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*For the last 30 years Aubrey Sheiham, Professor of Dental Public Health at University College London, has been a radical voice in public health. His wide area of interests include evidence-based dentistry, health promotion and food policy. Recently in London a special two-day conference was held to mark his distinguished career. This edition of Euro Observer, with Guest Editor, Dr Richard Watt, covers a range of issues on dentistry to commemorate his work.*

## Strategies for oral health care

Aubrey Sheiham

Dramatic changes in the extent and patterns of disease are a good test bed to evaluate the principles, scientific rigour and openness to change of a health profession. Questions such as 'Have they made good rational analyses of reasons for the changes?' 'How has the profession and governments responded to changes?' 'Are the shifts in policy appropriate?' This article will review such questions in relation to dental care in Europe because there have been dramatic improvements in oral health in last 30 years.

### Changes in oral health in Europe

In 1970, 12 year-olds in countries like Norway had about 10 DMFT teeth (DMFT=Decayed Missing and Filled Teeth). Now the DMFT is around 1. And the loss of all teeth fell from 17% in 1973 to 4% in 2004. The prevalence and severity of caries and destructive periodontal diseases are now low and still declining in Europe. Further examples of changes from the United Kingdom (UK) are:

- Percentages with no caries experience increased from 22% to 54% in 5 year-olds and from 7% to 50% in 12 year-olds.
- In 15 year-olds the DMFT decreased from 5.9 to 2.5.
- 16–24 year-olds with 18 or more sound teeth increased from 44% to 83% in 20 years.

- In 1978 the average 16–24 year old had 17 sound teeth and 8 fillings; by 1998 they had 24 sound teeth and 2.9 fillings. In 1978 25–34 year-olds had 13.9 sound teeth. That increased to 19.7 in 1998.<sup>1</sup>

European populations' oral health profiles changed in three ways: (1) Each new birth cohort has lower caries levels than the preceding cohort and children and young adults have low levels of dental disease. Young cohorts will need some regular low technology care. (2) Middle-aged adults' teeth are heavily restored and will need life-long maintenance and complex treatment. (3) Older people can be divided into two groups. Those with their own teeth and those without natural teeth. The former group is increasing in size as tooth loss declines.

### Reasons for improvements

Dentists played an insignificant role in improvements in oral health, indicating that dental diseases are readily prevented without dentists. The major improvements are due to external factors. Dental care accounted for about 3% of reduction in caries in 12 year-olds whereas broad socioeconomic factors (including or excluding fluoridated toothpastes) explains 65% of this reduction.<sup>2</sup> The improvements in periodontal health are due to decreases in smoking, and improvements in self-care using anti-plaque and calculus toothpastes.

### Implications of changes

- The need for dental care has markedly reduced in about 90% of the population under 50 years. Most people will need little regular dental care.
- Most dental intervention will be simple treatments.
- The reduction in need among younger people will not be compensated for by increased need by middle-aged and older people.
- Today's over-50s may need a lot of oral health care as they should retain their teeth and have already received much treatment, requiring repeated maintenance. Older adults will need relatively little care since many are edentulous.
- As populations are ageing with many natural teeth there will be a greater total consumption of oral health care during their lifetimes, unless evidence-based dentistry is implemented. However, the total lifetime consumption is cohort-dependent.
- The consequences of more people keeping their teeth into old age are uncertainty in forecasting demand and supplier-induced demand for treatment and prevention.
- The content of treatment courses will be markedly changed. For example, in Norway, there was an increase in those having nothing except scale and polish – from 31% in 1983 to 55% in 1993.<sup>3</sup> In 1994 less than 43% of UK adult claims were No Dental Intervention.<sup>4</sup>

Most importantly, there has been a change in the types of tooth sites affected by caries. Lesions are predominantly on easily accessible sites, are much smaller and progress very slowly or not at all, so treatment is simpler or not required.

- As DMFT scores decrease the percentage of the population needing regular care will decrease. At scores of 0–5, 33% of UK 16–24 year-olds attended clinics regularly compared to 57% with a score of 16+.
- At lower levels of dental caries the traditional preventive methods like professionally applied fluorides and chair-side dental health education is

not likely to be justified because they are no longer cost effective.

- The success of public health prevention strategies may necessitate governmental policies to protect consumers. Professional self-control may not be sufficient.

### Suggested policy changes

Some individuals and groups have suggested what changes in oral care policies should be implemented in the 21st century due to changes in oral health patterns and increased public awareness.

Barnes, the WHO Chief Dental Officer in 1978, concluded that use of dental services did not reduce dental disease. He recommended the need for a closer integration of the dental and general health service systems. The UK Dental Strategy Review Group considered that there is a need to change the emphasis of dentistry from technological repair by encouraging practitioners '[T]o limit intervention to the absolute minimum and to give prevention the opportunity to work'.

During the 1980s there was considerable over-treatment. A UK Government enquiry on over-treatment severely criticized the restorative approach. '[T]he restorative approach was at the heart of unnecessary treatment' and '[W]e have gone beyond the stage where there are in the profession two respectable alternative approaches, the "restorative" and the "preventive". It is now clear that those who follow the restorative approach and carry out more than the minimum number of restorations necessary are undertaking unnecessary treatment'.<sup>5</sup>

The problem with dentistry is that dentists treat two diseases – caries and periodontal diseases – both easily preventable without dentists. Dentists fail to prevent and do not practice evidence-based dentistry. I have recommended that there should be fewer dentists, intervening less and reorienting their efforts to improving effectiveness and quality. Reducing the numbers of dentists will allow them to use their skills more appropriately by delegating the proportionately more simple dental procedures. The profession needs to reorient towards

public health promotion, and retrain dentists to changed needs, evidence-based treatments and to public expectations such as maintaining their teeth for their lifetime, not getting tooth decay and not having to attend dentists every year. Better regulation of the public and private sectors and reviews of effectiveness are essential. Having fewer dentists will ensure that they maintain their high professional status and reasonable income as befits their long professional training. These views were echoed by the UK think-tank, Demos,<sup>6</sup> which concluded that the dentistry industry 'should shrink to a core of dental hygienists ... and a small number of specialists in trauma, cosmetic dentistry and orthodontics.'

The emphasis should be placed on quality issues and evidence-based dentistry. Others have stressed that a more open approach to clinical governance is essential if the professions are to recover and retain public confidence. Control by the profession through self-regulatory mechanisms is currently a myth. Self-regulation is being challenged by bodies like the Healthcare Commission, increasing cost-containment and by putting more responsibility for dental costs onto the individual. The growing focus on openness and public scrutiny, clinical governance and emphasis on treatment outcomes and requirements for revalidation will have a profound effect on dentistry and personnel projections.

*The World Oral Health Report 2003*<sup>7</sup> made recommendations for evidence-based dental care and the appropriate use of personnel. The British Dental Association also stressed that evidence-based dentistry is particularly important because 'there was little health gain from some of the dental services provided and lack of evidence-based treatment decisions'. The selective elimination of inappropriate care would free resources to provide care to more people. One way to do this is by developing high-quality and flexible appropriateness criteria to guide clinical decision-making. Indeed, evidence-based dentistry applied to two dental procedures – recall intervals and scale and polish – would reduce the workloads of dentists by about 20%.

## The profession's responses

The most common response of dental policy-makers to changes in oral health has been to propose increased access and numbers of dentists. This is illustrated by policies in Norway, which has the highest population per person-labour years for dental practitioners (about 1,150).<sup>8</sup> There, the number of dentists being trained is increasing. Similarly, in the UK, the government is recruiting from overseas and training more dentists. The main reasons for increasing dental personnel when logic suggests that with major improvements in oral health there should be fewer, are supplier-induced demand, over-treatment, increased privatization of dentistry and the growth of bodies corporate – ‘the McDonaldisation of dentistry’ – and the failure to practice evidence-based dentistry. Supplier-induced demand, coupled with a redefinition of need, lies at the root of problems with dental care. They lead to debates about lack of access to care – the ‘Scarborough phenomenon’ where long queues of patients wait for a new National Health Service dentist.

Grytten<sup>8</sup> has summarized the folly of supplier-induced demand. It has led to a situation in Norway where current estimates, based on 200 working days per year, indicate that a dental practitioner sees about five to six patients per day! ‘More dentists will treat fewer patients, with higher fees.’ They will have to find more work to do on people who have healthier dentitions. Dentists who are concerned with decreasing disease levels, a lowering of their earnings, and rising costs are hungry and therefore dangerous. They tend to carry out much unnecessary treatment and redefine need.

A good dentist will only do appropriate treatment and effective prevention. But since patients are poorly informed and in vulnerable positions lying on the dental couch with their mouth open, the dentist can influence the nature of care provided.<sup>8</sup> What we are seeing now throughout Europe is that dental specialties are redefining need by adding an interesting twist that was used by dentistry to establish its profession in the 19th century, namely, the rediscovery of

focal sepsis – the idea that oral conditions can affect heart disease, diabetes or pregnancy outcomes. The conclusions of systematic reviews are inconsistent, making these questions for additional research rather than the basis for assessing need or scaring the public.

As stated previously, most reforms are confined to the non-availability of services, costs, and insufficient preventive practice by dentists. They do not extend to the fundamental limitations of dentistry, namely:

- inappropriate use of interventionist approaches leads to a spiral of damage. Dentists think they are looking after a machine which is constantly breaking down; they do not allow it to repair because they do not consider the natural history of diseases;
- the way disease and needs are defined;
- failure to prevent avoidable disease and tackle the determinants of oral disease.

A feature of dental diseases is that simple and cheap public health methods are available to prevent and control them because the causes are known; they are diet, dirt, smoking, stress, and accidents. A major factor making dental care so expensive is the limitations of the dominant restorative approach to treat and prevent disease. I will mention some of the main limitations and propose alternatives because the current approaches can only perpetuate and not solve the problems.

Conventional dental approaches must change because:

- Whereas oral health should be the overriding goal, it has been displaced by dental treatment, which is a strategy not a goal.
- Treatment strategies may ensure better care for the few and a dependence on professionals, but little is done on health promotion and inter-sectoral working.
- Clinic-based, capital-intensive approaches to treat disease are unrealistic given the high costs and inadequate coverage.

## Suggested changes in approach

The decline in caries has led to advocating a ‘high-risk’ approach for preventive strategies. That approach has been challenged. The pivotal factor used to determine the choice of preventive strategy should be the distribution of disease in the population. Here, the fundamental axiom ‘that a large number of people exposed to a small risk may generate many more cases than a small number of people exposed to a high risk’, needs to be considered.<sup>9</sup> To decide whether to adopt a population or risk approach, Rose poses the fundamental question – namely, does a small increase in risk in a large number of individuals generate more cases than a large increase in risk in a few individuals?

The patterns of dental caries in populations displays the same shifting distributions as seen in systolic blood pressure and body mass index highlighted by Rose. As the mean decreases the whole distribution shifts to the left pulling the tail with it so that the so-called high risk group declines. These shifts in distribution from a normal to a reverse-J can occur in 10 years. The implication is that the shift in the whole distribution had a markedly beneficial effect on those at relatively high risk, who need far fewer fillings than the corresponding children at an earlier period.

The implications for strategy selection are that the majority of caries in European populations occurs in the majority of the population and not in the small tail of the distribution. Therefore, a policy for caries preventive strategies should be based on a ‘population’ or ‘directed population approach’ rather than a high-risk strategy.

Population strategies to promote oral health should include:

1. Focusing on determinants of health.
2. Preventive rather than curative strategies.
3. Tackling causes common to a number of chronic diseases.
4. Incorporating oral health into general health strategies.

5. Encouraging self-care.
6. Deploying the available resources to meet needs on the basis of priority.
7. Equitable distribution of services.
8. The use of appropriate technology based on sound scientific, evidence-based principles.

The improvement of health is achieved via social changes embodied in health promotion and is not confined to caries. Major improvements in the prevention of disease tend to follow social changes, whether these are alterations in social norms (dietary patterns, oral cleanliness, contraception), in the availability of key resources (fluoridated toothpaste, quality and quantity of food) or as a result of engineering (fluoridation of water supplies, clean water, effective waste disposal). There is no reason why a similar approach should not prove equally successful in the future.

### Oral health promotion

Recent systematic effectiveness reviews of dental health education have highlighted its limitations. A more progressive health promotion approach which recognizes the importance of tackling the underlying social, political and environmental determinants of oral health, is needed. For this approach to be successful in achieving sustainable changes in oral health, multi-sectoral working is essential.

There are basically two approaches for an equity-oriented health policy: one being to focus on reducing specific diseases and the other upon specific risk factors and public policies aimed at improving health conditions in general – the Common Risk/Health Factor Approach (CRHFA). The strategy should include efforts to improve health by reducing risks, promoting health and strengthening possibilities to cope with ‘given’ risk factors – creating supportive environments, reducing the negative effects of certain risk factors and facilitating behaviour changes. A major benefit of the CRHFA is the focus on improving health conditions in general for whole populations and groups at high risk, thereby reducing social inequities.

### Estimating dental needs

Estimating dental needs is fundamental to public health. Yet approaches to assessing dental need have not progressed. There are major shortcomings in the normative needs approach and a service-oriented definition of dental need. Instead of the conventional approach to assessing need, there is an alternative broader, socio-dental approach which takes into account the impact that oral state has on quality of life, peoples’ wants and behaviours, their propensity to change their behaviours, and importantly, evidence that the recommended treatment is effective.

### Evidence-based dentistry

Increases in demand for care have focused attention on meaningful criteria for using technologies and approaches. This has led to greater attention being given to the effectiveness of interventions relative to their cost. Closer scrutiny of what works should allow planners to prescribe what treatments are permissible. That would allow limited resources to be used more efficiently and effectively.

### The role of dentists

Dentists should be diagnosticians, carry out complex procedures, supervise primary oral health teams and act as advocates. Their future lies in fewer procedures of higher quality, together with population-based prevention. What is their appropriate role in prevention? At the lower levels of dental caries now prevailing, traditional preventive methods are no longer cost-effective. Much of the treatment by dentists can be done by auxiliaries. If effective health promotion is implemented the need for expensively trained dentists should decline.

Most dental practitioner involvement in strategy will be as health advocates. Health advocacy involves educating senior government and community leaders and journalists – decision-makers in general – about specific issues and setting the agenda to obtain political decisions that improve the health of the population.

In keeping with the concept of health promotion and making healthy choices the easy choices, a policy for dental care

should be geared to create environments where it is easier for the dental team to do good dentistry.

### Conclusions

The dental profession has fared badly on the questions set in this article to test its rigour and responsibilities as a health profession. In spite of evidence that the current methods and systems of dental care are relatively ineffective, costly and not well-accepted by the public, decision-makers and influential dental professionals remain preoccupied with availability of care and finance.

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# Evolving dental care services

Paul Batchelor

Oral diseases have declined throughout most of Europe. While in some countries, particularly those of Eastern Europe, clinical disease remains a major problem and the overall improvements in levels of oral health means that a growing percentage in each age cohort can now be expected to have many more and healthier teeth than in previous generations. However, this transformation in oral health poses a series of challenges to governments. The main one is to solve the paradox that despite the improvements, the costs of oral care have continued to increase. There appears to be an insatiable demand for dental care, possibly supplier-induced. Many countries report a shortage of dentists and growing public dissatisfaction with access to dental care. Why has this happened and how have governments responded?

The main issue centres on the growing expectations of what dental care can provide. Where previously the public were satisfied with removal of painful teeth this is no longer acceptable. Individuals want teeth saved. Furthermore, expectations surrounding the type of restoration have risen. However, as with all treatment, any restoration has a limited life and continual maintenance is required. Indeed nearly three quarters of the cost of dental care under the NHS involves replacing existing interventions. Generally, the more complex the intervention, the greater the maintenance. This restorative cycle offers a partial explanation as to why there are far higher dentist/population ratios in Scandinavia where similar practices exist. The levels of advanced dentistry is higher, despite having similar dental disease levels. Scandinavian dentists are as busy as their UK counterparts as complex dentistry was introduced far earlier in Scandinavia than in the United Kingdom. The ongoing level of care to maintain crowns and implants is far more costly

and time-consuming than that required for other care options.

Such issues pose at least three major challenges for governments. First, while disease levels have fallen, clinical decay still remains prevalent in some sections of society. As with health in general, those with the least resources have higher levels of disease. Within the resource constraints found in any care system, how can arrangements be altered to help ensure that those with the higher levels of clinical disease obtain care in the face of competing demands from the middle classes for cosmetic interventions? Second, with more treatments from advances in materials and techniques, how can government best play its stewardship role to ensure that only those treatments that are effective are provided? Finally, what processes need to be in place to ensure that when care is provided it is to an appropriate standard? The greater the controls in place, the greater the bureaucracy and costs.

In England and Wales, the issue of allocation of resources is being 'solved' by fragmenting the national contract through which dentists have been paid since 1948. From April 2006, a new contract will be negotiated between dentists and more localized commissioning bodies, the Primary Care Trusts (PCTs). It is argued by the government that PCTs can better identify the needs of their resident population than the previous, centrally-driven system that was based on the premise that the entire population needed care. As the commissioning process evolves, PCTs with an allocated budget for all of health (and social) care will make local decisions about how best to address all the local health needs. Of course, this may mean that should the dental needs be defined as very low in comparison to more general health needs and few funds

allocated to dentistry, the population will need to find dental care outside the NHS.

With respect to both the adoption of new and existing treatment modalities, along with the performance of care providers, clinical governance is being introduced. Clinical governance is defined as 'A framework through which NHS organizations are accountable for continually improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish'.<sup>1</sup> Developments are being pursued to provide the standards necessary to evaluate both performance and how the components within the system are performing. For performance evaluations initiatives include the Healthcare Commission (for organizations) and the National Patient Safety Agency (for individuals) while the National Institute for Health and Clinical Excellence will assess treatments.

European governments are prescribing reforms to their dental systems prior to making a thorough analysis. The biggest challenge is the ability to control what happens within the system. With a lack of appropriate outcome measures and poor information systems for monitoring performance, a reliance on market-type solutions and increasing the dental workforce, the most popular solution will create more problems. Problems such as supplier-induced demand and over-treatment. The development of appropriate outcome measures and proper incentive mechanisms are far more important in achieving equity and success than increasing the numbers of dentists.

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*Paul Batchelor is a Consultant in Dental Public Health and Honorary Senior Lecturer of Dental Public Health in the Department of Epidemiology and Public Health, University College London Medical School.*

# Public health strategies for oral health improvement

Richard Watt

Oral diseases are highly prevalent and their impact on both society and the individual is significant. Dental treatment is expensive for the individual, for the health system and for society as a whole. Although overall improvements in oral health have occurred in many European countries over the last 30 years, oral health inequalities have emerged as a major public health challenge. Dental treatment alone will never eradicate oral diseases. The causes of oral diseases are understood so the potential for preventive action is great. However, the dominant preventive approach adopted by the dental prevention is ineffective, costly and indeed exacerbates inequalities. Public health strategies are needed to create the opportunity and conditions to enable individuals and communities to enjoy good oral health. This article will outline the limitations of preventive dentistry and highlight a public health approach for the promotion of oral health across Europe.

## Limitations of preventive dentistry

In dentistry, preventive activities have largely followed a clinical and behavioural model.<sup>1</sup> The approach is dominated by the use of clinical preventive measures such as fluoride applications and fissure sealants, and dental health education techniques. The educational component focuses primarily on developing the individuals' oral health knowledge based upon the assumption that this will lead to changes in oral hygiene and dietary behaviours. This approach to prevention has been applied to individuals at the chair side, and high-risk groups in the community, mostly through school-based programmes.

What are the limitations of this

approach? A list of limitations are outlined in Table 1. At the most fundamental level this individualistic approach fails to achieve sustainable improvements in oral health as the interventions are palliative in nature, and largely ignore the underlying determinants that create poor oral health, the 'upstream' factors. As a result, inequalities rather than being reduced inequalities, may indeed be increased as those with resources are able to benefit the most from the interventions delivered.<sup>2</sup> Effectiveness reviews of oral health interventions have highlighted the ineffective nature of most educational programmes.<sup>3-6</sup> With professionals dominating this 'top down' approach, patients and communities are largely passive recipients of support, and therefore fail to engage or acquire a sense of ownership. As a result, a dependency culture is often created rather than an empowering one. Professional domination also means that programme costs are high. In addition, oral health interventions are

**Table 1: Limitations of the clinical preventive approach**

**Limited long term impact – fails to address underlying determinants of poor oral health**

**May increase health inequalities – 'inverse preventive care law'**

**Often minimal community involvement – 'top down' approach**

**Expensive – heavily reliant on costly professional input**

**Partner fatigue – schools and other partners bombarded with external input**

**Isolated approach often leads to conflicting messages**

**Limited coverage of population**

**Public apathy – loss of confidence in expert scientific advice**

often developed in isolation from other aspects of health improvement. This can lead to conflicting and contradictory messages being delivered to the public who, in many places, are increasingly sceptical of health education messages. Lastly, with limited resources available it is impossible to deliver preventive interventions to all those that may require support.

## Public health agenda

Based upon contemporary public health research and WHO guidance<sup>7,8</sup> future oral health strategies should be based upon the following guiding principles:

*Empowering:* initiatives should enable individuals and communities to assume more power over the personal, socio-economic and environmental determinants of their oral health.

*Participatory:* individuals and communities should be actively engaged in all stages of planning, implementation and evaluation of oral health programmes.

*Holistic:* rather than have a narrow and isolated focus, oral health strategies should foster physical, mental, and social health, and focus upon the common risks and conditions that influence both general and oral health.

*Inter-sectoral:* oral health professionals should work in collaboration with other professional groups, agencies and sectors to promote general and oral health.

*Equitable:* oral health initiatives should be guided by a concern for equity and social justice.

*Evidence-based:* future action should be developed from existing knowledge of good practice and findings from effectiveness reviews to achieve sustainable improvements in oral health across the population.

*Multi-strategy:* a variety of complementary strategies are needed, including policy development, organizational change, community development, legislation, advocacy, education and communication. Clinical prevention and health education alone are ineffective at producing long-term oral health gains.

*Professional development:* appropriate training is needed to develop the skills and knowledge of dentists and their teams to enable them to engage effectively in public health efforts to promote oral health

*Evaluation:* resources need to be invested to develop better systems of evaluation to assess and monitor the effectiveness and delivery of interventions.

## Conclusions

Future action to improve oral health and reduce inequalities requires a public health approach. Clinical prevention and dental health education alone will have a minimal effect and may increase inequalities across society. A public health agenda which seeks to tackle the underlying causes of poor oral health, through the implementation of a range of complementary actions provides the best way forward. The success of this approach depends upon establishing good working partnerships with the relevant agencies and sectors. In addition, it is essential that the population is involved in all stages of action planning.

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*Richard Watt is Professor of Dental Public Health in the Department of Epidemiology and Public Health, University College London Medical School. Email: r.watt@ucl.ac.uk*

# Redefining the way dental needs are assessed

Georgios Tsakos

Oral health care is very expensive. In European Union countries, total expenditure on dentistry varies from 3% to 13% of total health expenditure.<sup>1</sup> Faced with such an expensive service, it is necessary to have a clear perspective on needs assessment methods as they are at the core of health care planning.

The most commonly used type of needs assessment in oral health care planning is normative or professionally defined need. Most national and local oral health surveys adopt this approach. Normative need uses clinical measures alone and identifies diseases and impairments without considering the subjective perceptions of people. Locker<sup>2</sup> has summarized the shortcomings of normative need: 'from the point of view of contemporary definitions of health, clinical measures have serious limitations; they tell us nothing about the functioning of either the oral cavity or the person as a whole and nothing about subjectively perceived symptoms such as pain and discomfort.'<sup>3</sup> The limitations of normative need are:<sup>3</sup>

- It is neither objective, nor reliable, nor precisely quantifiable.
- While conceptually important, normative need neglects the psycho-social aspects of health and the concept of quality of life. It therefore contradicts the global definition of health.

- Normative need does not take into account the behaviours and compliance of patients – factors which are essential for the effectiveness of treatments.
- At a political level, the normative approach falls short in terms of human or consumer rights, as it excludes recipients of care from planning decisions.
- The normative approach usually results in very high estimates of need, thus being unrealistic and, therefore, of limited usefulness in treatment planning.

Despite the serious shortcomings, normative need assessment remains useful in some cases, for example, in reliably diagnosing a cavity requiring a filling. But the sole use of normative need is definitely not appropriate in other cases, such as missing teeth replacement, third molars extraction or orthodontics. In those cases, subjective perceptions play a pivotal role and therefore a broader approach is required.

The broader approach of needs assessment should address the aforementioned conceptual and practical limitations, thus extending beyond the traditional normative model. Following this rationale, a broader system for assessing dental treatment needs has recently been



World Health Organization  
Regional Office for Europe



Government of Belgium



Government of Finland



Government of Greece



Government of Norway



Government of Spain



Government of Sweden



European Investment Bank



Veneto Region of Italy



Open Society Institute



World Bank



London School of Economics and Political Science



London School of Hygiene & Tropical Medicine

developed.<sup>3,4</sup> The socio-dental needs assessment system is guided by measures of the impact of oral conditions on quality of life and principles of evidence-based dentistry and focuses on need 'as capacity to benefit',<sup>5</sup> implying that needs are identified when there are effective interventions available to meet them. The development of the socio-dental system conforms to the modern, theoretical, multi-factorial approach for the assessment of oral health care needs and incorporates the following components:

- clinical estimates of normative need;
- subjective perceptions, including perceived treatment needs and oral health-related quality of life (OHRQoL) measures;
- propensity to adopt health promoting behaviours; and
- scientific evidence of the effectiveness of treatments.

The socio-dental system uses these components and gradually integrates them to determine needs. Normative assessments are integrated with OHRQoL measures, which assess how the mouth affects daily performances, in order to define and prioritize treatment need. Then, behavioural propensity levels that facilitate the specification of required treatments are further integrated in the needs assessment system. Behaviour propensity mainly refers to four basic behaviours with established importance for oral health care; they are use of fluoride toothpaste, toothbrushing frequency, sugars intake, and pattern of dental attendance. Finally, evidence-based guidelines on the effectiveness of interventions cover all stages of the socio-dental system.

Obviously, the integration of normative need with OHRQoL is not appropriate for each dental condition. In life threatening conditions, such as oral cancer or precancerous lesions, or in chronic progressive conditions, such as active dentinal caries, clinical measures are of prime importance and treatment need is decided without considering OHRQoL. However, in conditions that are unlikely to progress or cause adverse health consequences in the absence of treatment, such as orthodontics and replacement of missing teeth, the

assessment of need is based on all components of the system. Consequently, the socio-dental system allows for different models of needs assessment, according to the nature of the dental condition.

Despite their importance, the components of the socio-dental approach have not been systematically used in dental needs assessment. Where they have been, large differences in estimates of need are reported in both elderly and child populations, with the socio-dental needs estimates being significantly smaller than normative need estimates.

This broader socio-dental system addresses the limitations of the sole use of normative assessments. It is conceptually coherent and practical. In addition, it provides treatment needs assessments that are closer to needs identified by good clinicians, as it combines the key factors considered during the individual decision-making process. Therefore, it identifies and quantifies needs at the population level more explicitly and in line with clinical decision-making, thus adhering to the principles of clinical governance and being useful in service planning.

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*Georgios Tsakos is Clinical Lecturer of Dental Public Health in the Department of Epidemiology and Public Health, University College London Medical School.*

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#### To join the mailing list, please contact

Anna Maresso

Observatory - London Hub

Tel: +44 20 7955 6288

Fax: +44 20 7955 6803

Email: [a.maresso@lse.ac.uk](mailto:a.maresso@lse.ac.uk)

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Email: [info@obs.euro.who.int](mailto:info@obs.euro.who.int)

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