

Health at a Glance: Europe

The case for including Oral Health Indicators

The Platform for Better Oral Health in Europe is a joint initiative of the Association for Dental Education in Europe, the Council of European Chief Dental Officers, the European Association of Dental Public Health, the Pan-European Region of the International Association for Dental Research and the Oral Health Foundation. Our shared goal is to create a common European approach towards improved oral health outcomes through research, education, promotion, and access to care.

The Platform for Better Oral Health in Europe [welcomes](#) the development of *Health at a Glance: Europe* as a way of helping to build cross-country knowledge of variations in public health outcomes as a means of supporting health systems and governments make better and more informed public health policies.

Considering the evidence linking the significant impact that oral health has on overall health we believe future editions of the report would benefit from including Oral Health Indicators.

Below, we outline why we believe this and include suggestions of readily available, consistent and reliable indicators that should be considered for inclusion. Those indicators are the following: dental caries prevalence data for 12-year olds in Europe; the economic burden of poor oral health in Europe; and prevalence of oral cancer in Europe.

We have identified a number of key health indicators that collectively reflect a range of important and relevant oral health outcomes. Although we strongly believe that significant oral health indicators need to be collected more systematically throughout Europe, solid data is available on the health indicators we deem essential. Moreover, we consider the indicators outlined below as the most robust currently available from a methodological standpoint, while also covering a wide geographical range of European countries, thus allowing for cross-continent comparison.

Chapter 1: The importance of oral health

Oral health is integral to the general health of citizens in the EU. Poor oral health impacts not only quality of life, but also society and health systems as a whole through associated economic costs. It has an impact throughout the course of life – from childhood, through the links between dental decay and development/growth, to older adulthood through the evidence linking poor oral health to decline in physical and cognitive function.

Dental decay is the most common non-communicable disease both in Europe and across the world¹ and has a substantial economic impact, affecting lost school days and subsequent poor educational attainment through to significant economic impact in adult life from time lost from work.

The mouth cannot be considered in isolation from the rest of the body. Gum disease and extensive tooth loss are being increasingly linked with other general health and systemic diseases² including diabetes, cardiovascular disease³, respiratory disease⁴, and dementia^{5,6}.

Indeed, oral disease not only affects the individual through pain, discomfort and the broader impact on their general health and quality of life, but also impacts health care and the wider community. The treatment of oral conditions poses a significant economic burden, estimated at 5-10% of public health expenditure in high-income countries according to the WHO⁷. This economic burden is unnecessary since oral diseases are largely preventable.

The poor and socially disadvantaged suffer higher levels of oral disease and inequalities exist in a comparable way to the prevalence of heart disease, stroke, and dementia. Oral health inequalities therefore constitute a significant public health problem.

Action is required on the broader social and environmental determinants of health. At the same time, better surveillance data is needed to inform better pan-European prevention strategies.

Why oral health data is important

The publication of high quality, comparable oral health data in Europe, together with better cost-effectiveness studies to assess the impact of prevention initiatives, would be indispensable tools in the fight for better oral health in Europe and support the goal of improving the overall health and wellbeing of EU citizens.

Despite significant achievements in the prevention of dental decay in Europe, much work still needs to be done in a number of areas, notably tackling oral health inequalities, addressing common risk factors and raising oral health awareness among policy makers.

Access to consistent oral health data would make it easier to identify what action is needed at pan-European and member state level to prevent associated chronic diseases, promote healthy living and protect the health of EU citizens. Data currently exists from several credible sources, and could be easily gathered and published in a more systematic manner as part of general reporting on public health metrics across member states.

Devising a set of oral health indicators, which could then be collected throughout Europe, in order to provide up-to-date data, would benefit EU citizens' oral health, by identifying areas of strength and areas of poorer performance in key oral health determinants. Such information would assist policy makers in making informed decisions that better target the needs of their own populations to improve oral health and the broader set of diseases that are inextricably linked to oral health.

Chapter 2: The link between oral health and general health

A range of health conditions are associated with poor oral health. It has long been recognised that poorly controlled diabetes is a well-established risk factor for developing periodontal breakdown. Recently published research shows how gum disease can increase diabetic complications, whereas treating the gum disease can lead to better outcomes for diabetic patients. Gum disease is also associated with the significant burden of cardiovascular disease and stroke. Furthermore, it is recommended that pregnant women treat their gum diseases properly, as this may reduce the risk of premature birth^{8,9}.



Cardiovascular diseases: Oral diseases can also be associated with cardiovascular diseases¹⁶. People with gum disease are almost twice as likely to have coronary artery (heart) disease than people without gum disease^{17,18,19,20}. Similarly, studies have found that people who have had a stroke are more likely to have gum disease than people who have not had one²¹.



Diabetes: It has long been known that people with diabetes are more likely to have gum disease than people without it^{10, 11, 12}. New research has also shown that people are more likely to develop diabetes if they have gum disease^{13, 14}. Diabetics also have an increased risk of losing teeth¹⁵.



Respiratory diseases: People with gum disease and inadequate oral hygiene have more bacteria in their mouths and may therefore be more likely to contract respiratory tract infections and can precede the development of pneumonia²². This particularly affects frail, older people, such as those in care homes and hospitals. Good oral hygiene has been shown to result in fewer people developing acquired pneumonia.



Ageing society: In addition, tooth loss can be seen as an early marker of decline in middle and older adulthood^{23, 24}. Studies have found links between poor oral health and physical and cognitive impairment in elderly people²⁵ and there is a link between number of teeth lost and earlier onset of dementia²⁶.

Lifestyle and social determinants (common risks factors)

The main risk factors that lead to the development of chronic diseases and oral diseases are common. The mouth is ultimately the key entry point to the body for alcohol, tobacco and unhealthy foods that are common risk factors that prevent people from achieving good health.



Diet: Sugar consumption is the main cause of dental caries, the most common non-communicable disease²⁷. In addition, a diet high in sugar and fat, and low in fruit and vegetables, essential vitamins and minerals contributes to a heightened risk of cardiovascular disease, cancer, obesity and diabetes²⁸. It has been suggested that obesity is second only to smoking as the strongest risk factor for periodontitis²⁹.



Tobacco use: Smoking and chewing tobacco are linked to several types of cancer (including oral cancer), respiratory disease, cardiovascular disease, and poor pregnancy outcomes whilst also increasing the risk of gum disease and tooth loss³⁰.



Alcohol consumption: Excessive alcohol consumption can contribute to the development of liver cirrhosis, cardiovascular disease, oral cancer, and other cancers^{31, 32}.



Poor oral hygiene: This is not only a risk factor for poor oral health, in particular gum disease, but also for other chronic diseases, such as pneumonia³³.



Social determinants: Poor oral health is influenced by a variety of social determinants, such as the community, family and individual environments, which cover determinants such as the characteristics of the healthcare system, the family's health practices, the socioeconomic status, the individual's health behaviours, their use of dental care, if they benefit from dental insurance, and their biologic and genetic endowment^{34,35}.

Chapter 3: Recommended Oral Health Indicators

As the only organisation in Europe representing the Association for Dental Education in Europe (ADEE); The Council of European Chief Dental Officers; The European Association of Dental Public Health; The Oral Health Foundation; and The Pan-European Region of the International Association for Dental Research, we are united in suggesting the inclusion of four new indicators in future editions of the Health at a Glance: Europe Reports. Our recommended indicators (in no particular order of priority) cover the following areas:

- 1. Oral health status**
Dental caries prevalence (DMFT) data for 12-year old's
- 2. Economic burden of oral diseases**
Dental care expenditure and productivity loss
- 3. Link between oral health and other non-communicable diseases**
Oral cancer
- 4. Health inequalities**
Educational and occupational inequalities in oral health

These indicators, when taken together, cover a broad cross-section of the status of oral health across the lifespan and would complement the existing non-oral health indicators already used in the report, especially given the clear link with wider health outcomes. We strongly believe that those indicators give the best available reflection of the state of oral health in Europe and can be used as accurate determinants of health in later life. Moreover, they cover a wide range of areas, including the socio-economic impact of poor oral health, the prevalence of oral cancers, the prevalence of caries across Europe and the impact of socio-economic inequalities on oral health.

For the first and the third recommendations (dental caries and oral cancer) we suggest the inclusion of national level data in the relevant chapters of the report, to outline the significant differences that exist between EU Member States. For the second recommendation (Economic Burden of Dental Disease), we recommend a reference to the economic burden of oral diseases across the European Union. However, this second indicator can also be used to highlight differences between Member States, especially when it comes to productivity losses due to poor oral health.

INDICATOR 1) Oral health status - dental caries prevalence (DMFT) data for 12-year old's

DMFT data for 12-year olds, is a clear and direct indicator of the state of oral health in children, as it expresses the number of teeth that are decayed, missing, or filled. More broadly, this also illustrates social inequalities and the inequality of access to care in Member States.

We recommend the inclusion of the data for EU Member States on the mean national DMFT score for 12-year olds in the chapter on 'determinants of health'. Affected teeth in children can be directly linked to living and social conditions and lifestyle, as well as the prevalence of public health measures.

Source: The Council of European Chief Dental Officers (CECDO), [References for DMFT Data for 12 year olds](#) at 14 January 2018³⁶

The CECDO collects DMFT Data for 12-year old's in a comprehensive survey compiling data for all EU countries and other European countries. This serves as a resource for Chief Dental Officers across Europe. The data set is updated regularly as new data are reported.

INDICATOR 2) Economic burden of oral diseases

Oral disease not only impacts the individual through pain and discomfort, and the broader impact on their general health and quality of life, but also impacts general healthcare and the wider community. This economic burden is unnecessary since oral diseases are largely preventable through good oral care routines, supported by the broader promotion of a healthy lifestyle and environment.

This indicator would naturally fit in the chapter on 'health expenditure'. We recommend the inclusion of a reference to the important financial burden that oral health expenditure has on the European society, adding also the indirect costs linked to oral health, noting especially that productivity loss due to oral health problems is higher in Western Europe than anywhere else in the world.

Source: Patel R. (2012) The State of Oral Health in Europe - Report Commissioned by the Platform for Better Oral Health in Europe³⁷ and Righolt A.J., Jevdjevic M., Marcenes W., Listl S. (2018) Global-, Regional- and Country-Level Economic Impacts of Dental Diseases in 2015. *Journal of Dental Research*, 1-7. DOI 10.1177/0022034517750572³⁸

In 2012, the Platform for Better Oral Health in Europe estimated that the direct cost of dental disease in the then 27 Member States of the European Union would be € 84 billion in 2015. Subsequently, Righolt et al. (2018) have published an estimate that in 2015 the direct cost of dental disease in West and Central Europe was \$US 104.67 billion (€ 85 billion) confirming the Platform's estimate. The Righolt et al. (2018) study investigated direct (dental expenditures) and indirect (productivity losses) costs due to dental diseases. Direct costs of dental diseases were estimated using a previously established systematic approach, indirect costs were estimated using an approach developed by the World Health Organization Commission on Macroeconomic and Health.

INDICATOR 3) Oral cancer

Oral cancer is the 15th most common cancer worldwide⁴⁰. In some European countries, oral cancer even is the type of cancer with the highest rate of morbidity. Tobacco use is estimated to be the primary risk factor for about 41% of oral cancer cases in men and 11% in women, but it also sometimes occurs due to a poor diet, poor oral hygiene or the human papilloma virus (HPV), all common risk factors with other non-communicable diseases.

We recommend the inclusion of data on the incidence and mortality from oral cancer under the chapter on 'health status'. Alternatively, the indicator could also fit under the chapter on 'determinants of health', as oral cancer can be directly linked to external factors affecting a person's health, notably smoking and the consumption of alcohol. As such, oral cancer also reflects socio-economic determinants of health.

Source: Ferlay J., Steliarova-Foucher E., Lortet-Tieulent J., Rosso S., Coebergh J.W.W., Comber H., Forman D. and Bray F. (2013), Cancer incidence and mortality patterns in Europe: estimates for 40 countries in 2012, *European Journal of Cancer*, 2013; 49, 1374-1403 ³⁹

This study provides an overview of the estimates for the incidence of, and mortality from cancer, including oral cavity and pharynx cancer in 40 European countries. The study uses statistical models to estimate national incidence and mortality rates for the year 2012 from recent trends, wherever possible. The estimated rates in 2012 were applied to the corresponding population estimates to obtain the estimated numbers of new cancer cases and deaths in Europe in 2012.

INDICATOR 4) Health inequalities

Health inequalities are one of the most important aspects of social injustice in Europe and worldwide, and are increasingly recognized as a serious, public health concern. Evidence from different European countries shows that subjects in lower socioeconomic levels are more likely to have poorer oral health than their counterparts in higher positions^{41, 42} (1, 2). The persistence of these inequalities in advanced, high income societies suggests that specific strategies have not been successful in tackling important determinants, even in the most egalitarian states. Tackling health (and oral health) inequalities has increasingly become a goal of governments in European countries.

Source: Guarnizo-Herreño CC, Watt RG, Pikhart H, Sheiham A, Tsakos G. Socioeconomic inequalities in oral health in different European welfare state regimes, *Journal of Epidemiology and Community Health* 2013; 67(9):728-35.

Listl S, Broadbent JM, Thomson WM, Stock C, Shen J, Steele J, Wildman J, Heilmann A, Watt RG, Tsakos G, Peres MA, van der Heijden G, Jürges H. Childhood socioeconomic conditions and teeth in older adulthood: Evidence from SHARE wave 5. *Community Dentistry and Oral Epidemiology* 2018; 46(1):78-87.

Using data from 21 European countries, Guarnizo-Herreño et al., (2013) showed evidence of significant educational and occupational inequalities in oral health (in the form of social gradients) in all countries analysed. The study used the same data source for all countries and employed statistical models to estimate inequalities in both relative and absolute terms. The Eurobarometer survey where these data came from extends to 31 European countries, allowing for relevant estimates in all countries. Later, Listl et al. (2018) revealed that Europeans' oral health was not only related to current socioeconomic conditions, but also to different indicators of childhood socioeconomic background. Analyses were conducted on data from the Survey of Health, Ageing and Retirement in Europe, which includes information from 14 European countries.

Annex I: Members of the Platform

The indicators have been identified following extensive consultations between various experts from the Platform for Better Oral Health in Europe's Task and Finish Group on Oral Health Indicators, with the support of the other members of the Platform:

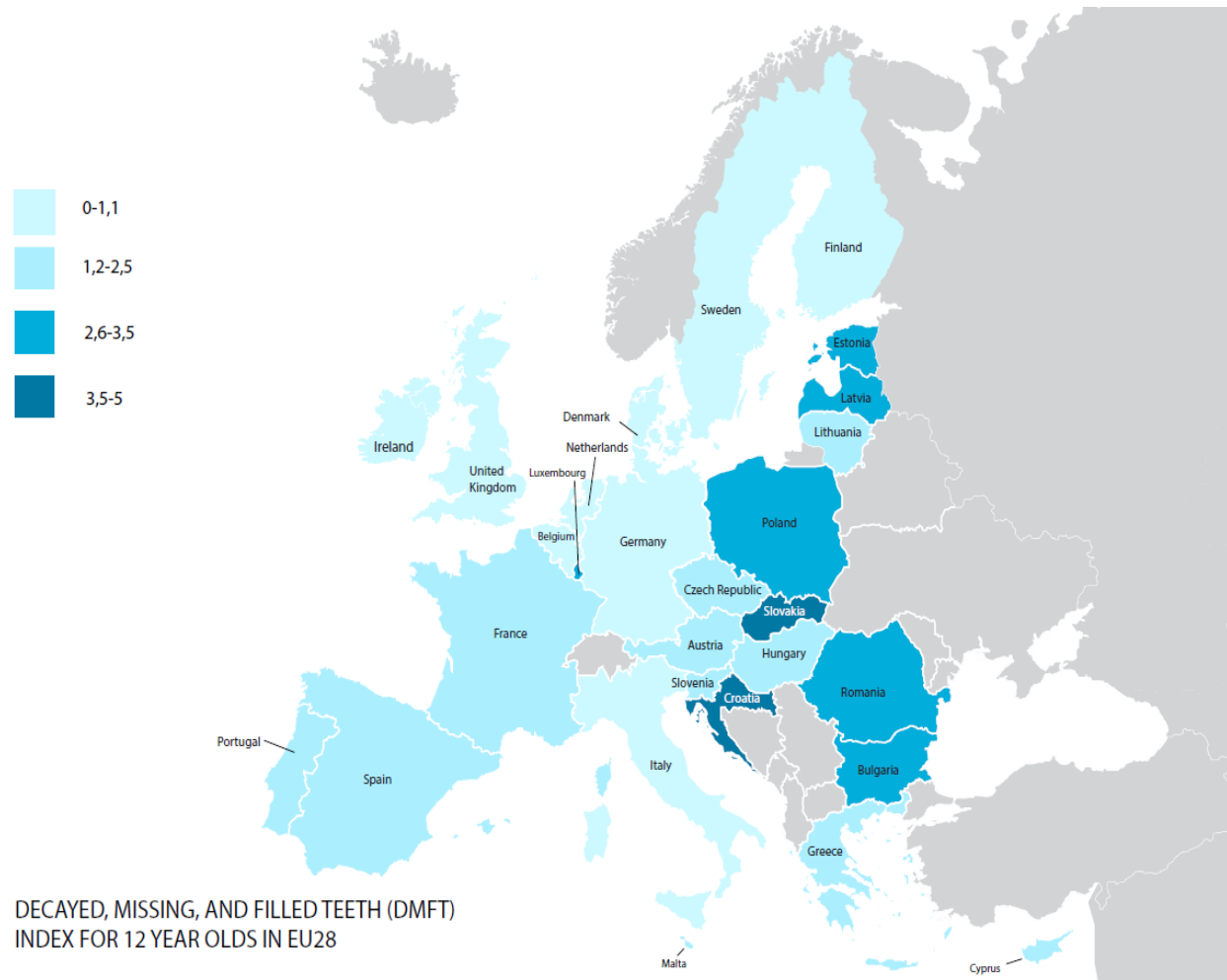
- Dr. Nigel Carter, Chief Executive of the Oral Health Foundation
- Prof. Kenneth Eaton, Visiting Professor at the Universities of Leeds and Brescia
- Dr. Ronald Gorter, University of Amsterdam
- Prof. Elizabeth Kay, University of Plymouth
- Prof. Brian O'Connell, Trinity College Dublin
- Dr. Corrado Paganelli, University of Brescia
- Dr. George Tsakos, University College London
- Prof. Dr. Jacques Vanobbergen, University of Ghent
- Dr. Paula Vassallo, University of Malta

Annex II: Oral Health Indicator data repository

In annex to this document you will find a repository with our recommended data sets regarding:

1. DMFT data for 12-year old's (recommendation 1);
2. The economic burden of dental care (recommendation 2);
3. Oral cancer (recommendation 3)

Annex III: Map of decayed, missing, and filled teeth - (DMFT) index for 12-year old's in EU28



Source: The Council of European Chief Dental Officers (CECDO), [References for DMFT Data for 12 year olds](#) at 14 January 2018²⁷

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