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SESSION III: Development and use of health output indicators

**OUTCOME INDICATORS AND QUALITY OF CARE;
THE WHO APPROACH**

Paper submitted by the World Health Organization
Regional Office for Europe*

Foreword

Behind the concept for the creation of the World Health Organization (WHO) were the ethical and moral concerns identified in 1946 as «*huge variations in mortality and morbidity which could not be explained by economic or genetic factors and represented not only health hazards but also a threat to peace*»¹.

Created in 1948, WHO promoted health for all by addressing problems such as management of infectious and communicable diseases, vaccinations, improved water supply and housing. In spite of many successes (e.g. the eradication of smallpox and, in several areas, polio), the health of the world's population did not improve at uniform rates. In an attempt to address the many pressing health needs, the World Health Assembly adopted, in 1977, a strategy of Health for All (HFA), based on and promoting the concept of primary health care.

In 1980, the HFA strategy was adapted to the European region. In 1984, a series of targets and over 200 indicators² for health-related outcomes and health services to be achieved by the year 2000 was endorsed by the European

* Prepared by Kirsten Staehr Johansen, Quality of Care and Technologies.

Member States³. These included specific targets on technology assessment and quality of services, which were seen as increasingly important aspects of any health care system. By 1988, however, HFA indicator monitoring⁴ demonstrated that, in spite of significant progress in the area of technology assessment, it had little or no influence on the quality of health care. The 1991 revision of the HFA targets for the European Region therefore modified Target 31 on quality: *«By the year 2000, there should be structures and processes in all Member States to ensure continuous improvement in the quality of care and appropriate development and use of health technologies.»* The target on technology assessment was replaced by one on health and ethics, stressing accountability to the public.

In 1984, a programme on Quality of Care and Technologies was created to assist European Member States, as well as countries from other WHO regions, in implementing quality assessment and management. As the differences in mortality and morbidity outcomes of non-communicable diseases could not be reduced successfully in the same way as communicable diseases, other systems, indicators and mechanisms were needed. A «top-down» approach alone was not effective and therefore a supplementary «bottom-up» model was developed. Using this model WHO⁵, together with health care authorities and providers, patients, industry and payers, created a series of indicators and data collection tools to improve the quality of health care services.

The concept of quality of care is based on monitoring of health-related and health services outcomes, which, in turn, have as their fundamental component the *quality indicator*, a variable whose value indicates the level or degree of quality. Differing from other methods for evaluating care, indicators, in the form of core data sets, put the patient at the centre as the key to the successful outcome of care and, similarly, addresses resource utilisation. Core data sets or basic information sheets (BIS), are the tools *par excellence* for the collection of data on health status and use of technologies, which can be used to monitor and compare outcome and cost of care, as the basic tool for developing and managing the quality of health care services.

1. Quality of Care and the WHO Approach

1.1 Introduction

The issue of quality of health care is almost as old as human history. The Hippocratic Oath, devised in ancient Greece, is still the cornerstone to quality of care today: *«the doctor shall serve the needs and benefit both patient and community and ensure that treatment does no harm»*. Even further back, about 2 000 BC, the Hammurabi code defined malpractice: *«if the surgeon has caused a man's death, he shall have his forehead cut off»*. However, this punitive approach was rejected by Confucius: *«lead the people by laws and regulate them by penalties and the people will try to keep out of jail but will have no sense of shame»*. Instead, he advocated: *«Lead the people by virtue and restrain them by the rules of decorum, and the people will have a sense of shame and, moreover, will become good»*.

The Concise Oxford Dictionary of Current English⁶ defines **quality as the «degree of excellence»**, which corresponds closely to the definition used by the Phoenicians and the ancient Greeks (Plato with links to ethics - Aristotleⁱ). This has gained wide acceptance^{7 8 9 10 11}, although not as fast as envisaged by Ernest Codman in 1917 when he stated, *«Hospitals, if they wish to be sure of improvement, must find out what their results are, must analyse their resources, [and] compare their results with those of other hospitals.»* In a more modern interpretation, the statement *«It is men and organizations that make the difference when it comes to excellence and competitiveness»* (Michel Godet) is particularly relevant.

1.2 Quality of Care and the National Medical Associations

Quality of health care services is of growing concern to health care authorities, providers, payers and consumers, and considerable efforts have been made over the last decades to achieve improved quality^{12 13 14}. The conscious recognition by health professionals of the *«moral and ethical»* obligations of their profession is evidenced by the European Forum of Medical Associations (EFMA)^{15 16} through their advocacy of a continuous quality of care development policy which recommends that *«...national medical associations should take a leading role in quality of care development with the overall aim of benefiting patient care. [...] QCD [quality of care development] is therefore both an **ethical, educational and a professional responsibility** that is inherent to the independence of the profession. To achieve this NMA's should:»*
promote the professional responsibility for QCD and institute the establishment of internal self-evaluative mechanisms among their members;

ⁱ *«It is unethical not to search for the highest excellence»*

promote the development of strategic quality markers by the individual specialties, including consideration of the personal experience of patients;

institute external quality initiatives. External quality evaluation should include mechanisms for support, supervision and the establishment of protected comparative databases, retrieved from appropriate recording of patient care data, managed by the profession to ensure that confidentiality for both patient and physician is guaranteed;

disseminate information on best demonstrated practice and promote its constructive application;

acknowledge that, apart from the fact that research is the basis for QCD, there is a need for research on QCD itself.

Aside from these broader societal developments, managing quality is important because:

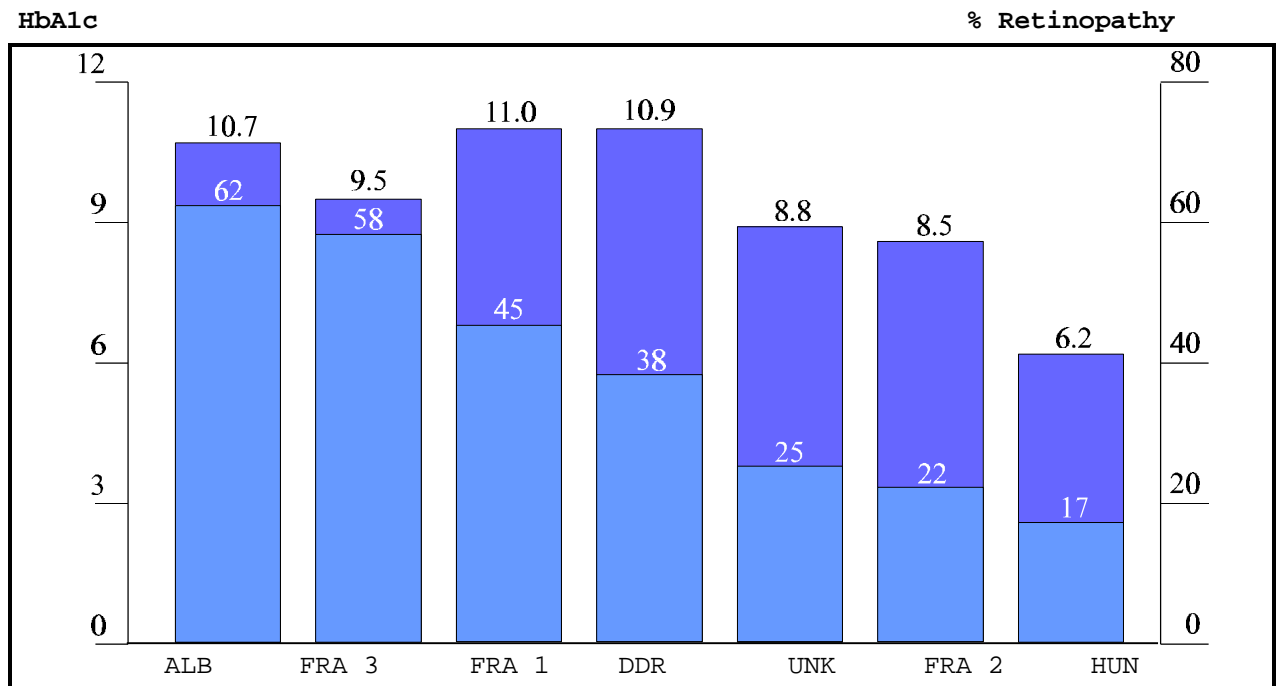
quality of care influences health outcomes which are the ultimate goal of health care provision^{17 18};

poor quality may damage health^{19 20};

quality of care influences the effectiveness of the care provided and the cost of treatment^{21 22 23 24}. As an example, in a follow up to the Diabetes Control and Complication Trial study²⁵, it is estimated that reduction of the mean blood glucose to a near normal level in people with insulin dependant diabetes would result in a gain of 611,000 years for the group of 120,000 persons with IDDM in the United States who meet the DCCT eligibility criteria over a nine-year period²⁶.

variations in quality of care produce variations in outcomes of health contributing to inequities in health outcomes. (see Fig 1)

Figure 1- % Retinopathy vs. HbA1c Mean Value



Metabolic control and retinopathy comparison after 10 years' treatment (pages 34 - 39) ²⁷.

1.3 Quality of Care and WHO

The WHO/EURO Health for All Target 31 reads: «By the year 2000, there should be structures and processes in all Member States to ensure continuous improvement in the quality of care and appropriate development and use of health technologies». The Ljubljana Charter²⁸, adopted by the Member States in the European Region as part of the European Health Care Reforms Conference in July of 1996, article 5.4 of the Fundamental Principles reads: «Focused on quality: any health care reform must have as its aim - and include a clear strategy for - continuous improvement in the quality of the health care delivered, including its cost-effectiveness».

Based on these principles, a model was developed by WHO/EURO, in collaboration with the Member States and a number of professional bodies, which is easily adaptable to any setting and different levels of health care, for any type of disease, condition or health care problem. The model requires relatively few resources although it does need the commitment of health authorities, health care providers, patients, and industry to be successful, as shown by the government-endorsed national policies.

This model covers the following stages: problem identification; situation analysis; setting targets; identification of intervention activities; monitoring and evaluation; and sustainability. For each one of the stages, the use of *indicators* is of crucial importance.

2. Dimensions of Quality and the use of Quality Indicators

2.1 Introduction

Donabedian²⁹ has been widely accepted as a way to conceptualise the main dimensions of quality of care. These include classification of quality into various levels: structure (organisational settings of care), process (health care treatment) and outcome (effects of care), known as *indicators*, which are divided up as follows:

Table 1. Donabedian's Dimensions of Quality of Care

Structure Indicators	Process Indicators	Outcome Indicators
resources	preventive care	health status
personnel	diagnosis	results of care
equipment	therapeutic care	patient wellbeing
facilities/installations	rehabilitation	patient satisfaction
information systems	patient information and education	efficiency of resource utilisation

An *indicator* is defined as a variable or parameter which can measure changes in a phenomenon directly or indirectly, in a valid, objective, sensitive and specific way.

2.2 Development of indicators

Indicators are an essential component of all phases of health care: policy-making at the health authority level, and treatment and services at the health care provider level. Development of *indicators* is one of the most significant steps in any quality of care programme, and it is important that those who will primarily be using the *indicators* in their daily work be directly involved in the process.

Quality indicators are variables whose values indicate the level of quality. Ideally, indicators are related to the final (true) outcome but in some cases intermediate indicators of outcome must be employed. Differing from other methods for evaluating care, the use of true outcome indicators, intermediate outcome indicators and validated structure and process indicators, in the form of quality core data sets, puts the patient at the centre as the key to the successful outcome of care.

In the phase of developing quality indicators, it is important that the professional bodies be involved throughout the process, so that there will be agreement on the final selection. Without the support of the professions, the indicators will have little credibility or acceptability. It is easy to see why: if health care providers are to be motivated by their professional pride and satisfaction to improve quality of care, quality indicators will provide the basis of information regarding outcome of care, and providers must see these as relevant, valid and reliable.

In some cases, identifying or defining quality indicators is relatively easy because the literature contains evidence concerning effectiveness of interventions, etc. In other cases, it will be necessary to rely on less validated measures.

Table 2. Examples of Quality Indicators for Quality Core Datasets

Priority Conditions	True Outcome Indicators	Intermediate Outcome Indicators	Process Indicators	Structure Indicators
Perinatal Care	Maternal mortality Intrapartum death Perinatal mortality	Eclampsia Diabetes Bleeding Apgar score Birth asphyxia Pre-term delivery	Caesarean section rate Forceps/vacuum Hysterectomy w/in 48 hrs	Maternity Clinic Delivery room Obstetrician Nurse Surgical equipment
Hypertension	Stroke Myocardial infarction Death	Blood pressure Albuminuria	Smoking cessation Compliance with anti-hypertensive treatment	General practitioner Cardiologist
Depression	Suicide	Severity scale	Compliance with anti-depressant treatment	Psychiatrist Psychologist
Diabetes	Blindness Renal failure Amputations Myocardial infarction, stroke	Hb A1c Retinopathy Microalbuminuria Foot ulcers Angina pectoris, by-pass surgery	Blood glucose monitoring Proliferative retinopathy treated with photo-coagulation Compliance with anti-hypertensive treatment Education on foot care Blood pressure monitoring, blood pressure therapy, smoking cessation	Endocrinologist Ophthalmologist Laser Dialysis equipment Chiropodist

Table 2 provides examples of quality indicators (true, intermediate, process and structure) developed for a number of diseases and conditions and which are part of core quality datasets, which provide the tools for data

collection, making possible the exchange of information on outcomes through standardised benchmarks and, in consequence, identification, dissemination and sharing of «best practices». Quality indicators can also be common to various core data sets (e.g. *wellbeing* quality indicators are included in the core data sets for diabetes mellitus, and *diabetes indicators* are in the obstetric core data set).

Based on this concept, and to enable the evaluation and monitoring of the results of health care, a number of different sets of *indicators* have been developed; for oral health in 1969, the World Health Organization and the Fédération Dentaire Internationale (WHO/FDI) agreed upon a basic outcome indicator (the number of decayed, missing, filled teeth = DMFT). In 1981, WHO/FDI set up national goals for oral health for the year 2000³⁰, covering the following target age groups: 5-6 years old, 12 years old, 35-44 years old and 65 years old and over. Thirty-five European Member States have actually set up national programmes in oral health, and a number of these have reported achieving the target of ≤ 3 DMFT at age 12³¹ (Albania, Bulgaria, Belgium, the Czech Republic, Denmark, Finland, France, Iceland, Ireland, Italy, the Netherlands, Norway, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom).

Updated WHO/FDI goals are now being proposed for **oral health** in Europe by the year 2020; the indicator used to measure progress - DMFT at age 12 - will read: *no more than 1.5, of which at 1.0 shall be FT* (filled teeth). Similarly, in 1989 at the first meeting of the St Vincent Declaration Action Programme in Diabetes Mellitus, WHO/EURO and the International Diabetes Federation (WHO/IDF) agreed on goals for the management of diabetes care³² (a reduction of 30-50% of new blindness, of renal failure, and limb amputations; cut morbidity and mortality from coronary heart disease, and achieve pregnancy outcomes which approximate that of non-diabetic women). In accordance with these goals, a total of 36 European Member States had national programmes for diabetes mellitus in 1997. One or more of these goals³³ have been achieved at the local, regional or national levels in Belarus, the Czech Republic, Denmark, Finland, France, Germany, Hungary, Iceland, Israel, Italy, the Netherlands, Norway, Lithuania, Poland, the Russian Federation, Spain, Sweden, Switzerland and the United Kingdom³⁴.

This does not mean that it is possible to standardise concepts of care in all settings. Health care management and concepts vary from country to country and even from region to region within countries and indicators need to be adapted to the local situation. However, the basis remains the same no matter what the local conditions: it is a continuous process which works both through «top down» management and, in reverse, «bottom-up» engagement, which, taken together, can lead to continuous quality of care development.

3. Using Quality Indicators in Practice

A model for quality of care should include the following: situation analysis; setting targets; identification of intervention activities; monitoring and evaluation; and sustainability. As was stated above, for each stage the use of *indicators* would be important. Below are examples of how quality *indicators* can and have been used and what can and has been achieved.

High blood glucose levels (as measured by HbA1cⁱⁱ), can lead to acute and/or late complications in **diabetes mellitus** with resulting increase in the cost of treatment and reductions in life expectancy. A study from the Swedish Institute for Health Service Development³⁵ documented significant differences within a single country in the levels of HbA1c, a key *indicator* for management of diabetes.

ⁱⁱ HbA1c is a measure of metabolic control. A score of more than 8% indicates poor control and is associated with increasingly adverse outcomes (e.g., amputations, blindness) as well as increasing health care costs ²⁵.

Figure 2. Quality of Diabetes Care in Sweden.

% of Diabetic Patients with Good Metabolic Control

Percentage of HbA1c < 8%

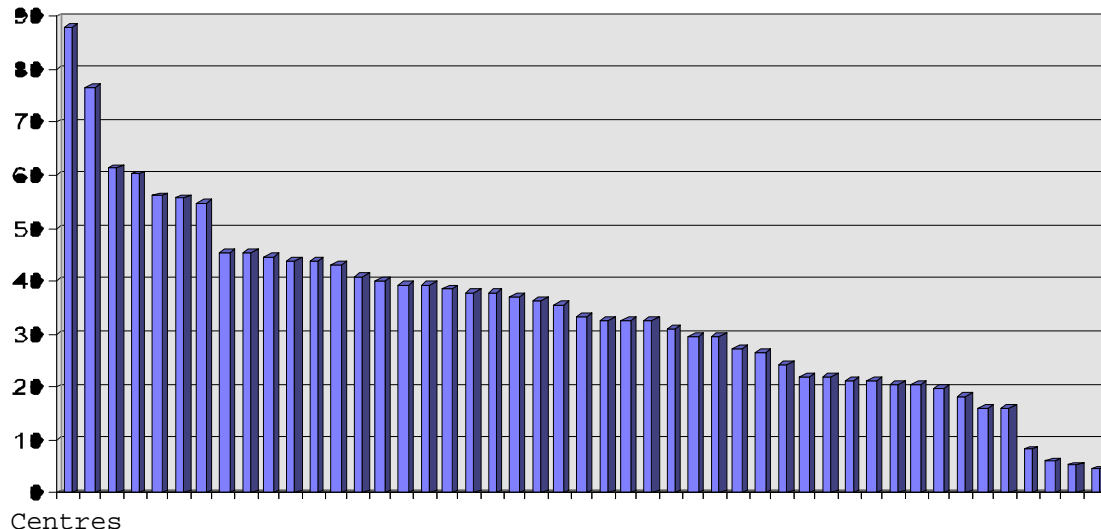


Figure 2 illustrates how the percentage of diabetic patients (in a local health centre) with well controlled diabetes varies from a low of about 5% in some centres to a high of almost 90% in others. This means that in some health centres a very large percentage of diabetics are likely to develop late and/or acute complications, such as blindness, amputations and untimely death, while in other centres the number will be much lower. Thus, the variation in the quality of diabetes care in Sweden results in significantly different health outcomes as well as ineffective use of resources.

Figure 3. Comparison of Metabolic Control in 802 Children with Diabetes in Romania treated by a diabetologist or paediatrician

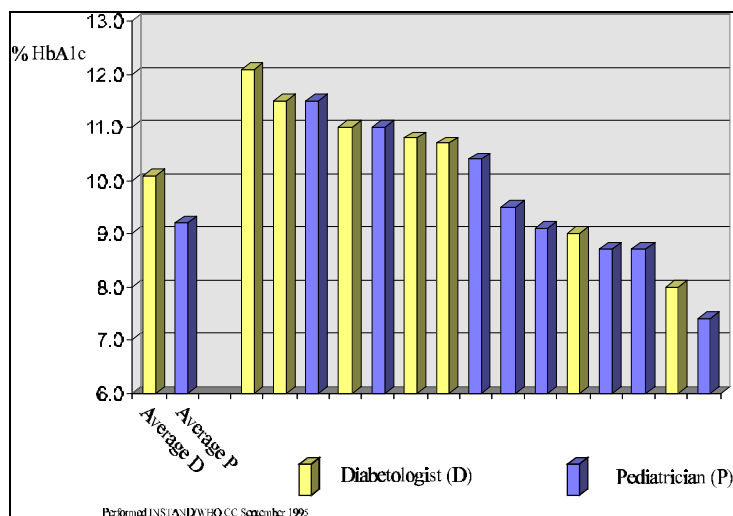
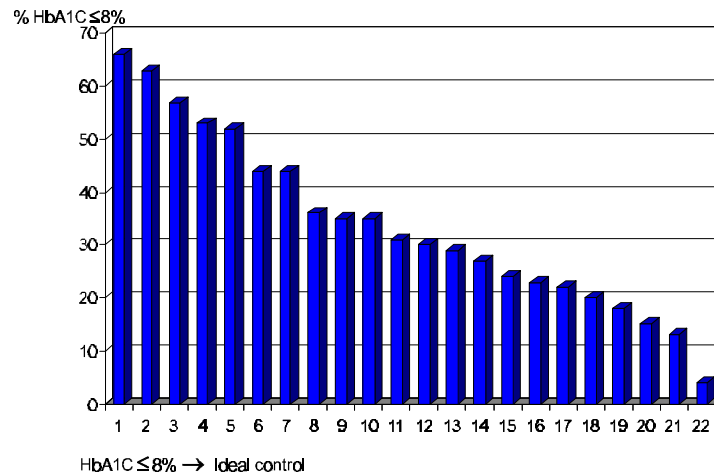


Figure 3 looks at metabolic control of 802 children in Romania also using the indicator HbA1c. The result shows differences in quality, however, these are

not necessarily linked to provider specialty; paediatricians have as good or even better results as diabetologists.

Figure 4. Comparison of Metabolic Control in 2 873 Children with Diabetes Worldwide



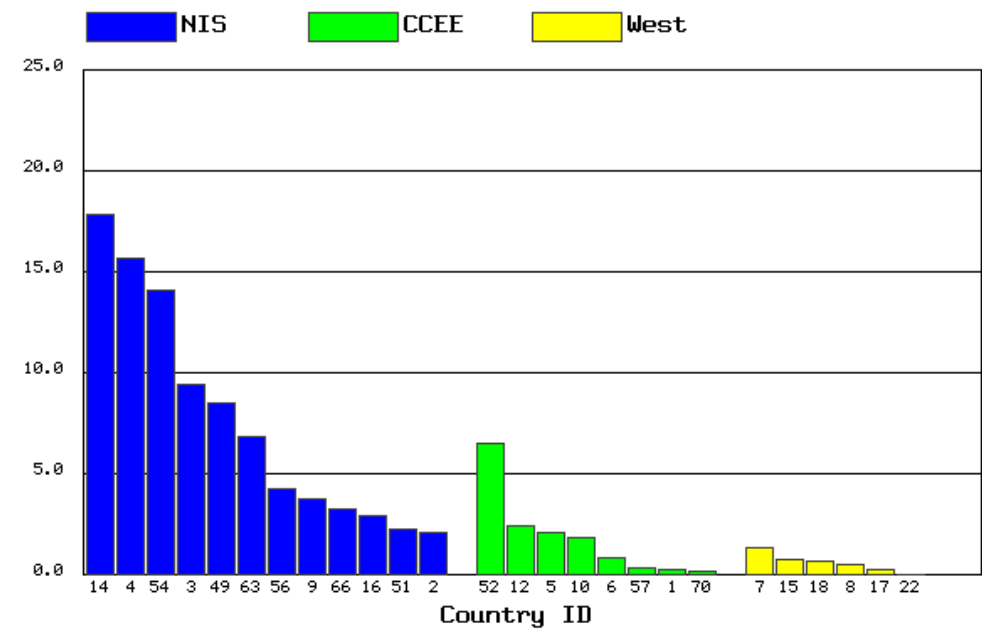
Mortensen et al: *Diabetes Care* 20: 714-720, 1997

As with Fig 2, Fig 3 also shows variation of good metabolic control (HbA1c ≤ 8) of over 2,800 children treated in centres in eighteen countriesⁱⁱⁱ, confirming that differences exist not only within countries and between countries at different economic levels (Fig 2 and 3) but between countries at similar economic levels.

For comparisons to be valid, all HbA1c were analysed at the same laboratory using a standard measurement procedure, and are therefore fully comparable. The same is true of the data in Fig 4.

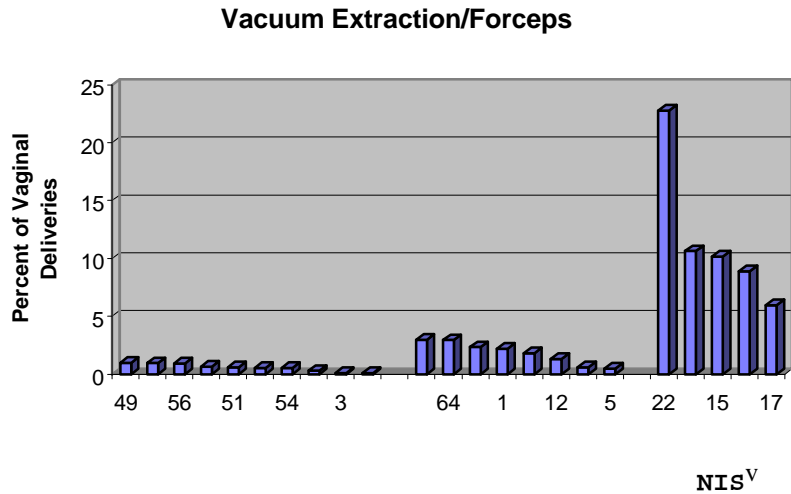
ⁱⁱⁱ Belgium, Canada, Denmark, England, Finland, France, Germany, Ireland, Italy, Japan, Norway, Portugal, Scotland, Spain, Sweden, Switzerland, the Former Yugoslav Republic of Macedonia and United States,

Figure 5. Quality Indicators in Perinatal Care - National Data - Intrapartum



Death^{iv}

Figure 6. Quality Indicators in Perinatal Care - National Data ^{iv}



CCEE^{vi}

WE^{vii}

NIS^v

^{iv} Data source: OBSQID database on <http://qct.who.dk>

^v Newly Independent States

^{vi} Countries of Central and Eastern Europe

^{vii} Western Europe

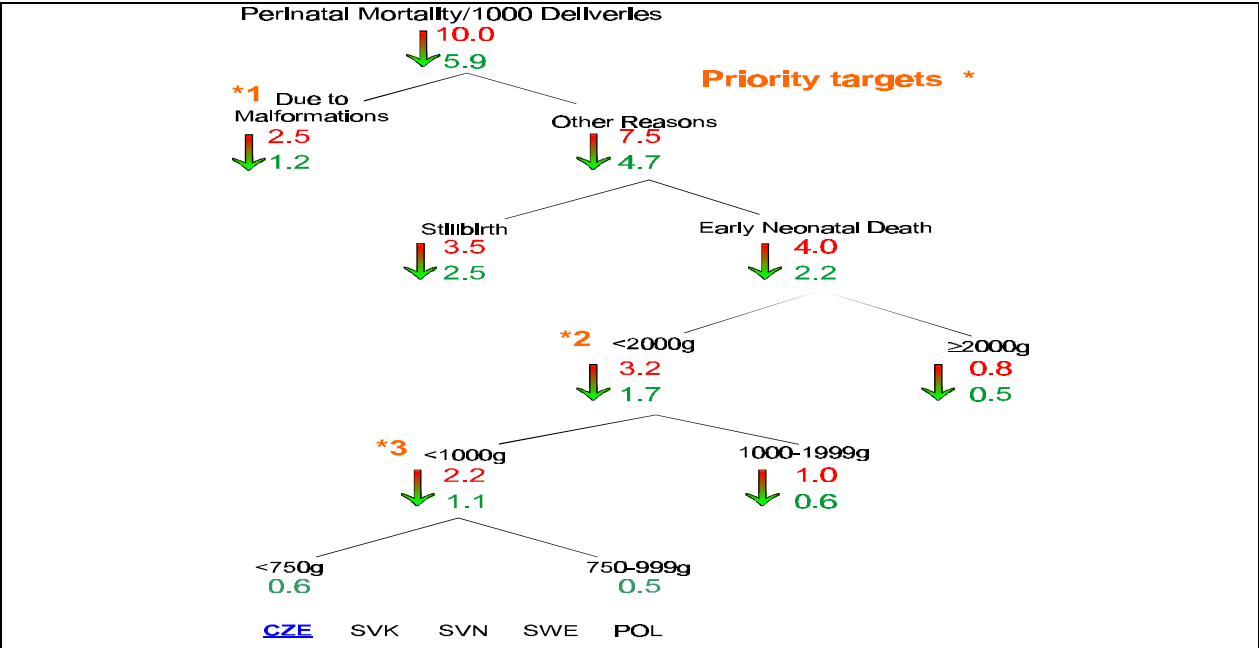
When evaluating quality of care, providers will first look at true outcome indicators; should these indicate negative results of care, it is necessary to look into the process to establish whether a link exists. In Fig. 5 and 6, this is fairly clear: *intrapartum death* (a true outcome indicator) is reflected in the use of *vacuum and forceps extraction* (process indicator). The lower the use of technology (process), the higher the mortality (outcome).

However, there are exceptions: in some countries in Central and Eastern Europe (CEE), although there is lower use of technology, outcome is equal to or even better than that of Western European countries. This points to an improved quality of care not necessarily dependent on either extra resources or use of technology, but on a well functioning QCD infrastructure for quality assurance, management and development.

In the countries of CEE with best results, the procedure has been the following: once situation analysis is complete, health authorities and/or health care providers will select those areas where an intervention programme could form the basis for improving health status of. As an example, Fig. 7 shows target setting for reduction of perinatal mortality. In the case in Fig 7, ³⁶ the first area for intervention was identified as *perinatal mortality*, a true outcome indicator for perinatal care, with a target of a 40% reduction. Analysis showed one cause of perinatal mortality to be *malformations*, which was selected as priority 1 for intervention. Using systematic use of ultrasound to screen for malformation in early pregnancy, mortality was reduced from 2.5 (before intervention) to 1.2 (after).

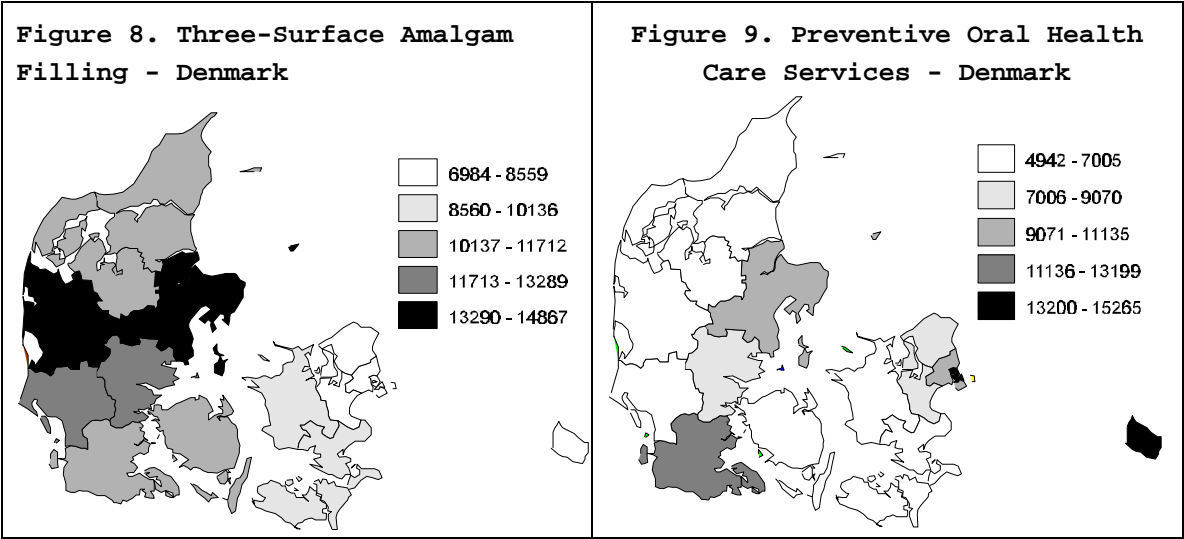
Priority 2 was identified as *early neonatal death*, and it was decided to intervene in the case of infants weighing $\leq 2\ 000$ grams; The solution depended mainly on timely detection of foetuses at risk of e.g. intra-uterine asphyxia. Here, a reduction has been achieved from 3.2 (before intervention) to 1.7 (after). Priority 3 targeted infants of $\leq 1\ 000$ grams, and achieved a reduction from 2.2 (before) to 1.1 (after), due to an improvement in the quality of care for newborns in this weight category.

Figure 7. Example of Quality Development in Perinatal Care



In this instance, it is clear that interventions should be aimed at achievable and realistic targets, taking into consideration the constraints and feasibility identified in the situation analysis. Specialists in other fields can relate some situation or characteristics that to them represents poor quality of care.

4. Use of Indicators for Cost Benefit Analysis



As an example of how *indicators* can be used for cost benefit analysis and decision-making, figures 8 and 9 use two oral health *indicators* in order to show oral health status in Denmark based on a fee-for-service scheme. The services include preventive care and restorative care, and quality of care mechanisms are based on feedback from the database of the National Health

Insurance. The practitioners have established local «quality circles» in order to exchange experiences in relation to outcomes and cost of services delivered. Reductions in traditional curative care services have been observed after an increase in the use of preventive oral services ³⁷ (Fig 9).

Figure 10. Average caries experience in 7-year-olds in Denmark, 1974-1991, based on the number of decayed, missing or filled teeth (DMFT)

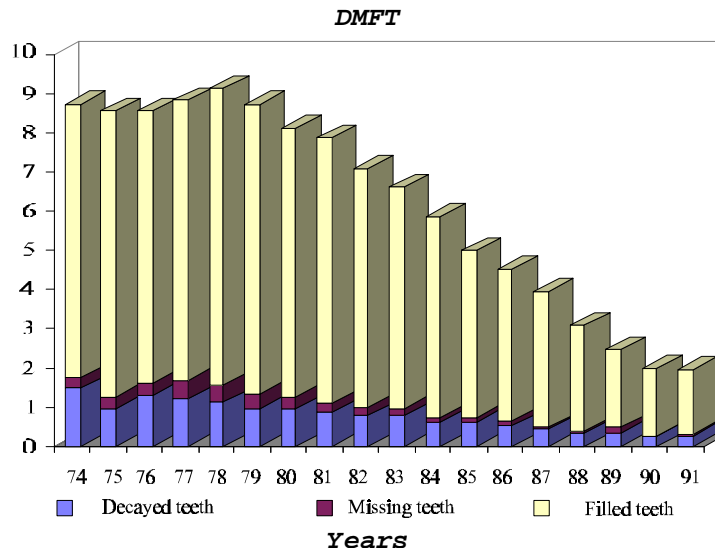


Fig 10 shows that the availability of data is not enough, although the Dental Association was behind the proposal for the monitoring; until the profession itself reacts to the data and starts implementing remedial action, there will be no reduction in outcome.

5. Generic Indicators

Some indicators cut across diseases and conditions, and are known as generic indicators. An example of the inter-relation is shown in Table 3.

Table 3 - Multi- cross-dimensional structure of generic indicators

Wellbeing	Reproductive health	Health of the Elderly	Musculo-Skeletal Disease	Oral Health	Diabetes Mellitus
Reproductive health			Reproductive health	Reproductive health	Reproductive health
	Wellbeing	Wellbeing	Wellbeing	Wellbeing	Wellbeing
Health of the Elderly			Health of the Elderly	Health of the Elderly	Health of the Elderly
Musculo-Skeletal Disease	Musculo-Skeletal Disease	Musculo-Skeletal Disease		Musculo-Skeletal Disease	Musculo-Skeletal Disease
Oral Health	Oral Health	Oral Health	Oral Health		Oral Health
Diabetes Mellitus	Diabetes Mellitus	Diabetes Mellitus	Diabetes Mellitus	Diabetes Mellitus	

6. Conclusion

The purpose of quality of care activities is to achieve continuous improvement. A health care provider will not be content with the status quo if his or her outcomes are inferior to those of peers. It is therefore essential that accurate feedback on his or her performance is available at regular intervals using standard or common quality *indicators* for comparison purposes.

Quality in health care begins with the knowledge of the patient's outcome and the conscious responsibility for resource utilization. Quality of care can be described as continuous improvement in four areas:

- on-going improvement, personally and professionally, in a constant upward spiral;
- continuous building of goodwill and positive communications;
- achievement of «win-win» situations for all partners, creating inter-functional teamwork, ensuring cooperation, loyalty and constancy of purpose;
- continuous improvement based on problem-solving around the parties of the quality of care process.

The use of quality *indicators* is fundamental for the achievement of these objectives.

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