

# Global research challenges for oral health



Article by **Poul Erik Petersen**

The World Health Organization (WHO) recently published a global overview of oral health, a statement that described the WHO Oral Health Programme's approach to promotion of further improvement in oral health during the 21st Century.<sup>1</sup> The report emphasized that despite great improvements in the oral health status of populations across the world, problems still persist. This is particularly so among underprivileged groups in both developed and developing communities. Oral diseases and conditions, including oral cancer, oral manifestations of HIV/AIDS, dental trauma, craniofacial anomalies, and noma (cancrum oris), all have broad impacts on health and well-being.

Dental caries and periodontal diseases have historically been considered the most important global oral disease burden. At present, the distribution and severity of dental caries vary in different parts of the world and within the same country or region (Figure 1 and Figure 2). The significant role of socio-behavioural and environmental factors in oral disease and health is demonstrated in a large number of epidemiological surveys.<sup>2</sup> Dental caries is still a major public health problem in most industrialized countries, affecting 60–90% of schoolchildren and the vast majority of adults. It is also a most prevalent oral disease in several Asian and Latin American countries, while it appears to be less common and less severe in most African countries. However, it is expected that the incidence of dental caries will increase in the near future in many developing countries of Africa, particularly as a result of growing consumption of sugars and inadequate exposure to fluorides (Figure 3). The current pattern of dental caries reflects primarily distinct risk profiles across countries (i.e. living conditions, lifestyles and environmental factors) and the outcome of implementation of preventive oral health systems.

While in some industrialized countries there has been a positive trend of reduction in tooth loss among adults in recent years, the proportion of edentulous persons amongst the elderly is still high in some countries (Figure 4).<sup>3</sup> In most developing countries, access to oral health services is limited and teeth are often left untreated or are extracted because of pain or discomfort. Tooth loss and impaired oral function are therefore expected to grow as a public health problem in many developing countries. Meanwhile, tooth loss in adult life may also be due to poor periodontal

health. Severe periodontitis which may result in tooth loss is found in 5–15% of most populations.<sup>1</sup> In industrialized countries, studies show that tobacco use is a major risk factor for adult periodontal disease.<sup>4</sup> With the growing consumption of tobacco in many developing countries the risk of periodontal disease and tooth loss, therefore, may increase. Periodontal disease and tooth loss are also related to general chronic diseases such as diabetes mellitus.<sup>5</sup> The growing incidence of diabetes may further impact negatively on the oral health of people in several developing countries. Oral cancer is highly related to use of tobacco and excessive consumption of alcohol. The incidence of oral cancer is particularly high among men, the eighth most common cancer worldwide (Figure 5).<sup>6</sup> In south-central Asia, consumption of tobacco in various forms is particularly high and cancer of the oral cavity ranks amongst the three most common types of cancer. The variation in oral cancer incidence rate across the world primarily reflects different risk profiles and access and availability to health services.

In several industrialized Western countries, oral health care is made available to the population, comprises preventive and curative services and is based on either private or public systems. Meanwhile, people in deprived communities, certain ethnic minorities, homebound or disabled individuals and older people are not sufficiently covered by oral health care. Many developing countries have a shortage of oral health personnel, services are mostly offered from regional or central hospitals of urban centres and little importance is given to preventive or restorative dental care.

## Research for oral health

Essentially, we have sufficient knowledge about the causes of most oral diseases for public health action, yet our knowledge about causal factors related to certain diseases such as cleft lip and palate and noma is incomplete. The major priority for new research is on prevention policy, translation of science and evaluation of programme effectiveness. Clinical and public health research has shown that a number of individual, professional and community preventive measures are effective in preventing most oral diseases.<sup>7</sup> However, optimal intervention in relation to oral disease is not universally available or affordable because of escalating costs and limited resources in many countries. This, together with insufficient emphasis on primary

Addressing neglected health issues

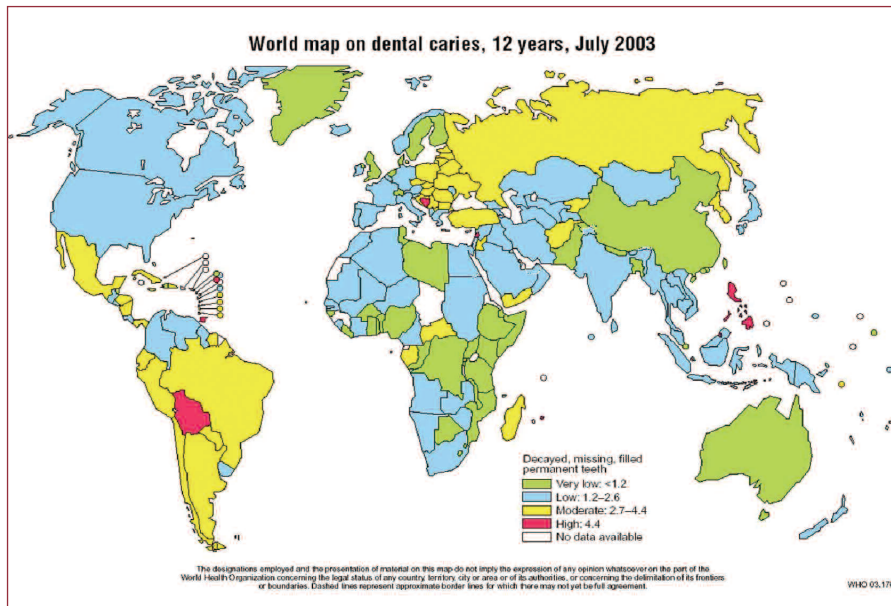


Figure 1: Levels of dental caries experience in 12-year-olds as measured by the Decayed, Missing due to Caries, Filled Teeth (DMFT) index<sup>1</sup>

prevention of oral diseases, poses a considerable challenge for several countries, particularly developing countries and countries with economies and health systems in transition.

The major challenges of the future will be to translate knowledge and experiences of disease prevention into action programmes. Advances in oral health science and knowledge have not yet benefited developing countries to the fullest extent possible. Clear disparities in economic strength, political will, scientific resources and capabilities, and the ability to access global information networks have, in fact, widened the knowledge gap between rich and poor countries.

**Building an international research agenda for oral health**

The need to re-examine an existing research agenda for international collaborative research has been stimulated by recent oral health sessions held at the annual Forums of the Global Forum for Health Research in 2002 in Tanzania, in Geneva in 2003 and most recently in Mexico City in 2004:

- a) The 5th Forum session focused on developing international collaborative research that actively involves research centres in developing countries. Significant experiences have been gained by the WHO Collaborating Centre for Dental, Oral and Craniofacial Research at the National Institutes of Health, Bethesda, Maryland, the United States.
- b) The 6th Forum session con-

sidered examples of international collaborative research that spans developing and developed countries and focuses on the measurement of socio-dental outcomes for the purpose of planning and evaluating oral health services.

c) The 7th Forum session discussed the development of an international collaborative research agenda that would be relevant to the Millennium Development Goals (MDGs) and included discussants from the WHO, the International Association for Dental Research (IADR) and some of the WHO collaborating centres sited in the Americas. The session focused on building research teams that address questions of global importance. Such research includes oral disease-systemic disease inter-

relationships, HIV/AIDS related oral disease, cranio-facial anomalies, oral cancer, health outcomes measurement such as quality of life indicators, and health promotion. It is considered highly relevant to ensure integration of oral health research into other health research projects at a community level that should enable efficient linkages of oral health measures with biological, social and environmental health determinants.

**WHO and oral health research**

In the future, more emphasis should be devoted to certain areas of research:

- ❖ Modifiable common risk factors to oral health and chronic disease, particularly the role of diet, nutrition and tobacco.
- ❖ Oral health-general health interrelationships.
- ❖ Psychosocial implications of oral health/illness and quality of life

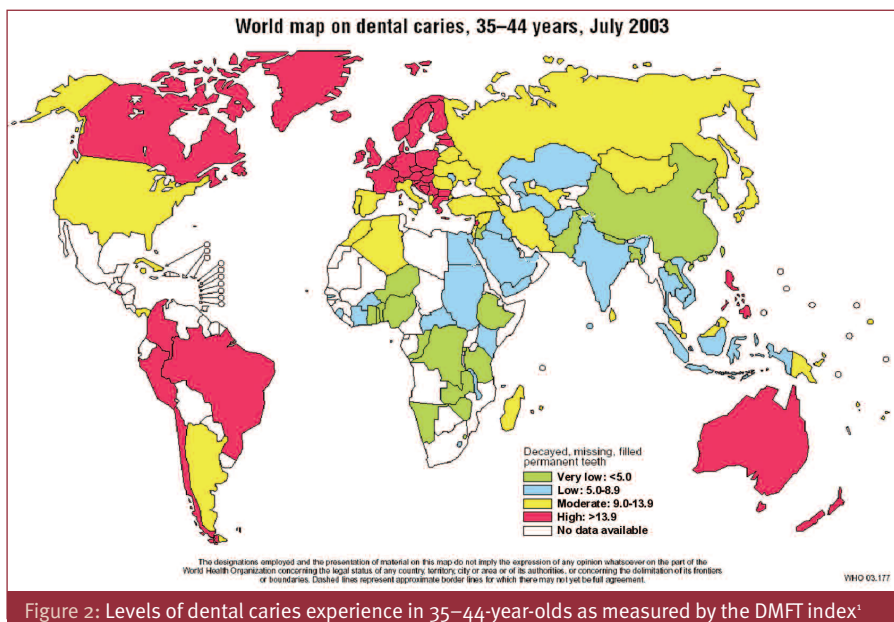


Figure 2: Levels of dental caries experience in 35-44-year-olds as measured by the DMFT index<sup>1</sup>

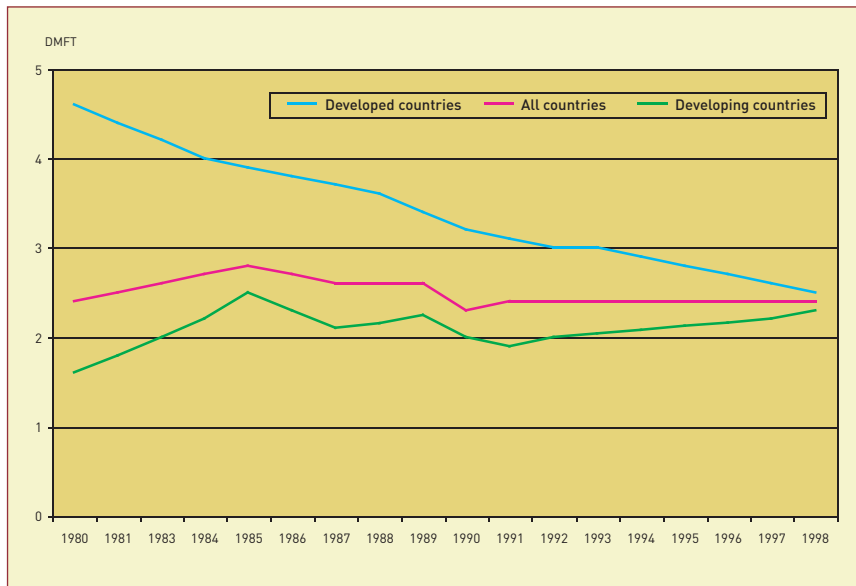


Figure 3: Changing dental caries experience index (mean number) of 12-year-olds in developing and developed countries as measured by the DMFT index\*

strengthen research capability in developing countries so that research is recognized as the foundation of oral health policy.

- Increased involvement of WHO Collaborating Centres on Oral Health in high-priority areas of research within national, regional or interregional centres.

- Encourage oral health research training programmes at local level or based on inter-university collaborative 'sandwich programmes'

- Provide universities and research institutes in developing countries with easy access to the scientific literature within oral health and online access to scientific articles and reports

- Facilitate the use of the Cochrane Library that provides systematic

reviews about the evidence for public health action.

In addition to WHO Collaborating Centres on Oral Health, the WHO Oral Health Programme supports research in developing countries in joint projects with non-governmental organizations such as the IADR and the World Dental Federation. Reducing the '10/90' gap in oral health research cannot take place in an isolated way, but may effectively take place through work within the framework of the Global Forum for Health Research. This forum provides support to priority-setting methodologies, sound measurement, and dissemination of results in order to break the vicious circle of 'ill health and poverty'.

Most recently, the WHO published the *World Report on Knowledge for Better Health*.<sup>10</sup> The report provides a

- Inequity in oral health and disease.
- Diagnostics and cost-effective intervention strategies in relation to certain conditions such as noma and craniofacial birth defects.
- Identification of the most indicative oral manifestations of HIV/AIDS.
- Population studies of oral mucosal lesions, including epidemiological surveys of HIV/AIDS related oral disease in developing countries.<sup>8</sup>
- The burden of oro-dental trauma, particularly in developing countries, and related risk factors.
- Evidence in oral health care: clinical care and public health practice.<sup>9</sup>
- Operational research on effectiveness of alternative community oral health programmes, including research on optimal levels of fluoride from multiple sources.
- Health systems research on reorientation of oral health services towards prevention and health promotion.
- Time-series data for oral health surveillance in developing countries.

The WHO Oral Health Programme has prioritized oral health research as part of the global strategy for better health.<sup>1</sup> The Programme stimulates oral health research for, with and by developing countries in several ways:

- Supporting initiatives that will

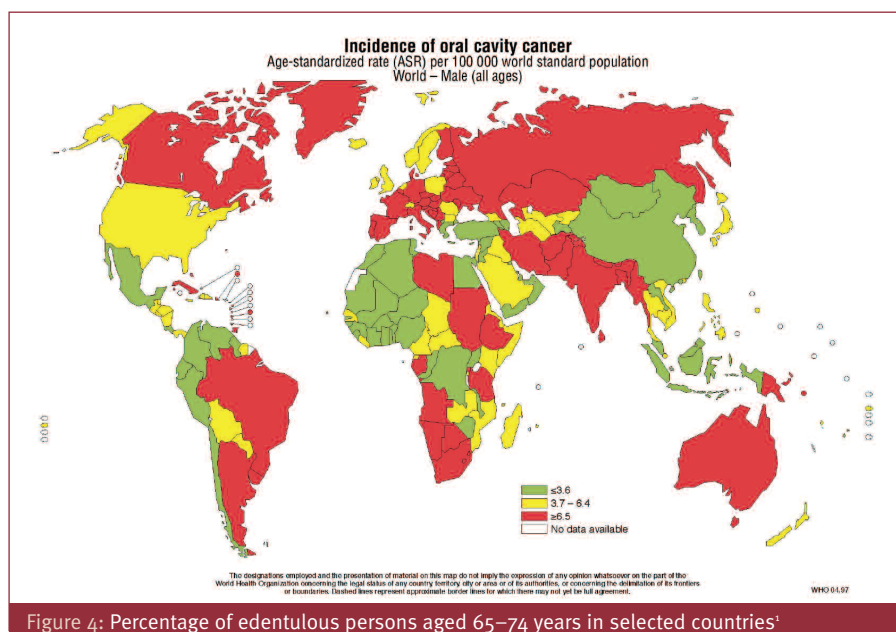


Figure 4: Percentage of edentulous persons aged 65–74 years in selected countries\*

Addressing neglected health issues

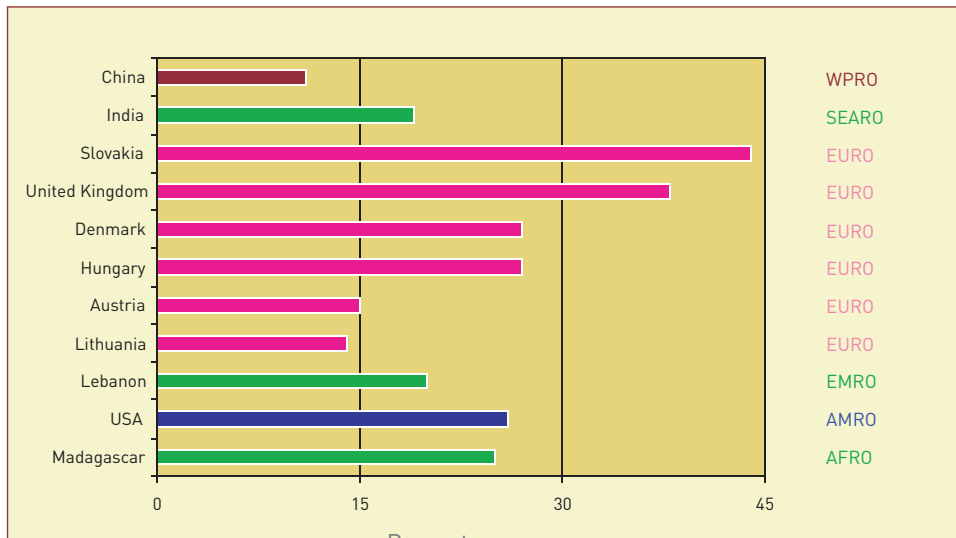


Figure 5: Age-standardized incidence rates of oral cavity cancer in males worldwide<sup>6</sup>

version of the paper by Dr Lois K Cohen, PhD, Director of the WHO Collaborating Centre for International Collaboration in Dental and Craniofacial Research, NIH, Bethesda, Maryland, the United States. The WHO Collaborating Centre has provided significant support to the development of an agenda for global oral health research and Dr Cohen played an important role in leading Forum sessions on oral health research at the annual meetings of the Global Forum for Health Research, beginning in Tanzania, 2002.

compass to reorient health research so that it may respond more effectively to public health challenges on a national and global level. This re-orientation requires a strengthening of the health research sector, an environment that is more conducive to research-informed policy and practice, and more focus on key priorities for research to improve health systems. The analysis and recommendations of the report apply to continuous oral health systems development and adjustment as well as to oral health research. □

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**References**

- Petersen PE. The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century – the approach of the WHO Global Oral Health Programme. *Community Dent Oral Epidemiol*, 2003, 31(Suppl 1):3–24
- Petersen PE. Sociobehavioural risk factors in dental caries – international perspectives. *Community Dent Oral Epidemiol*, 2005, 33 (In press)
- Petersen PE, Yamamoto T. Improving the oral health of older people: the approach of the WHO Global Oral Health Programme. *Community Dent Oral Epidemiol*, 2005, 33:81–92
- Tomar SL, Asma S. Smoking attributable periodontitis in the United States: findings from NHANES III. *J Periodontol*, 2000, 71:743–51
- Petersen PE, Ogawa H. Strengthening the prevention of periodontal disease – the WHO approach. *J Periodontol*, 2005, 76 (In press)
- Stewart BW, Weihues P. *World Cancer Report*. Lyon: WHO International Agency for Research on Cancer, 2003
- Cohen L, Gift HC (Eds). *Disease prevention and health promotion: Socio-dental sciences in action*. Copenhagen: Munksgaard, 1995
- Petersen PE. Strengthening the prevention of HIV/AIDS related oral disease. *Community Dent Oral Epidemiol*, 2004, 32:399–401
- Petersen PE, Kwan S. Evaluation of community-based oral health promotion and oral disease prevention – WHO recommendations for improved evidence in public health practices. *Community Dent Health*, 2004, 21(Suppl 1): 319–20
- World Health Organization. *World Report on Knowledge for Better Health*. Geneva: WHO, 2004