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TOWARDS A CONCEPTUALIZATION OF HEALTH

Submitted by World Health Organization*

I. INTRODUCTION

1. The measurement of population health, in a way that is comparable over time and across populations, is an essential requirement for the evaluation of health policies, assessment of intervention effectiveness and measurement of the efficiency of health systems. Without meaningful measures of health, it would be impossible to appraise whether health systems are achieving their primary goals, namely improving population health levels and reducing health inequalities.

2. As with any scientific endeavour, the measurement of health requires that a clear and common understanding of what is meant by "health" underlies the development and harmonization of health measurement instruments, and particularly those aimed at the measurement of the health of populations, where comparison across time or across populations is an important objective of most efforts at measurement, whether at national or international level.

3. One major shift over the past decade has been the realization that information on both mortality and health as a living state are required in order to describe health at the individual or population levels. Regardless of the time perspective that is chosen, or the numerous methodological considerations demanded by various different types of measures, an elemental

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requirement of any measure of population health is the need to describe and quantify the health state level of an individual at a particular moment in time.

4. This paper outlines an approach to the conceptualization, definition, description and measurement of health that builds on the many efforts over the last few decades to develop standard approaches to the description and measurement of individual health states using a multi-dimensional approach (1,2). This paper draws heavily on two recent WHO publications (3,4) and I wish to acknowledge the very extensive contributions of the work of the authors of these papers to the material included here.

II. DEFINING HEALTH

5. Historical efforts to define health have typically been concerned with two major objectives: (1) articulating ideals of health that may serve as targets or goals to which individuals and societies may aspire; and (2) defining the scope and boundaries of health. The latter objective has resulted in considerable debate between proponents of relatively broad definitions of health encompassing wide-ranging aspects of human welfare, advocates for narrow definitions that emphasise a more biomedical view, and numerous more shaded views falling somewhere between these two extremes. In this paper, I focus on the conceptualization of health in order to operationalize its measurement in populations.

6. In the preamble to the WHO Constitution, the founders of WHO famously defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." This definition was preceded by a declaration that "…the following principles are basic to the happiness, harmonious relations and security of all peoples" and followed by the statement that the "health of all peoples is fundamental to the attainment of peace and security…" (5). In defining health in terms of an ideal, the WHO Constitution provided a first building block for an operational definition of health. Over the half-century since the WHO definition was set forth, there have been continuing efforts to develop more precise conceptualizations of health that may be linked to operational measures (6-9). Often, however, operational appoaches to measuring health, e.g. using standardized questionnaires or interviews, have not been based on an explicit and clear conceptualization of health. In a comprehensive review covering 30 years, Hansluwka (10) concluded that the challenge remained to develop appropriate measures that are comparable, yet reflect the multi-dimensional nature of health.

7. An important line of debate has revolved around the distinction between health and well-being. In the 1970s and 1980s, a number of critics argued that health is a component of well-being, not identical to it, and that the WHO definition medicalized non-health elements of everyday life (11-13). That some core notion of health distinct from wellbeing exists across populations despite socio-cultural variation on the determinants and experience of health, is consistent with current thinking on common values (14-15). There seems to be a powerful intuitive notion that health is not identical to well-being. Across all populations and cultures, some distinction is made between health and other aspects of well-being. In addition to health, education, economic security, environmental quality and peace are usually considered as some of the important components of well-being (16).

8. We may also gain some understanding of intuitive notions about the scope of health by appealing to common views of what may be characterized as health interventions, and by examining the range of responsibilities of health ministries. If health were to be defined as broadly as well-being, this would imply that the health system includes all areas of human activity – such as education, industry, tourism and agriculture, among others. Consequently, there

would no longer be any operational distinction between the health system and any other system, and so ministers and ministries of health would need to be held accountable for all areas of human activity.

9. Although debates about the scope of health are ongoing, developments in conceptual definitions and operationalization of health status over the last two to three decades have converged on a common framework in which:

- Health status is an intrinsic, multi-dimensional (or multi-domain) characteristic of individuals.
- Measurement of health status in populations refers to determining the levels of functioning of individuals on multiple domains (or dimensions, or attributes) of health in representative population samples
- Functioning within health domains is conceptually distinct from overall well-being or quality of life.
- Determinants of health status (pathologies, aetiologies, risk factors, encounters with health services, more distal socio-cultural health determinants) must be distinguished from health status.

10. One of the most critical implications of this consensus view is that there is a clear distinction between health itself and its determinants and consequences. In the spirit of the definition set forth in the WHO Constitution, I would argue that we should not equate health with diseases or diagnostic categories, but rather recognize a causal chain through which risk factors are determinants of diseases, and diseases in turn are determinants of health states. Factors, both physical and behavioural, that cause changes in health cannot themselves be construed as measures of health. For example, tobacco use may lead to respiratory problems. In such situations the risk factor of tobacco needs to be understood as distinct from the health outcomes to which it contributes. To understand how we may act to improve health, we must be able to separate the actual health states in which people live from the factors that influence these health state – only then can we examine the relationships between health and its determinants and intervene in this causal chain. This distinction is reflected in the evolution of the WHO family of classification systems, which includes the International Classification of Diseases and Related Health Problems (ICD) and the International Classification of Functioning, Disability and Health (ICF).

11. The ICD was originally developed to classify causes of mortality for common international use, but has since been extended to include diagnoses and causes of morbidity, as well as a wide variety of signs, symptoms, abnormal findings, complaints, and social circumstances that may be reasons for contact with a health service but do not qualify for a formal diagnosis (17). Over the last several decades, it has become clear that risk factors, diagnostic causes and mortality events are inadequate indicators of the health impact of diseases, injuries and more distal determinants, the utilization of resources or the need for services. Thus, efforts to characterise more precisely the relevant attributes of a particular state of health have led to a gradual shift in focus away from diagnostic descriptions alone and towards an understanding of health in terms of functioning and disability expressed in different domains.

12. WHO, in recognition of this need, published the International Classification of Impairments, Disabilities and Handicaps (ICIDH) in 1980 to provide a framework for the study of disablement (18). Since its publication nearly two decades ago, the ICIDH has been used extensively across the world and translated into several languages internationally. The ICIDH was published as a prototype rather than a true classification system, and the conceptualization

embodied in the ICIDH evolved dramatically through the development of its second incarnation, now called the International Classification of Functioning, Disability and Health, or ICF (19). The ICF provides a formal framework for cataloguing the multiple domains of health.

III. THE CONCEPTUAL BASIS FOR QUANTIFYING HEALTH

13. In this section, we consider the conceptual basis for the quantification of health levels. A common theme that has emerged from efforts to develop operational definitions of health is the view of health as an intrinsic, multi-dimensional attribute of individuals. This intuitive understanding of health crosses cultural boundaries, such that when we talk about a person's health, we are understood to be referring to his or her levels on the various components or domains of health. In other words, our proposed conceptual framework focuses on the *health state* of an individual. A description of the health state of the individual thus consists of a series of values indicating levels on domains such as mobility, pain, hearing and seeing.

14. The quantification of health levels requires cardinal measures of health that allow for meaningful interpersonal comparisons. The simplest comparisons are those in which only one domain is considered. On a single domain, ordinal comparisons are usually straightforward; for example, most people would agree that somebody with monocular blindness is healthier than a person with binocular blindness, *ceteris paribus*. The challenge of aggregating across different individuals requires that we go beyond the level of ordinal comparisons such that we can make meaningful comparisons of differences between two health levels. In other words, we require measures with interval-scale properties.

15. As a starting point, each domain must specify a sufficiently coherent construct to allow for quantification along a single scale. Such a scale may be observable or latent. If it is not possible to construct a single measurement scale for a domain, that is an indication that the domain includes more than one important health construct. For example, inclusion of colour blindness in the domain of vision will probably lead to measurement difficulties, since colour blindness cannot be measured or reported on the same scale as visual acuity. If colour blindness turned out to be an important aspect of health for description or measurement, then it would be necessary to include it in a health state description as a separate domain.

What are we measuring in domains of health?

16. The ICF replaced the concepts of *disability* and *handicap* in the ICIDH with the concepts of *capacity* and *performance*. *Capacity* refers to an individual's ability on a domain as it would be manifested in a uniform environment (or set of environments) – for example, the ability to walk 100 metres on a level, well-lit non-slippery surface. *Performance* describes an individual's ability on a domain as it is manifested in his or her current environment. The gap between capacity and performance therefore reflects the impact of an individual's actual environment (and perhaps motivation) relative to the uniform environment. Both performance and capacity may be measured either with or without an individual's personal aids. Unlike performance, which is directly observable, measurement of capacity requires either changing the environment of the individual or carrying out a counterfactual analysis – asking what the individual's performance would be in an environment other than the actual one.

17. Given this distinction between capacity and performance, which construct do we aim to capture in conceptualizing levels of health for measurement? To the extent that performance reflects an individual's unique environmental setting, which may vary widely over time and as individual circumstances change, it is probably not congruent with most notions of health. If a

person cannot climb stairs in her usual environment because the stairs are too steep, most people would not say that her health state had changed if the stairs were modified to be less steep. Likewise, we would not want to characterize the same cognitive impairment differently in two individuals simply because they have different vocations that call upon different types of cognitive tasks, and would not say that an individual with a hearing impairment is healthier simply because he avoids noisy gatherings. These examples point to a common-sense understanding of health that does not correspond to performance because it excludes the idiosyncracies of an individual's environment. This is consistent with the notion of health as an attribute of individuals rather than environments (though environments may have causal influence on a person's health state). Note that here we clearly part company with those who would equate health with well-being or overall quality of life, since these latter constructs clearly do depend on local environmental barriers and facilitators. I note in passing that the modern conceptualization of disability as a result of the interaction of individual and environment might be considered to relate more closely to performance.

18. The notion of capacity corresponds more closely to the common-sense interpretation of health by defining external environmental factors in a uniform way. More precisely, I would argue that capacity *with* an individual's currently available treatment interventions (e.g. therapeutic drugs) and personal aids is the most appropriate construct. This construct requires clarification on two important issues: the boundary between personal aids and environmental factors, and the specification of the normative environment.

19. On the question of personal aids and treatments, there are certain factors outside the naked individual that many societies commonly understand to improve health states along relevant domains. These include specific classes of drugs that compensate for an individual's health problems, as well as personal aids such as pacemakers, glasses, and hearing aids. For example, an individual may have normal blood pressure if relevant drugs are available and consumed, but high blood pressure without these drugs. We believe that most people would consider the person's health to have changed through the use of the drugs. Some may argue that only those personal aids that directly change a person's physiology should be taken into account. This argument would imply, for instance, that a laser operation to modify the cornea of a vision-impaired individual would improve health, but that provision of contact lenses or glasses would not; similarly, a human hand transplant would improve health, but a bionic hand, no matter how sophisticated, would not. We believe that such distinctions are inappropriate. Drawing the boundary to include those interventions that change physiology and exclude those that substitute or compensate for physiological impairments would omit many health system interventions that are commonly perceived to improve health. Stated another way, defining health too narrowly will mean that many health system interventions such as pacemakers, certain dietary supplements and drugs, contact lenses and glasses, will not result in health improvements, but only in well-being improvements.

20. This issue is closely related to the question of how health domains are defined. For example, if the function for the vision domain relates to "seeing," then it makes no sense to distinguish corneal modification from contact lenses in terms of their health impacts. On the other hand, if the function for the vision domain relates to the refractive properties of the eyeball only, then corneal modification improves health whereas contact lenses do not. We argue that the common-sense notions of health embodied in health system activities in most societies reflect broader domains of human functioning, such as seeing, hearing and mobility, than narrow domains of physiological function. Appealing to common-sense notions of health, a reasonable distinction may be made between interventions that are specific to a person, and those that stay with the environment. Defining the boundary between personal aids and environmental factors in

this way – more broadly than by the physiological criterion – an individual with near vision problems would be understood to gain in health through either a laser operation or the provision of contact lenses or glasses, but not through an increase in the font size of all print in the person's local environment.

21. The distinction proposed here leaves us with personal interventions (drugs, implanted devices, external devices and aids) that improve capacity in a health domain and are available to individuals in the wide range of environments that they are likely to encounter, i.e. interventions that are essentially within individual control rather than environmentally determined. Improvements in domain capacity above a certain threshold are not seen as health improvements. Thus for example, though a car improves mobility, it is above the mobility threshold where improvements are seen as health improvements.

22. Having identified capacity with personal aids as the relevant construct, is it necessary to specify the normative external environment in which capacity is contextualized? No current multidimensional health instrument clearly addresses this issue, though some do specifically address the question of whether difficulty should be assessed with or without aids such as glasses. When considering interview questions concerning difficulty within a given domain such as mobility, it is unclear whether respondents are considering their current environment, or a general facilitating environment consonant with their experience of a range of environments encountered in daily life. It is likely, for example, that when asked whether they have difficulty climbing stair, respondents who live in an environment without stairs, would still consider their capacity to climb a flight of stairs, perhaps from experience or extrapolation. I return to this issue briefly later on.

The boundaries of good health

23. Another issue that needs to be addressed in operationalizing a definition of health is whether all increments and decrements on a domain are understood as improvements and losses of health, respectively, or whether there is some threshold above which increments and decrements are not perceived as changes in a person's health state. For example, should one consider a person with an IQ of 180 as being healthier in the domain of intellectual functioning than another individual with an IQ of 150? Or should one say that the former is not necessarily healthier by virtue of a capacity that exceeds some norm for cognitive excellence? This is of relevance to the construction of measures of population health that are congruent with common notions of health and also common perceptions of the intrinsic value of health (for example, health may be perceived as a basic right or a human right, and societies as having some moral obligation to direct resources towards improvement of health). The concept of a threshold for full health probably accords better with commonly held societal views of health than an allowance for unbounded improvements in domain capacities to be considered as improvements in health. The 'supra-health' levels are perhaps better referred to as talent.

24. Some have argued that the cut-point for full health can be identified purely in biological terms by examining the statistical distribution of functioning in the domain (20). Others have argued that the judgment of whether one individual is healthier than another can only be understood in terms of the ability to realise one's vital goals (21). I would argue that the domain threshold for full health is a normative choice: there is no criterion that would allow us, *a priori*, to choose a particular point on the population distribution of domain capacity as representing the threshold for full health. Further, this normative choice should reflect common perceptions that health is both intrinsically valuable and instrumentally valuable to human beings. In intuitive

terms, the threshold for a particular domain is the level of capacity below which people generally recognize decrements as departures from excellent health.

Combining dimensions in health state valuations

25. We have thus far been discussing conceptualizations of levels within a single domain of health. More complicated conceptually is the problem of comparing overall health levels associated with multi-dimensional health states. If we imagine that an individual's health may be described in terms of a vector of levels on the numerous domains that constitute health, we refer to overall judgments about the health level associated with this health state as *health state valuations*. Health state valuations are measured on a cardinal scale that ranges from zero (for a state equivalent to death) to unity (for a state of ideal health). The mapping between multiple domains of health and health state valuations reflects the relative weights that individuals place on different domains of health, which may include complex interactions between levels on various domains.

26. Concepts and issues in the conceptualization and measurement of health state valuations are addressed in a later session of this meeting. At this stage, we need do no more than recognize that a health state valuation provides a scalar cardinal index of the overall level of health associated with a multidimensional health state, defined in terms of a set of numbers quantifying capacity on each domain scale (e.g. level of mobility, level of self-care, level of affect, level of pain and level of cognition). In this conceptualization, health state valuations pertain strictly to the components of health, not to broader sets of components of well-being, or the contribution of health to well-being.

IV. MEASUREMENT ISSUES

27. Having defined a conceptual framework for quantifying the health of individuals or populations, it is necessary to develop a valid, reliable and comparable way to operationalize the measurement of health. This requires an enumeration of a set of core domains that are necessary and sufficient to describe health states for measurement purposes; methods to measure levels of capacity on each of these domains; and methods for eliciting judgments about overall health levels associated with different multidimensional states, or aggregating across capacity levels on multiple domains.

Which domains to measure

28. During the last three decades, there has been general acceptance of an approach to describing health states of individuals in terms of multiple domains of health, and in developing self-report instruments that seek information on each of these domains. Existing health state measurement instruments have differed considerably in their content, however, in an attempt to arrive at a set of domains that covers the universe of health adequately. They have often combined domains of physiological function with other domains of well-being.

29. The first standardized health state measurement instruments generally focused on capturing the most severe states, particularly among older age groups and individuals living in long-term care institutions. Measures such as the Activities of Daily Living (ADLs) emphasized performance in different areas, for example eating; getting in and out of bed; getting around in the home; and dressing, bathing or using the toilet (22). The levels of performance in these areas were considered to be proximate descriptions of the severity of health states in terms of the level of assistance required by persons in these states.

30. These early instruments were enlarged to apply to a broader group of individuals and included questions covering Instrumental Activities of Daily Living (IADLs), such as heavy housework; light housework; laundry; shopping for groceries; getting around outside the home; traveling; managing money; taking medicine; and telephoning (23). Typically, ADL questions are relevant to the most severe health states because of their focus on basic physical and cognitive functions, while IADL questions provide more sensitive discrimination at less severe levels of health. However, as IADL questions are based on normative roles and activities, the responses are more prone to cultural and gender biases, both within and across populations. As a result, IADL questions may not all be applicable to everyone within populations. For example, in a survey of elderly in four Western Pacific countries, the IADL question "can you prepare your own meals," was only asked to women (24).

31. The second wave of health state measurement instruments were developed with clinical and general populations in mind, and combined self-assessment of descriptions on different dimensions of health and of performance in different activities and roles (1,2, 25, 26). Standardized general health state profiles that have been used internationally by multiple research groups include the Quality of Well-Being Scale (27); the McMaster Health Index (28); the Sickness Impact Profile (29); the Nottingham Health Profile (30); the Health Utilities Index Mark 3 (31); EuroQol Quality of Life Scale (32); Short-Form 36 Health Survey (33); the WHO Disability Assessment Schedule -II or WHODAS-II (34); and the WHO World Health Survey health status module (35).

32. Additional disease -specific health state descriptive instruments that have been developed for use in clinical trials or with individuals receiving specialized treatments (25).

Figure 1. Domains of health included in three health state description instruments

MOS Short-Form 36	Euroqol EQ-6D	WHO World Health Survey
Physical functioning Mental/emotional functioning Physical role Emotional role Social functioning Pain and discomfort Vitality Overall health	Mobility (walking about) Self care (washing and dressing) Usual activities (work, school, housework, family, leisure) Anxiety and depression Pain and discomfort Cognition (memory, concentration, coherence, IQ)	Mobility Self-care Pain and discomfort Cognition Interpersonal activities Vision Sleep and energy Affect

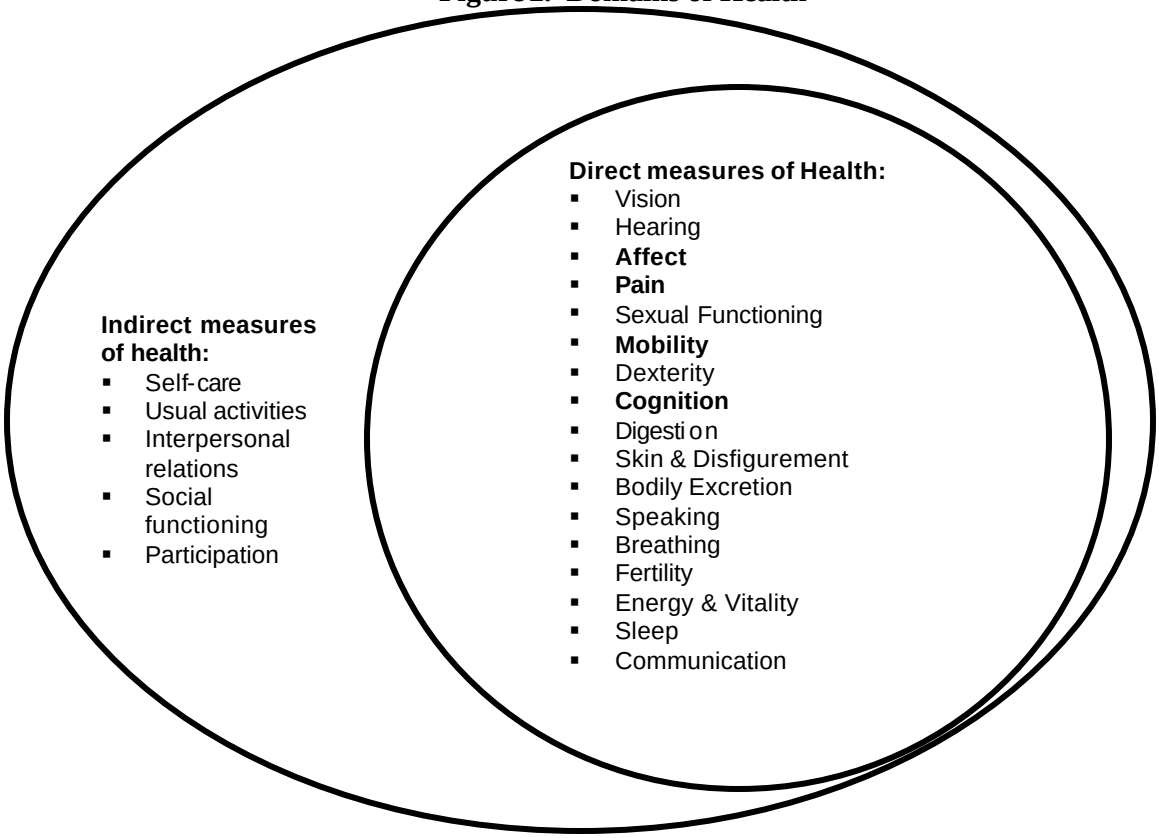
33. The challenge for standardizing health state descriptions is to include all domains considered to be important in terms of societal health goals and in terms of health state valuations. The set of domains used for measurement must be as exhaustive as possible within the practical constraints of data collection mechanisms, as well as generally acceptable as capturing the content of the ordinary meaning of health. At the same time, to reduce respondent burden, we must identify a parsimonious set of domains of health that minimise overlap or redundancy, which occurs if the measured level on one domain can be largely explained by measurement of one or more other domains.

34. We may distinguish three categories of domains that can be considered in the design of a health state descriptive system (Figure 1):

- core domains of health that almost all people agree upon as important to the direct measurement of health (shown in bold)
- additional domains of health that most people agree are direct measures of health, but that might not provide substantial information additional to the core domains
- other domains that are not strictly components of health but serve as good proximate measures of the experience of health (labeled as indirect measures of health)

35. In outlining a conceptual definition of health, we emphasized the distinction between health and the consequences or impacts of a state of health on the well-being or other aspects of the life of an individual, especially if these are mediated through the physical or social environment. While this distinction is critical for conceptual clarity, we note that in some instances the best or only *measurable* phenomena pertaining to levels on some domains may in fact be consequences that are outside the realm of health, a consideration that needs to be kept in mind when operationalizing domains of health. Thus, amongst the domains listed in Figure 2, some of the domains labeled as indirect measures of health, while not strictly defined as components of health, may serve as useful proxy indicators of health in a parsimonious measurement instrument.

Figure 2. Domains of Health



36. Sadana (36) has reviewed the domains included in the commonly used standardized health status assessment instruments, and WHO has undertaken a survey development program to establish a core set of generic domains to describe health states (35). Although most previous health measurement efforts have been led by researchers in North America and Europe, WHO has collaborated with groups throughout the world to develop a generic health measurement module with broad applicability. Selection of domains and key criteria for their selection are addressed later in this meeting.

Measuring performance or capacity

37. Ideally, it would be made explicit in the measurement process whether the quantity of interest is capacity or performance. We have argued above that the relevant construct should be capacity with available personal aids. As an example of the operationalization of this construct, the World Health Survey health measurement module includes the following questions for the domain of vision:

> Q2070. Do you wear glasses or contact lenses?
> (If Respondent says YES to this question, preface the next two questions with "Please answer the following questions taking into account your glasses or contact lenses".)
>
> Q2071. In the last 30 days, how much difficulty did you have in seeing and recognizing a person you know across the road (i.e. from a distance of about 20 meters)? (None/Mild/Moderate/Severe/Extreme or cannot do)
>
> Q2072. In the last 30 days, how much difficulty did you have in seeing and recognizing an object at arm's length or in reading? (None/Mild/Moderate/Severe/Extreme or cannot do)

38. In practice, there may be a high degree of correlation between performance and capacity on some domains, and it may not always be necessary to make these subtle distinctions in self-report questions. For domains comprised of more complex tasks, such as usual activities and self care, it may be more practical to measure performance rather than capacity with or without usual aids.

V. DISCUSSION AND CONCLUSIONS

39. The conceptual framework for health outlined here supports the consensus view that health is more than a matter of the absence of specific disease or injury. It is also the presence of certain threshold levels of ability to carry out physical and mental actions and tasks. In summary,

- **Health** is an attribute of individuals, which is best operationalized as a multidimensional set of domains;
- To obtain meaningful information on health and health interventions, the **boundaries and scope** of health must be defined by identifying a set of core domains of health.
- The **threshold** for loss of health in any given domain reflects societal norms or standards.
- Health state description and measurement must be distinguished from (1) subjective evaluations of health; (2) consequences of health states; and (3) environmental impacts on health and other proximate or distal determinants of health.

40. In keeping with the above conclusions, we propose that for measurement purposes, health be understood as a multidimensional phenomenon that can be sufficiently described by a core set

of health domains, each characterized by a single cardinal scale of capacity (measured or latent, and including currently available personal aids). The overall level of health associated with the set of abilities (or capacities) on the core health domains may be characterized by a cardinal scale of health state valuations. These valuations quantify level of health, not quality of life, well-being or utility.

41. People with the same health, defined in this way, may experience considerable differences in total well-being primarily due to differences in other determinants of well-being (including social, economic, environmental and individual factors) as well as the interaction of their health with other individual or environmental determinants of well-being. We thus distinguish between health itself and the consequences or impacts of a state of health on the well-being or other aspects of the life of an individual, especially if these are mediated through the physical or social environment. For example, an individual, because of cognitive impairments, may be socially isolated, with few friends or other interpersonal relationships. Although the various mental functions required to acquire and maintain relationships are components of health, the lack of relationships is a well-being consequence of a health state, not a loss of health per se.

42. The proposal to focus on cardinal scales of capacity in each health domain may be perceived as taking a "medical model" approach to the conceptualisation of health by restricting attention to "loss of health" rather than positive aspects of health. In fact the cardinal scale for a health domain has no intrinsic directionality – higher values are associated with better health and lower values with lesser health, and these relationships are symmetric. The existence of a normative threshold above which all levels of domain capacity represent full health is an empirical question.

43. There may also be concern that the exclusion of health determinants from the proposed conceptualization of health will direct people's attention to treatment interventions rather than primary prevention interventions, and to pathology rather than broader social and environmental determinants. Given that the proposed definition of health focuses explicitly on the rather than its determinants, whether distal risk factors such as cholesterol and blood pressure or proximal determinants such as disease and injury, it does not privilege interventions that act at any particular level of the causal web. The relationship of both classes of determinants to health states is amenable to empirical study, as long as the measurement of the determinants is not incorporated into or confounded with the measurement of the health states.

44. This conceptualisation preserves the spirit of the WHO Constitution definition: rather than equating health with diseases or diagnostic categories, it recognizes a causal chain through which risk factors are determinants of diseases, and diseases in turn are determinants of health states. Using a parsimonious but comprehensive set of domains as the basis for descriptions of health states allows detailed data collection on key components of individual health and provides a basis for describing and measuring health states. It is worth reiterative that this conceptualization of health is clearly narrower than the concept of well-being, but broader than a restrictive definition of health that concerns only the physiological and mental functioning of the naked individual.

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