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Operationalisation of the construct of access to dental care: a position paper and proposed conceptual definitions

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Background: 'Access' is a term readily used in a political and policy context, but one which has not leant itself to measurement of progress towards policy goals or comparisons between health systems. Like 'quality', 'access' is a multi-dimensional construct, but currently often remains a vague and abstract concept which is difficult to translate into something specific, concrete and therefore measureable. ***Methods:*** The paper describes previous work and identifies a need for a greater consensus and conceptual clarity in the selection of metrics for dental access. ***Results:*** The construct of dental access is described as involving the concepts of 1: opportunity for access; 2, realised access (utilisation); 3, equity and 4, outcomes. Proposed conceptual definitions are given and a case made for measuring 'initial utilisation' separately from 'continued utilisation', reflecting modern approaches which distinguish 'entry access' (gaining entry to the dental care system), from the process of gaining access to higher levels of care. Using a distinction between 'entry access' and 'effective access' allows a choice of whether to restrict measurement to mainly supply side considerations, or alternatively to extend the measurement to include whether there is equity in the proportion of patients who are able obtain effective needed interventions. ***Conclusions:*** A development of conceptual definitions of dental access could facilitate measurement of progress towards policy goals and operationalisation of the construct.

Key Words: *access; equity; dental services; health policy; operationalisation, privatisation*

Access to dental care as a policy concern

Access to health care contributes to the improvement of health and the relief of illness. In low income countries problems of access concern the availability of basic health services, whereas in more affluent countries, questions concern the degree of comprehensiveness that can be offered by health care systems, the extent to which equity is achieved and the timeliness and outcomes of care (Gulliford *et al*., 2003). Against a background of a growing privatisation of health care in Europe (Maarse, 2006), access to dental care has become increasingly prominent as a health policy concern; for private provision of dental care is relatively common, and there has been a further expansion in recent times alongside a contraction of public dental services. The pace of dental service privatisation has varied from country to country, with private sector expansion especially rapid in Eastern Europe, particularly in former Eastern Germany (Widstrom *et al*., 2001). Access to health care is also a topical issue in the US, where recent efforts to reduce disparities in health care access have focused mainly on the expansion of health care coverage. There the perceived lack of access to dental care among underserved populations has fuelled moves towards the creation of oral health therapists.

Operationalisation of access as a policy goal

Whilst providing access to dental care is an oft stated policy goal, operationalisation of the construct requires that a system of measurement must be put in place, so that progress towards achieving goals and the cost-efficiency of methods of achieving improvements can be evaluated. Currently there is a general consensus that measuring access to dental care is important, but agreement on what aspects of the construct should be included, or what measures should be used, is lacking. One of the global targets for the year 2020 set out by the Federation Dentaire Internationale, World Health Organisation and International Association of Dental Research, is '*to increase the proportion of the population with access to adequate oral health care by/toX/Y%*' (Hobdell *et al*., 2003). The absence of absolute values in this target is deliberate. The intention of the unspecified goal is that the nature of target figures for 'access' is established on the basis of local circumstances such as the adequacy of the information base and local priorities. 'Access to dental care' is therefore seen here as a construct which is defined according to local policy priorities. This approach however leaves little room for any meaningful comparison between different areas or countries: since local decisions on what data should be collected means there is little emphasis on collecting standardised data which is essential to enable cross-national comparisons. Consequently, whilst there is much previous research on access to dental care concerning individual users as the unit of analysis (Gibson, 2003), there is relatively little literature which compares access to dental care at a community, national or international level.

Cross-national comparisons however are seen to be valuable in evaluating the performance of systems (Kmi-

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etowitcz, 2000). For example: data shows that despite spending more of its gross domestic product (GDP) on health than on any other county, the US is ranked only 37 out of 191 WHO member states according to five performance indicators, whereas the UK which spends just 6% of GDP on health is ranked 18th (WHO, 2000). Having explicit equity targets is also a useful way in which to monitor progress towards national policy goals; and a comparison of the national situation with the situation prevailing in other types of health system (or looking at changes over time – are services becoming more or less equitable in that country?) may be more useful than comparing the current national situation with some ideal and possibly unobtainable state (Wagstaff *et al*., 1989).

A failure to translate access to dental care from an abstract and vague construct into something which is specific, concrete and ultimately observable and therefore measureable creates problems at a national political level too, as can be illustrated by an example from the English context; where although dental access is recognised as an important political priority: access measured by the proportion of the population who have attended a National Health Service (NHS) dentist in the last 24 months is currently the only performance measure currently used for this aspect of health care. In a Parliamentary Health Select Committee debate concerned with evaluating the success of a new system of remuneration for dental practitioners, a key issue under discussion, was whether the reforms had addressed problems experienced by the public in gaining 'access' to NHS dental care (House of Commons, 2008). Included in the evidence given is a quote from the Chair of the British Dental Association, which summarises the debate: '*The buzz word associated with this contract is 'access'. One of the questions you see in our evidence is 'What is access?' Is it the number of times somebody goes to the dentist? Is it the amount of care a patient needs to make sure his or her oral health is corrected? What is it? There is no definition of access and therefore measuring it on an ongoing basis is flawed*'.

This example, of how the concept of 'dental access' is a prominent issue in policy debate, but somehow detached from a clear definition, programme of data collection and monitoring towards policy goals, is not an isolated example seen in the English context only. This paper aims to provide a position paper to inform future work and discussion in the area. We firstly describe previous work in the area and argue for the need for a greater consensus and conceptual clarity in the selection of indicators to measure dental access. We then describe dental access as a multi-dimensional construct which involves the concepts of: 1, opportunity for access (service availability); 2, realised access (service utilisation); 3, equity; and 4, outcomes of care. Finally we propose that operationalisation of dental access as a construct would be facilitated by drawing a distinction between the concept of access to care which is related to the availability and the processes of *entry* into health services (entry access) and the issues which come into play after a patient has entered the system, concerning whether effective, equitable, and efficient care is obtained (effective access). We put forward a definition of 'entry access' and a definition of 'effective access', and suggest indicators which might be used to measure these concepts.

Previous work identifying indicators and comparative databases of dental access

Currently data are collected on a regular basis by the Council of European Chief Dental Officers (CECDO), the WHO Global Data Bank, the Organisation for Economic Co-operation and Development (OECD) and Eurobarometer databases. Indicators chosen by the various programmes often differ, which reduces the potential for comparison besides producing an often bewildering abundance of data. There are for example, 15 different indicators routinely used as measures of dental manpower. There are figures for different European countries for a range of indicators ranging from the proportion of the population visiting a dentist in the last year, the proportion requiring emergency dental care, dental manpower ratios, through to measures of outcome such as the proportion edentulous in the population and scores of oral health impact. Several other specific programmes have also been established, concerned with identifying health indicators and constructing comparative international databases. Examples of these programmes include 'Indicateurs de Santé dans les Régions d'Europe' (ISARE) (Ochoa *et al*., 2003; Wilkinson *et al*., 2008) and the European Global Oral Health Indicators programme (EGOHID), (Bourgeois *et al*., 2005). The EGOHID programme relies on a coordination of locally collected data for comparison between countries, with indicators identified, such as '*the proportion of the population aged 18 years and over with access to a dentist within a convenient distance (30 minutes) from their place of work or residence*'. The indicators chosen are identified as being useful to health care planners to identify areas in which to establish practices.

Dental access databases used in programmes such as CECDO and the EGOHID programmes are generally maintained without aims related to developing theoretical generalisations. Instead, they aim to describe 'how things are' in different countries since comparing trends in a particular country with patterns in others, is a potentially powerful political tool influencing health reform, even if relationships between variables are not fully understood. This approach however is at odds with the general principle that metrics work best when connected to a clear conceptual framework (Etches *et al*., 2006; Wolfson, 1994). A conceptual framework as part of a theory helps structure ideas to explain causal connections between, within, and across specified domains. In the context of public health indicators, a clear conceptual framework for the selection and use of indicators, help to point to the dimensions of population health of import, and lead to more balanced discussions about what indicators should be targeted by interventions in order to impact population health. Using a conceptual framework guards against the selection of indicators that are merely 'feasibility-driven' or 'available-data-driven'. A concept-driven selection process therefore results in more methodologically sound indicators. Whilst much data relating to indicators of dental access are available, particularly in currently maintained cross-national databases, what is missing is consensus on what is important, and how groups of indicators might work together to give a balanced picture.

Work underpinned by a conceptual framework

The conceptual model which has predominated as a framework for understanding the various determinants of health system use and outcomes of care is Andersen's model (Andersen and Davidson, 2001). Andersen and Davidson present a conceptual framework of access to health care which stresses both individual determinants of health care use and community (contextual) characteristics. The model suggests that the major components of the contextual characteristics are measured in the same way as individual characteristics determining access (divided into pre-disposing, enabling and need). In the model both individual and contextual characteristics are linked to the health behaviour of individuals (especially their use of health services) and resulting outcomes (health and satisfaction with services). The model suggests that it is the interrelationships between contextual factors (such as social class, education, availability of care) which determine the likelihood of individual behaviour such as personal health practices (e.g. frequency of tooth-brushing) and use of services (e.g. dental attendance for routine rather than symptomatic care).

There is some basis for the application of Andersen's model in the dental context. Contextual predisposing factors such as income are found to have an indirect effect on oral health outcomes (self-rated oral health), (Baker, 2009). The model has also been used previously to inform data collection in two International Collaborative Studies (ICS I and ICSII) conducted between 1973 and 1990, involving the US, Canada, New Zealand, Australia, Japan, Norway, Ireland, Poland and Germany, co-ordinated by the World Health Organisation (Arnljot *et al*., 1985; Chen *et al*., 1997). The objectives of these studies were to learn lessons from the study of dental care systems in different countries in an effort to help participating countries examine their systems for effectiveness and efficiency, and to share this knowledge (Chen *et al*., 1997).

Interpretation of these cross-national data however proved difficult, with comparisons between countries showing inconsistent and often counter-intuitive findings (Maas, 2006). There was often a lack of correlation between access to care and oral health, which meant that although data were used as a source of debate, there was little evidence of this being translated into policy-relevant conclusions (Maas, 2006). It is thought likely that one reason for some of the counter-intuitive findings was an incomplete understanding of the inter-relationships between the relevant factors studied. This indicates that before further cross-national survey work concerned with access to dental care is undertaken, there needs to be development of the theoretical frameworks used. Baker (2009) suggests that perhaps personal health practices and the use of services are separate constructs and not different facets of a multi-dimensional construct as suggested by Andersen's model. She also suggests that there may be other constructs not identified in Andersen's model which would increase its explanatory power. Examples might be an individual's attitudes' or health beliefs which help predict intentions which are then linked to behaviour. Contextual factors are also under-represented. Existing datasets often include variables which are easy to measure and quantify, ignoring those that are more difficult to assess such as social capital and health system structure.

Thus current conceptual models such as Andersen's model require further development, particularly with respect to a more complete elucidation of contextual factors. Currently there is an emphasis on variables which are easy to identify and quantify, and a more sophisticated set of measures are needed. There is also need for more longitudinal studies to be undertaken which would allow the testing of reciprocal relationships in conceptual models (Baker, 2009). To develop this work there may be a conscious decision to include some nations within the study and not others, informed by the hypotheses being tested. The selection of indicators used in this work will also be informed by its purpose, in setting out to test theoretical relationships and develop the model's explanatory power. The type and amount of data collected would be inappropriate for routine monitoring of progress towards policy goals.

Conceptual definitions of health care access to inform selection of global indicators

Andersen and Davidson (2001) however suggest that their model may be used to identify important concepts which should be measured when monitoring trends in access both within and between countries for policy reasons. They identify six global dimensions of access to health care.

1. Potential access (the presence of enabling resources: health personnel and facilities must be available where people live and work; people must have the means and 'know-how' to get to the services and make use of them)
2. Realised access (the actual use of services)
3. Equitable access (utilisation rates are explained by variations in demographic characteristics and need)
4. Inequitable access (social structure e.g. ethnicity, health beliefs, and enabling resources determine who gets healthcare)
5. Effective access (the relative impact of health service use)
6. Efficient access (similar to effective access but with an added emphasis on assessing resources used to influence outcome).

In setting out these six concepts, Andersen and Davidson move beyond the vague use of the term 'access' which is often used in a policy context as a short-hand to denote various issues concerned with using services. They portray 'access' is described as a multi-dimensional construct which has several ingredients, with policy concerns involving not just whether services are available to the population, but whether care is provided in an equitable, effective and efficient way. The six dimensions suggest a type of a hierarchy of 'access', with initial considerations concerning whether or not services are available, with further dimensions such as equity concerns being important when the funding of the health system, social and cultural attitudes and political-will allow. Although there is a need for conceptual definitions of access to inform the selection of global indicators for policy purposes in the dental context, Andersen and Davidson's six dimensions of dental access have never been applied in this way. In the following section we discuss these

concepts to develop conceptual definitions and so inform the measurement and evaluation of dental access. In order to simplify the framework we have combined equitable and inequitable access into a single dimension, and do not consider efficient access, presenting dental access as a construct comprising of four concepts: 1, opportunity for access (service availability); 2, realised access (utilisation of services); 3, equity of access and 4, outcomes of care. The four concepts are depicted diagrammatically in Figure 1, and a summary of the conceptual definitions for each of the four domains with example of suggested indicators is provided in Table 1.

Conceptual definitions relevant to measuring access to dental care

Opportunity for access (service availability)

Defining 'access' purely in terms of whether or not a person has the opportunity to gain entry to the system is relatively straightforward. The word 'access' derives from the Latin *accedere* (come to), and the Oxford English dictionary therefore defines access as 'the means or *opportunity* to approach or *enter* a place'. Within the healthcare context, 'access' can therefore be defined as 'the potential to utilise a service if required' (Gulliford *et al*., 2002). A common approach when defining access to dental care is to limit the conceptual definition to 'whether the patient is *able* to obtain and make use of dental care' (Guay, 2004). We suggest that delineating this as a conceptual definition is useful, since the primary determinants of access under consideration are consequently mostly related to the supply side of the oral healthcare system (e.g. adequacy of the dental workforce). This notion of 'access' restricts the definition to 'the *opportunities* open to people to use health services' (Culyer *et al*., 1992). This may be a particular concern in policy contexts where significant privatisation of services has resulted in sections of the population not being able to obtain care.

Definitions like these based on availability and the processes of *entry* into health services raises the issue as to how we might define what would be an appropriate level of service to offer. In the dental context this can be particularly difficult since consumers may identify a need for care because they are concerned about their appearance rather than because of health concerns. Thus it is appropriate to limit the conceptual definition to supply side issues rather than introducing the complication of consumer demand. Service availability for all those seeking care for symptoms such as pain, facial swelling or difficulty eating, may on the other hand under-represent what should be available in a fully functional oral health system. It is generally agreed that preventive care is an important part of dental service provision and regular examinations can lead to detection of early lesions and reduce treatment interventions. Thus we might broaden this conceptual definition to denote 'the broad set of

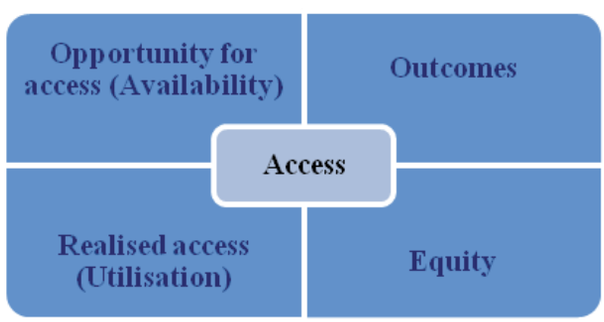

Figure 1. *Model outlining four components of access*

Table 1. Summary of the conceptual definitions for the domains of dental access with suggested indicators

Concept	*Conceptual definition*	*Supply or demand side*	*Examples of relevant indicators*
Opportunity for access	Whether individuals or groups are *able* to obtain and make use of needed dental care	Supply side	• Proportion of the population (by age group) who claim to access a dentist within 30 minutes of their home or place of work • Proportion of the population for whom publicly funded care is available • Dentist : population ratio.
Realised access	Initial utilisation: Whether the individual or group makes contact with dental services for any type of care (emergency, therapeutic and/or preventive)	Supply and demand sides	• Proportion of the population who have visited the dentist in the last 12 months.
	Continued engagement: Whether the individual or group receive non-symptomatic care	Supply and demand sides	• Reason for the last visit to the dentist (proportion of the population, by age group, visiting the dentist for a check-up/ routine care/emergency treatment.
Equitable access	Where demographic and need variables account for most of the variance in utilisation	Supply and demand sides	• Horizontal Inequity Index.
Outcomes of care	Whether individuals or groups benefit as a result of their encounter with the service	Supply and demand sides	• Patient Reported Outcome Measures.

concerns that centre on the degree to which individuals or groups are able to obtain *needed* services from the medical care system' (Millman, 1995). The provision and use of preventive as well as curative services is therefore also included and may be a less obvious way in which inequity is expressed. Specifying what constitutes 'needed services' will be an important decision for policy makers. This will be influenced by political and societal values as well as financial constraints, and may differ between countries. We therefore propose a conceptual definition as: whether individuals or groups have the opportunity to obtain dental services that they need (either for relief of the symptoms, restorative care, or a complete range of care including prevention), Table 1. The level of care which should be provided to the population will be dictated locally according to the policy objectives of each oral health care system.

Realised access (utilisation)

Although policy makers *talk* about access to health care and often have in mind a relatively narrow definition concerned with opportunity, given the problem of finding appropriate measures of 'opportunity', we find that in the majority of literature and datasets the most common type of metric in use is utilisation rate (Culyer *et al*., 1992). For example, in the dental context, the most commonly used measure of 'access' is the proportion of people who have visited the dentist in the last 12 months (or 2 years). Utilisation is often seen as 'the proof of access' (Aday and Andersen, 2009): in other words, measuring whether a service is taken up is a signifier that facilities represent a suitable 'degree of fit' between patients and dental services (Penchansky and Thomas, 1981).

Utilisation can be defined in terms of the extent to which a given group uses a particular health service in a specified time. 'Utilisation' is a more complex concept than 'service availability' because it involves not just factors 'external' to patients, but also reflects patient demand (Guay, 2004); i.e. service uptake is influenced by 'internal' factors (such as the perceived need for care, cultural preferences) which operate independently of supply-side factors (indeed, levels of disease itself may also moderate rates of utilisation, Figure 2). It is therefore difficult to draw conclusions from data simply mapping utilisation rates over time. A rise in utilisation may represent an increase in service availability, but it could also reflect rising patient demand.

Recent literature has identified 'candidacy' as being relevant when considering the use of health services. This concept describes a person's entry to the system as being a combination of the individual first presenting themselves for care and their eligibility for care being then validated by the provider (Goddard, 2009). Utilisation captures this aspect of entry to the system which is not described purely by figures representing service availability (e.g. manpower figures, location of services). Recent authors suggest that 'access' should be seen as a process which has multiple stages (Goddard, 2009), in much the same way as is suggested by Daly *et al*., (2002). Gaining a point of entry to the service represents a different stage of the health care journey than does sustaining engagement with the service and obtaining equitable and optimal health outcomes (Goddard, 2009). At each stage of the process, barriers may exist to impede further progress, relating potentially to the characteristics of the individual (some underserved people may recognise candidacy more in terms of emergency care than in the use of prevention and continuing care); as well as to supply-side characteristics (a notion of 'navigation' has also been developed which concerns the extent to which services are 'permeable'). Donabedian (1972) also recommends that one should distinguish between two components in the use of service: 'initiation' and 'continuation', again recognising that different factors influence each. We therefore propose separate conceptual definitions of utilisation in recognition that particularly in relation to dental care, there are distinct groups of users who seek emergency care only, and others who are looking for a regular source of dental care (Table 1).

Gulliford (2009) suggests that empowered individuals should receive health care that is in keeping with their preferences and values. This modern approach to access to care arguably represents a particularly ego-centric and individualistic world view which is increasingly apparent in a range of social policy approaches in high income countries - where responsibility is given over to individuals and families to chart the course of their own lives. Obtaining 'needed' health care is seen as the responsibility of consumers, rather than being the result of centrally planned, top-down governance - which is the more common approach in middle and low income countries. Gulliford argues that it is legitimate to accept that individuals may decline to accept advanced treatment after considering all available information. Like Donabedian (1972), he suggests that access involves '*the processes of gaining entry to the health care system*', but also should be extended to consider '*the processes of gaining higher (as well as lower) levels of care*'. Having conceptual definitions which recognise initial care utilisation as a separate consideration to continued care utilisation acknowledges this as important.

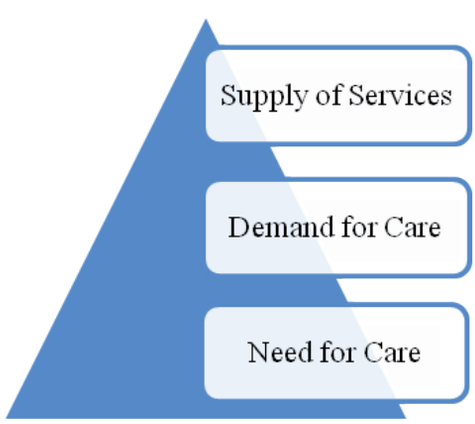

Figure 2. *Utilisation metrics are a function of supply, need and demand*

Equity

Although utilisation rates reflect a set of more complex factors than simply 'opportunities' to use services, they also reflect important policy concerns: that often a difference in *consumption* of services exists which does not correlate with health needs. Utilisation rates (reflecting demand) can reveal differences in the population not only on the basis of income, but also on the basis of educational background; and this may be a real concern to policymakers. The poor and poorly educated may have the same *opportunities* to take up care, but fewer *realise* these opportunities. Thus utilisation rates are therefore particularly useful when they are used to reflect the extent of equity in service provision.

Inequities are inequalities which are considered unjust or unfair. Equity in health is described as 'an ethical value that may be operationally defined as striving to reduce systematic disparities in health between more or less advantaged social groups within and between countries' (Braveman *et al*., 2001). Hence the concept of equity concerns both facts about inequalities and value judgements about fairness. The egalitarian approach based on principles of social justice which underpins many health systems (for example in Western Europe) is often an important policy concern, although this is not a universally accepted principle across all health systems (Wagstaff *et al*., 1989).

The term equity can be applied either to health care access or to funding. Equity in access to health care exists when health care is accessed according to need. Equity in funding exists when contributions are made according to ability to pay. Both types have a horizontal and vertical dimension. Horizontal equity requires that equals are treated equally. Vertical equity requires that un-equals are treated in proportion to their inequality (Gulliford, 2003). Vertical equity considerations are most commonly applied with respect to funding issues. Equitable access occurs when demographic and need variables account for most of the variance in utilisation (Andersen, 1968). There are several approaches to measuring equity: the most simple of which is a comparison of utilisation rates for different population groups, with a comparison with the rate for the reference group (average for the whole population). Regression models provide a more sophisticated means of taking into account the fact that people from poorer socio-economic backgrounds usually have higher levels of need, and higher rates of utilisation would therefore be expected. They are based on a dependent variable with the chosen measure of access (it could be service availability, utilisation or outcome); with explanatory variables chosen to include measures of health need (e.g. in need or not), measures of socio-economic status (e.g. education, employment status, income), and demographic variables (e.g. age, gender). Concentration curves enable a graphical representation of the relationship between income and utilisation. The cumulative proportion of the population ranked by income is plotted on the horizontal axis, and the cumulative proportion of either health care utilisation on the vertical axis. A correction for a higher level of need (disease) found in low income groups is included in a second type of concentration curve which standardises for need (Van Doorslaer *et al*., 2006). This compares the actual observed distribution of care by income, with the *need-expected* distribution of use and generates a figure called the Horizontal Inequity Index. The Horizontal Inequity Index is a concentration index of inequality in need-standardised use, and values are interpreted in the same way as the concentration index, with values ranging between -1 and +1.

The way need is measured is crucial to determine whether access to dental care is reasonable according to need (Frenz and Vaga, 2010). Currently dental need estimation is often based on clinical measures such as DMFT, which have inherent flaws when used for this purpose. Self-reported health status may be a preferred proxy for need, but this also presents challenges, since reporting of illness is known to increase as income increases (Frenz and Vaga, 2010). Self-reporting may therefore reflect social and cultural perceptions: a factor which needs to be explored further then taken into account when making comparisons between data from different countries or over time. There has been some effort to bring more rigour to measurement of equity in the context of medical care by using adjustments for variables related to subjective unmet meets when measuring needs-adjusted utilisation (Allin *et al*., 2010), but these innovations have yet to be used in the dental context.

Although techniques such as these provide a way of understanding of interpreting figures based on utilisation in a policy-relevant way, they are only a couple of examples where dental data is explored in relation to equity. Analyses of data from the 2000 wave of the European Household Panel survey included income-related inequality in the use of medical care and dental services (Van Doorslaer and Masseria, 2004). Standardisation for needs was only undertaken using age standardisation, even though data on levels of dental disease such as the average number of decayed, missing and filled teeth (DMFT) are available, and would have given a better representation of 'need'. Nevertheless, a consistent pattern of pro-rich distribution relating to utilisation was reported, with substantial variation in its degree between countries. Inequity was particularly high in Portugal, high in Spain and Ireland, and also in Hungary, Italy and Finland, but quite low in Sweden and the Netherlands. Van Doorslaer and Masseria noted that the pro-rich inequity appeared negatively correlated with the average utilisation rate. In countries with low dental care use, the pro-rich gradient was much steeper than in those countries with more extensive dental care use. This illustrates how analysis of equity, taken together with cross-national comparisons of utilisation rate can lead to generation of hypotheses with policy-relevant conclusions.

Outcomes of care

Even using measures of inequality of utilisation adjusted for need has some limitations as a measure of inequity of access. Equity considerations are now moving away from purely looking at differences in the extent to which people use services, toward a greater emphasis on the extent to which they benefit as a result of their encounter with services. Since health services exist to promote or preserve health, a primary concern for policy makers is be able to measure how 'fit-for-purpose' they are. Hence

policy makers have concerns which go beyond service availability or even utilisation. The Institute of Medicine therefore includes within their conceptual definition of access whether the health service delivers beneficial outcomes for consumers (Millman, 1995). Based on a belief that health care can make important differences to people's lives, access is defined as '*the timely use of personal health services to achieve the best possible outcomes*' (Millman, 1995). This definition therefore introduces the notions of the right service. Rogers *et al.* (1999) summarises this approach by defining *optimal access* as '*providing the right service at the right time in the right place*'. According to this perspective, measures of access should include indicators of health outcome (Gulliford *et al*., 2002).

Embracing the concept of outcomes of care within the access construct recognises that there is an interaction between service user and the service as provided (Tanahashi, 1978). Tanahashi outlines a concept of 'effective coverage' in that: '*Health service coverage is a concept expressing the extent of interaction between the service and the people for whom it is intended, this interaction not being limited to a particular aspect of service provision, but ranging over the whole process from resource allocation to the achievement of the desired objective*'. Thus an objective of effective coverage would be '*the proportion of the population in need of an intervention that receives an effective intervention*'. This definition is posed in equity terms since its denominator is need. Again, agreement on what the system could afford in terms of defining *need* may be down to a local discussion, and be presented as a possible hierarchy of provision from emergency, basic and a full complement of continued care which includes restoration and prevention, depending on local circumstances.

Separating 'entry access' and 'effective access'

It is clear that disentangling the multi-dimensional nature of access to dental care is difficult, given that the many of the concepts involved (opportunity for access, utilisation, equity and outcome) are intimately related to each other. This paper seeks to advance debate in this area by introducing some more specific terminology to the discussion. Local public health and policy practitioners may make decisions on this basis, to agree to limit their measurement of access to a relatively restricted area (i.e. opportunity for access), or alternatively to consider a range of issues and therefore metrics which embrace both supply and demand side issues as well as equity concerns. Having a range of conceptual definitions for different access domains facilitates the discussion.

An alternative approach is to limit and therefore simplify the scope of measurement of access. Where a simple analysis is required, it may be wise to limit considerations purely to '*whether individuals and groups are able to receive initial care*' (*entry access*). This confines measurement to metrics concerned with service availability as well as metrics concerned with realised initial access (Table 1). For a more extensive analysis which includes equity and outcome domains, the concept of *'effective access'* could be used, defined in terms of '*the proportion of the population in need of an intervention that receives an effective intervention*'. Distinguishing between different stages of a patients' progress through the health care system is in keeping with current thinking in the wider health care literature.

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