental service (Major and Chronic Diseases Report 2007).
- Limited coverage of populations – collection of administrative data sometimes linked to individual characteristics, such as insurance status.
- The oral health needs of certain disadvantaged groups, such individuals with special needs, institutionalised persons and the homeless, are not clearly identified.
- Data access limitations – data collected by institutions other than national government or national institutes may sometimes not be readily accessible due to confidentiality issues or intellectual property rights issues preventing release.
- The cost of oral diseases in many EU Member States, including avoidable costs through prevention, oral health promotion and public health policies, is not evaluated.
- The percentage of GNP spent on oral care can be estimated in some EU Member States. However, estimating expenditure is extremely challenging due to the difficulties in quantifying out-of-pocket or “private expenditure”.
- A set of 40 key indicators have been agreed between public authorities during the EU-funded EGOHID project but these are not supported by consistent, comparable and updated data.

## A lack of research in oral health promotion

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Oral health inequalities will only be reduced through the implementation of effective and appropriate oral health promotion policy. Treatment services will never successfully tackle the underlying cause of oral diseases (Watt and Sheiham 1999). Robust and reflective data is of supreme importance in the planning, implementation and evaluation of community preventive activities and oral health promotion. However, very few high quality outcome measures exist for use in the evaluation of oral health policy and environmental interventions. The lack of appropriate and high quality outcome measures is hampering the development of oral health promotion (Watt et al. 2006). As a result, there are few data to demonstrate the impact and potential of preventative measures. Insufficient emphasis is often placed on the primary prevention of oral diseases.

## **Defining best practice principals in prevention and oral health promotion: Developing an oral health promotion model to address the wider determinants of health**

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In many EU Member States oral health care is not fully integrated into national or community health programmes. To date, the common risk factor approach (CRFA) has been highly influential in integrating oral health into general health promotion, and chronic disease prevention (Williams 2011). However, it is increasingly acknowledged that applying the CRFA too specifically, and solely focussing on changing oral health behaviours may be an ineffective strategy for tackling inequalities (Watt and Sheiham 2012). A more progressive health promotion approach that recognises the importance of tackling the underlying social, political and environmental determinants of oral health is needed.

## **Building capacity and capability in planning, delivering and assessing oral health promotion and preventative activities: Dental workforce limitations**

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Dental public health (DPH) is the branch of dentistry that is primarily concerned with the prevention of oral disease and promoting oral health, thus improving the quality of life for populations (DH 2010).

Specialists in DPH are trained to understand the epidemiological, demographic, clinical, social, political and financial aspects of the provision of health and oral health care, and to give advice and leadership in the these areas.

However, the specialism of dental public health is officially recognised by only a few Member States: Bulgaria, Finland and the UK (CED 2009). In Bulgaria there is a specialty called Social Medicine and Dental Health Organisation (Eaton et al. 2009). In the UK, where the specialty is relatively well-established, the Department of Health has stated that the current capacity of the dental public health workforce does not reflect the substantially increased responsibilities of the local health service for dentistry (DH 2010).

This lack of dental public health capacity and capability will limit the ability of individual Member States to construct and utilise oral health epidemiological infrastructures to develop robust oral health strategy and policy.



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## Section 7: Recommendations for European decision-makers

### *Key points*

#### *Actions should serve to:*

#### *Make a commitment to improving oral health as part of EU policies by 2020*

- *Recognise the common risk factors for oral diseases and other chronic diseases, and work towards linking oral health policies across other EU policies.*
- *Better integrate oral health into relevant national and EU health programmes and policies.*
- *Develop a coherent European strategy for the promotion of oral health and the prevention of oral diseases.*

#### *Address increasing oral health inequalities*

- *Address the major oral health challenges of children and adolescents, socio and economically deprived groups, an increasing elderly population and vulnerable populations in Europe.*
- *Employ an approach that focusses on the wider political, environmental, social and economic drivers that create oral health inequalities. A multi-strategy approach is needed that considers further measures such as legislation, fiscal policy and community development. This radical policy reorientation is principally the remit of national policy makers and professional organisations.*
- *Encourage a cross-sectoral approach which incorporates health and social care to address the social determinants of oral health. Develop supportive oral health environments in local settings such as schools, colleges, hospitals, workplaces and care organisations.*
- *Develop the roles of health and social care professionals, such as general medical practitioners, pharmacists, child health nurses, general nurses, midwives, social workers and aged care workers, as oral health promoters, as part of their broader health and wellbeing promotion responsibilities.*
- *Encourage and promote policies to ensure access to fluoride for the whole population.*
- *Guarantee availability and access to high quality and affordable oral health care, including free basic treatment for individuals under 18 years of age.*
- *Ensure access to relevant and evidence based oral health information to encourage patient empowerment and self-care.*

## Key points

### *Actions should serve to:*

#### *Develop the dental workforce*

- *Maximise the potential of the dental team (dentists, hygienists, therapists, nurses, technicians, oral health promoters and educators) to ensure an appropriate use of skill mix in undertaking preventative interventions.*
- *Develop the role of oral health professionals in generic health promotion to address risk factors such as cigarette smoking, poor diet, high alcohol consumption, and sedentary lifestyles. Smoking cessation interventions delivered by oral health professionals have been shown to be effective.*
- *Support the training and education of dentists to develop robust oral health epidemiological infrastructures and assist in oral health strategy and policy development.*

#### *Address the lack of research in oral health promotion*

- *Make oral health and the prevention of oral diseases a priority under European health and research programmes.*
- *Provide funding for research under the Research Framework Programme specifically targeted at:*
  1. *Community-based research on the social determinants of general and oral health, and inequalities in health.*
  2. *Promoting effective ways to integrate oral health into general health promotion.*
  3. *Improving the oral health of high-risk groups, deprived communities or individuals.*
  4. *Improving the cost effectiveness of oral health promotion.*
- *Incorporate research on oral health as appropriate into policies for the integrated prevention and treatment of chronic non-communicable and communicable diseases, and into maternal and child health policies.*
- *Set up sustainable European infrastructures to undertake collaborative cross country research on oral health promotion and preventative strategies.*

#### *Improve the data and knowledge base*

- *Develop policy objectives to align and improve the collection of health data, including oral health data, across EU Member States. This may involve creating and financing European infrastructures:*
  1. *A registry to identify all clinical trials and other types of community-based trials to assist in computer searches.*
  2. *A database which integrates essential oral health indicators into national health surveillance, capturing robust, comparable data at a national and European level, and also allowing continual assessment of validity.*
- *Disseminate all major research outcomes, best practice measures and learning experiences in oral health policy to enhance probability of building a systematic body of evidence.*

These recommendations are intended to serve as a foundation for the policy debate, by complementing existing European and national policy initiatives on oral health promotion and preventative initiatives.

The Platform is committed to supporting the implementation of these recommendations, and to this end will invite interested stakeholders to join specific task forces. These task forces will be asked to develop specific action plans with concrete goals and timelines. The Platform will monitor the progress achieved on an on-going basis.

## **Make a commitment to improving oral health and preventing oral diseases across Europe and within individual Member States by 2020**

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### **Actions:**

- Recognise the common risk factors for oral diseases and other chronic diseases, and work towards linking oral health policies across other EU policies and expand the scope of oral health policy to related issues.
- Develop more prominent oral health initiatives and policies at a national and European level.
- Integrate oral health into national or community health programmes far more than at present.
- Develop a coherent European strategy for the promotion of oral health and the prevention of oral diseases.
- Promote a comprehensive approach to fostering good health and tackling major chronic diseases through (CED 2011):
  1. Improving information on risk factors
  2. Facilitating cooperation between stakeholders and between Member States
  3. Supporting general and oral health promotion and prevention campaigns at EU level

## Address increasing oral health inequalities

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### Actions:

- Address existing oral health inequalities as part of the implementation of the Strategy for Reducing Health Inequalities in Europe.
- Include health inequalities as one of the priority areas within the ongoing cooperation arrangements on health between the European regions and the Commission (Commission of the European Communities 2009).
- Provide further support to existing mechanisms for policy coordination and exchange of good practice on health inequalities between Member States such as the EU expert group on Social Determinants of Health and Health Inequalities, linking both to the Social Protection Committee and the Council Working Party on Public Health and the Social Protection Committee (Commission of the European Communities 2009).
- Review the possibilities to assist Member States to make better use of EU Cohesion policy and structural funds to support activities to address factors contributing to health inequalities (Commission of the European Communities 2009).
- Address the major oral health challenges of children and adolescents, of an increasing elderly population and of vulnerable population groups in Europe. Health promotion and disease prevention activities must be tailored to different population groups according to their differing lifestyles, life stages and life conditions (CED 2011).
- Employ a more politicised approach to tackle the causes of oral health inequalities, in actively promoting a healthy diet and regulating the marketing and labelling of food products. Encourage and promote policies to ensure access to fluoride for the whole population (CED 2011).
- Guarantee availability and access to high quality and affordable oral health care, including free basic treatment for individuals under 18 years of age. Specific actions include enhancing access to, and uptake of, oral health services for vulnerable and underserved populations including children and adults from low income households, people without health insurance and the elderly.
- Focus local actions on the formulation of oral health policy directed at developing supportive oral health environments in a variety of local settings such as schools, colleges, hospitals, workplaces and care organisations.
- Develop the roles of a range of health and social care professionals, such as general medical practitioners, pharmacists, child health nurses, general nurses, midwives, social workers and aged care workers, as oral health promoters, as part of their broader health and wellbeing promotion responsibilities.
- Implement oral health promotion programmes in preschool settings to ensure that a supportive early life environment is created, may be particularly important (WHO 2008).

## Define best practice principals in prevention and oral health promotion

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Increasing emphasis is now being placed on tackling the shared structural, social and environmental determinants of chronic diseases (Kwan and Petersen 2010, WHO 2008). Future oral health policy thus needs to focus upon the wider political, environmental, social and economic drivers that create oral health inequalities in society. A multi-strategy approach is needed that considers further measures such as legislation, fiscal policy and community development. This radical policy reorientation is principally the remit of national policy makers and professional organisations, and for this approach to be successful in achieving sustainable changes in oral health, multi-sector work is essential.

### Actions

- Enhance the exchange of information, knowledge, and best practice alongside improving the coordination of policies between different levels of government and across a number of sectors (health care, employment, social protection, environment, education, youth and regional development). This can help to focus actions on various social determinants to consistently improve health outcomes (Commission of the European Communities 2009).
- Ensure good access to relevant and evidence based oral health information to encourage patient empowerment and self-care.

## Develop the dental workforce

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### Actions

- Maximise the potential of the dental team (dentists, hygienists, therapists, nurses, technicians, oral health promoters and educators) to ensure an appropriate use of skill mix in undertaking preventive interventions.
- Develop the role of oral health professionals in generic health promotion to address risk factors such as cigarette smoking, poor diet, high alcohol consumption, and sedentary lifestyles. Smoking cessation interventions delivered by oral health professionals have been shown to be effective (Carr and Ebbert 2007).
- Support the training and education of dentists to develop robust oral health epidemiological infrastructures and assist in oral health strategy and policy development.

## Bridge the research gap in oral health promotion

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### Actions

- Provide funding under the Research Framework Programmes to focus on:
  1. Community-based research on the social determinants of general and oral health, and inequalities in health (Williams 2011).
  2. Effective ways to integrate oral health into general health promotion
  3. Improving the oral health of high-risk groups, deprived communities or individuals
  4. Cost effectiveness of oral health promotion to raise awareness of the size of oral health care costs
- Incorporate research on oral health as appropriate into policies for the integrated prevention and treatment of chronic non-communicable and communicable diseases, and into maternal and child health policies (Sheiham et al. 2011).
- Set up sustainable European infrastructures to undertake collaborative cross country research on oral health promotion and preventative strategies.
- Establish and finance longer-term publicly funded research programmes.
- Emphasise dissemination of good practices relevant to addressing health inequalities by EU Agencies, including: the European Foundation for the Improvement of Living and Working Conditions, the European Centre for Disease Prevention and Control and the European Agency for Health and Safety at Work.

## Improve the data and knowledge base, and mechanisms for measuring, monitoring evaluation and reporting

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The burden of oral disease and needs of populations are continually changing, and oral health systems and scientific knowledge are evolving rapidly. To address these challenges effectively, public health administrators and decision-makers need the tools, information and a forum to access, interpret, and monitor health needs, choose relevant intervention strategies, and design reflective policy options to improve the performance of the oral health system. Policy objectives are thus required to improve oral health information and data collection across Europe.

### Actions:

- Construction of a database which captures quality assured data at a national and European level, and also allows the continual assessment of validity.
- Integration of essential oral health indicators into health surveillance and knowledge systems at a national and European level. Oral health indicators need to be utilised as markers of health inequalities.
- Research is needed into the problem of lack of an evidence base for various community-based oral health interventions to reduce inequalities in oral health. A registry to identify all clinical trials and other types of community-based trials to assist in computer searches could be beneficial (Sheiham et al. 2011).
- Creation and sustainable financing of European infrastructures is required to review and disseminate all major research outcomes, best practice measures and learning experiences in oral health policy through, for example, registries and databases. The evidence base should be translated into easily understood policies and practices through practical toolkits and guidelines.



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